SOIL SURVEY OF

Jackson County, Illinois

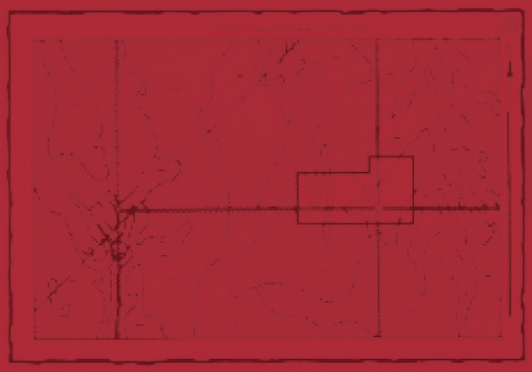
United States Department of Agriculture
Soil Conservation Service and Forest Service
In cooperation with
Illinois Agricultural Experiment Station

HOW TO USE

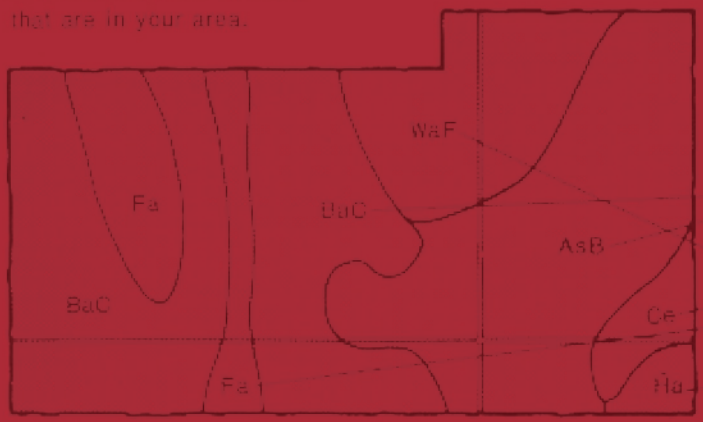
1. Locate your area of interest on the "Index to Map Sheets"

2. Note the number of the map sheet and turn to that sheet.

3. Locate your area of interest on the map sheet.



4. List the map unit symbols that are in your area.



Symbols

AsB
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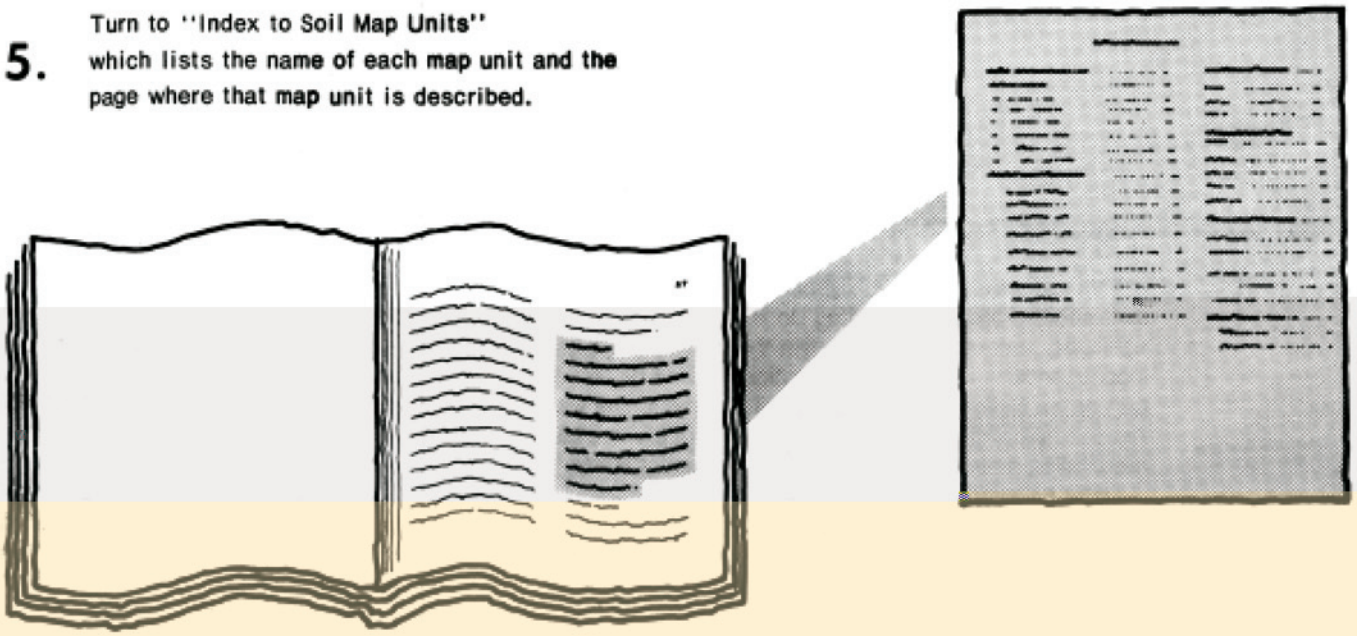
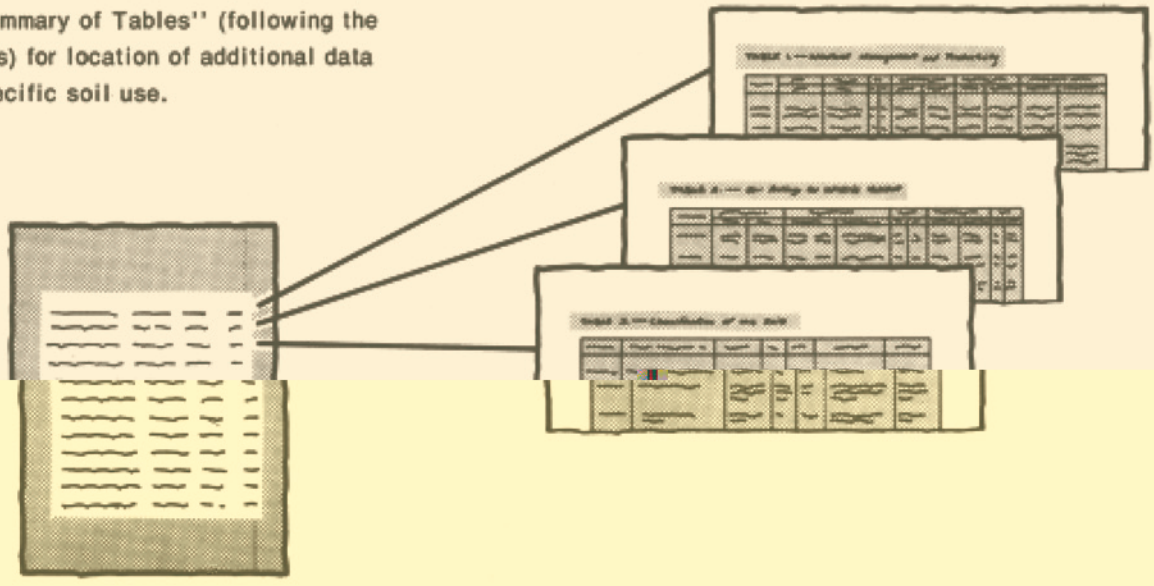
THIS SOIL SURVEY

5. Turn to "Index to Soil Map Units" which lists the name of each map unit and the page where that map unit is described.



6. See "Summary of Tables" (following the Contents) for location of additional data on a specific soil use.

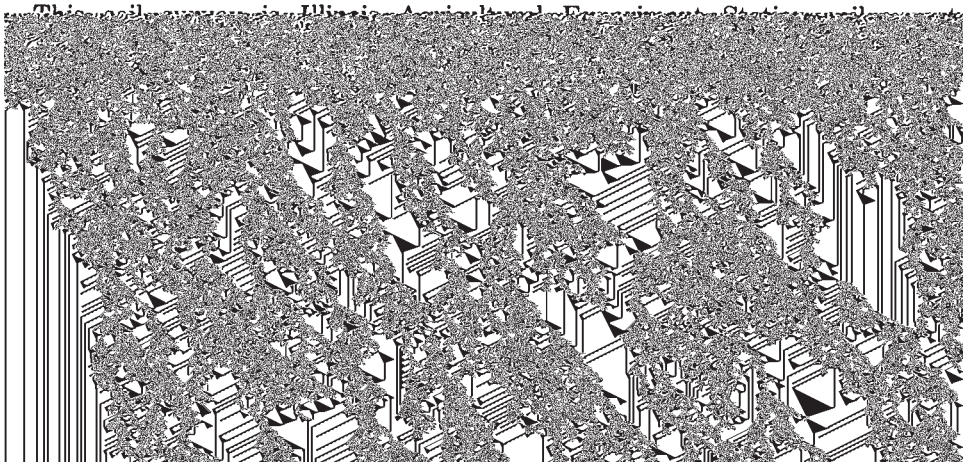


7. Consult "Contents" for parts of the publication that will meet your specific needs. This survey contains useful information for farmers or ranchers, foresters or agronomists; for planners, community decision makers, engineers, developers, builders, or homebuyers; for conservationists, recreationists, teachers, or students; to specialists in wildlife management, waste disposal, or pollution control.

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and state agencies, usually the Agricultural Experiment Stations. In some surveys, other federal and local agencies also contribute. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey. In line with Department of Agriculture policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

Major fieldwork for this soil survey was completed in the period 1969-74. Soil names and descriptions were approved in 1975. Unless otherwise indicated, statements in the publication refer to conditions in the survey area in 1975. This survey was made cooperatively by the Soil Conservation Service, the Forest Service, and the Illinois Agricultural Experiment Station. It is part of the technical assistance furnished to the Jackson County Soil and Water Conservation District. The cost was shared by the Jackson County Board of Supervisors.

Soil maps in this survey may be copied without permission, but any enlargement of these maps can cause misunderstanding of the detail of mapping and result in erroneous interpretations. Enlarged maps do not show small areas of contrasting soils that could have been shown at a larger mapping scale.



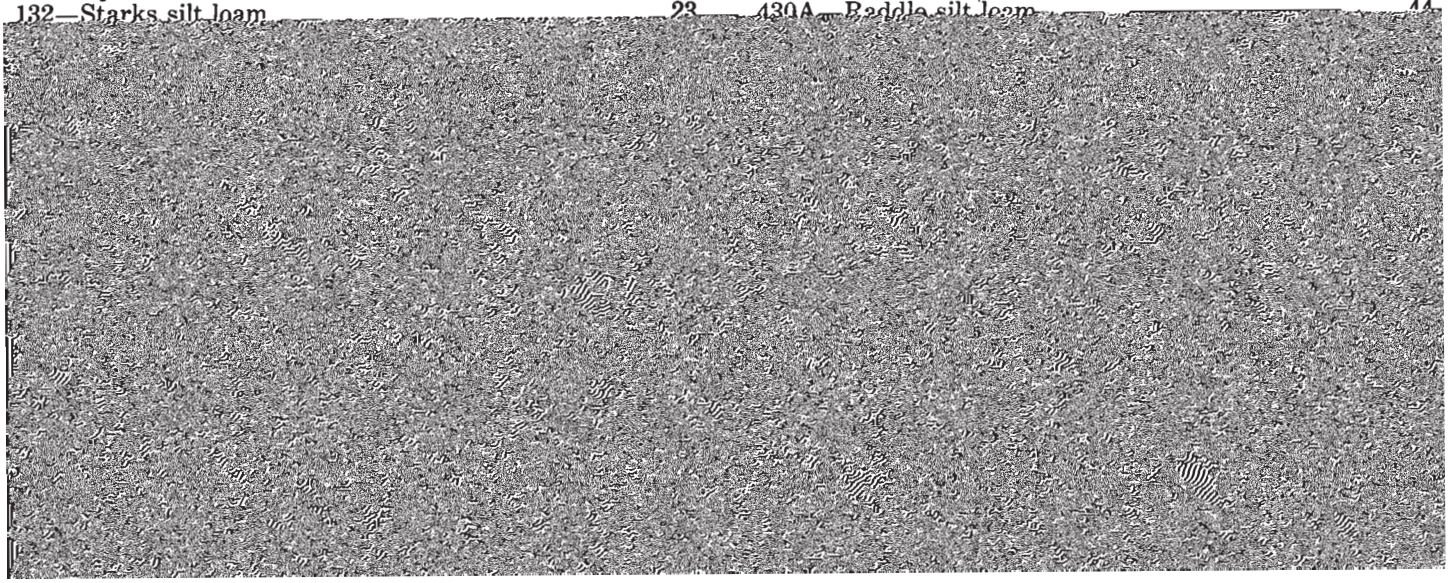
Contents

	Page
Index to soil mapping units	iv
Summary of tables	vi
General nature of the county	1
History and development	1
Relief, physiography, and drainage	1
Climate	2
How this survey was made	2
General soil map for broad land use planning	3
1. Belknap-Wakeland association	3
2. Darwin-Medway-Cairo association	4
3. Jacob-Booker association	4
4. Hurst-Colp-St. Charles association	5
5. Alvin-Camden association	5
6. Bluford-Ava-Wynoose association	6
7. Hosmer association	6
8. Hosmer-Wellston association	6
9. Alford-Wellston association	7
10. Orthents association	7
Soil maps for detailed planning	8
Soil descriptions	8
Use and management of the soils	63
Crops and pasture	64
Yields per acre	66
Capability classes and subclasses	66
Woodland management and productivity	67
Recreation	68
Wildlife habitat	68
Engineering	70
Building site development	70
Sanitary facilities	71
Construction materials	72
Water management	73
Soil properties	73
Engineering properties	74
Physical and chemical properties	74
Soil and water features	75
Test data	76
Formation of the soils	77
Parent material	77
Plant and animal life	77
Topography	78
Climate	78
Time	78
Classification	78
Soil series and morphology	79
Alford series	79
Alvin series	79
Ava series	80
Banlic series	80
Belknap series	81
Birds series	81
Bluford series	81
Bonnie series	82
Booker series	82
Bowdre series	83
Burnside series	83
Cairo series	83
Camden series	84
Coffeen series	84
Colp series	85
Darwin series	85
Dupo series	86
Gorham series	86
Goss series	87
Haymond series	87
Hickory series	87
Hosmer series	88
Hoyleton series	88
Hurst series	89
Jacob series	89
Karnak series	89
Medway series	90
Neotoma series	90
Okaw series	91
Orthents, clayey	91
Orthents, loamy	91
Orthents, silty	91
Piopolis series	92
Racoon series	92
Raddle series	92
Sexton series	93
Starks series	93
Stoy series	94
St. Charles series	94
Wakeland series	95
Ware series	95
Weir series	96
Wellston series	96
Wynoose series	97
References	97
Glossary	97
Illustrations	103
Tables	117

Issued February 1979

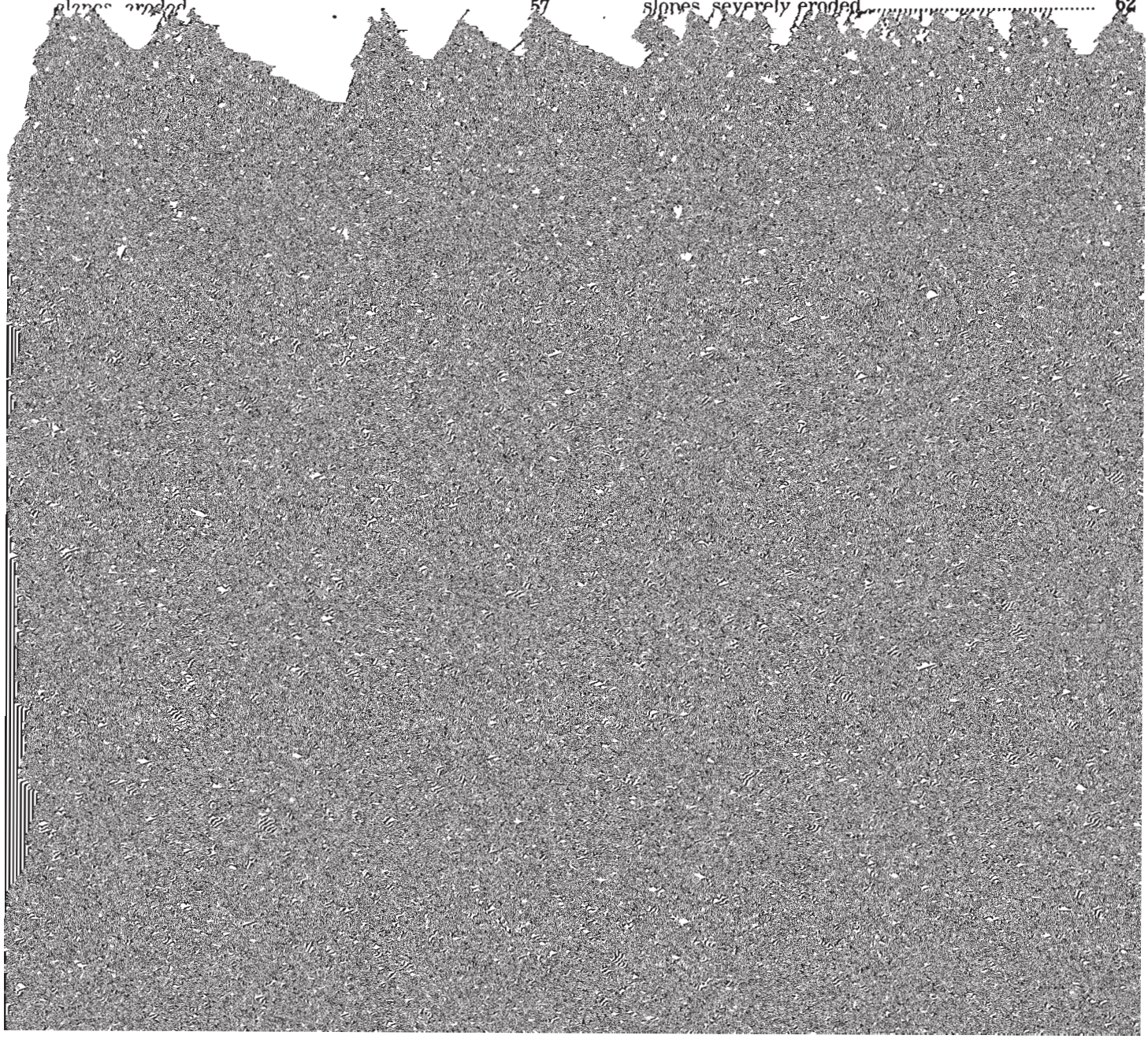
Index to Soil Mapping Units

	Page
3A—Hoyleton silt loam, 0 to 3 percent slopes	8
3B2—Hoyleton silt loam, 3 to 6 percent slopes, eroded	9
8E—Hickory silt loam, 18 to 30 percent slopes	9
8E3—Hickory soils, 15 to 30 percent slopes, severely eroded	10
8G—Hickory silt loam, 30 to 50 percent slopes	10
12—Wynoose silt loam	11
13A—Bluford silt loam, 0 to 2 percent slopes	11
13B—Bluford silt loam, 2 to 4 percent slopes	12
14B—Ava silt loam, 2 to 6 percent slopes	13
14C3—Ava silty clay loam, 6 to 12 percent slopes, severely eroded	13
71—Darwin silty clay	14
71+—Darwin silt loam	14
F71—Darwin silty clay, frequently flooded	15
W71—Darwin silty clay, wet	15
84—Okaw silt loam	16
85—Jacob clay	16
W85—Jacob clay, wet	17
108—Bonnie silt loam	17
109—Racoon silt loam	18
122A—Colp silt loam, 0 to 3 percent slopes	18
122B2—Colp silt loam, 3 to 7 percent slopes, eroded	19
122C2—Colp silt loam, 7 to 12 percent slopes, eroded	19
122C3—Colp silty clay loam, 7 to 15 percent slopes, severely eroded	20
122D—Colp silt loam, 12 to 20 percent slopes	21
131B—Alvin very fine sandy loam, 1 to 7 percent slopes	21
131C3—Alvin loam, 7 to 15 percent slopes, severely eroded	22
131E—Alvin very fine sandy loam, 12 to 25 percent slopes	22
132—Starks silt loam	23
214C2—Hosmer silt loam, 7 to 12 percent slopes, eroded	31
214C3—Hosmer silty clay loam, 7 to 12 percent slopes, severely eroded	31
214D2—Hosmer silt loam, 12 to 18 percent slopes, eroded	32
214D3—Hosmer silty clay loam, 12 to 18 percent slopes, severely eroded	33
243B—St. Charles silt loam, 2 to 7 percent slopes	33
308B2—Alford silt loam, 2 to 6 percent slopes, eroded	34
308C2—Alford silt loam, 6 to 12 percent slopes, eroded	35
308C3—Alford silty clay loam, 6 to 12 percent slopes, severely eroded	35
308D2—Alford silt loam, 12 to 18 percent slopes, eroded	36
308D3—Alford silty clay loam, 12 to 18 percent slopes, severely eroded	37
308E—Alford silt loam, 18 to 30 percent slopes	37
308E3—Alford silty clay loam, 18 to 30 percent slopes, severely eroded	38
308G—Alford silt loam, 30 to 50 percent slopes	38
331—Haymond silt loam	39
333—Wakeland silt loam	39
334—Birds silt loam	40
338A—Hurst silt loam, 0 to 2 percent slopes	40
338B2—Hurst silt loam, 2 to 6 percent slopes, eroded	41
382—Belknap silt loam	41
420—Piopolis silty clay loam	42
W420—Piopolis silty clay loam, wet	42
426—Karnak silty clay	43
427—Burnside silt loam	43
428—Coffeen silt loam	44
430A—Raddle silt loam	44



Index to Soil Mapping Units—continued

	Page
850D3—Hosmer-Hickory complex, 12 to 18 percent slopes, severely eroded	52
850E—Hickory-Hosmer silt loams, 18 to 30 percent slopes	53
850E3—Hickory-Hosmer complex, 18 to 30 percent slopes, severely eroded	54
852E—Alford-Wellston silt loams, 15 to 30 percent slopes	55
852G—Alford-Wellston silt loams, 30 to 50 percent slopes	55
929C3—Ava-Hickory complex, 7 to 12 percent slopes, severely eroded	56
929D2—Hickory-Ava silt loams, 12 to 18 percent slopes, eroded	57
percent slopes	58
977E—Neotoma-Wellston complex, 18 to 30 percent slopes	59
977G—Neotoma-Wellston complex, 30 to 50 percent slopes	59
999D—Alford-Hickory silt loams, 12 to 18 percent slopes	60
999D3—Alford-Hickory complex, 12 to 18 percent slopes, severely eroded	61
999E—Hickory-Alford silt loams, 18 to 30 percent slopes	61
999E3—Hickory-Alford complex, 18 to 30 percent slopes, severely eroded	62



Summary of Tables

Page

Acreage and Proportionate Extent of the Soils (Table 4) 120
Acres. Percent.

Building Site Development (Table 9) 146
Shallow excavations. Dwellings without basements. Dwellings with basements. Small commercial buildings. Local roads and streets.

Classification of the Soils (Table 17) 192
Soil name. Family or higher taxonomic class.

Construction Materials (Table 11) 160
Roadfill. Sand. Gravel. Topsoil.

Engineering Properties and Classifications (Table 13) 171
Depth. USDA texture. Classification—Unified, AASHTO. Fragments more than 3 inches. Percentage passing sieve number—4, 10, 40, 200. Liquid limit. Plasticity index.

Engineering Test Data (Table 16) 190
Soil name and location. Parent material. Illinois report number. Depth. Moisture density. Percentage

Summary of Tables—Continued

Page

Soil and Water Features (Table 15) 186
Hydrologic group. Flooding—Frequency, Duration, Months. High water table—Depth, Kind, Months. Bedrock—Depth, Hardness. Potential frost action.

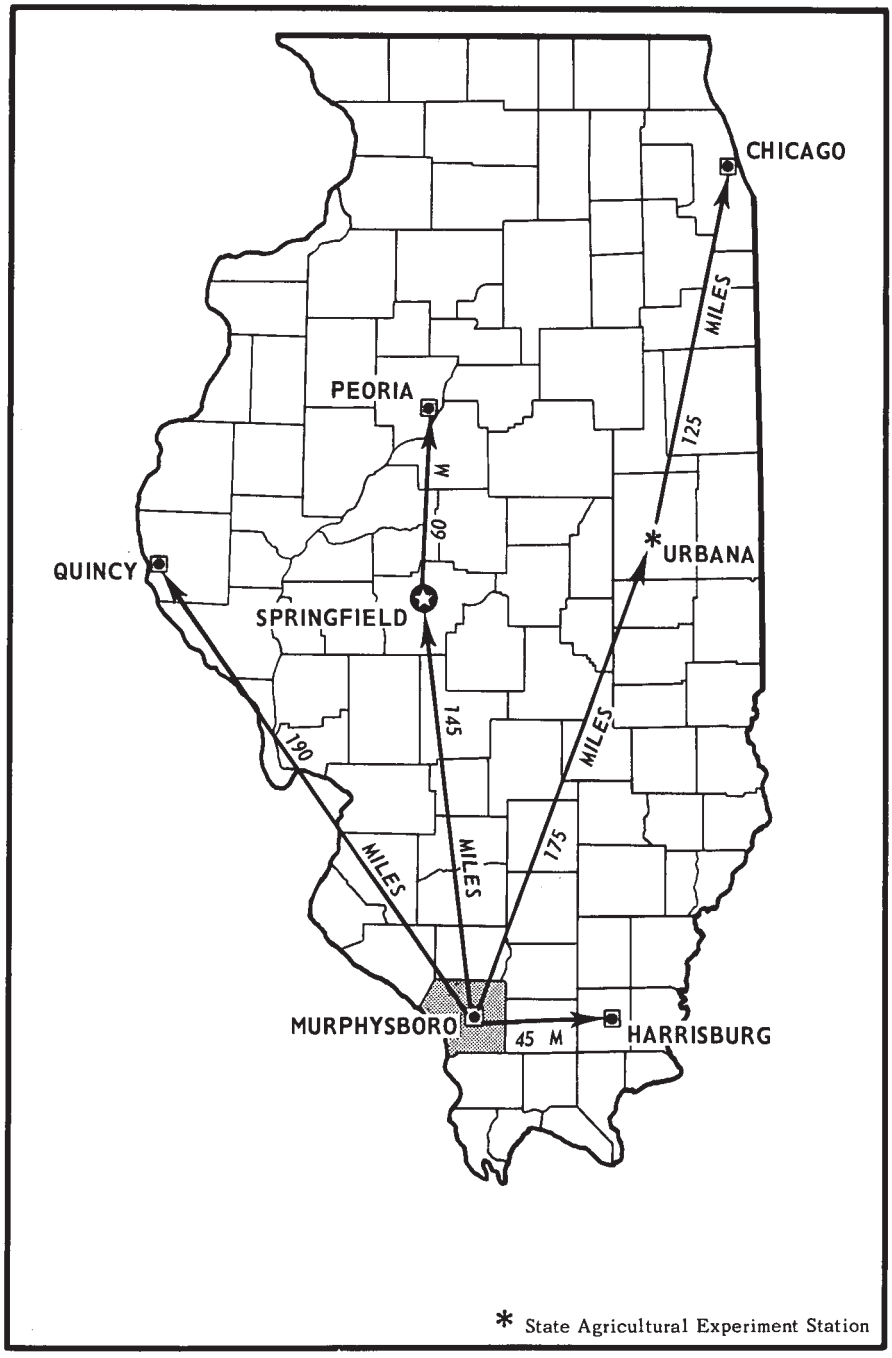
Temperature and Precipitation Data (Table 1) 118
Month. Temperature. Precipitation.

Water Management (Table 12) 166
Pond reservoir areas. Embankments, dikes, and levees. Aquifer-fed excavated ponds. Drainage. Terraces and diversions. Grassed waterways.

Wildlife Habitat Potentials (Table 8) 141
Potential for habitat elements—Grain and seed crops, Grasses and legumes, Wild herbaceous plants, Hardwood trees, Coniferous plants, Wetland plants, Shallow water areas. Potential as habitat for—Openland wildlife, Woodland wildlife, Wetland wildlife.

Woodland Management and Productivity (Table 6) 126
Ordination symbol. Management concerns—Erosion hazard, Equipment limitation, Seedling mortality, Windthrow hazard. Potential productivity—Important trees, Site index. Trees to plant.

Yields Per Acre of Crops and Pasture (Table 5) 122
Corn. Soybeans. Wheat, winter. Oats. Grass-legume hay. Grass-clover.



Location of Jackson County in Illinois.

SOIL SURVEY OF JACKSON COUNTY, ILLINOIS

By R. J. Herman, assisted by C. C. Miles, L. A. Dungan, B. E. Currie, and P. W. Ice, Soil Conservation Service

Soils surveyed by B. E. Currie, L. A. Dungan, R. J. Herman, C. C. Miles, and W. D. Parks, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service and Forest Service, in cooperation with Illinois Agricultural Experiment Station

General Nature of the County

PAUL W. ICE, District Conservationist, Soil Conservation Service, helped prepare this section.

This section gives general information about Jackson County. It describes the history and development of the county, the farming and industry, and the relief and climate.

History and Development

Jackson County, named for Andrew Jackson, is located along the Mississippi River in southern Illinois. It comprises about 605 square miles, or 387,200 acres.

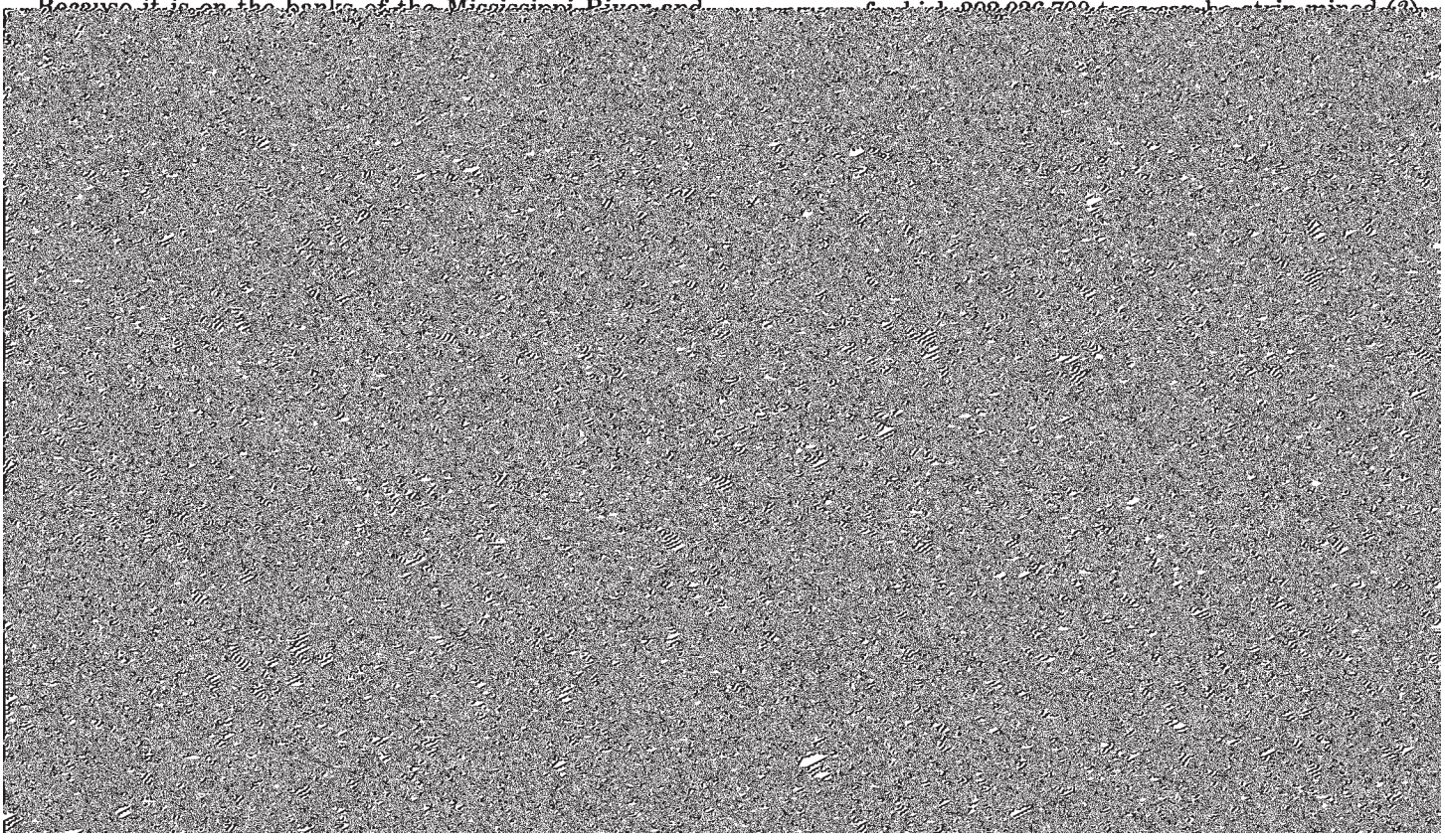
Because it is on the banks of the Mississippi River and

At present there are eleven incorporated towns in the county. Carbondale and Murphysboro, with populations of 22,816 and 10,013, are the two largest towns. The 1970 census showed a total county population of 55,008 (*5*).

Transportation facilities in the county include six state highways, one U.S. highway, two major railroads, and the Southern Illinois Airport, which is between Carbondale and Murphysboro.

The county's economy is well distributed among agriculture, education, government, and industry. With the exception of educational services, wholesale-retail trade is the principal nonagricultural activity.

Mineral resources include coal, limestone, sand, and gravel. Jackson County has about 712,794,000 tons of coal



A wide, fertile flood plain lies between the Mississippi River and the rugged hilly area to the east. Bottom lands along the Mississippi and Big Muddy Rivers are nearly flat and are poorly drained and somewhat poorly drained. Levees along the Mississippi and Big Muddy Rivers protect this area from hazardous river floods, but flooding beyond the levees prevents cropping or damages crops in some years.

Adjacent to the flood plains are rocky bluffs and rough hills that are nearly vertical and occasionally rise more than 200 feet above the floor of the flood plain. These hills enter the northwestern corner of the county and form a band up to 8 miles wide as they approach diagonally to Murphysboro. South of Murphysboro they expand to fill nearly all the southeastern quarter of the county.

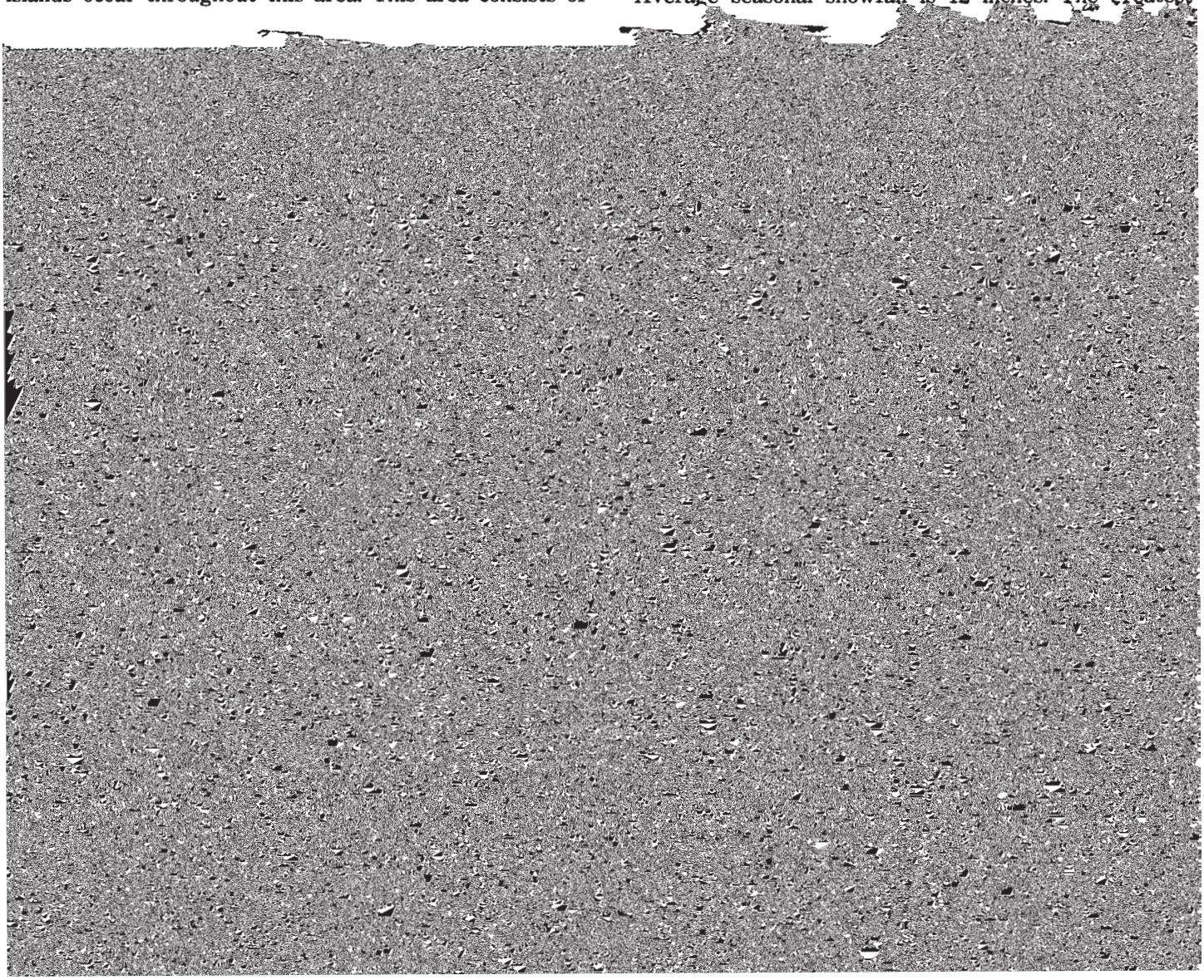
The northeastern quarter of the county is dominantly flat. Most of the area was forested, but a few prairie islands occur throughout this area. This area consists of

the average daily maximum temperature is 89 degrees. The highest recorded temperature, which occurred on July 12, 1966, is 106 degrees.

Growing degree days, shown in table 1, are equivalent to "heat units." Beginning in spring, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

Of the total annual precipitation, 23 inches, or 55 percent, usually falls during the period April through September, which includes the growing season for most crops. In 2 years out of 10, the April-September rainfall is less than 19 inches. The heaviest 1-day rainfall during the period of record was 5.77 inches at Carbondale on May 22, 1957. About 53 thunderstorms occur each year, and about 23 of these occur in summer.

Average seasonal snowfall is 12 inches. The greatest



Soils that have profiles almost alike make up a soil se[illegible]. The general soil map at the back of this publication

Wakeland soils have 0 to 2 percent slopes and are somewhat poorly drained. Typically, the surface layer is brown silt loam about 13 inches thick. The substratum to a depth of about 60 inches is slightly acid to neutral silt loam. It is mainly mottled brownish gray and light brownish gray. Permeability is moderate, and the available water capacity is very high.

Minor soils include Okaw, Bonnie, Banlic, and Piopolis soils. Okaw soils are clayey and occur on benches along the Big Muddy and Little Muddy Rivers and along Beaucoup Creek. Bonnie and Piopolis soils are poorly drained and formed in silt loam and silty clay loam alluvium. Banlic soils are similar to Belknap soils except that they have a fragipan in the lower part of the subsoil and occur mainly on slight rises in the flood plains.

Frequent flooding and seasonal wetness limit the use of the soils in this association. Most areas along the Big Muddy and Little Muddy Rivers and along Beaucoup Creek are wooded, but the higher, open areas of these soils are used for row crops. Soils along streams flowing north or west into the Big Muddy River are used for meadow, row crops, and woodland. Soils along the bluff areas west of the Big Muddy River are used for corn, soybeans, and wheat. If protected and drained, these soils are well suited to intensive cropping. Wetter areas are suitable for development of wetland wildlife habitat. Protection from overflow and drainage of low-lying areas are the main concerns of management.

2. Darwin-Medway-Cairo association

Very poorly drained to somewhat poorly drained soils that formed in water-laid clayey or loamy sediment on the flood plain of the Mississippi River

This association consists mainly of nearly level to sloping soils on broad flats, ridges, and knolls of the Mississippi River bottom land. It extends over approximately 8 percent, or 29,850 acres, of the county. About 34 percent of the association is Darwin soils, 17 percent is Medway soils, 15 percent is Cairo soils, and 34 percent is minor soils (fig. 2).

Darwin soils are on broad, nearly level areas or in depressions. Medway soils are on ridges or knolls along sloughs or overflow channels, and Cairo soils are on low ridges of intermediate terrain.

Darwin soils have 0 to 2 percent slopes and are very poorly drained or poorly drained. Typically, the surface and pale brown very fine sandy loam. Permeability is moderate, and the available water capacity is high.

Cairo soils have 0 to 3 percent slopes and are poorly drained. Typically, the surface layer is very dark grayish brown heavy silty clay about 12 inches thick. The subsoil is about 33 inches thick. The upper part is mainly mottled grayish brown clay and dark grayish brown and dark yellowish brown silty clay. Below this is mainly grayish brown and dark yellowish brown heavy clay loam and loam. The substratum to a depth of about 60 inches is grayish brown loamy very fine sand. Permeability is very slow in the upper part of the subsoil and moderate in the lower part.

Minor soils include Ware, Karnak, Gorham, and Bowdre soils. Ware and Bowdre soils are on ridges and knolls, and Karnak soils are in depressions and on broad flats. Gorham soils are on low ridges on intermediate terrain.

Most areas of this association are used for growing corn, soybeans, grain sorghum, and wheat. These soils are suited to intensive cropping. Overflow from backwaters, drainage of low-lying soils, and tilth of clayey soils are the main concerns of management. Soils that are not protected by the levee are subject to flooding and to cutting and deposition.

3. Jacob-Booker association

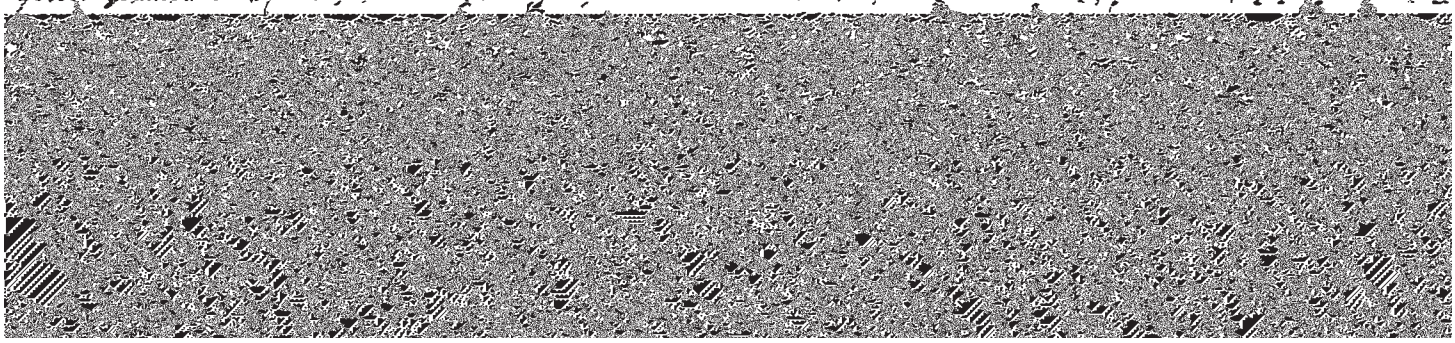
Very poorly drained and poorly drained soils that formed in water-laid, acid clayey sediment on the flood plain of the Mississippi River

This association consists of nearly level to depressional soils on the Mississippi River bottom land just west of the Big Muddy River. The association extends over approximately 6 percent, or 23,100 acres, of the county. About 54 percent of the association is Jacob soils, 29 percent is Booker soils, and 17 percent is minor soils.

Jacob and Booker soils are on broad flats of the Mississippi River bottom land. Most areas of the Booker soils occur in the northwestern part of the association.

Jacob soils have 0 to 2 percent slopes and are very poorly drained or poorly drained. Typically, the surface layer is dark gray clay about 4 inches thick. The subsoil, about 46 inches thick, is gray clay underlain by olive gray clay. The substratum to a depth of about 60 inches is grayish brown clay. Permeability is very slow, and the available water capacity is moderate.

Booker soils have 0 to 2 percent slopes and are very



tion, are suited to soybeans or grain sorghum. The root system of most crop plants is restricted by the clayey, acid soil. Overflow from backwaters, drainage, fertility, and tilth are the main concerns of management. These soils are well suited to the development of wetland wildlife habitat.

Dominantly nearly level to moderately steep soils that formed in water-laid sediment on terraces

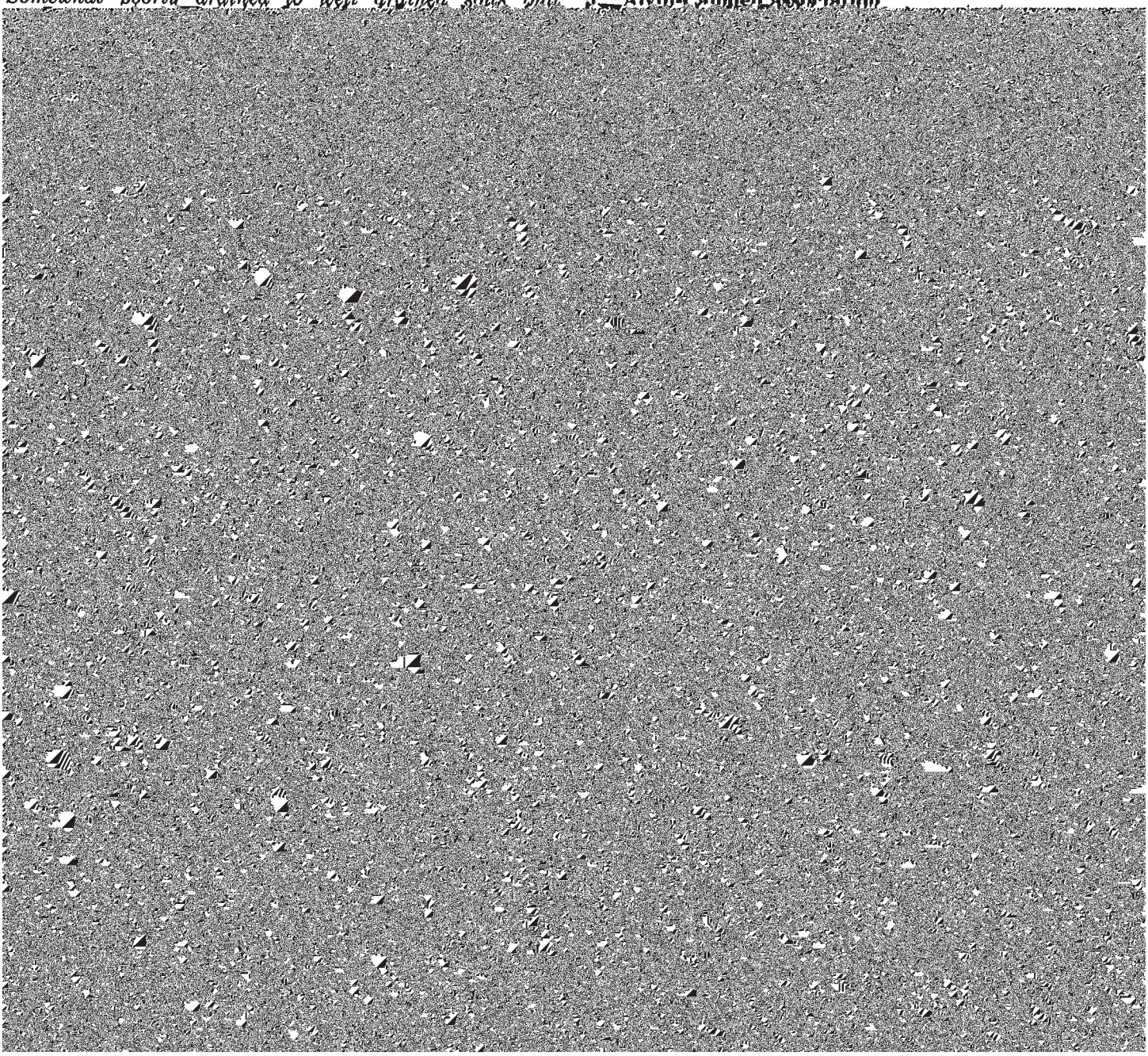
4. Hurst-Colp-St. Charles association

Somewhat poorly drained to well drained soils that

sociated with Hurst soils. Starks, Camden, and Sexton soils occur near terrace breaks along the Big Muddy and Little Muddy Rivers where sediments are more silty. Wakeland soils are on the narrow bottom lands that dissect the terraces.

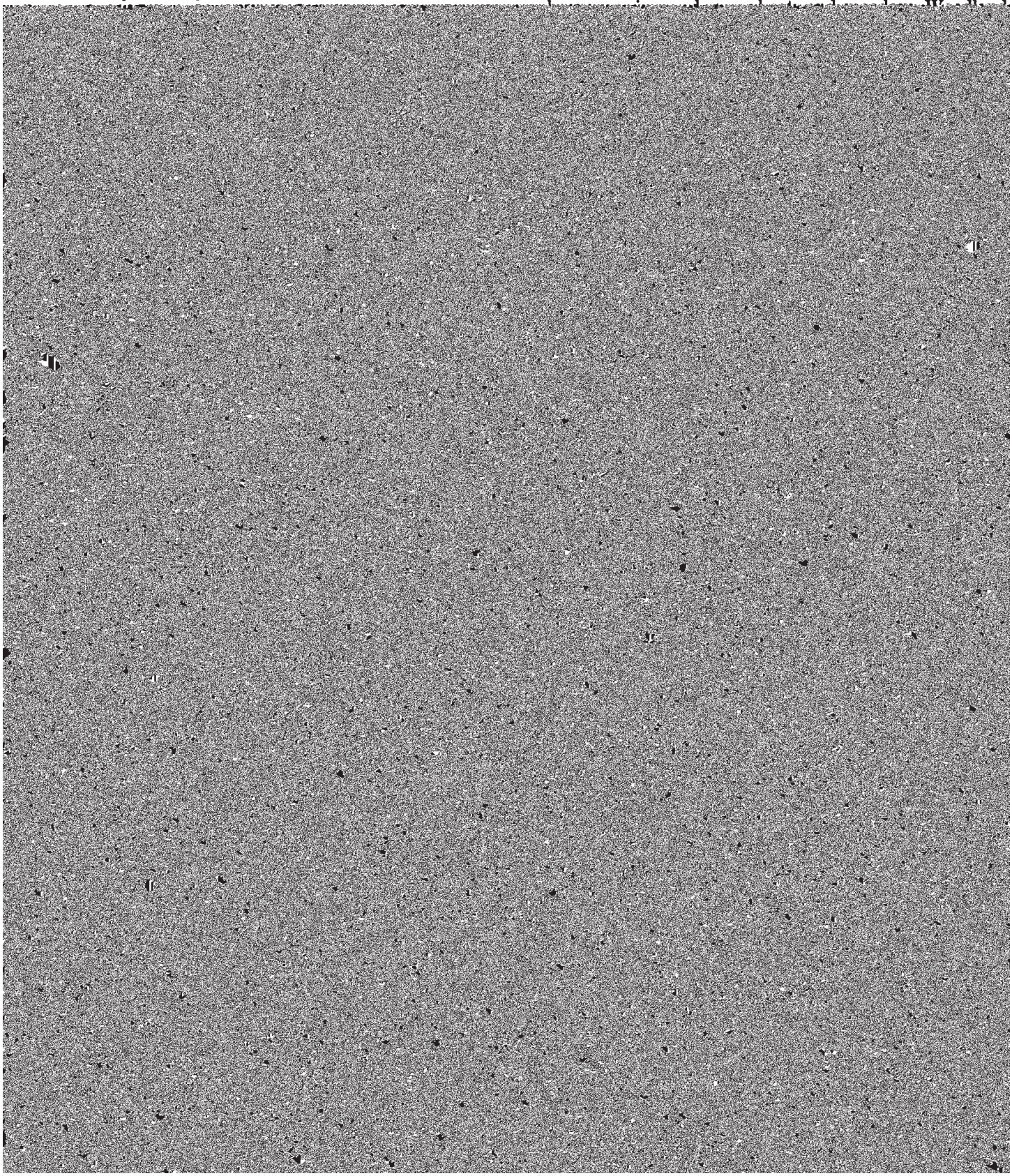
Corn, soybeans, wheat, and some meadow are commonly grown on the soils of this association. Woodland is common on the steeper slopes and on some broad flats. St. Charles soils and the more silty soils are well suited to vegetables. Removing excess water from the nearly level areas and controlling erosion on the more sloping soils are the main concerns of management.

5. Alvin-Camden association



Dominantly nearly level to very steep soils

Soils of this association are used for growing corn,

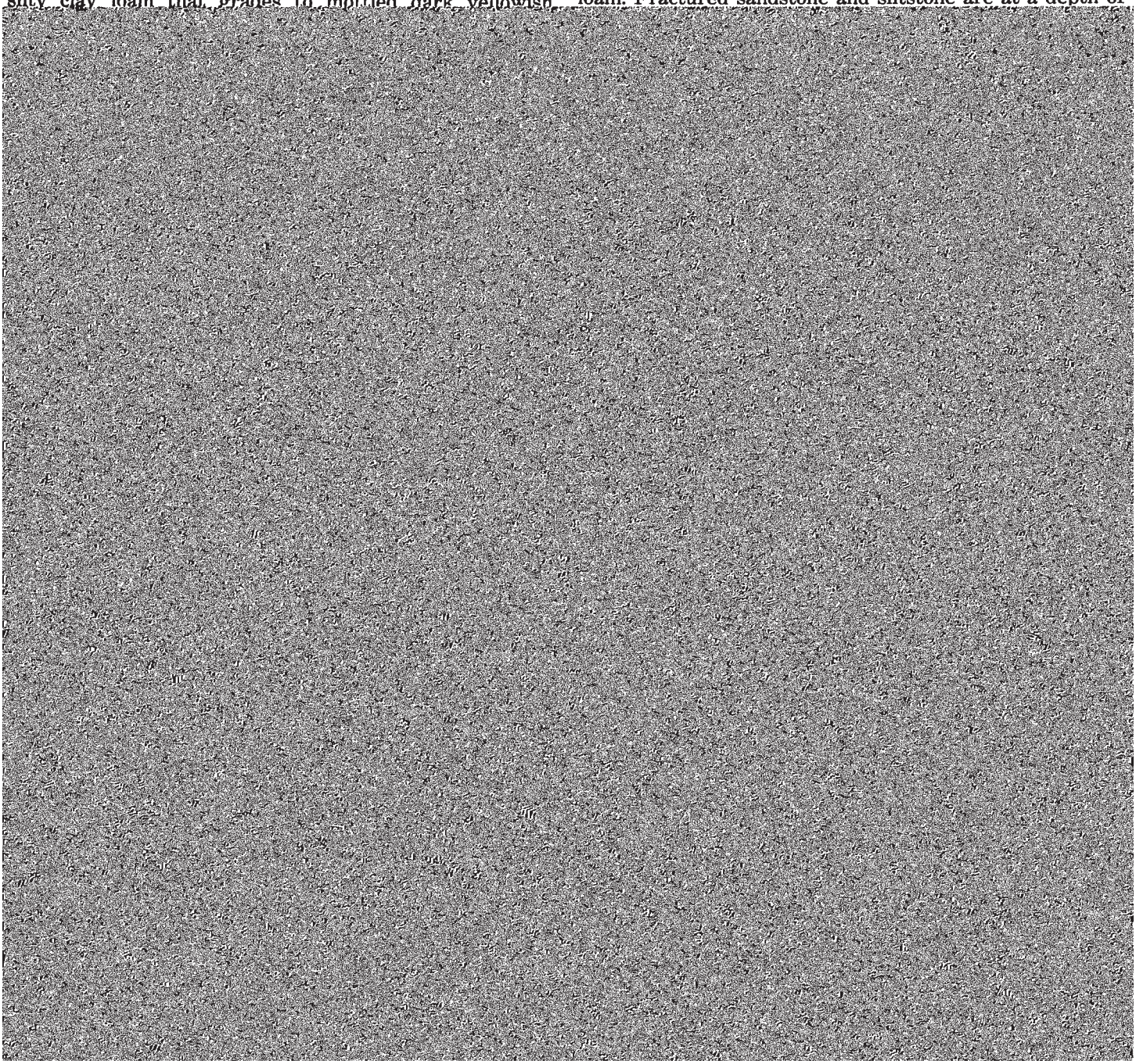


percent of this association is Hosmer soils, 19 percent is Wellston soils, and 25 percent is minor soils.

Hosmer soils are on sloping ridgetops and strongly sloping hillsides. Wellston soils are on strongly sloping to very steep hillsides.

Hosmer soils have slopes of 2 to 18 percent and are moderately well drained. Their surface layer is brown silt loam about 9 inches thick. The subsoil is about 41 inches thick. The upper part is strong brown light silty clay loam that grades to mottled yellowish brown heavy silt loam. The lower part, which contains a very firm, compact zone, is mottled dark yellowish brown and yellowish brown silty clay loam that grades to mottled dark yellowish about 8 inches thick. The subsoil is 58 inches thick. The upper part is strong brown silty clay loam. The lower part is brown silty clay loam that grades to brown heavy silt loam. Permeability is moderate, and the available water capacity is high.

Wellston soils have slopes of 15 to 50 percent and are well drained. Their surface layer is dark grayish brown silt loam about 1 inch thick. The subsurface layer is yellowish brown silt loam about 5 inches thick. The subsoil is about 44 inches thick. The upper part is strong brown heavy silt loam that grades to silty clay loam. The lower part is strong brown heavy silt loam that grades to heavy loam. Fractured sandstone and siltstone are at a depth of



Many of the larger depressions and trenches have filled with water and formed ponds or lakes. Waste material separated from coal has been piled into several mine dumps. Small areas of undisturbed soil are enclosed by the spoil banks.

Most areas of this association are idle and have sparse vegetation of grasses, forbs, and shrubs. The vegetation is generally inadequate for food, nesting, and escape cover for wildlife. A few areas are in woodland or pasture. The less sloping areas are suited to pasture, hayland, and, where stone content is low, to homesites. The ponds or lakes are a possible source of water for irrigation. Erosion and sedimentation, stoniness, and steepness of slopes are the main concerns of management.

Soil Maps for Detailed Planning

The kinds of soil (mapping units) shown on the detailed soil maps at the back of this publication are described in this section. The descriptions together with the soil maps can be useful in determining the potential of a soil and in managing it for food and fiber production; in planning land use and developing soil resources; and in enhancing, protecting, and preserving the environment. More information for each soil is given in the section "Use and Management of the Soils."

Preceding the name of each mapping unit is the symbol that identifies the unit on the detailed soil map. Each mapping unit description includes general facts about the soil and a brief description of the soil profile. In each description, the principal hazards and limitations are indicated and the management concerns and practices needed are discussed.

A soil mapping unit represents an area on the landscape and consists mostly of the soil or soils for which the unit is named. Most of the delineations shown on the detailed soil map at the back of this publication are phases of soil series.

Most mapping units include small, scattered areas of soils other than those that appear in the name of the mapping unit. Some of these soils have properties that differ substantially from those of the dominant soil or soils and thus could significantly affect use and management of the mapping unit. The soils that are included in mapping are recognized in the description of each mapping unit. Some of the more unusual or strongly contrasting soils that are included are identified by a special

properties, limitations, capabilities, and potentials for many soil uses is given for each kind of soil in other tables in this survey. (See "Summary of Tables.") Many of the terms used in describing soils are defined in the Glossary.

Soil Descriptions

3A—Hoyleton silt loam, 0 to 3 percent slopes. This nearly level to very gently sloping, somewhat poorly drained soil is on broad, slightly undulating ridgetops. Individual areas of this soil are rounded or irregular in shape and range from about 5 to 200 acres in size.

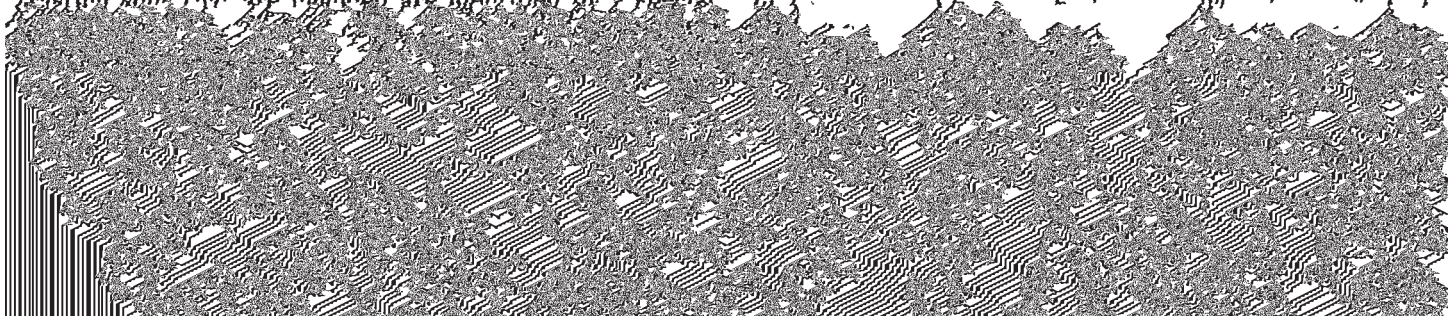
Typically, the surface layer is very dark grayish brown silt loam about 9 inches thick. The subsurface layer is about 10 inches thick. It is pale brown and light yellowish brown silt loam with yellowish red mottles. The subsoil is about 41 inches thick. In the upper 4 inches it is mixed red and brown light silty clay with thick grayish brown films on faces of peds. Below that, it is about 11 inches of mottled grayish brown heavy silty clay loam. Next, it is 12 inches of mottled grayish brown silty clay loam. The lower part of the subsoil, which extends to a depth of 60 inches, is yellowish brown silt loam mottled with light brownish gray. In some areas the surface layer is dark grayish brown.

Included with this soil in mapping are small mine-sink areas and small areas of the poorly drained Wynoose soils. Also included are areas that are mildly alkaline in the lower part of the subsoil. Inclusions make up about 10 percent of this mapping unit.

Water and air move slowly through this soil, and surface runoff in cultivated areas is slow. Reaction ranges from extremely acid in the upper part of the subsoil to neutral in the lower part, and it varies in the surface layer because of local liming practices. The surface layer is friable and easily tilled. Seasonal wetness restricts growth in some years. Organic-matter content is medium, and the available water capacity is high.

Most areas of this soil are farmed. This soil has good potential for cultivated crops, hay, pasture, and trees; fair potential for recreational use; fair to good potential for wildlife habitat and for vegetables and some small fruits; and poor potential for most engineering uses.

This soil is well suited to corn, soybeans, small grain, and grasses and legumes for hay and pasture. Seasonal wetness is the main concern of management, and surface drainage is needed to improve productivity. Shallow



Returning crop residue to the soil or regularly adding other organic material helps improve fertility and increase water intake.

This soil is not well suited to building site development because of the wetness hazard, shrink-swell potential, and frost action. Sewage lagoons will function properly for onsite waste disposal. Excess water can be removed by shallow ditching and proper grading. Footings and footing drain tile should be installed at the proper depth to overcome frost action and wetness problems. Capability subclass IIw; woodland suitability subclass 3o.

3B2—Hoyleton silt loam, 3 to 6 percent slopes, eroded. This gently sloping, somewhat poorly drained soil is on knolls and on side slopes along drainageways. Individual areas of this soil are rounded or elongated and range from about 5 to 150 acres in size.

Typically, the surface layer is 6 inches of very dark grayish brown silt loam with some yellowish brown and yellowish red silty clay loam subsoil intermixed. It ranges from 4 to 8 inches thick. The subsoil is about 40 inches thick. The upper part is mixed yellowish red and grayish brown light silty clay; the middle part is about 20 inches of mixed yellowish brown and gray silty clay loam; and the lower part is mottled, yellowish brown silt loam. The substratum to a depth of about 60 inches is mottled brown silt loam. In some places the surface layer is not mixed with subsoil material and is underlain by a thin

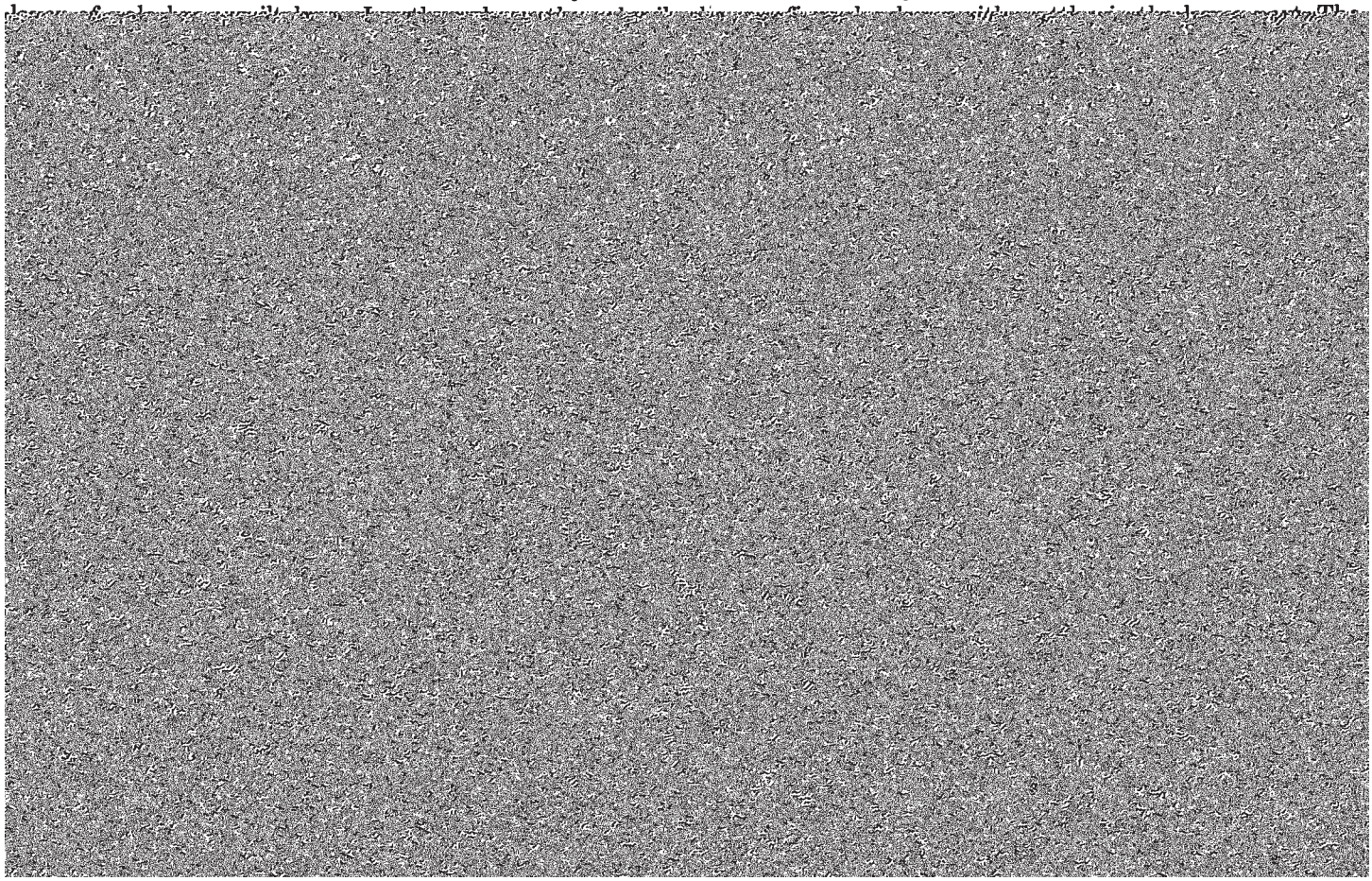
reduced by returning crop residue to the soil or by adding organic material. The effective rooting depth is limited because of increased sodium content in the subsoil, and yields are likely to be reduced because of a lack of water.

Grasses and legumes grow well on this soil and are effective in controlling erosion. Wetness limits the choice of plants, and winter damage by frost heave is likely. Ditches should be used to remove excess water, and plants tolerant to seasonal wetness should be selected to reduce winter damage.

This soil is not well suited to building site development or onsite waste disposal. Seasonal wetness, permeability, and potential frost action limit use. Proper installation of footings and installing footing drain tile reduce wetness and frost heave. Sewage lagoons function satisfactorily in the less sloping areas if properly installed. Capability subclass IIIe; woodland suitability subclass 3o.

8E—Hickory silt loam, 18 to 30 percent slopes. This moderately steep and steep, moderately well drained or well drained soil is on side slopes just above bottom lands or along drainageways near bottom lands. Individual areas vary from irregular to long and narrow in shape, and they range in size from 2 to about 100 acres.

Typically, the surface layer is dark grayish brown silt loam about 2 inches thick, and the subsurface layer is brown silt loam 3 inches thick. The subsoil is about 51 inches thick. It is yellowish brown, strong brown, and pale



on the contour. Steeper areas need to be hand planted because of limitations to use of equipment.

This soil is generally unsuitable for building site fertilizer should be added according to tests. The pasture should be allowed sufficient time to establish, and it should not be overgrazed or grazed when the soil is too

tilization, seeding, mulching, and shaping. Capability subclass VIIe; woodland suitability subclass 1r.

12—Wynoose silt loam. This nearly level, poorly drained soil is on broad drainage divides in the upland till plain area of the county. Individual areas of these "claypan" soils are irregular in shape and range from 2 to several hundred acres in size.

Typically, the surface layer is grayish brown silt loam about 5 inches thick. It has many fine iron-manganese concretions (buckshot). The subsurface layer, 9 inches thick, is light gray and light grayish brown silt loam with yellowish brown mottles. The subsoil is about 44 inches thick. The upper 18 inches of the subsoil is grayish brown silty clay with yellowish brown mottles. The next 26 inches is grayish brown silty clay loam with yellowish brown mottles. In some places the surface layer is very dark grayish brown or dark grayish brown and the upper part of the subsoil has red mottles. The lower part of the subsoil in places has a reaction of neutral or mildly alkaline.

Included with this soil in mapping are small areas of the somewhat poorly drained Bluford and Hoyleton soils. They occupy slightly higher positions on the landscape near slope breaks or narrow finger ridges between lateral drainageways. They make up about 5 percent of the unit. Also included are small depressions or mine sinks, some of which are ponded or remain wetter than the surrounding area.

Water and air move through this soil very slowly, and surface runoff is slow to ponded. Reaction ranges from extremely acid to medium acid in the subsoil and varies widely in the surface layer as a result of local liming practices. The surface layer is friable and easily tilled. Organic-matter content is low, and the surface layer crusts over or puddles after hard rains. Available water capacity is moderate and not sufficient for optimum growth during some growing seasons.

Most areas of this soil are farmed. This soil has fair to good potential for cultivated crops, hay, pasture, and trees; poor potential for recreation uses because of wetness; fair to good potential for wildlife use; and poor potential for most engineering uses.

This soil is suited to trees that can tolerate wetness. The main management problem is controlling competing vegetation. This can be done by site preparation, spraying, cutting, or girdling to eliminate unwanted weeds, brush, or trees.

This soil is well suited to wetland wildlife. Wildlife areas could center around mine-sink areas, some of which pond water for extended periods. Wetland wildlife and wetland plants do well around these and other areas of this soil.

Most engineering uses of this soil are hampered by seasonal wetness, high clay content, high volume change on wetting or drying of upper subsoil material, and very slow permeability. These problems are not easy to overcome, and the soil remains difficult to work. Sewage lagoons and excavated ponds are uses that are well suited to this soil. Capability subclass IIIw; woodland suitability subclass 4w.

13A—Bluford silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on broad, undulating ridgetops or just above the head of drainageways. Individual areas are irregular in shape and range from 2 to about 100 acres in size.

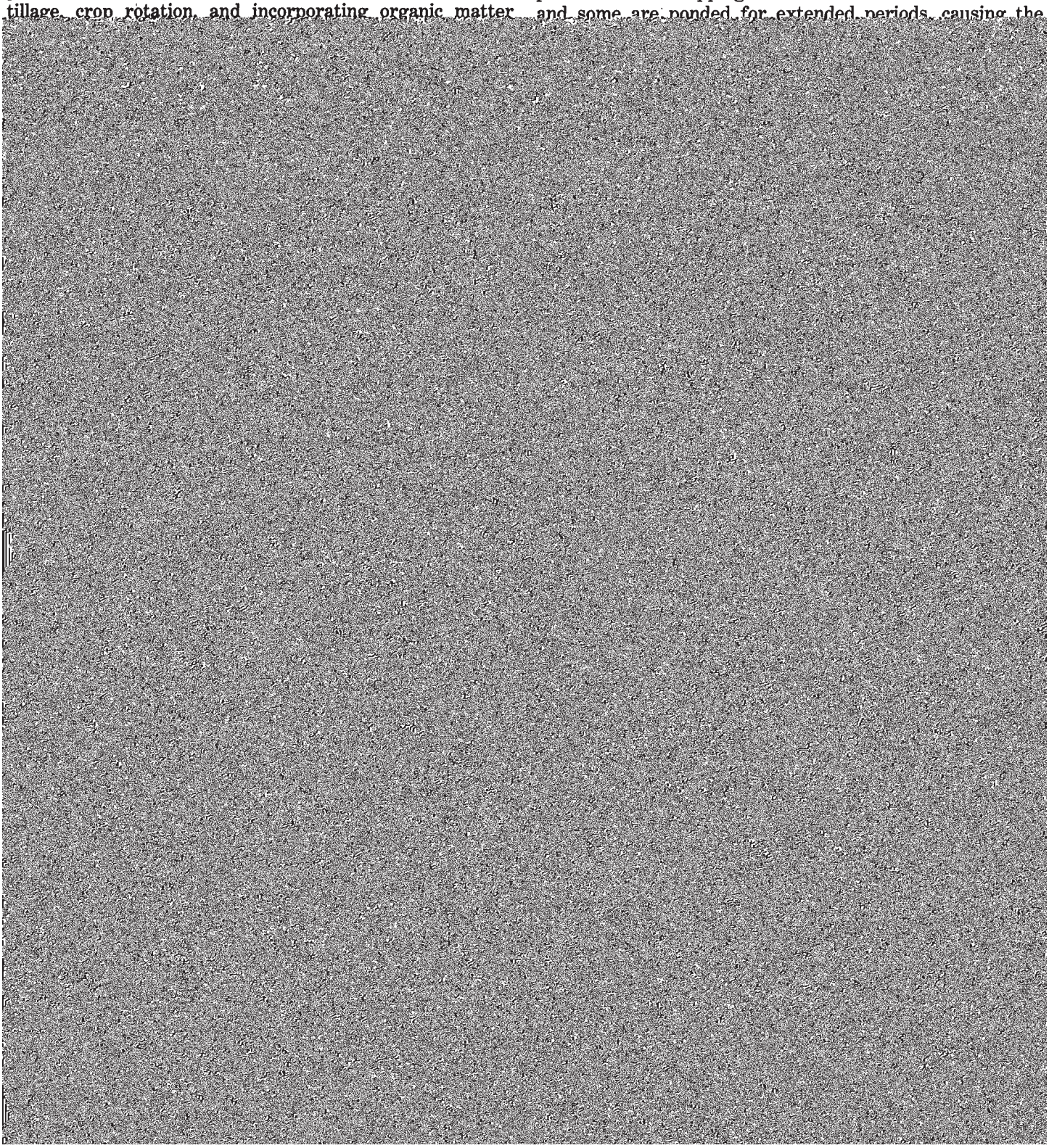
Typically, the surface layer is dark grayish brown silt loam about 8 inches thick. The subsurface layer, about 10 inches thick, is brown and pale brown silt loam with yellowish brown mottles. The subsoil is about 54 inches thick. The upper 11 inches of the subsoil is dark yellowish brown and yellowish brown silty clay loam and silty clay; the next 17 inches is brown and grayish brown silty clay loam with yellowish brown mottles; and the lower 26 inches is brown, firm and slightly brittle silt loam with light brownish gray mottles. In some places the surface layer has not been mixed by plowing and is thinner. Some areas have a neutral reaction in the lower part of the subsoil.

Included with this soil in mapping are small areas of the poorly drained Wynoose soils. They occupy slight depressions on the landscape. Mine sinks are also included and some are ponded for extended periods and cause the surrounding area to remain wet.

Water and air move through this soil at a moderate to slow rate, and surface runoff is slow. Reaction ranges

improve this soil. It can be reduced by shallow surface ditching and land leveling. Crusting and compaction of the surface layer and poor penetration of the subsurface layer by both roots and water are additional management problems. These problems can be reduced by minimum tillage, crop rotation, and incorporating organic matter

surface layer that is difficult to work. Also included are areas of a soil, at the head of drainageways or on side slopes, that has a surface layer, 4 to 8 inches thick, that contains some subsoil material. This soil makes up 2 to 5 percent of this mapping unit. Mine sinks are also included and some are ponded for extended periods, causing the



14B—Ava silt loam, 2 to 6 percent slopes. This gently sloping, moderately well drained soil is on ridgetops, knolls, and short, uneven side slopes along drainageways. Individual areas of this unit are irregular in shape and range from 2 to about 30 acres in size.

Typically, the surface layer is dark brown silt loam about 7 inches thick. It ranges from 5 to 9 inches in thickness over most of the area. The subsoil is about 50 inches thick. The upper part is brownish yellow heavy silt loam about 13 inches thick. The lower part is 3 inches of strong brown light silty clay loam with thick coatings of light gray, 16 inches of mottled yellowish brown silty clay loam grading to mottled strong brown heavy silt loam, 9 inches of firm and dense, mottled strong brown heavy silt loam, and 9 inches of firm and dense, mottled strong brown silt loam. The substratum to a depth of about 68 inches is mottled dark brown silt loam.

Included with this soil in mapping are small areas of somewhat poorly drained Bluford soils at the head of drainageways and on the ridgetops just above drainageways. They make up 5 to 10 percent of this mapping unit. Also included are a few severely eroded areas, a few small areas of poorly drained Wynoose soils, and a few mine sinks.

Water and air move through this soil at a moderately slow rate in the upper part of the subsoil and at a very slow rate in the lower part. Surface runoff is medium. Reaction ranges from strongly acid to extremely acid in the subsoil and varies widely in the surface layer as a result of local liming practices. The surface layer is friable and easily tilled but tends to crust or puddle after hard rains, especially in areas where the plow layer contains subsoil material. Organic-matter content is low. Available water capacity is moderate. Root development is restricted below a depth of about 39 inches by the dense, compact silty material.

Most areas of this soil are farmed. This soil has fair to good potential for cultivated crops, hay, pasture and trees; fair to good potential for most recreation and wildlife uses; and fair to poor potential for most engineering uses.

This soil is suited to corn, soybeans, grain sorghum, small grain, and grass and legumes grown for hay and pasture. If the soil is used for crops, there is a hazard of erosion. Minimum tillage, winter cover crops, crop rotation, and grassed waterways help prevent excessive soil loss. In a few areas slopes are long enough and smooth enough to be terraced or farmed on the contour. Returning crop residue to the surface or regularly adding other organic material helps to improve fertility, reduce crusting, and increase water intake.

The use of the soil for pasture or hay helps in controlling erosion. Proper stocking rates, crop rotation, restricted use during wet periods, and clipping help maintain the pasture and keep the soil in good condition.

This soil is suited to trees, and a few areas remain in native hardwoods. Tree seeds, cuttings, and seedlings survive and grow well if competing vegetation is controlled or removed through proper site preparation, spraying, cutting, or girdling.

This soil is suitable for building site development if proper design and installation procedures are used. These include installing footing drains and placing the footings below the depth of frost action. Very slow permeability in the lower part of the subsoil is a problem for septic-tank absorption fields. The soil is suitable for sewage lagoons if slope is considered in the design. Proper grading and banking of streets and roads help increase stability of slopes and reduce the effects of frost action. The more sloping areas along drainageways provide good water storage sites, but dams must be constructed carefully to increase soil strength. Capability subclass IIe; woodland suitability subclass 2o.

14C3—Ava silty clay loam, 6 to 12 percent slopes, severely eroded. This sloping, moderately well drained soil is on short, uneven side slopes along drainageways. Individual areas of this soil are irregular in shape and range from 2 to about 25 acres in size.

Typically, the surface layer is yellowish brown light silty clay loam about 4 inches thick. It ranges from 2 to about 5 inches thick over most of the area. The subsoil is about 40 inches thick. In the upper 4 inches it is yellowish brown silty clay loam; the next 15 inches is dark brown silty clay loam with grayish brown mottles; and the lower 21 inches is mixed brown and grayish brown silt loam that is firm and brittle. The substratum to a depth of about 60 inches is dark brown and pinkish gray silt loam. In some places that are not severely eroded, the surface layer is dark brown silt loam about 7 inches thick and is mixed with some of the yellowish brown subsoil. In timbered areas, the surface layer is not mixed with the subsoil and is underlain by a subsurface layer about 3 inches thick.

Included with this soil in mapping are small areas, at the head of drainageways, of the somewhat poorly drained Bluford soils and, at the base of some slopes, areas of the moderately well drained Hickory soils. Also included is recent silty colluvial material that washed from the surrounding slopes. Inclusions make up 10 to 15 percent of the acreage.

Water and air move through this soil at a moderately slow rate in the upper part of the subsoil and at a very slow rate in the lower part. Surface runoff is rapid. Reaction ranges from strongly acid to extremely acid and varies widely in the surface layer as a result of local liming practices. The surface layer is firm and difficult to work into an adequate seedbed because it mostly consists of the more clayey subsoil. Clods form if the soil is worked when wet, and the soil crusts or puddles after hard rains. Organic-matter content is very low, and available water capacity is moderate. Root development is restricted below a depth of about 2 feet by dense, compact silty material.

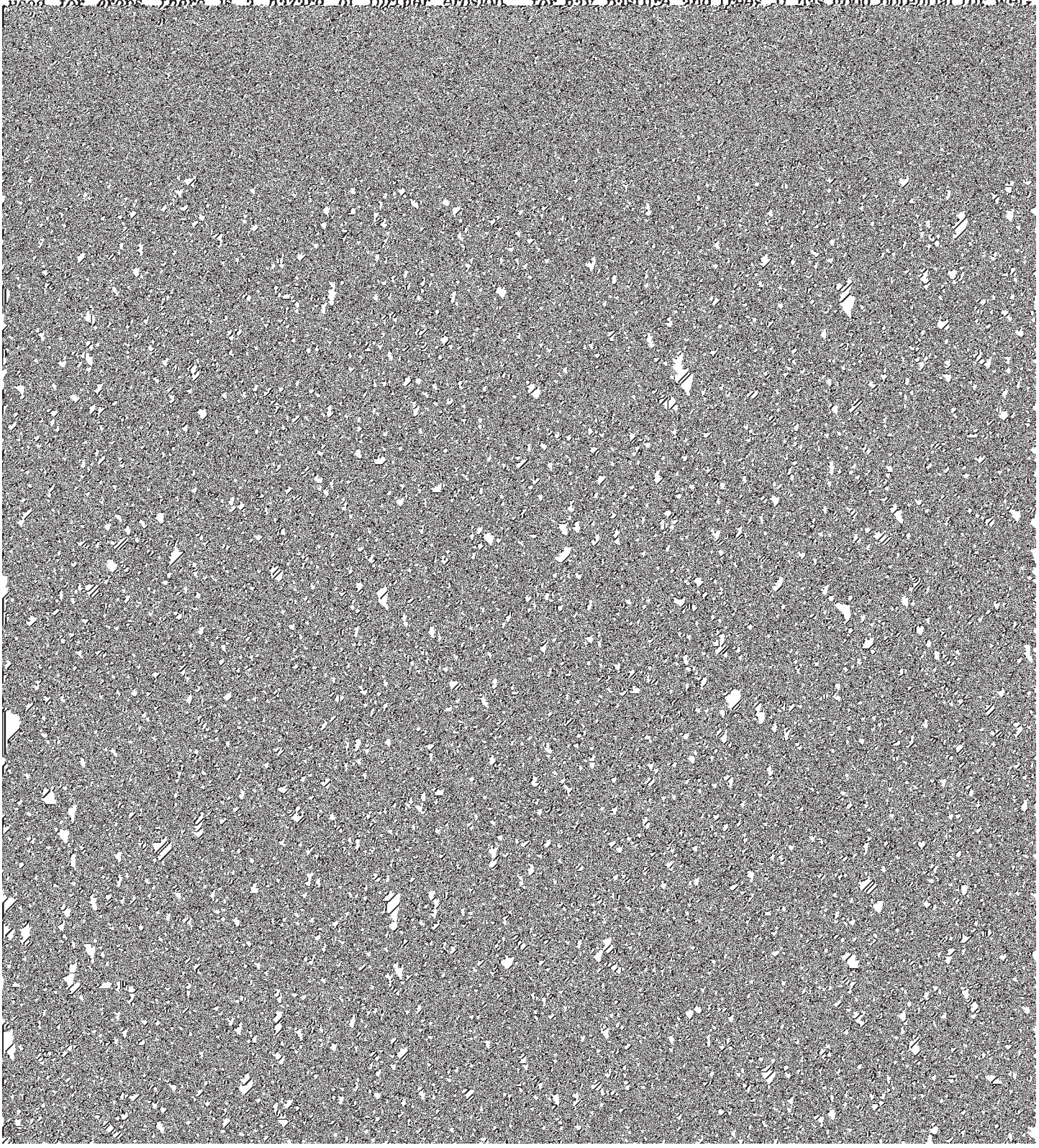
Most areas are farmed. This soil has poor to fair potential for cultivated crops and fair to good potential for hay, pasture, and trees. It has poor to good potential for

recreation uses, fair to good potential for most wildlife uses, and poor to fair potential for most engineering uses.

This soil is suited to cultivated crops and small grain only in rotation with grass and legumes. If this soil is used for crops, there is a hazard of further erosion.

develop during dry periods. In some years, the choice of plants is restricted by overflow.

Most areas of this soil are farmed. This soil has fair potential for cultivated crops and poor to fair potential for hay, pasture, and trees. It has good potential for wet-



Most areas of this soil are farmed. This soil has fair potential for cultivated crops, hay, pasture, and trees. It has poor to fair potential for recreation and wildlife uses and poor potential for most engineering uses.

This soil is suited to corn, soybeans, grain sorghum, small grain, and some specialty crops if wetness is reduced. Shallow ditches at frequent intervals and land leveling are methods commonly used to reduce wetness. Droughtiness caused by deep sandy overwash can be eliminated by land leveling and deep tillage that mixes the sandy and underlying clayey materials. Some of these sandy areas are well suited to melons and early vegetables if they are protected from wind erosion and properly fertilized.

Hay and pasture can be grown on this soil if adequate drainage is provided. Use should be restricted during wet periods to keep pasture and soil in good condition. Wetness-tolerant grasses and legumes should be favored.

This soil has serious limitations for building site development and for onsite waste disposal because of very high shrink-swell potential, very slow permeability, flooding hazard, and the fluctuating water level. Areas with sandy overwash are somewhat better building sites. Footing drain tile should be used to remove "perched" water and reduce the wetness hazard. Capability subclass IIIw; woodland suitability subclass 3w.

F71—Darwin silty clay, frequently flooded. This nearly level, poorly drained or very poorly drained soil is on broad flats and narrow channels primarily on the unprotected side of the levee on the Mississippi River flood plain. A few areas are on the protected side of the levee near old levee breaks. Individual areas of this soil are elongated or irregular in shape and range from 5 to about 500 acres in size.

Typically, the surface layer is very dark gray silty clay about 9 inches thick. The substratum to a depth of about 64 inches is very dark grayish brown silty clay in the upper 9 inches, dark gray light silty clay in the middle 24 inches, and gray and dark grayish brown in layers of very fine sandy loam, loam, and silty clay loam in the lower part. In some places the surface layer is silty clay loam. In other places the substratum is layered, with textures ranging from sand to silty clay.

Included with this soil in mapping are areas of recent sandy overwash and a few areas of soils that have short, steep slopes. Also included are areas of Medway soils, frequently flooded, on low ridges and areas where loamy and sandy sediments make up most of the substratum. Inclusions make up 10 to 15 percent of this unit.

Water and air move through this soil at a slow to very slow rate, and surface runoff is slow to ponded. Reaction ranges from neutral to moderately alkaline, and the subsoil is high, and the surface cracks during dry periods. This soil is flooded frequently and for long periods.

Most areas of this soil are farmed. This soil has poor to fair potential for cultivated crops, hay, pasture, and trees. It has poor potential for recreation uses, good potential for wetland wildlife, and poor potential for most engineering uses.

This soil is suited to corn, soybeans, and grain sorghum. Frequent flooding of this unprotected soil is the main limitation. Flooding often damages or destroys crops growing on this soil and limits the choice of plants in most years. Poor tilth and wetness are additional limitations. Tilth can be improved by reduced tillage and by returning crop residue to the surface. Fall plowing is not recommended because of the hazard of erosion during flooding. Shallow ditches are effective in removing excess surface water from this soil.

This soil is suited to trees, and some areas remain in native hardwoods. Seedling mortality and equipment limitations are problems. The clayey surface soil is difficult to compact around roots and often requires hand planting for best results. Flooding and deposition are likely to cause damage to seedlings and restrict planting or harvesting operations.

Building sites, roads, and onsite waste disposal systems are generally unsuited on this soil because of frequent flooding. In most areas of this soil, overcoming the flooding hazard is not feasible. Capability subclass IVw; woodland suitability subclass 3w.

W71—Darwin silty clay, wet. This nearly level, poorly drained or very poorly drained soil is in low depressions in old channels, in sloughs, and along drainageways. Individual areas of this soil are mostly narrow and elongated in shape and range from 5 to about 200 acres in size.

Typically, the surface layer is very dark gray silty clay about 11 inches thick. The surface layer is normally saturated or water ponds on the surface for extended periods. The subsoil is about 37 inches thick. It is dark gray clay and silty clay with prominent, dark brown mottles. The substratum to a depth of about 60 inches is dark gray silty clay. In some places the dark surface layer is only about 5 inches thick. In other places some part of the subsoil is strongly acid.

Included in mapping are small areas of this Darwin soil that are not so wet. Also included are areas of silt loam or silty clay loam overwash usually at the outer edges where more silty soils adjoin this mapping unit. Inclusions make up about 5 percent of the unit.

Water and air move through this soil at a very slow rate, and water is at or near the surface during the growing season in most years. Reaction ranges from slightly acid to mildly alkaline. This soil is too wet to till in most

Most large areas of this soil are timbered; some are used for pasture. This soil has poor potential for cultivated crops, hay, and pasture and poor to fair potential for trees. It is too wet for recreational use, but has good potential for some wildlife habitat. It has poor potential for engineering uses.

Cultivated crops and hay are not normally suited to this soil because of the extreme wetness hazard (fig. 7). The low position on the landscape and the very slow permeability make this soil difficult to drain. Deep ditches or tile inlets are usually needed.

Some areas are suited to pasture, but the length of their use is limited by wetness. The quality of the pasture is poor because few grass species can tolerate the wetness. Restricted use during wet periods is necessary to keep the pasture and the soil in good condition.

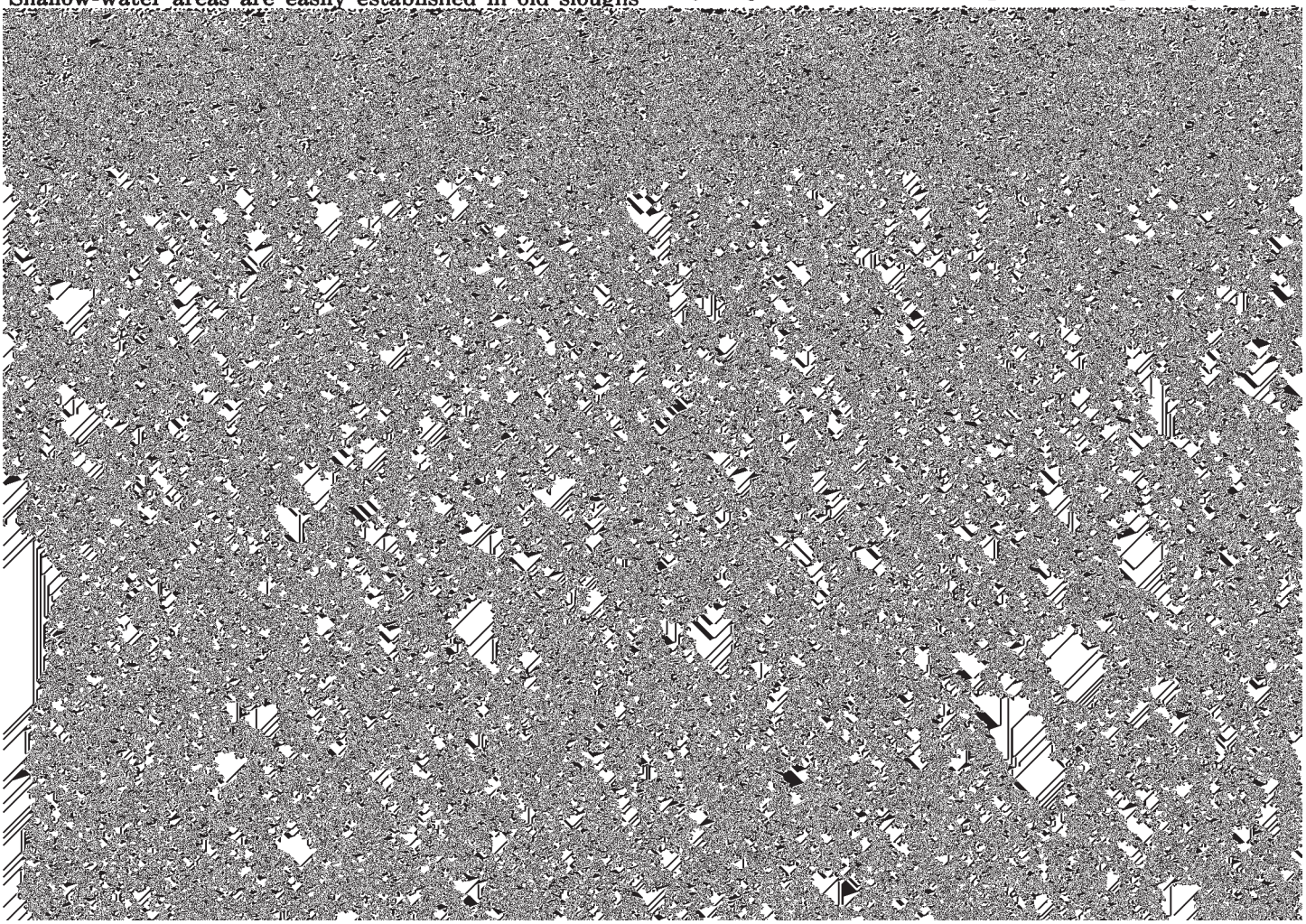
This soil is fairly well suited to trees that tolerate wetness, and most areas remain in native hardwoods. Seedling mortality and equipment limitations are management problems. Hand planting of nursery stock is usually necessary to establish or improve a stand. Machine planting is sometimes possible in dry years.

The best use of this soil is for wetland wildlife habitat. Shallow-water areas are easily established in old sloughs

Water and air move through this soil at a very slow to slow rate, and surface runoff is slow to ponded. Reaction ranges from extremely acid to medium acid in the subsoil and varies widely in the surface layer as a result of local liming practices. The surface layer is friable and easily tilled. It tends to crust or puddle after hard rains. Organic-matter content is low, and available water capacity is moderate. Surface drainage is needed because water "perches" above the clayey subsoil (fig. 8).

Most areas of this soil are farmed. This soil has fair potential for cultivated crops, hay, and pasture. It has poor potential for recreation uses, fair to poor potential for woodland, and poor potential for most engineering uses.

This soil is suited to corn, soybeans, grain sorghum, small grain, and grasses and legumes grown for hay and pasture if adequate surface drainage is provided. Shallow ditching and land leveling will reduce the wetness hazard. Surface crusting and compaction can be reduced by returning crop residue to the soil and by minimum tillage methods. Chisel plowing into the subsurface layer will increase the water intake of this layer. Wetness-tolerant grasses and legumes should be used when planting for hay or pasture. Winter damage of small grain, grass, and



Also included are a few areas that have a silty clay loam surface layer. Inclusions make up about 2 to 5 percent of this unit.

Water and air move through this soil at a very slow rate, and surface runoff is slow to ponded. Reaction ranges from extremely acid to strongly acid. The surface layer is very firm and extremely difficult to till. Clods form if this soil is worked when wet. Organic-matter content is low, and available water capacity is moderate. Root development is restricted in most years by the fluctuating water level. Shrink-swell potential is very high, and wide cracks develop during dry periods. The choice of plants is restricted by flooding in some years.

Most areas of this soil are in woodland; some have been cleared for cultivated crops. This soil has poor to fair potential for cultivated crops and for hay, pasture, and trees. The potential for recreation uses is poor, for wildlife habitat it is fair, and for most engineering uses it is poor.

This soil is suited to grain sorghum, soybeans, and small grain if the wetness hazard and flooding are controlled. Trees should be planted on the contour. Seedlings survive and grow well if competing vegetation is controlled. Equipment limitations, seedling mortality, and plant competition are severe. Trees should be planted in spring when the soil is wet. Cultivation is needed to control competing vegetation. Trees should be harvested when the soil is dry. Logging roads and skid trails should be constructed on the contour. Erosion control is needed on roads and trails. Wetness limits the use of equipment. Logging roads and skid trails should be surfaced with gravel or crushed rock. Capability unit IVw-1; woodland suitability group 2w2.

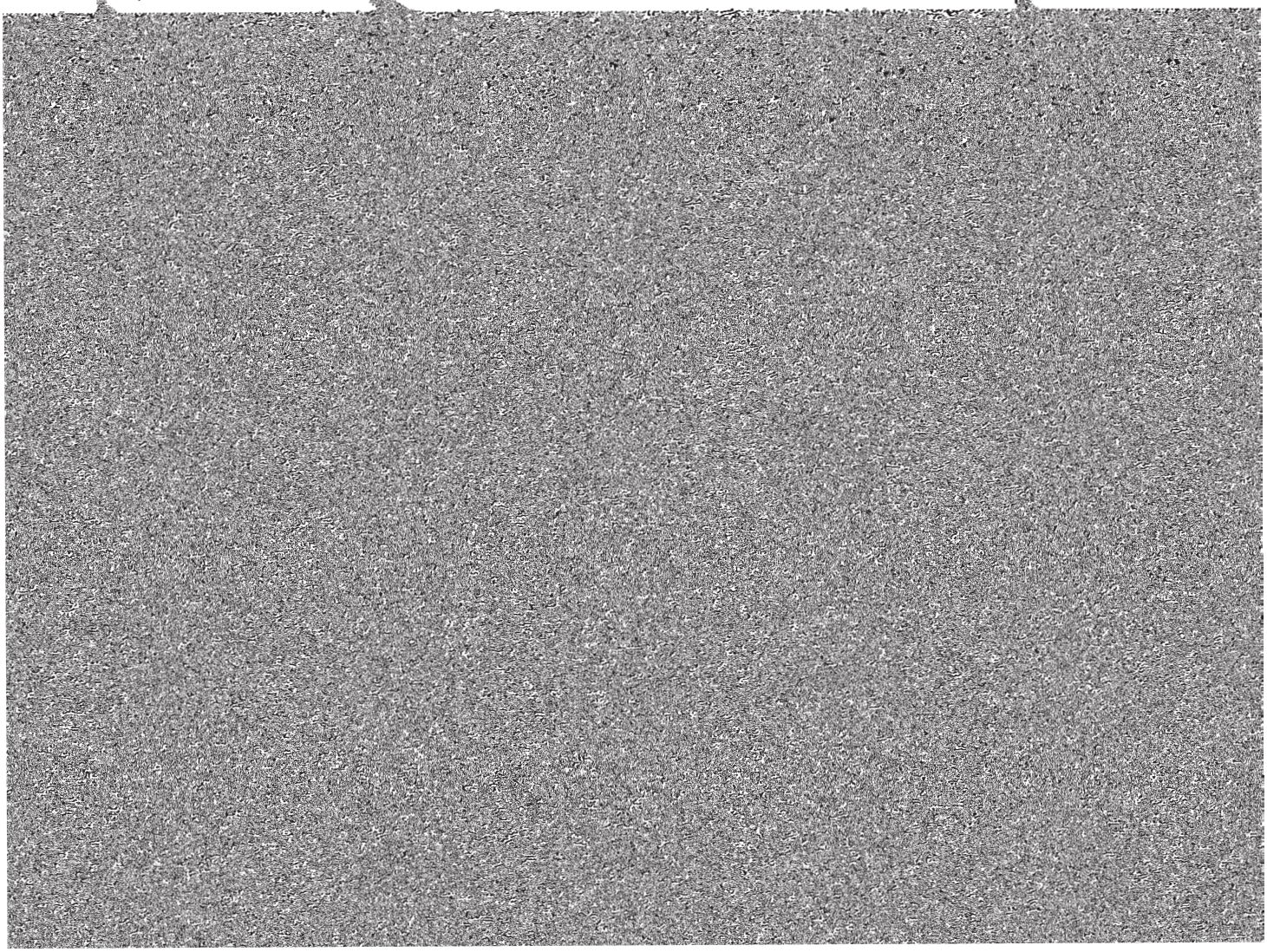
Darwin silty clay loam (Da). This nearly level soil is in depressions and on broad flats on the bottom land. Areas are irregular in shape and range from 10 to 100 acres in size. Slopes are 0 to 2 percent.

Typically, the surface layer is black silty clay loam about 10 inches thick. The subsoil is about 46 inches thick. It is gray clay with olive brown mottles in the upper 30 inches. The lower 16 inches of the subsoil is olive gray clay. The substratum to a depth of 60 inches is grayish brown clay with light olive brown mottles. The subsoil, in some places, has greenish gray colors. The surface layer is darker colored in places, and in some depressions it is silt loam or silty clay loam.

Included in mapping are a few areas of this Darwin soil that are not so wet. These areas are most common within Oakwood Bottoms. Inclusions make up about 5 percent of this unit.

Water and air move through this soil at a very slow rate, and water ponds on the surface. Reaction ranges from extremely acid to strongly acid. In cleared areas this soil is too wet to till in most years. Shrink-swell potential is very high, and wide cracks develop during dry periods. Organic-matter content is low, and available water capacity is moderate. Root development is restricted by the wetness.

Most large areas of this soil are timbered. This soil has poor potential for cultivated crops, hay, and pasture and



Included with this soil in mapping are small areas of soils that are sandy, a few mine sinks, areas of bedrock outcrops along streams, and small areas of the same soil that are ponded for extended periods. Also included are areas of Racoon, Belknap, and Wakeland soils. Racoon soils are usually near the edge of the flood plain or on slight rises within the flood plain. Belknap and Wakeland soils are on natural levees near the streams. Inclusions make up 15 percent of this unit.

Water and air move through this soil at a slow to moderate rate, and surface runoff is slow to ponded. Reaction ranges from extremely acid to medium acid in the subsoil and varies in the surface layer because of liming. The surface layer is friable and easy to till but dries slowly in spring. Surface crusts form because of weak structure and low organic-matter content. Available water capacity is high. This soil has a seasonal high water level at or near the surface and is flooded frequently.

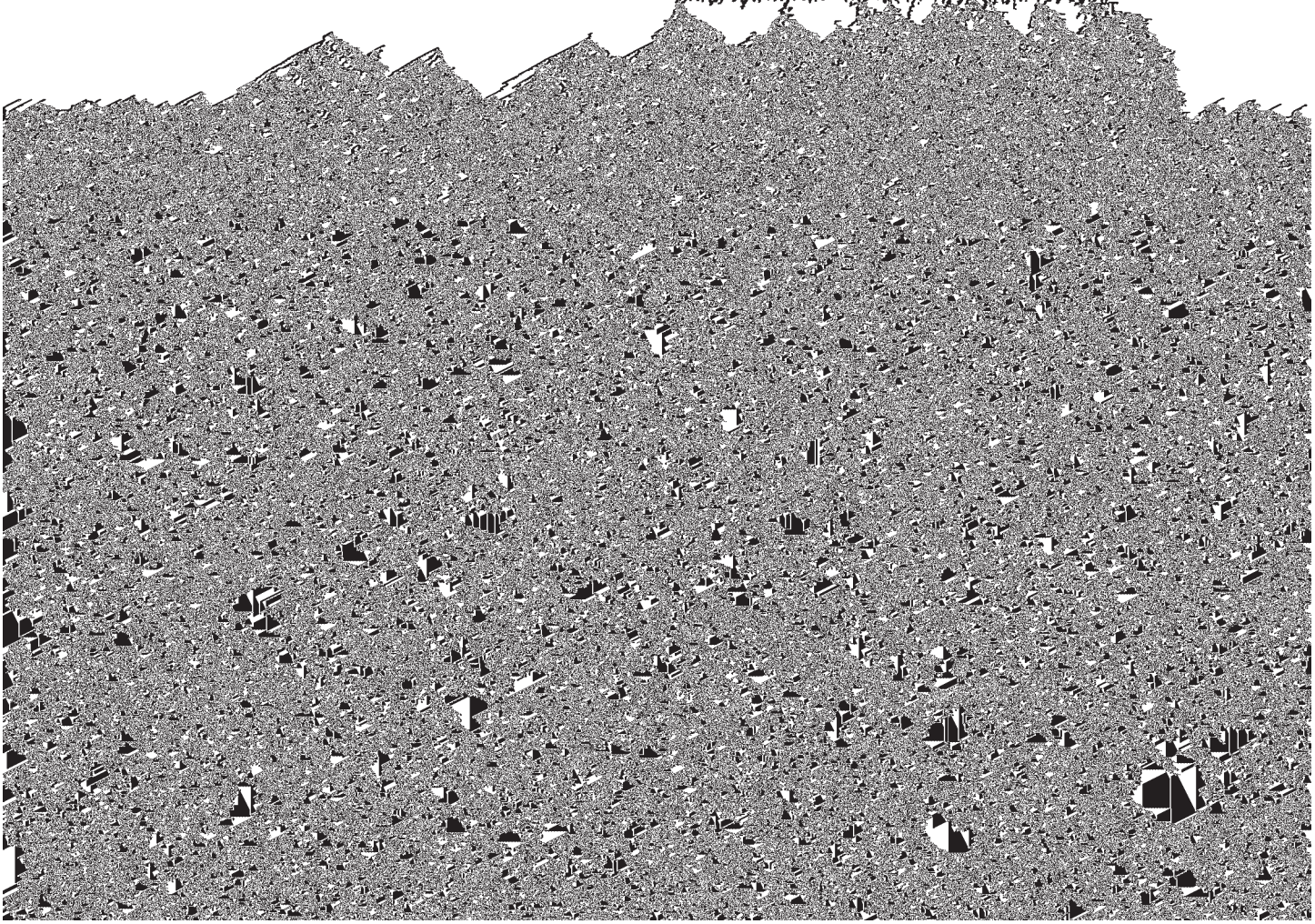
Most areas of this soil are in pasture or in native hardwoods. This soil has fair potential for cultivated crops, hay, pasture, and trees. The potential for recreational uses is poor, the potential for wildlife uses is mostly fair to good, and the potential for most engineering uses is poor.

brownish gray in the lower 11 inches. The subsoil is about 41 inches thick. It is light brownish gray silty clay loam mottled with strong brown and grades to silt loam in the lower 5 inches. In some places the lower part of the subsoil is silty clay.

Included with this soil in mapping are small areas that remain wet for extended periods and a few small mine-sink areas. Also included are small areas of Wynoose silt loam and Okaw silt loam, which have a thinner subsurface layer and more clay in the surface layer than the Racoon soil. Inclusions make up about 2 to 5 percent of this unit.

Water and air move through this soil at a slow rate, and surface runoff is slow. Reaction ranges from extremely acid to strongly acid in the subsurface layer and subsoil and varies in the surface layer because of local liming practices. The surface layer is friable and easily tilled but remains wet late in spring because of the high water level. The surface tends to crust or puddle after hard rains because of poor structure and low organic-matter content. Available water capacity is high.

Most areas of this soil are farmed. This soil has fair to good potential for cultivated crops, hay, pasture, and trees. It has poor potential for most recreational uses because of wetness, fair to good potential for wildlife, and poor potential for most engineering uses.



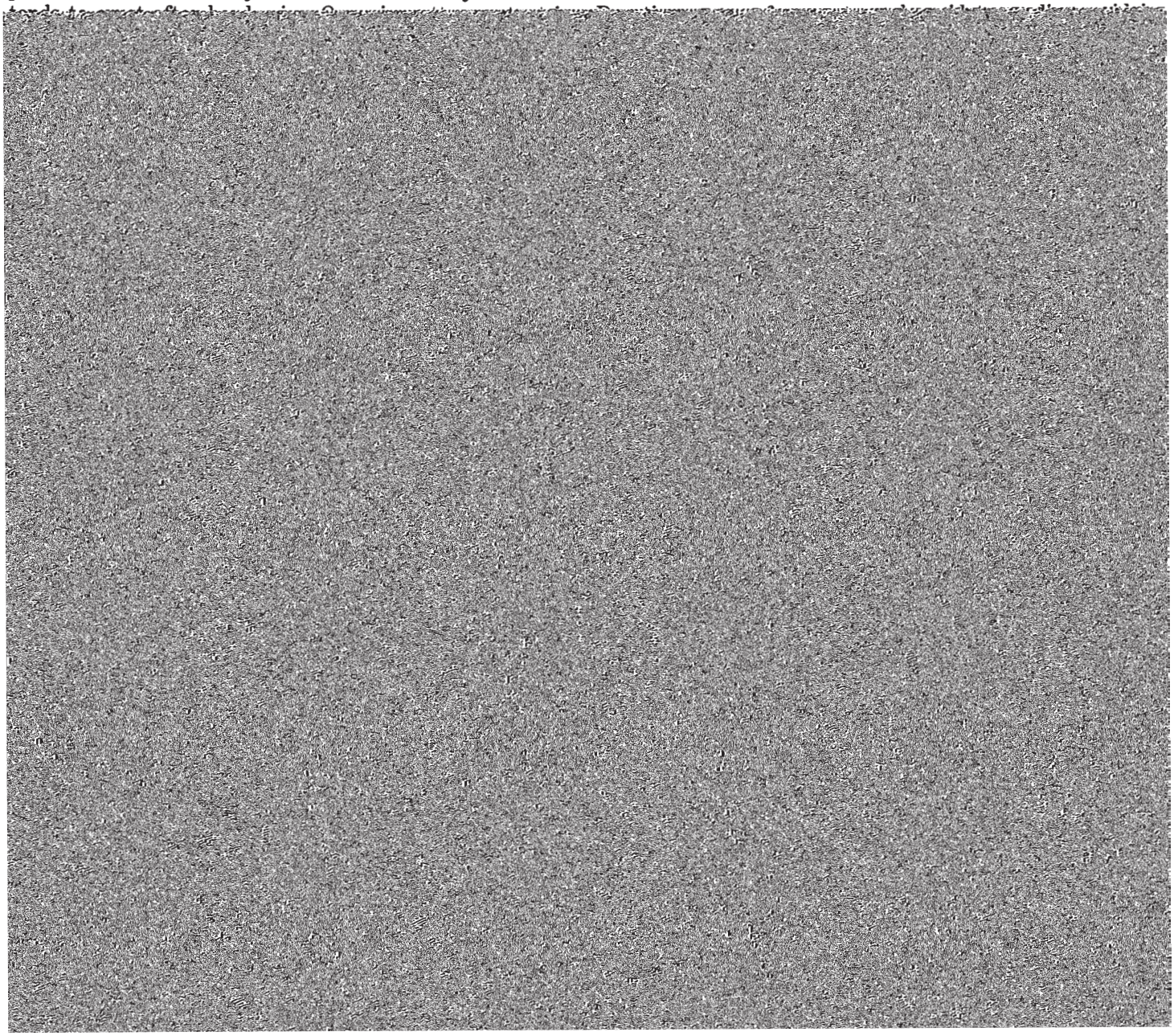
Included with this soil in mapping are a few sandy areas, a few short, steep terrace breaks, a few mine sinks, and a few severely eroded areas on knolls. Also included are a few areas of St. Charles and Hurst soils. St. Charles soils are on slightly higher positions above terrace breaks, and Hurst soils are in low-lying areas or at the head of drainageways. Some areas of Colp soils that have 3 to 7 percent slopes are also included on knolls and along side slopes. Inclusions make up about 5 to 10 percent of this unit.

Water and air move through this soil at a slow rate, and surface runoff is slow to medium. Reaction ranges from extremely acid to medium acid in the subsoil and varies widely in the surface layer as a result of local liming practices. The surface layer is friable and easily tilled but

substratum is within 40 inches. In these places the substratum is layered silt loam, silty clay loam, and silty clay. In places where this soil remains in native hardwoods, the surface layer is not eroded and is dark grayish brown. In these places the surface layer is underlain by a thin, pale brown subsurface layer.

Included with this soil in mapping are a few sandy areas, a few areas of short, steep terrace breaks, and a few small severely eroded areas on side slopes. Also included are a few areas of St. Charles and Hurst soils. St. Charles soils are on knolls and terrace breaks, and Hurst soils are at the head of drainageways. Inclusions make up about 5 percent of this unit.

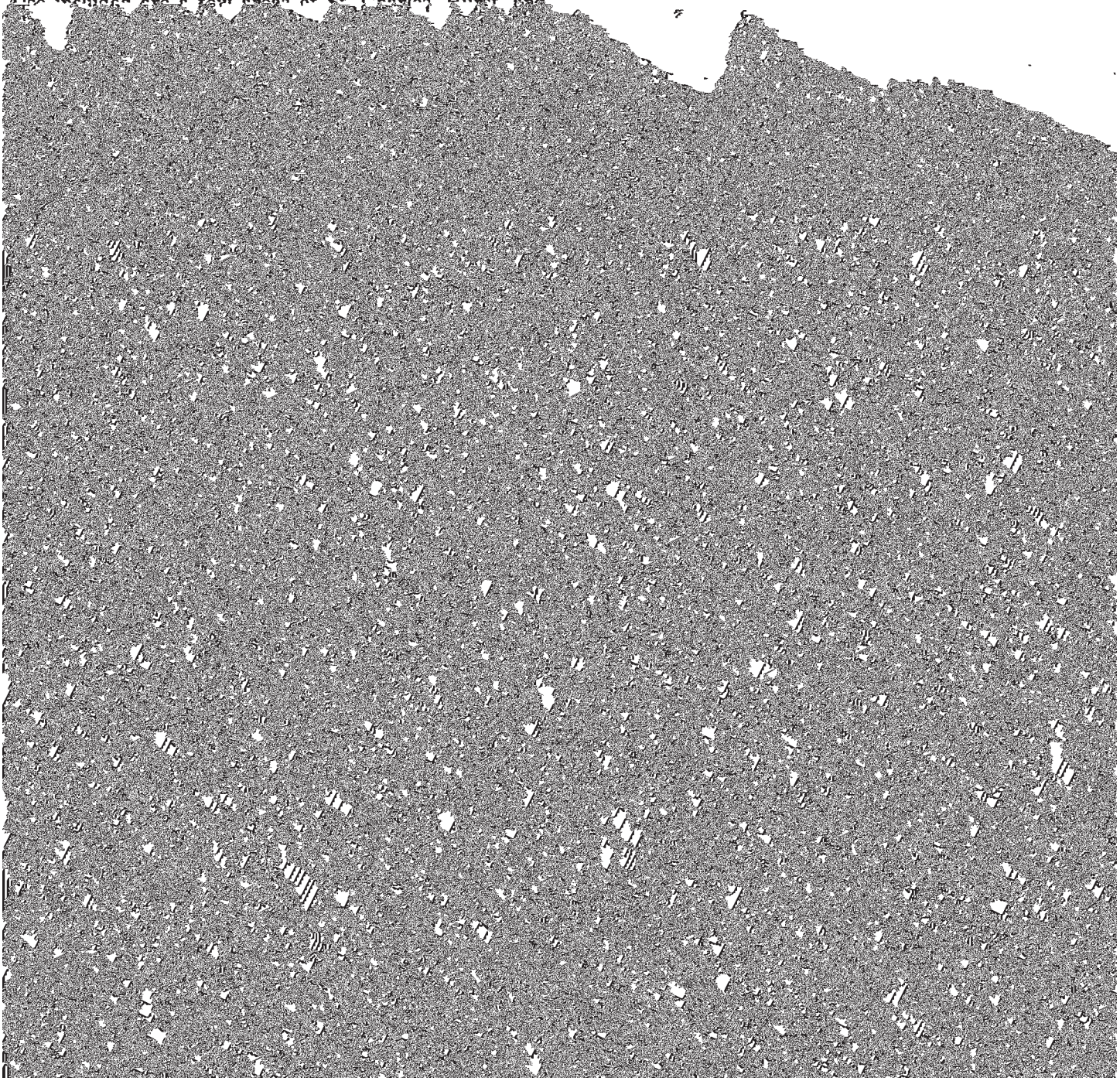
Water and air move through this soil at a slow rate, and surface runoff from cultivated areas is medium.



the next 29 inches is mottled yellowish brown silty clay; and the lower part is mottled light brownish gray silty clay. The substratum to a depth of about 60 inches is mottled light brownish gray in layers of silty clay loam and silty clay. In some places the subsoil is thinner and the calcareous substratum is within 40 inches of the surface. In wooded areas the surface layer is darker and is underlain by a thin, pale brown silt loam subsurface layer.

Included with this soil in mapping are a few sandy areas, a few areas of short, steep terrace breaks, a few wet areas, and a few severely eroded areas on side slopes. Also included are a few areas of St. Charles, Hurst, and

Typically, the surface layer is yellowish brown silty clay loam about 4 inches thick. It ranges from 1 to about 5 inches in thickness over most of the area. The subsoil is about 40 inches thick. In the upper part it is mottled yellowish brown silty clay; the lower part is mixed light brownish gray and yellowish brown silty clay with silty clay loam layers. The substratum to a depth of about 60 inches is mottled light brownish gray in layers of silty clay, silty clay loam, and silt loam. In some places the subsoil is thinner and the calcareous substratum is within 40 inches of the surface. In other places the upper part of



This soil is suited to trees, but the growth rates are only fair. The problems include seedling mortality, equipment limitations, and an erosion hazard. Pine trees are best adapted, and hand planting will reduce seedling mortality. Because the clayey soil is sticky when wet, planting and harvesting equipment can be used only during dry periods. Trees grow so slowly that they should be interplanted with a cover crop to protect the soil from erosion.

This soil is not suitable for building sites because of slopes and shrink-swell potential. Most slopes need to be reshaped to be used for building sites. Capability subclass VIe; woodland suitability subclass 3r.

122D—Colp silt loam, 12 to 20 percent slopes. This strongly sloping to moderately steep, moderately well drained soil is on side slopes along drainageways and on hillside terrace breaks. Individual areas of this soil are elongated to irregular in shape and range from 4 to about 75 acres in size.

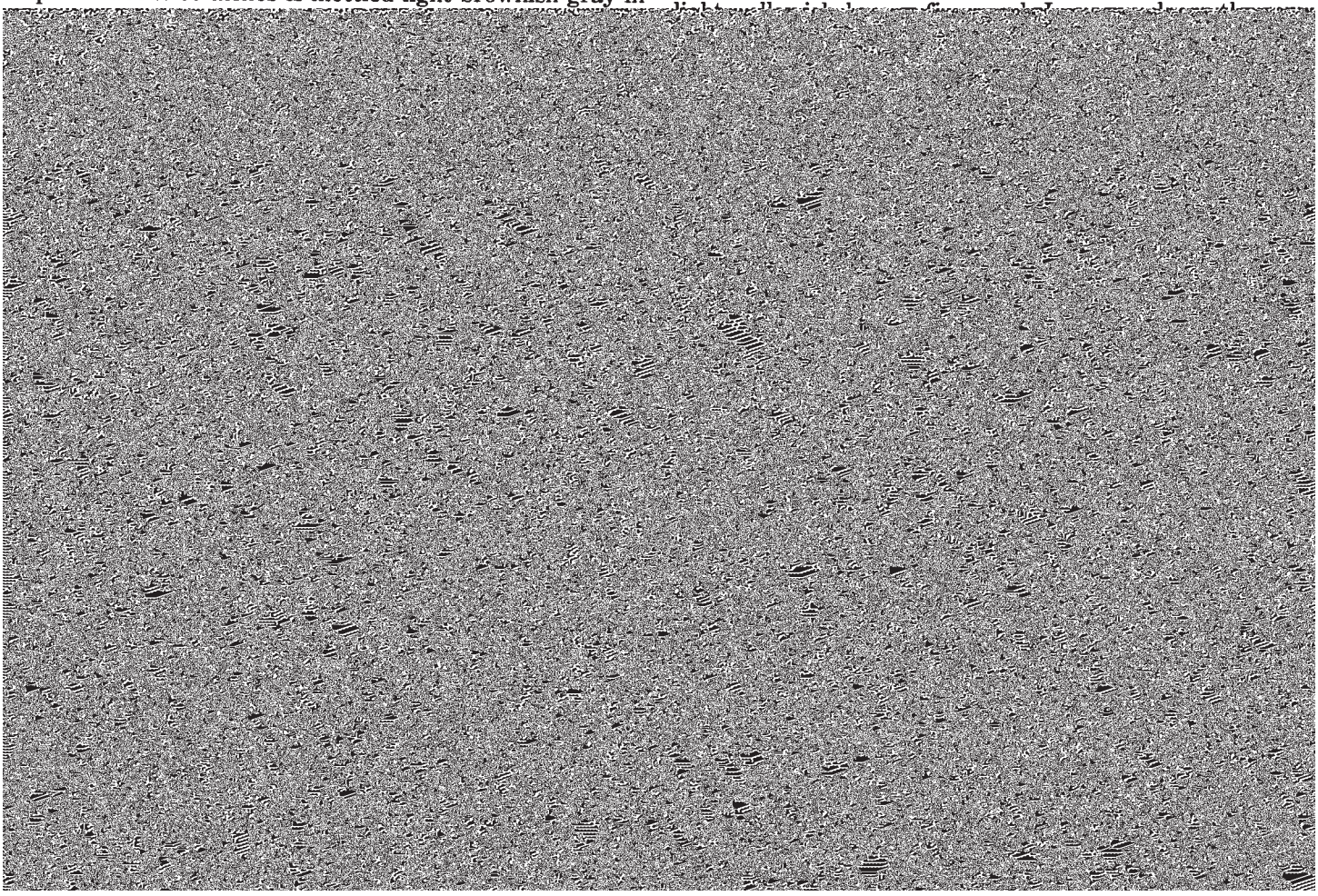
Typically, the surface layer is dark grayish brown silt loam about 3 inches thick. It is underlain by a pale brown subsurface layer about 4 inches thick. The subsoil is about 40 inches thick. In the upper part it is mottled yellowish brown silty clay; the lower part is mottled light brownish gray silty clay and silty clay loam. The substratum to a depth of about 60 inches is mottled light brownish gray in

This soil is suited to trees, and many of the steeper areas remain in native hardwoods. Management concerns include the erosion hazard and equipment limitations. Because surface runoff is rapid to very rapid, areas planted to trees erode quickly unless protected by a cover crop. Slopes limit use of equipment in planting and harvesting, and some areas need hand planting.

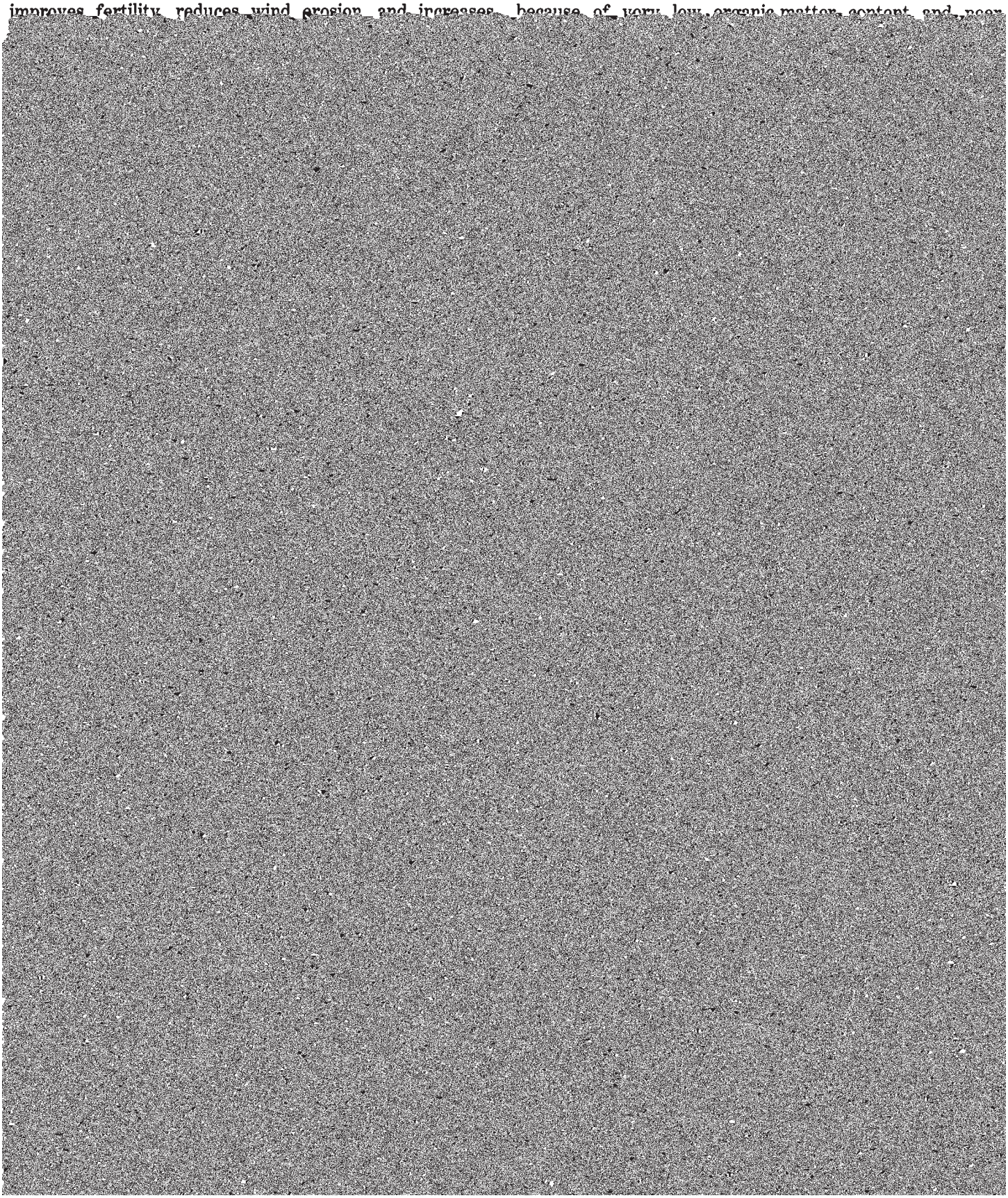
This soil is not well suited to building sites or onsite waste disposal systems because it is steep and clayey. Capability subclass VIe; woodland suitability subclass 3r.

131B—Alvin very fine sandy loam, 1 to 7 percent slopes. This nearly level to gently sloping, moderately well drained or well drained soil is on broad and narrow convex ridgetops and on side slopes at the head of drainageways. Individual areas of this soil are irregular in shape and range from 5 to 200 acres in size.

Typically, the surface layer is dark brown very fine sandy loam about 7 inches thick. The subsurface layer is brown and dark brown very fine sandy loam about 4 inches thick. The subsoil is about 38 inches thick. In the upper part it is dark yellowish brown loam about 12 inches thick; the next 5 inches is dark brown loam; and the lower 21 inches is dark brown fine sandy loam that grades to loamy fine sand with depth. The substratum to a depth of about 64 inches is mixed yellowish brown and



improves fertility, reduces wind erosion, and increases because of very low organic matter content and poor



Reaction ranges from very strongly acid to medium acid in the subsoil and varies in the surface layer as a result of local liming practices. The surface layer is very friable and dries quickly after rains. Organic-matter content is low, and available water capacity is moderate.

Most areas of this soil are in pasture or trees. This soil has poor to fair potential for cultivated crops and fair potential for hay, pasture, and trees. It has fair to poor potential for recreational uses, fair to good potential for most upland wildlife, and poor potential for most engineering uses.

This soil is suited to grain sorghum, wheat, and grasses and legumes grown for hay and pasture. If the soil is used for cultivated crops, there is a hazard of erosion. Erosion and lack of available water for good plant growth are management problems. Minimum tillage, winter cover crops, and planting on the contour help prevent excessive soil loss. Planting crops that are drought tolerant and adding organic material to the surface layer to increase water intake reduce droughtiness.

This soil is best suited to pasture or hay. Grasses and legumes grow well if properly fertilized and help in controlling erosion. Proper stocking rates, pasture rotation, and timely deferment of grazing during dry periods help to keep the pasture and soil in good condition.

This soil is suited to trees, and some areas remain in native hardwoods. Tree seeds and seedlings survive and grow well if competing vegetation is controlled or removed by proper site preparation, or by spraying, cutting, or girdling. There is a moderate erosion hazard, and the use of equipment is somewhat limited on the steeper slopes. Logging trails and roads erode rapidly but can be protected by planting a cover crop. The sandy surface provides poor traction for trucks and tractors and

Included in mapping are small areas of the poorly drained Sexton soils, small mine-sink areas, small areas of short, steep slope breaks, and small sandy areas. Some areas of the better drained Camden soils on slightly higher rises are also included. Inclusions make up about 5 percent of the unit.

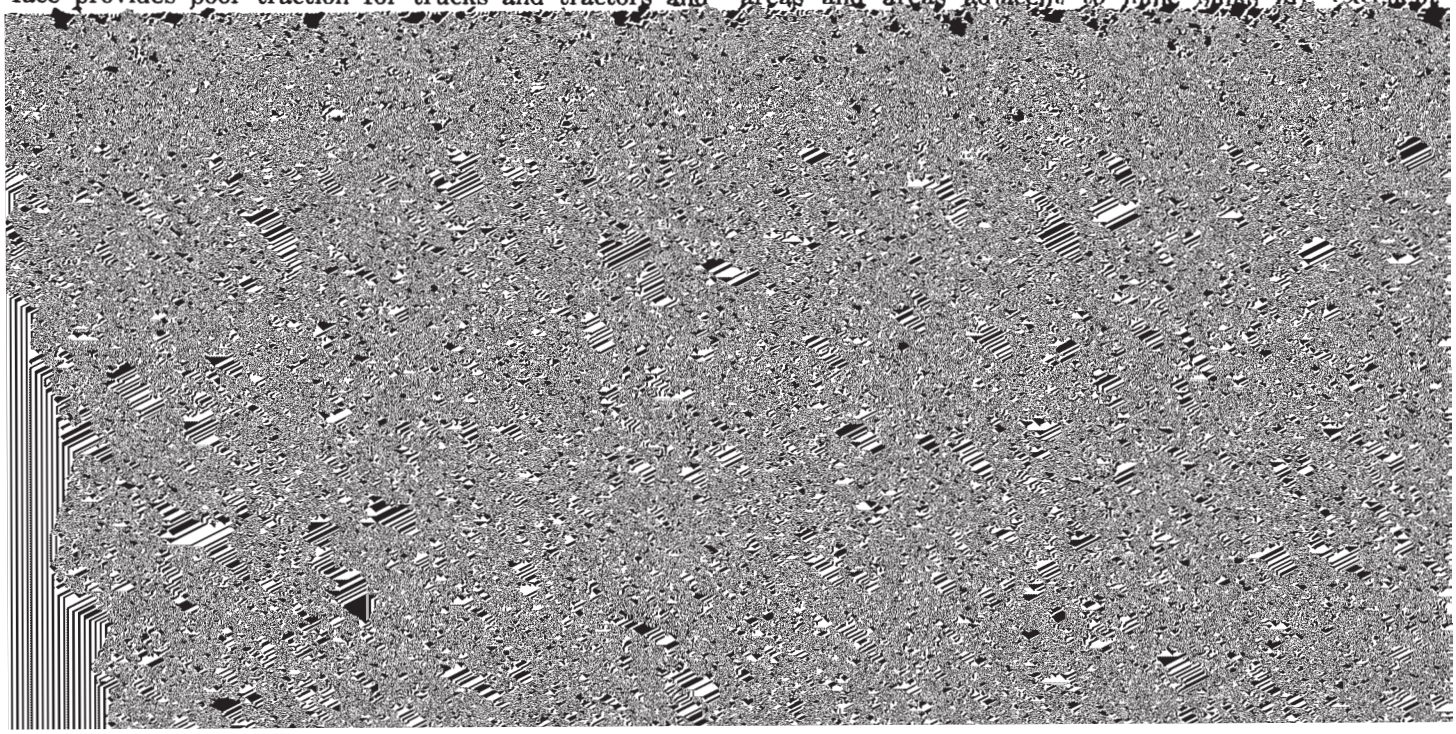
Water and air move through this soil at a moderately slow rate, and surface runoff is slow. Reaction ranges from very strongly acid to medium acid in the subsoil and varies widely in the surface layer as a result of local liming practices. The surface layer is friable and easily tilled, but it tends to crust or puddle after hard rains because of poor structure and low organic-matter content. Available water capacity is high.

Most areas of this soil are farmed. This soil has good potential for cultivated crops, hay, pasture, and trees, fair to good potential for recreational uses and wildlife, and fair to poor potential for most engineering uses.

This soil is suited to corn, soybeans, grain sorghum, small grain, and grasses and legumes grown for hay and pasture. Drainage is needed for optimum growth and increased productivity. Surface drainage by shallow ditching is usually adequate. Tile will function well if spaced at proper intervals. Surface crusting and compaction can be reduced by incorporating crop residue into the soil and by practicing minimum tillage.

This soil is suited to most recreational uses but has a seasonal wetness hazard, which can be alleviated by surface drainage. Areas that are used intensively tend to become very compacted unless a good vegetative cover is maintained. Compaction can be minimized by deferring use during wet periods.

This soil is well suited to development for wildlife. Wet areas and areas adjacent to mine sinks are excellent



is strong brown and yellowish brown loamy fine sand. In some places the surface layer is loam or very fine sandy loam.

Included in mapping are small areas of short, steep slope breaks or escarpments. Also included are areas of soils having a sandy surface layer, a few areas of this Camden soil that are more sloping and severely eroded, and a few areas of the somewhat poorly drained Starks soils. Inclusions make up 2 to 5 percent of the unit.

Water and air move through this soil at a moderate rate, and surface runoff from cultivated areas is slow. Reaction ranges from very strongly acid to slightly acid in the subsoil and varies widely in the surface layer as a result of local liming practices. The surface layer is friable and easily tilled. Available water capacity is high, and organic-matter content is low.

Most areas of this soil are farmed. This soil has good potential for cultivated crops, hay, pasture, and trees and for most recreational, wildlife, and engineering uses.

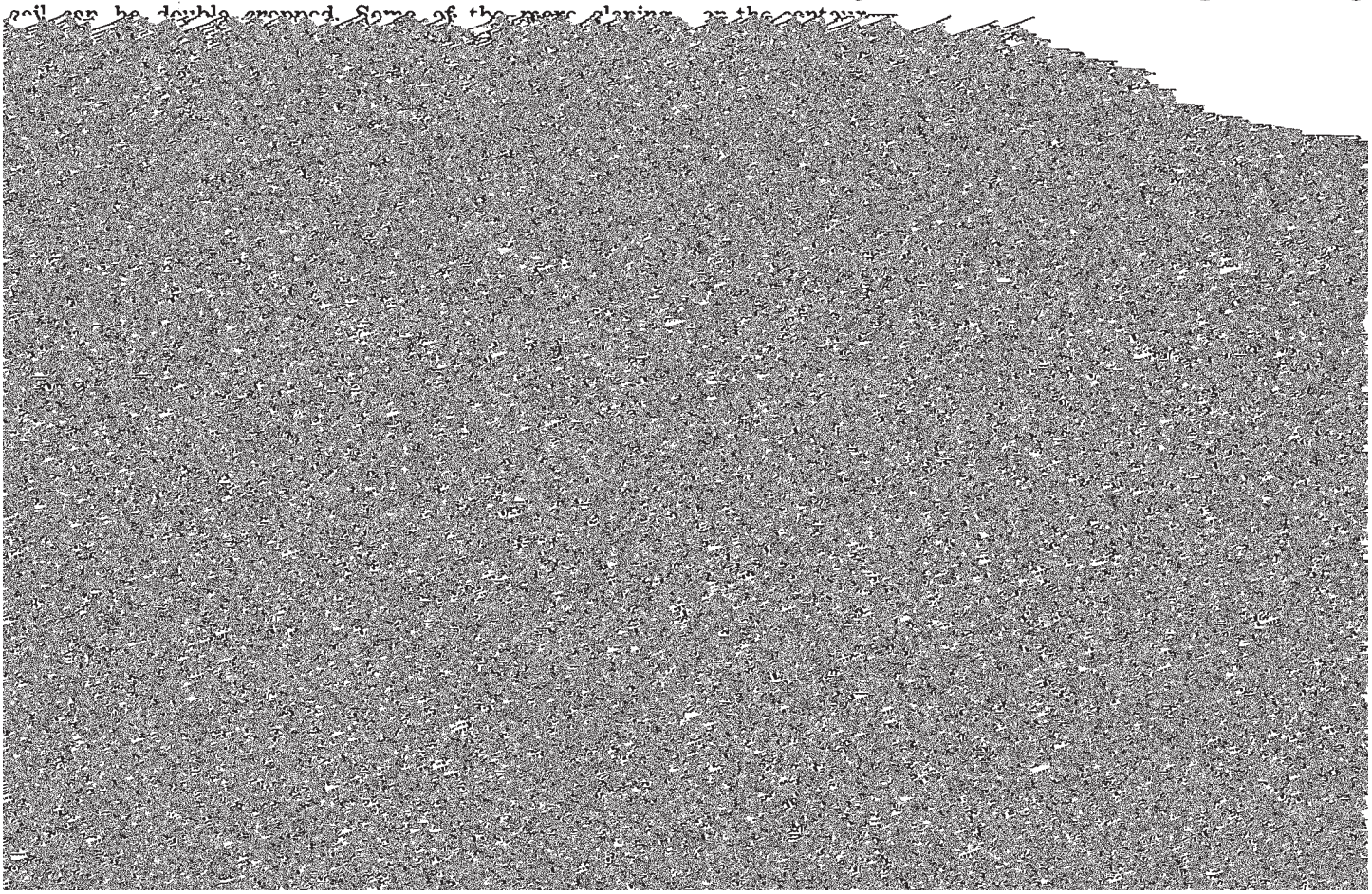
This soil is well suited to all crops commonly grown in the county. It is also suited to a wide variety of specialty crops, such as fruits and vegetables. Fertilizers should be added, and crop residue should be incorporated into the surface soil to increase productivity and water intake. Areas with a sandy surface should be protected from blowing by using winter cover crops. In most years this soil can be double cropped. Some of the more sloping [illegible] on the contour.

Included with this soil in mapping are areas that have a sandy surface layer, areas that are severely eroded, and areas of short, steep slopes or escarpments. A few areas of the more sandy Alvin soils are included where they are associated on the landscape with this Camden soil. Inclusions make up about 5 percent of this unit.

Water and air move through this soil at a moderate rate, and surface runoff from cultivated areas is medium. Reaction ranges from very strongly acid to slightly acid in the subsoil and varies in the surface layer as a result of local liming practices. The surface layer is friable and easily tilled. It tends to crust after hard rains because of low organic-matter content and the increased amount of subsoil mixed in the surface layer by plowing. Available water capacity is high.

Most areas of this soil are farmed. This soil has good potential for cultivated crops, hay, pasture, and trees and for fruit and some vegetables. It has good potential for most recreational uses and for wildlife and good to fair potential for most engineering uses.

This soil is well suited to corn, soybeans, small grains, and grasses and legumes grown for hay and pasture. There is a hazard of erosion if this soil is used for cultivated crops. Minimum tillage, winter cover crops, and crop rotation help reduce erosion and maintain tilth. In a few areas slopes are favorable for terracing and farming



Typically, the surface layer is dark yellowish brown silt loam about 6 inches thick. It ranges from 3 to 7 inches in thickness over most of the area. The subsoil is about 55 inches thick. The upper part is strong brown silty clay loam. The middle part is strong brown clay loam. The lower part is strong brown and yellowish brown fine sandy loam. The substratum to a depth of about 76 inches is strong brown and yellowish brown loamy fine sand. In some places the surface layer is loam or very fine sandy loam. In other places the upper part of the subsoil contains more sand. Also, in places the surface layer is not eroded and is dark grayish brown.

Included with this soil in mapping are areas that have a sandy surface layer, a few areas that are severely eroded, and areas of the same soil on short, steep slopes. The more sandy Alvin soils and the more clayey St. Charles soils are also included in a few areas where they are associated with this Camden soil on the landscape. Inclusions make up about 5 percent of this unit.

Water and air move through this soil at a moderate rate, and surface runoff from cultivated areas is medium. Reaction ranges from very strongly acid to slightly acid in the subsoil and varies in the surface layer as a result of local liming practices. The surface layer is friable and easily tilled. It tends to crust after hard rains because of low organic-matter content and the increase in clay resulting from mixing of the subsoil by plowing. Available water capacity is high.

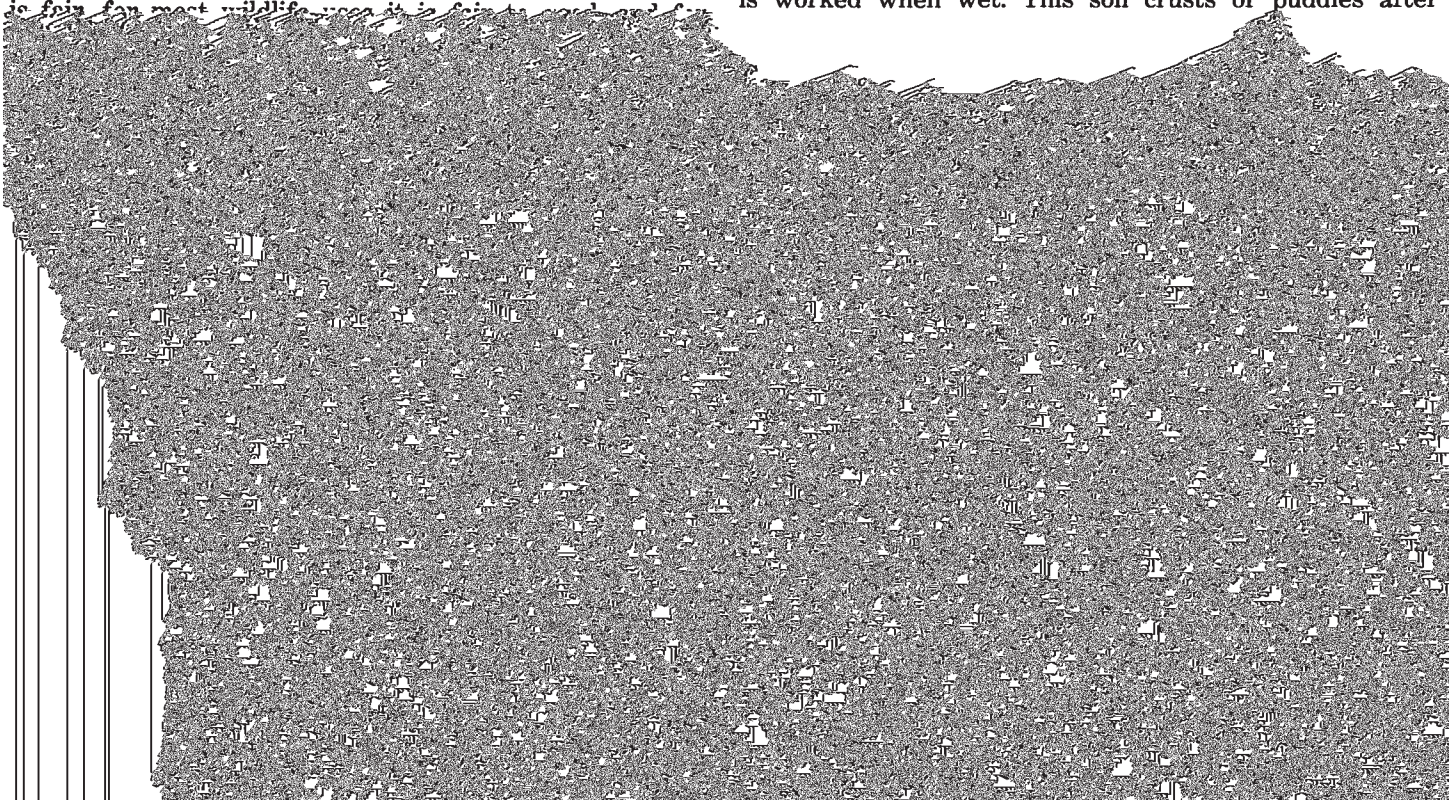
Most areas of this soil are farmed. This soil has fair to good potential for cultivated crops, hay, pasture, trees, and orchard crops. The potential for most recreation uses is fair for most wildlife uses it is fair [illegible]

slopes along drainageways or on hillsides at terrace breaks. Individual areas of this soil are irregular to elongated in shape and range from about 4 to 60 acres in size.

Typically, the surface layer is dark brown silty clay loam about 5 inches thick. It consists primarily of subsoil material and ranges from 3 to 6 inches in thickness. The subsoil is about 45 inches thick. The upper part is strong brown silty clay loam. The middle part is strong brown clay loam. The lower part is mixed brown, yellowish brown, and light brownish gray layers of fine sandy loam, loam, and silt loam. The substratum to a depth of about 60 inches is mixed brown, yellowish brown, and light brownish gray layers of fine sandy loam and loam. In some places layers of light silty clay occur in the subsoil and substratum.

Included in mapping are areas of similar soils that have short, steep slopes and a few areas that have a sandy surface layer; areas of the more sandy Alvin soils that are associated with this Camden soil on the landscape; and, along the bottoms of the narrow drains, areas of silty alluvial soils that are too small to separate in mapping. Areas of this Camden soil with steeper slopes along drainageways are also included. Inclusions make up about 15 percent of this unit.

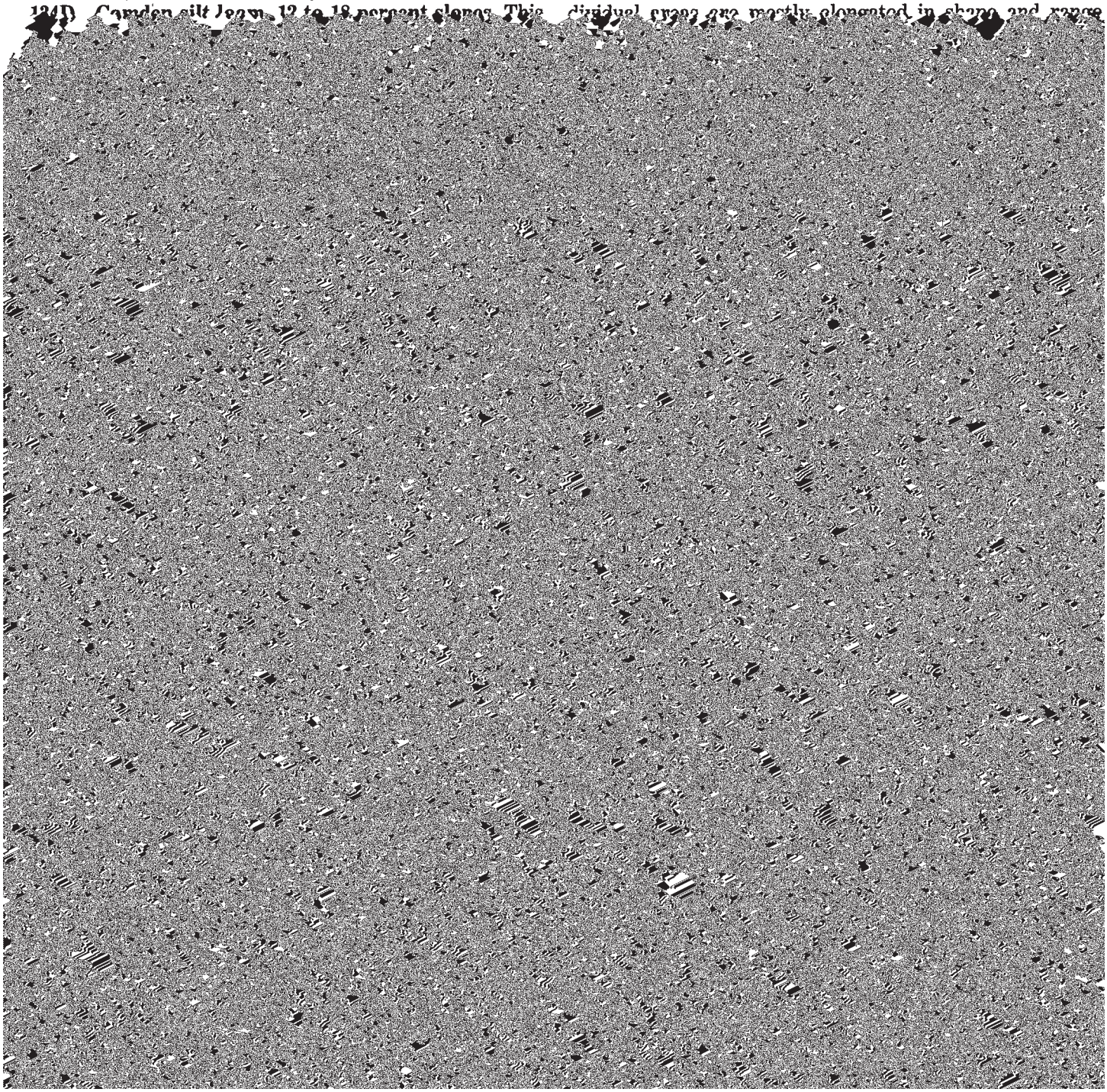
Water and air move through this soil at a moderate rate, and surface runoff from cultivated areas is rapid. Reaction ranges from very strongly acid to slightly acid in the subsoil and varies in the surface layer as a result of erosion and local liming practices. The surface layer is firm and somewhat difficult to till. Clods form if this soil is worked when wet. This soil crusts or puddles after



This soil is well suited to trees if competing vegetation is controlled by proper site preparation or by spraying. There are no hazards to planting or harvesting trees.

Building sites are limited on this soil by slope. The somewhat clayey, sticky surface layer requires special attention if vegetation is to grow adequately. Fertilizers, especially lime and nitrogen, are needed for adequate growth. Wells should be sealed to prevent contamination of well water by onsite waste disposal systems. Capability subclass IVe; woodland suitability subclass 1o.

134D—Camden silt loam, 12 to 18 percent slopes. This



This soil is not well suited to building site development or onsite waste disposal systems because of steepness of slopes and the erosion hazard. Some slope reshaping can overcome the limitation of slope. Exposed areas will quickly revegetate if properly shaped, fertilized, and seeded. Onsite waste disposal systems may cause contamination of water supplies where wells are unsealed. Capability subclass IVe; woodland suitability subclass 1r.

162—Gorham silty clay loam. This nearly level, poorly drained soil is on low, flat ridges on bottom lands. Individual areas are mostly elongated in shape and range

This soil is generally unsuited to building sites or onsite waste disposal systems because of flooding and wetness hazards. Roads and streets need special design to reduce the wetness and frost action hazards. Capability subclass IIw; woodland suitability subclass 2w.

164A—Stoy silt loam, 0 to 2 percent slopes. This nearly level, somewhat poorly drained soil is on broad upland divides or at the head of drainageways. Individual areas of this soil are irregular or rounded in shape and range from about 2 to 125 acres in size.

Typically, the surface layer is dark grayish brown and brown silt loam about 8 inches thick. It is underlain by a yellowish brown silt loam subsurface layer about 6 inches thick. The subsoil is about 42 inches thick. The upper part is yellowish brown heavy silt loam mixed with pale brown. The next layer is mottled yellowish brown silty clay loam. Below that is strong brown, dark brown, and light brownish gray silty clay loam. The lower part is firm and slightly brittle, dark yellowish brown and light brownish gray silt loam. The substratum to a depth of about 64 inches is mottled yellowish brown silt loam. In some places the firm and slightly brittle zone is in the substratum.

Included with this soil in mapping are a few areas of Hosmer and Weir soils. Hosmer soils are on slightly higher knolls, and Weir soils are in depressions or low-lying positions. A few areas of this Stoy soil on steeper slopes are also included. Inclusions make up 2 to 5 percent of this unit.

Water and air move through this soil at a slow rate, and surface runoff from cultivated areas is slow. Reaction ranges from extremely acid to strongly acid in the subsoil and varies widely in the surface layer as a result of local liming practices. The surface layer is friable and easily tilled but has a tendency to crust or puddle after hard rains. Root development and downward water movement are somewhat restricted by the platy subsurface layer. Organic-matter content is low, and available water capacity is high.

Most areas of this soil are farmed. This soil has good potential for cultivated crops, hay, pasture, and trees. The potential for recreation uses is fair, for wildlife uses it is fair to good, and for most engineering uses it is fair to poor.

This soil is suited to trees, and some areas remain in native hardwoods. There are no hazards or limitations to be concerned about.

This soil is suited to building sites if wetness and shrink-swell problems are removed or controlled by proper design or installation of foundations, footings, and footing drain tile. Sewage lagoons can be installed for onsite waste disposal. Capability subclass IIw; woodland suitability subclass 3o.

164B—Stoy silt loam, 2 to 4 percent slopes. This gently sloping, somewhat poorly drained soil is on undulating ridgetops, side slopes along drainageways, and foot slopes. Individual areas of this soil are irregular or elongated in shape and range from 2 to about 150 acres in size.

Typically, the surface layer is mixed dark grayish brown and brown silt loam about 8 inches thick. It is underlain by a yellowish brown silt loam subsurface layer about 6 inches thick. The subsoil is about 42 inches thick. The upper part is mixed yellowish brown, pale brown, and light brownish gray silt loam. The next layer is mottled yellowish brown and light brownish gray silty clay loam. Below that is strong brown, dark brown, and light brownish gray silty clay loam. The lower part is firm and slightly brittle, dark yellowish brown and light brownish gray silt loam. The substratum to a depth of about 64 inches is mottled yellowish brown silt loam. In some places the firm and slightly brittle zone extends into the substratum.

Included with this soil in mapping are a few small areas of short, steep slopes, a few depressions in wet areas, and a few severely eroded areas. Also included are a few areas of the poorly drained Weir soils on ridgetops, mainly at the head of drainageways; some areas of the better drained Hosmer soils along side slopes; and a few areas of more sloping Stoy soils along drainageways. Inclusions make up about 5 percent of this unit.

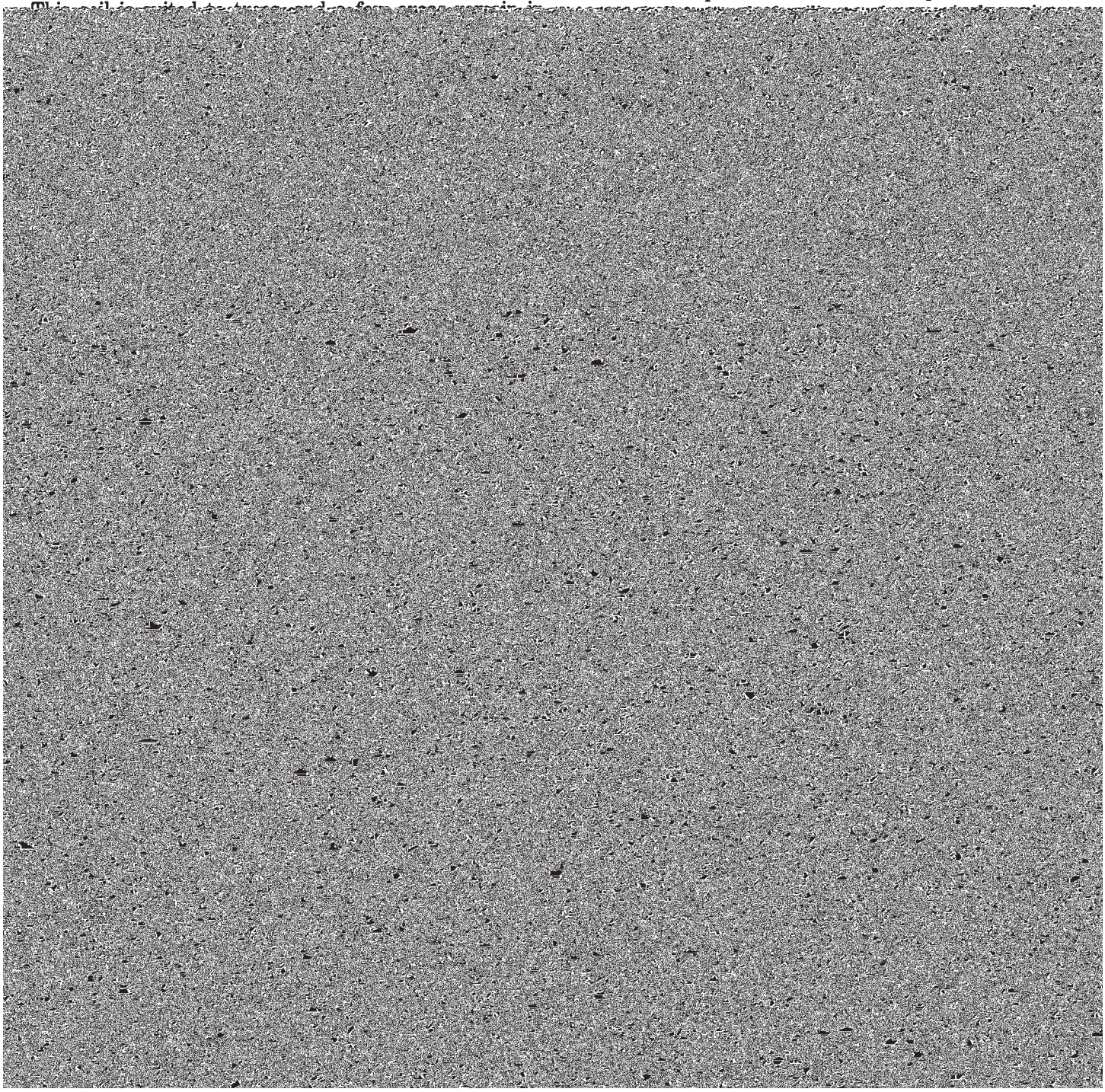
Water and air move through this soil at a slow rate, and surface runoff from cultivated areas is medium. Reaction in the subsoil ranges from extremely acid to strongly acid. The surface layer is friable and easy to till but tends to crust or puddle because of low organic-matter content and poor surface structure. Available

ing and compaction can be reduced by crop rotation and reduced tillage and by incorporating organic matter into the surface layer. Disrupting the platiness of the subsurface layer by deep tilling or chisel plowing increases downward water movement and root growth.

The use of this soil for hay or pasture helps in controlling erosion. Overgrazing or cutting when the soil is wet will cause surface compaction and increase runoff. Timely deferment of grazing during wet periods helps keep the crop and the soil in good condition.

fair, for openland and woodland wildlife uses it is fair to good, and for most engineering uses it is fair to poor.

This soil is suited to corn, soybeans, grain sorghum, wheat, and legumes and grasses for hay and pasture. Protecting this soil from further erosion, low fertility, and poor tilth are the main concerns of management. Erosion can be reduced by minimum tillage, winter cover crops, and grassed waterways. Areas having uniform slopes can be contoured. Zero tillage and crop rotations will protect the soil and improve tilth. This soil responds well to addi-



Most areas of this soil are farmed. This soil has fair potential for cultivated crops, hay, pasture, and trees, poor potential for most recreational uses, fair to good potential for most wildlife uses, and poor potential for most engineering uses.

This soil is suited to corn, soybeans, grain sorghum, small grain, and grasses and legumes. The wetness hazard and surface crusting are the main concerns of management. The "perched" water can be removed by shallow ditching. Minimum tillage, returning crop residue, and fertilizing will improve yields, build structure, and reduce surface crusting.

Hay and pasture are suited to areas from which excess water has been removed by ditching. Overgrazing or grazing when the soil is too wet will cause surface compaction and reduce water intake. Fertilizer should be applied and only wetness-tolerant grasses and legumes should be planted to maintain stands and to keep the crop growing properly. Winterkill is common in low, undrained areas, and frost heaving affects some plants.

This soil is not well suited to building sites or waste disposal systems with filter tile because of seasonal wetness. Certain types of structures can be built on this soil if properly designed and installed. Sewage lagoons can be built to dispose of septic wastes. Roads, streets, and sidewalks should be ditched and graded to drain excess water and reduce potential frost action. Capability subclass IIIw; woodland suitability subclass 4w.

180—Dupo silt loam. This nearly level, somewhat poorly drained soil is on flood plains or alluvial fans. Individual areas of this soil are elongated or irregular in shape and range from about 5 to 250 acres in size.

Typically, the surface layer is dark brown silt loam about 7 inches thick. The substratum extends to a depth

Root development is restricted by the underlying clayey material and water that "perches" above it. Organic-matter content is low, and available water capacity is high.

Most areas of this soil are farmed. This soil has good potential for cultivated crops, hay, pasture, and trees. The potential for recreational uses is poor to fair, for wildlife uses it is fair to good, and for most engineering uses it is poor.

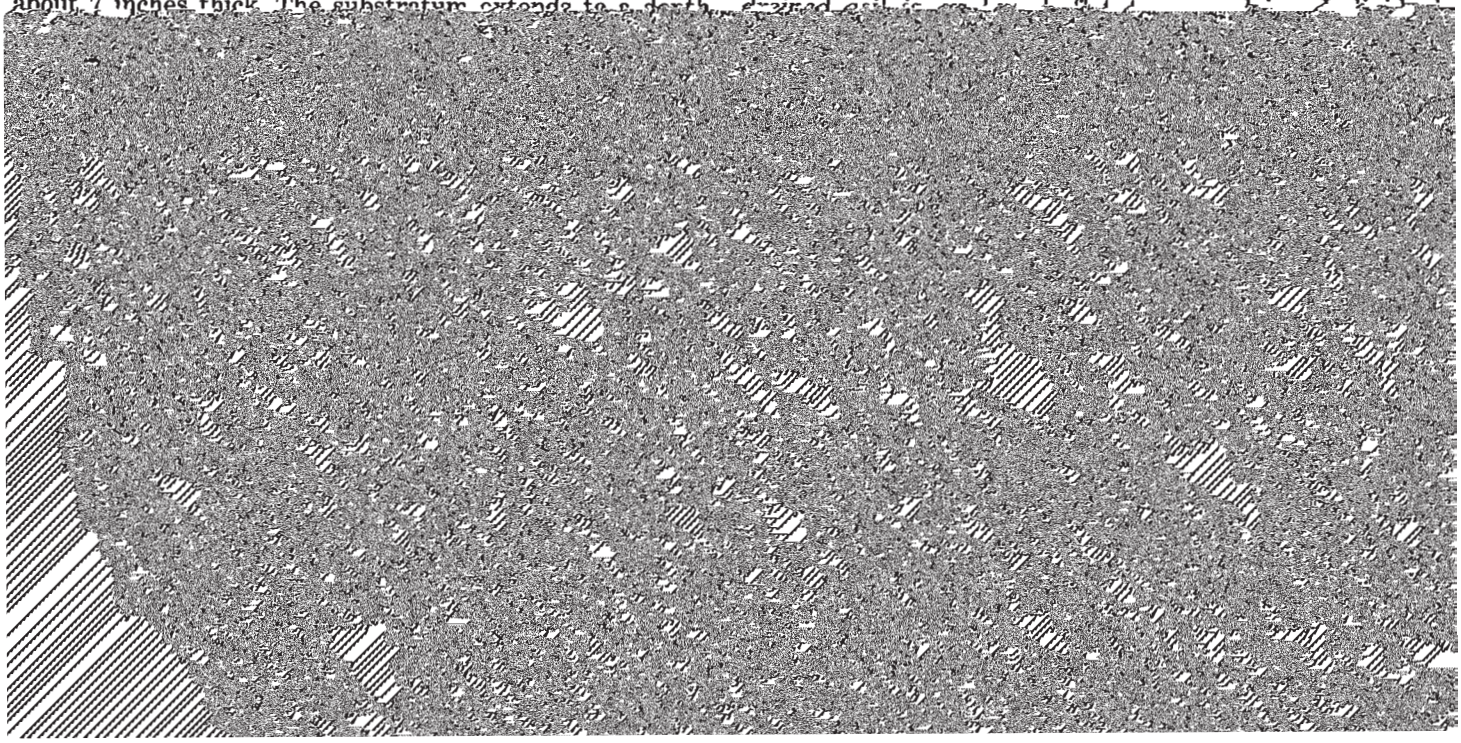
This soil is suited to corn, soybeans, wheat, and legumes and grasses for hay and pasture. Wetness is the main concern of management. Surface water can be reduced by shallow ditching and the perched water can be removed by tiling if an outlet is available. Overflow water can be diverted and controlled by proper ditching and low levees.

Pasture and hay crops grow well if excess water is reduced. Damage in winter is likely on undrained sites because the frost-heave potential is high. Wetness-tolerant plants should be planted, and the water problem should be eliminated by drainage. Restricting grazing and cutting during wet periods keeps the crop and soil in good condition.

This soil is suited to trees, and if adapted species are planted there are few problems except equipment limitation resulting from wetness. Planting and harvesting of trees will be delayed during the spring.

Building sites and onsite waste disposal systems are not well suited to this soil. Wetness and the overflow hazard limit use. This soil can be drained with ditches and tile. Levees and diversions will protect it from overflow. Capability subclass IIw.

208—Sexton silt loam. This nearly level, poorly



ture and low organic-matter content. The platy subsurface layer is compact and restricts water movement and root growth. The seasonal water level is near or at the surface during the spring. Available water capacity is high.

Most areas of this soil are farmed. This soil has good potential for growing cultivated crops, hay, pasture, and trees. The potential for recreation uses is poor, for wildlife uses it is fair to good, and for most engineering uses it is poor.

This soil is suited to corn, soybeans, grain sorghum, wheat, and grasses and legumes for hay and pasture. The wetness hazard and surface crusting are the main management problems. Surface drainage with shallow ditches helps in removing excess water. Minimum tillage and returning crop residue to the soil help to build structure and keep the surface more porous. Deep plowing and chisel plowing are somewhat helpful in disrupting the platy subsurface layer to increase water movement and root growth.

Wetness-tolerant grasses and legumes grow best on this soil. Overgrazing or grazing when the soil is too wet causes surface compaction and poor tilth. Excess surface water should be removed by drains to improve the crop and to extend the period of use.

This soil is suited to trees that are adapted to wet conditions. Tree seeds and seedlings survive and grow well if competing vegetation is controlled by proper site preparation or by spraying, cutting, or girdling. Equipment used for planting and harvesting is limited by wetness during some periods.

Most structures are not well suited to this soil because of wetness. Wetness problems can be overcome with

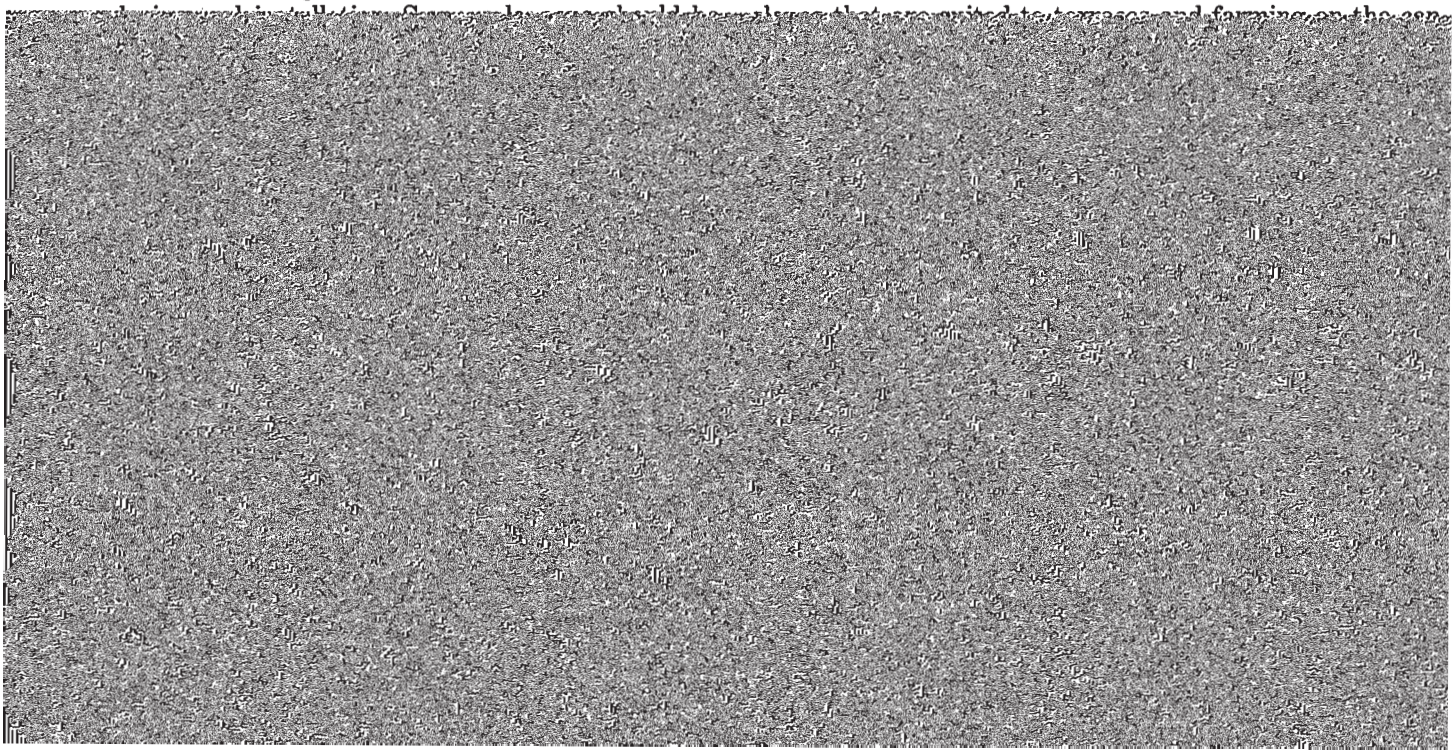
very firm, compact lower part is deeper and thinner. In other places the surface layer is dark yellowish brown.

Included with this soil in mapping are a few areas of similar soils on short, steep slopes and escarpments, a few small wet areas, and a few severely eroded areas. Also included are small areas of Alford and Stoy soils. Alford soils are on high knolls on ridges, and Stoy soils are at the head of drainageways and in nearly level areas on broad ridgetops. Inclusions make up about 5 percent of this unit.

Water and air move through the upper part of the subsoil at a moderate rate and through the compact lower part at a very slow rate. Surface runoff from cultivated areas is medium. Reaction ranges from extremely acid to strongly acid in the subsoil and varies in the surface layer because of local liming practices. The surface layer is friable and easily tilled but tends to crust or puddle after hard rains. Root development is restricted below a depth of about 25 to 40 inches by the very firm, compact lower part of the subsoil. Organic-matter content is low, and available water capacity is moderate.

Most areas of this soil are farmed. This soil has fair to good potential for cultivated crops, hay, pasture, trees, and some special crops. The potential for most recreation uses is fair, for most wildlife uses it is good, and for most engineering uses it is fair to good.

This soil is well suited to corn, soybeans, grain sorghum, wheat, and grasses and legumes for hay and pasture. Controlling erosion, maintaining or improving tilth and fertility, and the moderate available water supply are the main problems. Minimum tillage, winter cover crops, and grassed waterways help prevent excessive soil loss from cultivated areas. A few areas have



This soil is suited to building site development if the limitation imposed by the perched water table in the subsoil is overcome. Sewage lagoons function well, whereas septic tank absorption fields do not function well because of permeability. Proper design and installation of footings and footing tile will eliminate wetness and frost-action hazards. Capability subclass IIe; woodland suitability subclass 2o.

214C2—Hosmer silt loam, 7 to 12 percent slopes, eroded. This sloping, moderately well drained soil is on narrow ridgetops, knolls, and side slopes. Individual areas of this soil are irregular or elongated and range from 2 to about 50 acres in size.

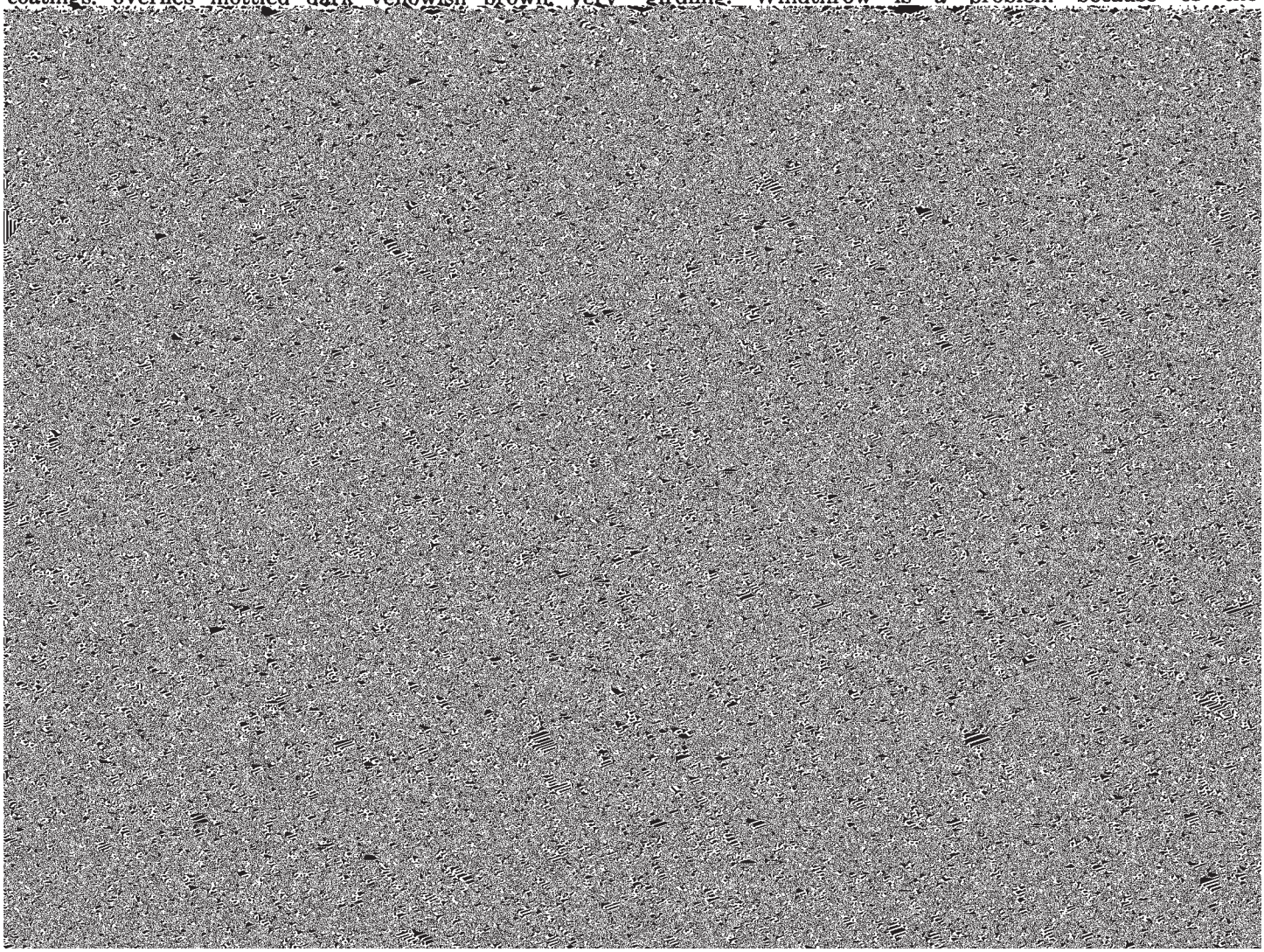
Typically, the surface layer is dark yellowish brown silt loam about 6 inches thick. It ranges from 4 to 8 inches in thickness over most of the area. The subsoil is about 41 inches thick. The upper 14 inches is strong brown light silty clay loam over mottled yellowish brown heavy silt loam. In the lower 27 inches the subsoil has a very firm and compact zone; a thin layer of mottled yellowish brown heavy silt loam, which has thick pale brown coatings, overlies mottled dark yellowish brown, very

waterways help prevent excessive soil loss. A few areas have slopes that are long enough and smooth enough to be terraced and farmed on the contour. Soil crusting can be reduced by zero tillage or by returning crop residue to the surface. Crops that are drought tolerant should be planted to reduce the effects of restricted rooting depth and moderate available water supply.

Grasses and legumes help in controlling erosion and grow well if the soil is properly fertilized. Competing vegetation should be controlled by clipping or spraying as needed. Proper stocking rates, pasture rotation, and restricted use during wet periods help to keep the pasture and the soil in good condition.

This soil is suited to apples and peaches if the slopes are protected from erosion and fertilizers are added as needed. Erosion can be controlled by properly established and maintained cover crops.

This soil is well suited to trees, and many areas are in native hardwoods. Tree seeds and seedlings survive and grow well if competing vegetation is controlled or removed by site preparation or by spraying, cutting, or girdling. Windthrow is a problem because of the



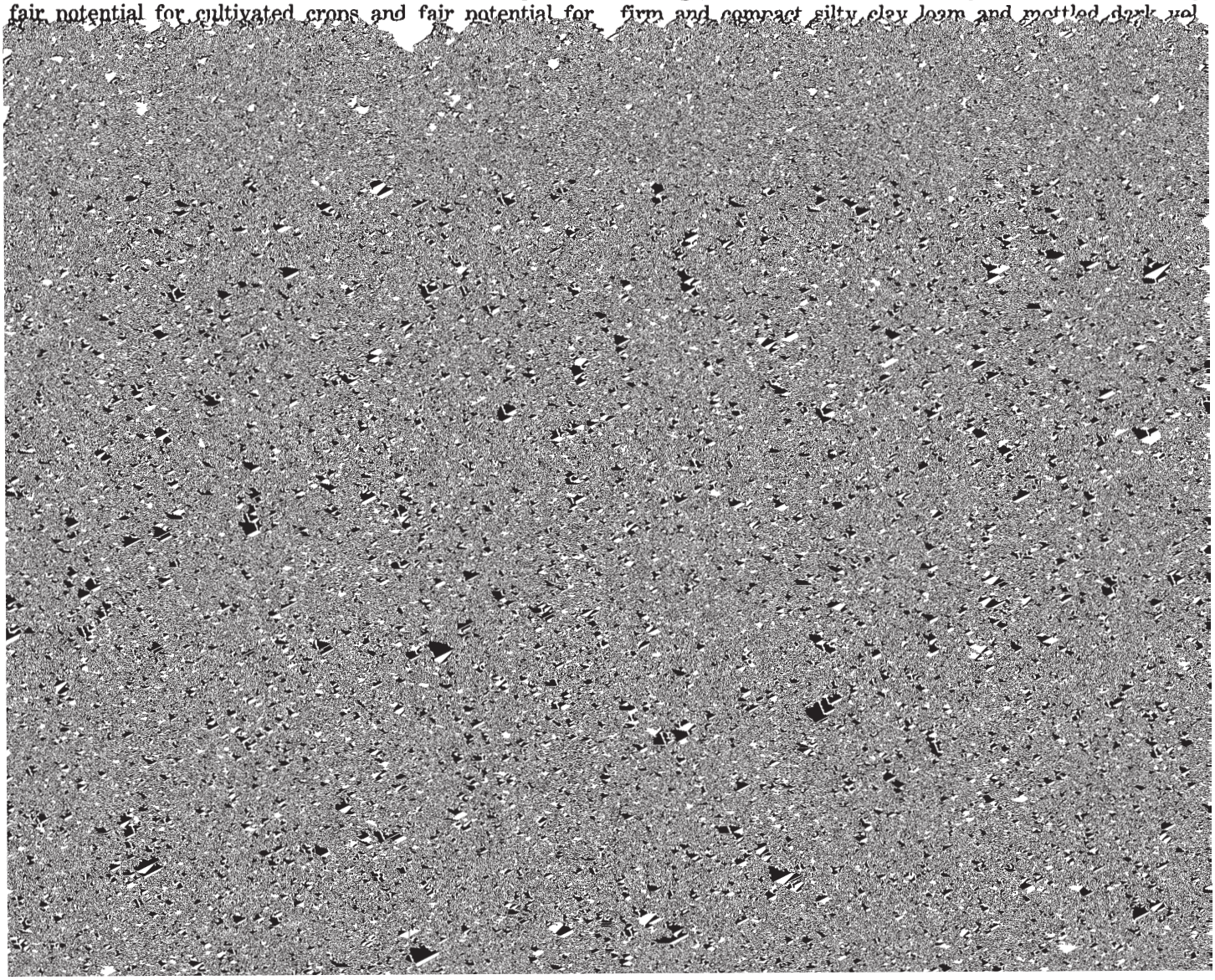
ridgetops, Hickory soils are on lower side slopes, and Belknap soils are in narrow drainageways. A few gullied areas of this soil are also included. In these areas most or all of the subsoil has been eroded away. Inclusions make up about 10 percent of this unit.

Water and air move through the upper part of the subsoil at a moderate rate and through the lower part at a very slow rate. Surface runoff from cultivated areas is rapid to very rapid. Reaction ranges from extremely acid to strongly acid in the subsoil and varies in the surface layer because of local liming practices. Root development is restricted below a depth of 14 to 30 inches by the very firm, compact lower part of the subsoil. The surface layer is firm and somewhat difficult to till. Clods form if the surface layer is worked when wet, and crusts form after hard rains because of poor structure, the clay content, and very low organic-matter content. Available water capacity is moderate.

Most areas of this soil are farmed. This soil has poor to fair potential for cultivated crops and fair potential for waste disposal systems are not suited because of slope and slow permeability. Sewage lagoons are difficult to construct because of slope. Capability subclass IVe; woodland suitability subclass 2o.

214D2—Hosmer silt loam, 12 to 18 percent slopes, eroded. This strongly sloping, moderately well drained soil is on convex ridgetops, on side slopes below ridges, and on foot slopes below steep soils. Individual areas of this soil are elongated or irregular in shape and range from 2 to about 30 acres in size.

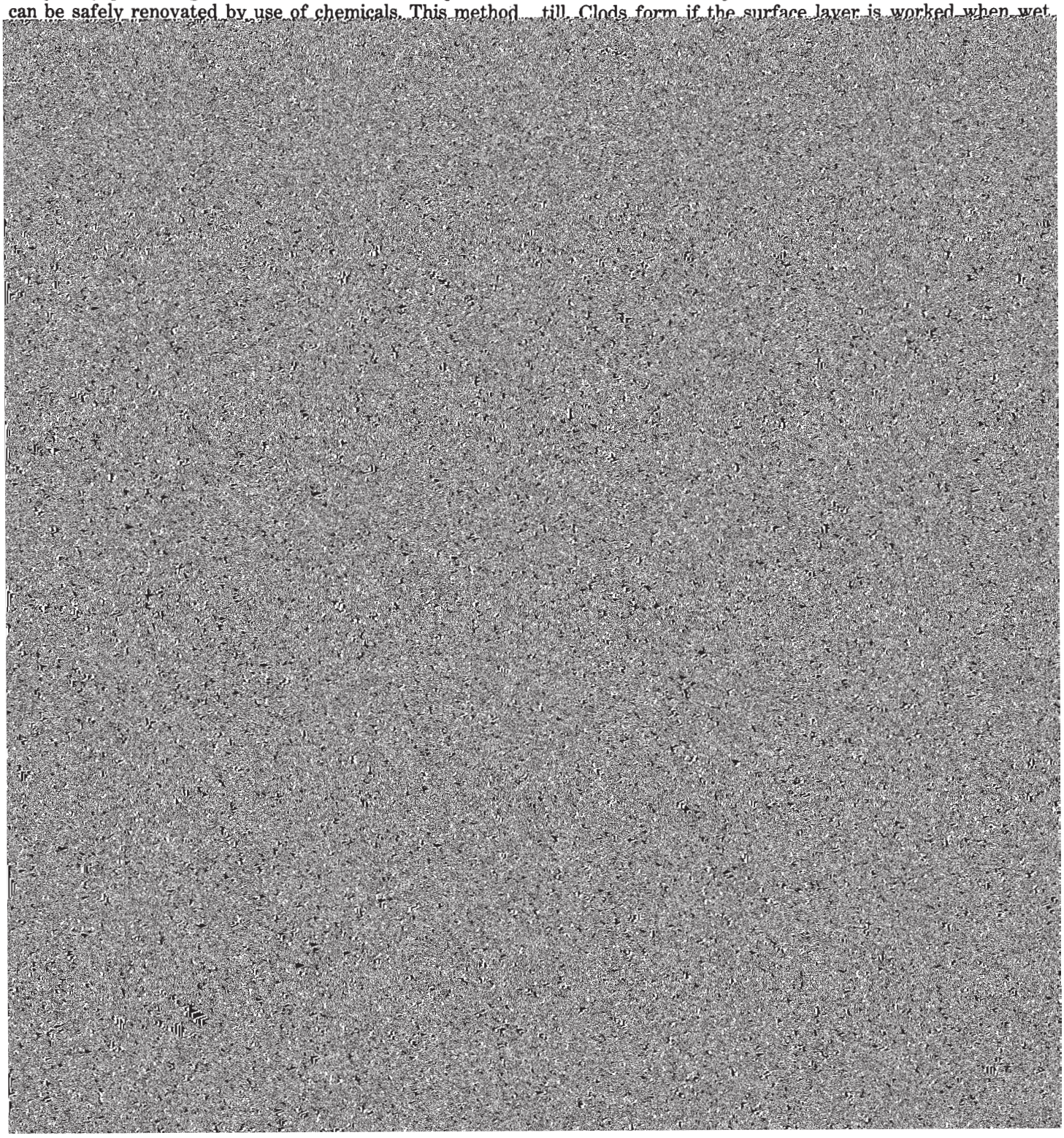
Typically, the surface layer is dark yellowish brown silt loam about 5 inches thick. It ranges from 4 to 7 inches in thickness over most of the area. The subsoil is about 40 inches thick. The upper 13 inches is strong brown light silty clay loam over mottled yellowish brown heavy silt loam. In the lower 27 inches the subsoil has a very firm and compact zone; a thin layer of mottled yellowish brown heavy silt loam, which has thick, pale brown coatings, overlies mottled dark yellowish brown, very firm and compact silty clay loam and mottled dark yel



loss. A few slopes are uniform enough to be terraced or contour farmed. Zero tillage permits row crops to be grown more often in the rotation, protects the soil from erosion, and increases water intake.

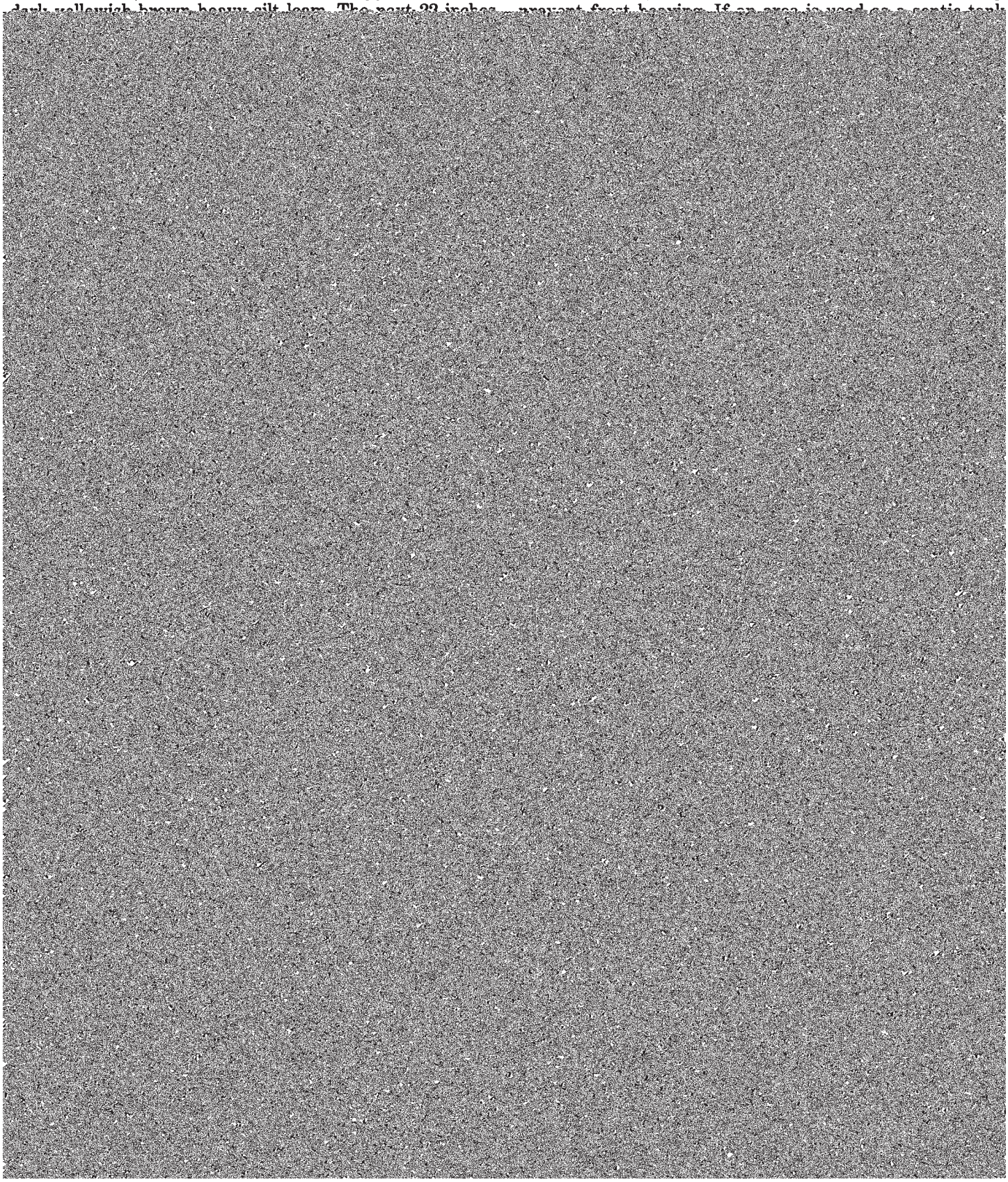
Most areas of this soil are now in pasture and are adequately protecting the soil from erosion. Old pastures can be safely renovated by use of chemicals. This method

Water and air move through the upper part of the subsoil at a moderate rate and through the lower part at a very slow rate. Surface runoff is very rapid. Reaction ranges from extremely acid to strongly acid in the subsoil and varies at the surface as a result of local liming practices. The surface layer is firm and somewhat difficult to till. Clods form if the surface layer is worked when wet.



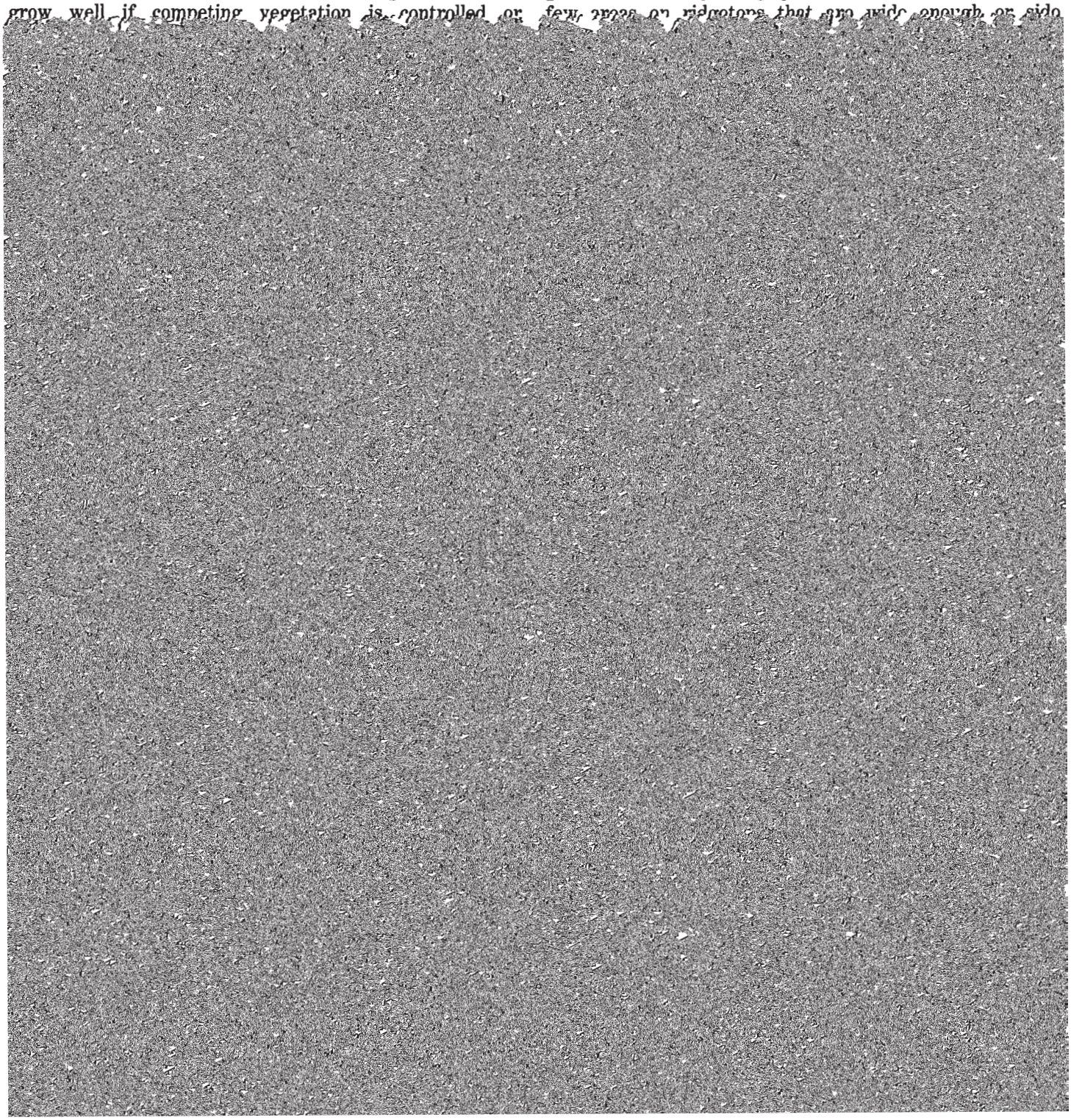
loam. The subsoil is 45 inches thick. The upper 3 inches is dark yellowish brown heavy silt loam. The next 22 inches

come. Installing footings below the freeze zone can help prevent frost heaving. If an area is used as a septic tank



This soil is well suited to fruits and vegetables. Erosion is the main management problem. Erosion can be controlled by cover crops, terracing, contouring, and minimum tillage. This soil can be irrigated if water is available and slopes are protected.

Trees grow well on this soil, and some areas remain in native hardwoods. Tree seeds and seedlings survive and grow well if competing vegetation is controlled or few areas on ridgetops that are wide enough or side



and wildlife uses, and fair to good potential for most engineering uses.

This soil is suited to corn, soybeans, small grain, and grasses and legumes for hay and pasture. If the soil is used for cultivated crops, there is a hazard of erosion. Minimum tillage, crop rotation, winter cover crops, and grassed waterways help prevent excessive soil loss. A

along drainageways where bedrock crops out. Also included are areas of steeper Alford soil and a few areas where the soil has short, steep slopes. Inclusions make up about 5 percent of this unit.

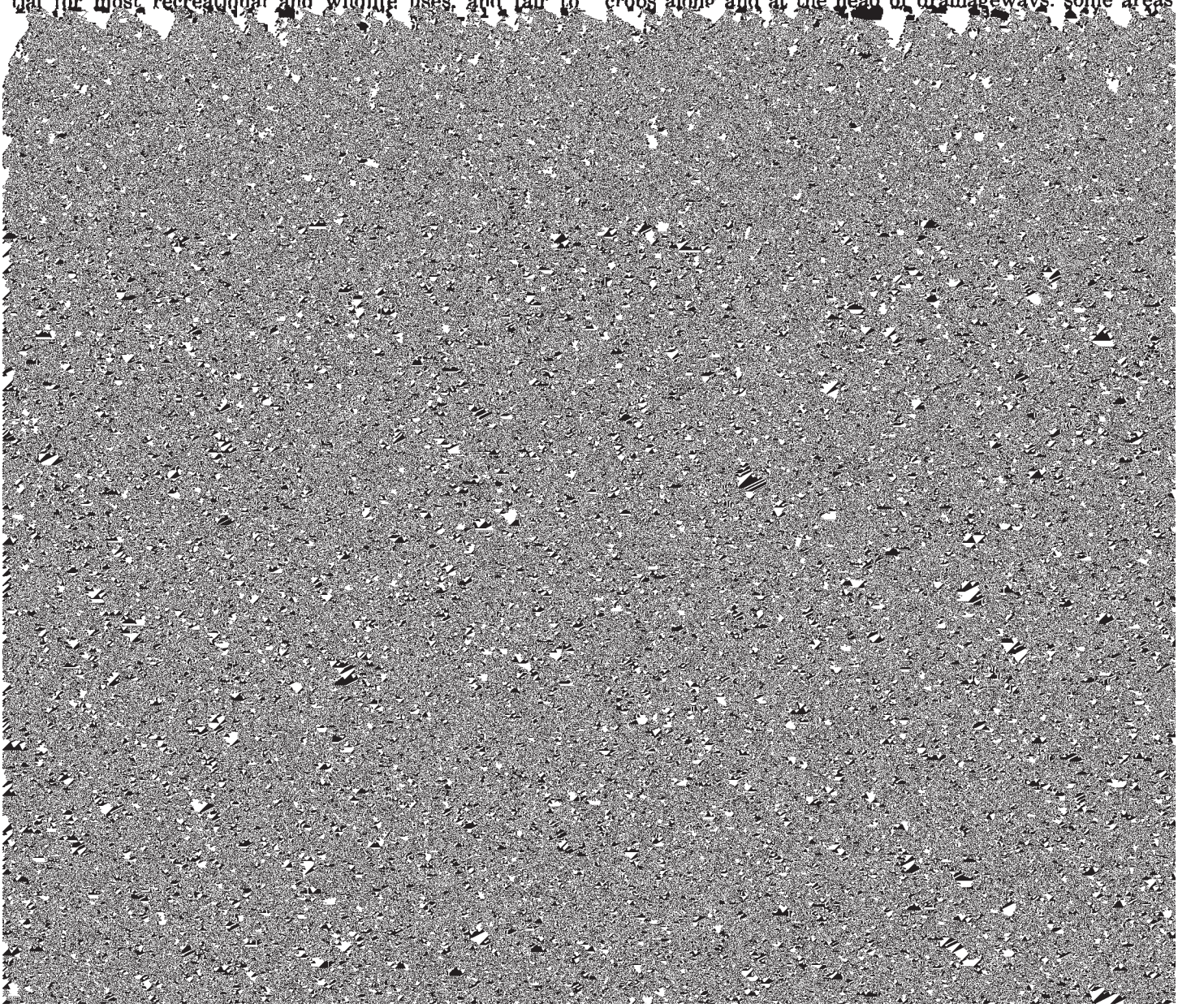
Water and air move through this soil at a moderate rate, and surface runoff from cultivated areas is rapid. Reaction ranges from medium acid to very strongly acid in the surface layer as a result of local liming practices. The surface layer is firm, slow to dry, and somewhat difficult to till. Clods form if the surface layer is tilled when wet, and the surface tends to crust after hard rains because of poor structure and very low organic-matter content. Available water capacity is high.

Most areas of this soil are farmed. This soil has fair potential for growing cultivated crops, fair to good potential for hay, pasture, trees, and orchard crops, fair potential for most recreational and wildlife uses, and fair to

this soil are mainly elongated or irregular in shape and range from about 5 to 80 acres in size.

Typically, the surface layer is yellowish brown silt loam containing some strong brown subsoil material. It is about 5 inches thick but ranges from 4 to 7 inches in thickness over most of the area. The subsoil is about 55 inches thick. The upper 34 inches is strong brown silty clay loam. The next 10 inches is brown silty clay loam. The lower 11 inches is brown heavy silt loam. In some places, particularly in timbered areas, the surface layer is dark grayish brown and is underlain by brown silt loam. In other places the lower part of the subsoil has grayish mottles.

Included with this soil in mapping are small limestone sinkholes, areas of this Alford soil on short, steep slopes, and bedrock escarpments. Also included are many small areas of severely eroded soil; a few areas of bedrock outcrops along and at the head of drainageways; some areas



possible. Plant competition should be controlled by site preparation, spraying, cutting, or girdling.

This soil is limited for building site development and onsite waste disposal by slope and the erosion hazard. Streets and roads should be constructed on the contour as much as possible to reduce roadside erosion. Capability subclass IVe; woodland suitability subclass 1o.

308D3—Alford silty clay loam, 12 to 18 percent slopes, severely eroded. This strongly sloping, well drained soil is mainly on hillsides between ridgetops and steep slopes and on side slopes along drainageways. Individual areas of this soil are elongated or irregular in shape and range from about 5 to 50 acres in size.

Typically, the surface layer is strong brown silty clay loam about 4 inches thick. The subsoil is about 50 inches thick. The upper 25 inches is strong brown silty clay loam. The next 10 inches is brown silty clay loam. The lower 15 inches is brown heavy silt loam. The substratum to a depth of about 60 inches is brown silt loam. In a few places the original surface layer remains, and it is dark brown or yellowish brown silt loam. In other places the lower part of the subsoil has grayish mottles.

Included with this soil in mapping are a few sinkholes, a few areas along drainageways and on hillsides where bedrock crops out, and a few areas of bedrock escarpments at the head of drainageways. Also included are some areas of the stony Wellston soils and the loamy Hickory soils at the base of some slopes and along drainageways, a few areas of the slowly permeable Hosmer soils along drainageways, and some areas that are so severely eroded and gullied that the lower part of the subsoil is at the surface. Inclusions make up 10 to 15 percent of this unit.

Water and air move through this soil at a moderate rate, and surface runoff from cultivated areas is rapid to very rapid. Reaction ranges from medium acid to very strongly acid in the subsoil and varies in the surface layer as a result of local liming practices. The surface layer is firm, slow to dry, and somewhat difficult to till. Clods can form if this soil is tilled when wet, and the surface tends to crust over after hard rains because of poor structure, increased clay content, and very low organic-matter content. Available water capacity is high.

Most areas of this soil are farmed. This soil has poor potential for cultivated crops and fair to good potential for hay, pasture, and trees. The potential for recreational and wildlife uses is poor to fair, and for most engineering uses it is poor to fair.

This soil is well suited to grasses and legumes for hay and pasture. This soil is erodible and low in fertility, and crusts form at the surface. It should be fertilized, and crop residue should be returned to the soil to improve fertility, reduce crusting, and increase water intake. Legumes and grasses help in controlling erosion. The soil and pasture can be maintained by rotating pastures and restricting use during wet periods.

Row crops are poorly suited to this soil because of slopes and the erosion hazard. Extreme caution and minimum tillage or zero tillage are needed when this soil is used for cultivated crops.

This soil is suited to trees, and some idle areas are naturally revegetating with native hardwoods. Controlling plant competition is the main concern of management. Competing vegetation can be controlled or removed by proper site preparation, by spraying, or by cutting.

Most idle land areas of this soil have sufficient cover to protect the surface from excess erosion. These areas are well suited to a wide variety of openland wildlife and plants.

This soil is generally unsuited to building site development or onsite waste disposal because of steepness of slopes. Certain types of structures can be developed on the natural landscape. Other areas require grading and leveling to reshape the landscape to make it suitable for these uses. Streets and roads should be constructed on the contour where possible to limit erosion of roadsides. Capability subclass VIe; woodland suitability subclass 1o.

308E—Alford silt loam, 18 to 30 percent slopes. This moderately steep to steep, well drained soil is on hillsides along drainageways and bottom lands. Individual areas are irregular in shape and range from 5 to about 400 acres in size.

Typically, the surface layer is dark grayish brown silt loam about 3 inches thick. The subsurface layer is yellowish brown silt loam about 7 inches thick. The subsoil is about 50 inches thick. The upper 25 inches is strong brown silty clay loam. The next 15 inches is brown light silty clay loam. The lower 10 inches is brown heavy silt loam. In some places the subsoil contains less clay and is heavy silt loam in the upper part. In other places the surface layer is loam, and the subsoil is clay loam.

Included with this soil in mapping are small areas that are severely eroded, small sandy areas, areas of limestone sinkholes, and areas of bedrock outcrops. Also included are areas where slopes are short and steep, areas of bedrock escarpments, and small areas of the stony Wellston soils along the drainageways or at the base of some slopes. In some areas the Wellston soils are at the head of drainageways. In other places large boulders and stones are on the surface. These areas are normally just below bedrock escarpments. Inclusions make up 5 to 10 percent of this unit.

Water and air move through this soil at a moderate rate, and surface runoff is rapid to very rapid. Reaction ranges from medium acid to very strongly acid in the subsoil and from medium acid to neutral in the surface layer. Organic-matter content is low, and available water capacity is high.

Most areas of this soil are in native hardwood trees. This soil has fair to good potential for pasture and trees, mostly fair to good potential for wildlife uses, and poor potential for most engineering uses.

This soil is not suited to cultivated crops because of steep slopes. Cleared areas are best suited to pasture, although the less sloping areas of this unit can be used for hay. Grasses and legumes grow well and help in con-

trolling erosion once the stand becomes established. Steep slopes limit machinery use and make site preparation, cutting or clipping, and harvesting difficult when this soil is used for hay. Grazing should be closely watched, and pastures should be rotated to keep the pasture and soil in good condition.

This soil is best suited to trees, and most areas are

Most areas of this soil are in pasture or are idle land. This soil has poor potential for cultivated crops, poor to good potential for hay, pasture, and trees, poor potential for recreation uses, fair to good potential for most wildlife uses, and poor potential for most engineering uses.

This soil is not suited to cultivated crops because of the hazard of erosion and equipment limitations. Use can be

Water and air move through this soil at a moderate rate, and surface runoff is very rapid. Reaction ranges from medium acid to very strongly acid in the subsoil and from medium acid to neutral in the surface layer. Organic-matter content is low, and available water capacity is high.

Most areas of this soil are in native hardwood trees. This soil has good potential for trees and for some wildlife uses. The potential for all other uses is poor.

This soil is not suited to cultivated crops or hay because of very steep slopes. In some places the less sloping areas can be planted to pasture. The erosion hazard is severe and difficult to control. Proper stocking rates and timely deferment of grazing are necessary to keep the pasture in good condition.

This soil is best suited to trees, and most areas are used for timber. The very steep slopes limit equipment use, and the erosion hazard is severe. Once established, trees adequately protect this soil from excessive erosion. Extreme care must be used during logging operations because logging trails and roads will rapidly erode. Removing and cutting trees are problems, but special equipment and safety precautions can overcome these problems.

The very steep slopes make this soil unsuitable for building development. A few less sloping areas, however, that were included in mapping may be suitable. Roads are difficult to build and maintain because of the severe erosion hazard and should be constructed on the contour where possible to limit erosion. Capability subclass VIIe; woodland suitability subclass 1r.

331—Haymond silt loam. This nearly level, well drained soil is along streams on natural levees. The areas are elongated and range from 4 to about 60 acres in size.

This soil is suited to corn, soybeans, small grains, grasses and legumes for hay and pasture, and some specialty crops. Flooding, with associated deposition and streambank erosion, is the main hazard. The flooding hazard is greatest in winter, but occasionally crops are damaged by floods during the growing season.

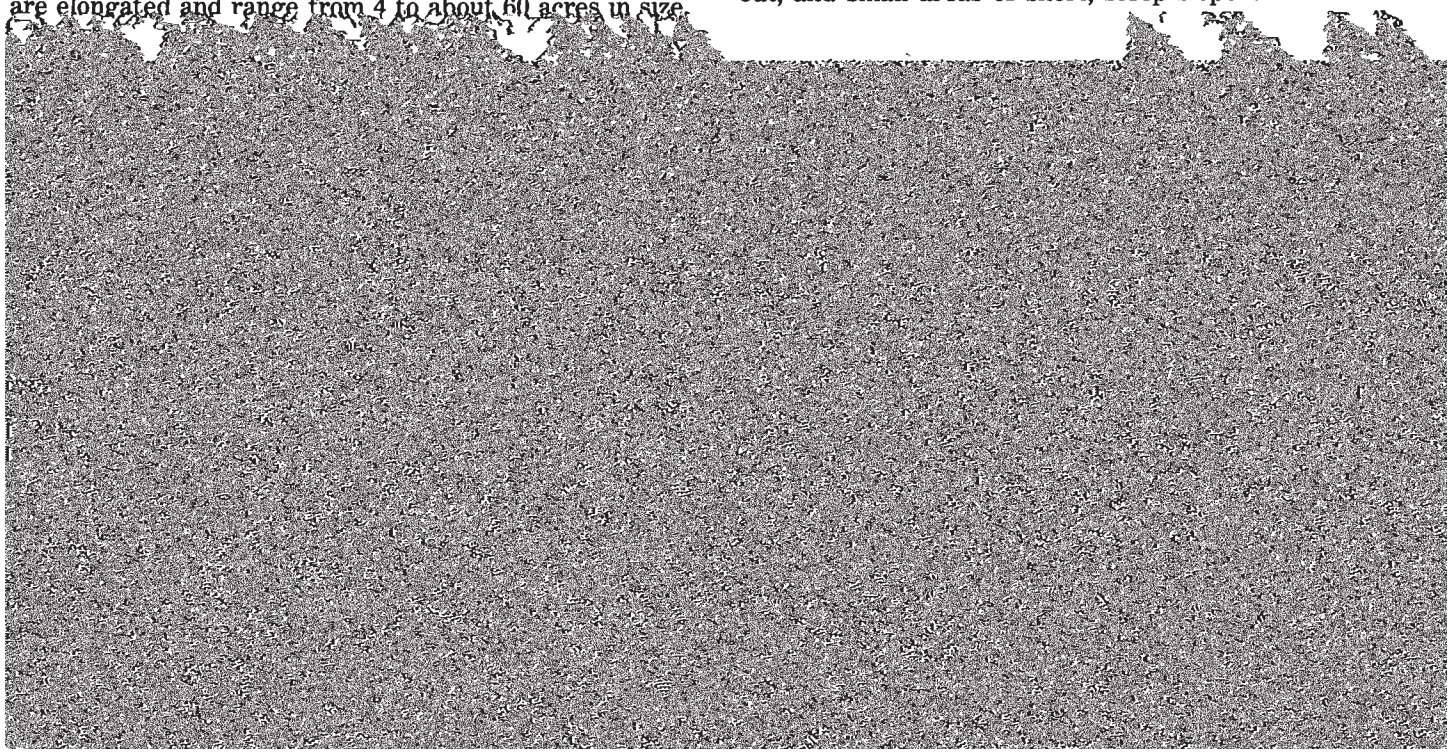
This soil is well suited to a wide variety of trees, and some areas remain in native hardwoods. Flooding can damage young seedlings. Plant competition should be controlled to obtain maximum growth rates.

This soil is generally unsuited to building site development because flooding is a hazard unless the soil is adequately protected by upstream structures. Capability class I; woodland suitability subclass 1o.

333—Wakeland silt loam. This nearly level, somewhat poorly drained soil is on narrow and broad, flat bottom lands along creeks and streams. Individual areas are mostly elongated and irregularly shaped in broad areas and range from about 5 to several hundred acres in size.

Typically, the surface layer is brown silt loam about 13 inches thick. The substratum to a depth of 60 inches is silt loam. The upper 4 inches is brown with brownish gray mottles. The next 22 inches is grayish brown with dark yellowish brown mottles. The lower 21 inches is light brownish gray with brown mottles. On some narrow bottom lands, the lower part of the substratum contains stony loam. On some broad bottoms, the lower part of the substratum contains silty clay loam or silty clay sediments. In some places reaction in the lower part of the substratum is mildly alkaline.

Included in mapping are small areas that have a sandy surface layer, small wet areas, areas where rock crops out, and small areas of short, steep slope breaks. Also in-



Many of the narrow areas are used for pasture or hay. Proper stocking rates, timely deferment of grazing, and restricted use during wet periods help to keep the pasture and soil in good condition. Clipping and spraying

years, and flooding occasionally destroys crops before harvest.

This soil is suited to trees, and many areas remain in native hardwoods. Adapted species grow well if plant

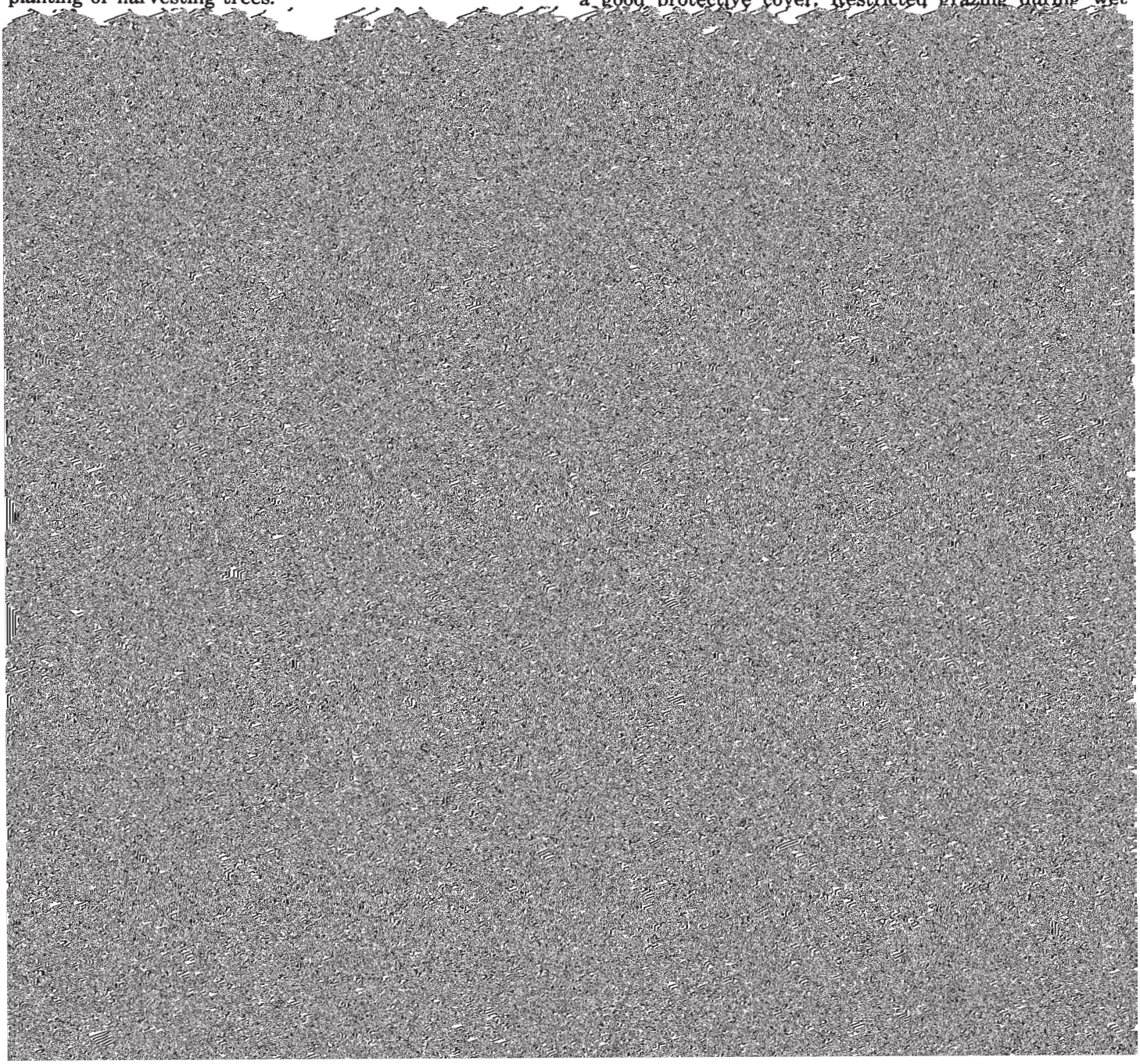
material to the surface helps reduce crusting and increase water intake. Disrupting the platy subsurface layer by deep plowing or chisel plowing increases water intake and enhances root growth.

The use of this soil for pasture or hay is not extensive, but wetness-tolerant grasses and legumes grow well if proper amounts of fertilizer are added. Overgrazing when the soil is wet can cause surface compaction and reduce water intake. Excess water can be removed by shallow ditches.

This soil is suited to trees, and some areas remain in native hardwoods. There are no hazards or limitations in planting or harvesting trees.

This soil is suited to soybeans, grain sorghum, wheat, and grasses and legumes for hay and pasture. Erosion is the main hazard. Natural fertility is low. Minimum tillage, winter cover crops, and grassed waterways help to reduce soil erosion. Returning crop residue to the soil or regularly adding other organic material helps to improve fertility, reduce crusting, and increase water intake. Additions of lime and fertilizers, especially nitrogen, are necessary to improve production.

The use of the soil for pasture or hay helps in controlling erosion. This soil should be fertilized according to tests. Wetness-tolerant plants should be used to establish a good protective cover. Restricted grazing during wet

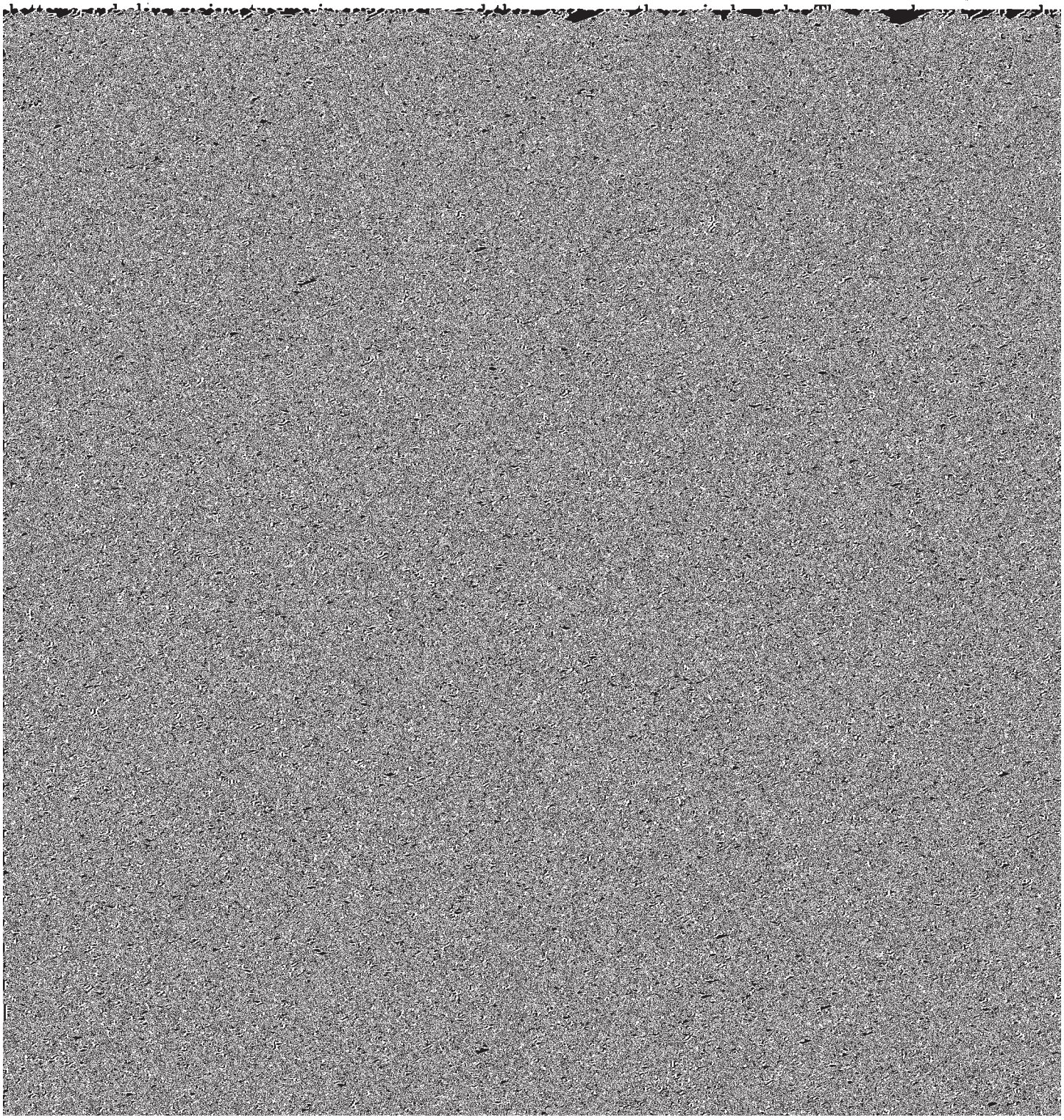


good for wildlife uses. It is poor for most engineering uses.

This soil is suited to corn, soybeans, grain sorghum, wheat, and grasses and legumes. The hazard of flooding is the main management concern. Dikes and levees can protect against floods but generally are not practical. Because of flooding, time of planting is affected on wide

cultivated crops, hay, and pasture. The potential for trees is fair to good, for recreation uses it is poor, for wildlife it is mostly fair to good, and for most engineering uses it is poor.

This soil is suited to corn, soybeans, and grasses and legumes for hay and pasture, but during most years the choice of crops is limited by flooding. Flooding and wet-



use is usually short. The wetness hazard is difficult to overcome without great expense, and levees and pumps are needed to protect and adequately drain this soil.

This soil is suited to trees. Hazards include equipment limitations and seedling mortality. Most areas can be hand planted during drier periods with wetness-tolerant trees that are adapted to the site. Competing vegetation should be removed by cutting or girdling.

Many areas of this soil are suited to wetland plants and are excellent habitat for wetland wildlife. There are some shallow water areas, and many others could be easily developed. The extreme wetness limits the choice of plants that can provide food for wildlife.

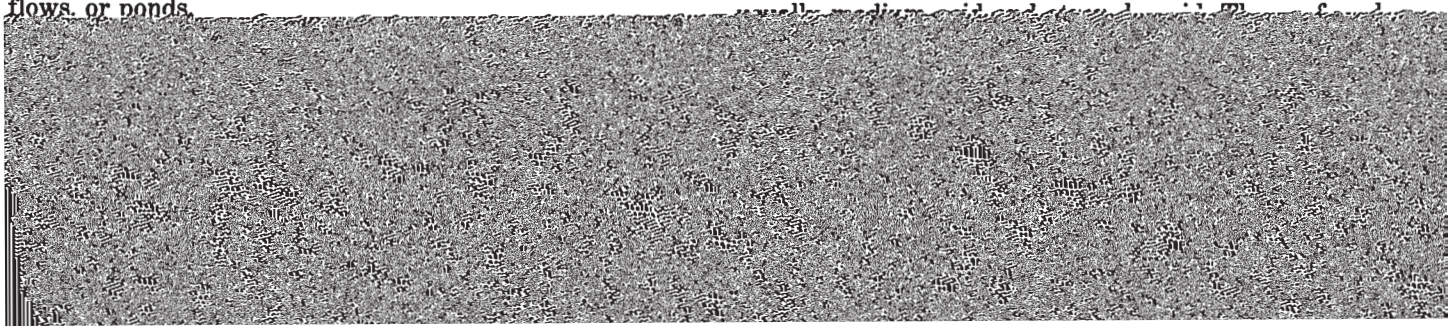
This soil is generally unsuited to building sites or onsite waste disposal because of wetness and flooding hazards. A system of levees and pumps or filling the area is necessary to overcome the limitations. Capability subclass Vw; woodland suitability subclass 2w.

426—Karnak silty clay. This nearly level to depressional, poorly drained or very poorly drained soil is in broad, flat areas and narrow, low-lying channels or sloughs on bottom lands. Individual areas are mostly elongated in shape and range from 10 to about 400 acres in size.

Typically, the surface layer is very firm, very dark gray silty clay about 6 inches thick. The subsoil is about 48 inches thick. The upper 11 inches is dark gray clay with dark brown mottles. The lower part is gray clay with yellowish brown mottles. The substratum to a depth of 60 inches is gray silty clay loam with strong brown mottles.

Included with this soil in mapping are small areas that remain wet for extended periods and small areas that have sandy overwash. A few areas of Dupo soils in slightly higher areas are also included. Inclusions make up 2 to 5 percent of this unit.

Water and air move through this soil at a very slow rate, and surface runoff is slow to ponded. Reaction ranges from strongly acid to neutral in the subsoil and varies in the surface layer as a result of liming. Shrink-swell potential is very high, and wide cracks develop in the surface layer during dry periods. The surface layer is very firm and difficult to till, and it dries slowly. Clods form if the surface is worked when wet. Organic-matter content is low to medium, and available water capacity is low to moderate. The seasonal water level is at or near the surface during the spring, and water floods, overflows, or ponds.



winter. Shallow ditches at frequent intervals and land leveling provide adequate drainage for most areas. Deep ditches are necessary to drain low-lying depressions. Surface tilth can be improved by fall plowing and by limiting trips over the field to reduce compaction.

Wetness-tolerant grasses and legumes can be grown for pasture and hay. Restricted use during wet periods will help to keep the pasture and soil in good condition. Draining and protecting from flooding or overflow will increase yields and extend the period of use.

Trees are suited to this soil. Seeding mortality and plant competition are management problems. Hand planting of wetness-tolerant species obtains the best results. Plant competition can be controlled by proper site preparation, spraying, and prescribed burning.

Low-lying areas or depressions that are difficult to drain are suitable for wetland plants and as habitat for wetland wildlife.

This soil is not suited to building sites, roads, or onsite waste disposal systems unless the major limitations are overcome. This wet clayey soil is difficult to work and is unstable on wetting and drying. It has additional limitations of flooding, ponding, or overflow and very slow permeability. Capability subclass IIIw; woodland suitability subclass 3w.

427—Burnside silt loam. This nearly level to gently sloping, moderately well drained or well drained soil is on narrow drainageways in areas overlying bedrock. Individual areas of this soil are elongated in shape and range from about 4 to 75 acres in size.

Typically, the surface layer is dark brown silt loam about 8 inches thick. The subsoil is about 16 inches thick. It is dark yellowish brown silt loam in the upper part and dark brown channery loam in the lower part. The substratum to a depth of about 60 inches is dark brown flaggy sandy loam. In some places the surface layer is stony loam or loam. In other places the subsoil is thicker and the stony loam material is deeper than 30 inches from the surface. In some places reaction is slightly acid or neutral.

Included with this soil in mapping are a few areas where bedrock crops out. Also included are areas of Haymond, Wakeland, and Belknap soils in less sloping positions further away from the head of drainageways and in areas where the valley broadens out. Inclusions make up about 10 to 15 percent of this unit.

Water and air move through this soil at a moderate rate, and surface runoff is slow to medium. Reaction ranges from very strongly acid to medium acid but is

This soil is suited to soybeans, grain sorghum, and grasses and legumes for hay and pasture. Few areas are used for row crops because they are generally inaccessible and small. Flooding is the main hazard, and protecting most areas from flooding is impractical.

Grasses and legumes grow well if properly fertilized and managed to keep out competing vegetation. Clipping and spraying pastures will control undesirable plants.

This soil is well suited to trees. Tree seeds and seedlings survive and grow well if competing vegetation is controlled or removed by proper site preparation or by spraying, cutting, or girdling. There are no hazards or limitations to planting or harvesting trees. Many areas, however, have limited access because of the surrounding topography, which often includes bedrock escarpments.

This soil is generally unsuited to building sites because of the flooding hazard. Areas protected by levees can be developed. Capability subclass IIs; woodland suitability subclass 1o.

428—Coffeen silt loam. This nearly level, somewhat poorly drained soil is on the lower parts of stream terraces and alluvial fans. Individual areas of this soil are elongated or irregular in shape and range from 10 to about 40 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 17 inches thick. The subsoil is silt loam about 47 inches thick. It is dark brown and brown in the upper part and grayish brown and brown in the middle part. The lower part is yellowish brown and grayish brown. The substratum to a depth of 76 inches is pale brown and grayish brown silt loam. In some places the lower part of the subsoil and the substratum are silty clay or clay. In other places the surface layer is not so dark colored.

Included with this soil in mapping are a few areas of Raddle and Dupo soils. Raddle soils are in slightly higher positions, and Dupo soils are in lower positions. Inclusions make up about 5 percent of this unit.

Water and air move through this soil at a moderate rate, and surface runoff from cultivated areas is slow. Reaction ranges from medium acid to neutral. The surface layer is friable and easily tilled. Organic-matter content is medium, and available water capacity is very high.

Most areas of this soil are farmed. This soil has good potential for cultivated crops, hay, pasture, and trees. The potential for recreation use is mostly fair, for wildlife use it is good to fair, and for most engineering uses it is poor.

This soil is well suited to corn, soybeans, wheat, and grasses and legumes for hay and pasture. Most areas are suitable for double cropping. The main problems are a seasonal high water table and occasional overflow by water coming in from the uplands. The high water table can be corrected by a tile drainage system and overflow can be controlled by ditches and diversions.

This soil is not well suited to building site development or onsite waste disposal because of flooding and wetness hazards. If the soil is protected from overflow by ditches and levees, structures can be safely built on this soil. Capability class I; woodland suitability subclass 2w.

430A—Raddle silt loam. This nearly level to very gently sloping, moderately well drained or well drained soil is on stream terraces and at the base of upland slopes adjoining bottom lands. Areas of this soil are elongated or rounded and range from 10 to 250 acres in size.

Typically, the surface layer is very dark grayish brown silt loam about 12 inches thick. The subsoil is about 53 inches thick. The upper 5 inches is dark brown silt loam. The next 6 inches is dark yellowish brown silt loam. The lower 42 inches is dark yellowish brown silt loam with pale brown and light brownish gray mottles. The substratum to a depth of about 70 inches is mottled yellowish brown silt loam. In some places the surface layer is thinner and is dark brown.

Included with this soil in mapping are a few small areas of sandy soils, a few low areas of soils that are wet, and a few areas of this Raddle soil on short, steep slopes and in sloping areas where erosion is a hazard. Inclusions make up about 15 percent of this unit.

Water and air move through this soil at a moderate rate, and surface runoff is slow to medium. Reaction ranges from medium acid to neutral. The surface layer is friable and easily tilled. Organic-matter content is medium, and available water capacity is very high.

Most areas of this soil are farmed. This soil has good potential for cultivated crops, hay, pasture, and trees. The potential for most recreation and wildlife uses is good, and for most engineering uses it is good to fair.

This soil is well suited to corn, soybeans, wheat, and grasses and legumes. Most areas are suitable for double cropping. The main problem is controlling runoff from upland slopes. Runoff can safely be diverted by shallow ditches or grassed waterways. The more sloping soils in included areas will erode if they are intensively farmed, but they can be protected if zero tillage or minimum tillage and contour farming are used.

This soil is suited to building site development and onsite waste disposal if overflow water coming from the uplands is controlled or diverted. Local streets and roads should be protected from frost action by proper banking and ditching to remove excess water. Capability class I.

456—Ware loam. This nearly level to gently sloping, moderately well drained or well drained soil is on undulating ridges and natural levees along old channels and sloughs on the protected side of the levee on the Mississippi River flood plain. The areas are elongated and range from 4 to more than 200 acres in size.

Typically, the surface layer is very dark grayish brown and very dark brown loam about 14 inches thick. The subsoil is about 7 inches thick. It is mixed brown and very dark grayish brown very fine sandy loam. The substratum to a depth of about 60 inches is yellowish brown and grayish brown very fine sandy loam with layers of loamy very fine sand. In some places the substratum is loamy fine sand and sand.

Included with this soil in mapping are a few areas of soils that are sandy at the surface, soils in a few small wet areas, a few areas of soils on short, steep slopes, and

a few areas of soils that have a loamy fine sand subsoil. Also included are a few areas of Medway soils having a slope that is similar to that of this Ware soil and a few areas of this Ware soil having slopes of up to about 10 percent. Inclusions make up about 10 to 15 percent of this unit.

Water and air move through this soil at a moderate to moderately rapid rate, and surface runoff from cultivated areas is slow to medium. The surface layer is friable and easily tilled. It dries quickly after rains and warms up early in the spring. Organic-matter content is medium, and available water capacity is moderate to high.

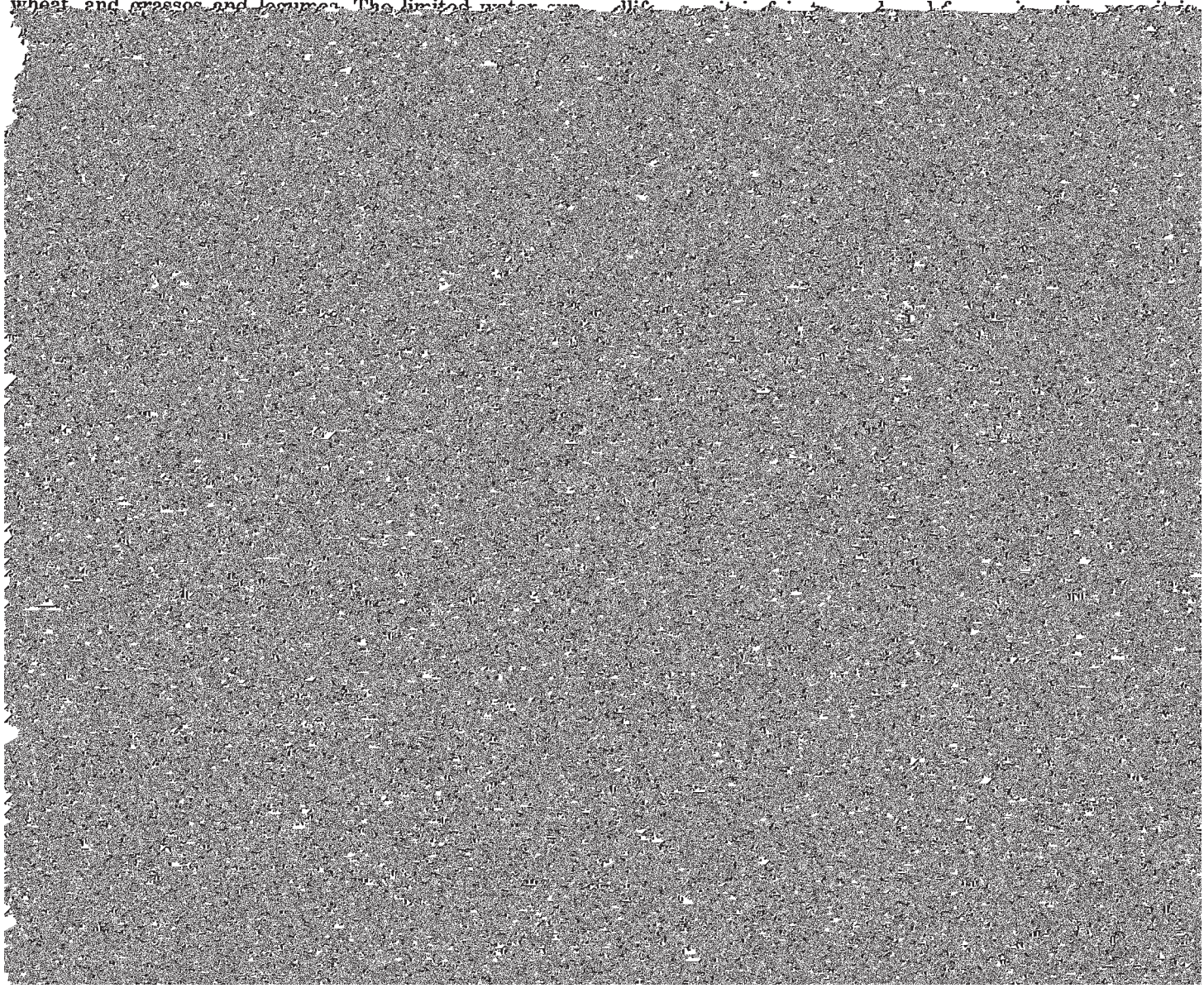
Most areas of this soil are farmed. The soil has fair to good potential for cultivated crops, hay, pasture, trees, and some special crops. It has fair to good potential for recreation uses, good potential for most wildlife uses, and fair potential for most engineering uses.

This soil is suited to corn, soybeans, grain sorghum, wheat, and grasses and legumes. The limited water [illegible]

poorly drained Medway soils, areas of recently deposited loose sand near the river and along the main overflow channels, and a few areas of this Ware soil on the protected side of the levee. In some areas the surface layer is brown and yellowish brown. A few included areas have slopes of up to 10 percent. Inclusions make up about 10 percent of this unit.

Water and air move through this soil at a moderately rapid rate, and surface runoff is slow. Reaction ranges from mildly alkaline to moderately alkaline and is usually calcareous in the substratum. The surface layer is friable to very friable and easy to till. It dries quickly after rains and warms up early in the spring. Organic-matter content is low to medium, and available water capacity is low to moderate. This soil is subject to frequent flooding.

Most areas of this soil are farmed. This soil has fair potential for cultivated crops, hay, pasture, and trees. The potential for recreation uses is poor to fair, for most wil-



liming practices. The surface layer is very firm and difficult to till. The soil clods if worked when wet. It is very plastic when wet and very hard when dry. Shrink-swell potential is very high, and wide cracks form when the surface dries. Rooting depth is restricted because of the seasonal high water level, and this soil is subject to overflow by floodwater. Organic-matter content is medium, and available water capacity is low to moderate.

Many areas of this soil are farmed, and many remain in native hardwood trees. This soil has fair potential for cultivated crops, hay, pasture, and trees, poor potential for recreation areas, fair to poor potential for most wildlife uses, and poor potential for most engineering uses.

This soil is suited to corn, soybeans, grain sorghum, wheat, and grasses and legumes if the wetness hazard is controlled. Shallow ditches at frequent intervals and land leveling are commonly used to reduce wetness. Tilth is a problem but can be improved by fall plowing, providing drainage, incorporating crop residue into the surface layer, and practicing minimum tillage to reduce compaction.

Hay and pasture can be grown on this soil if adequate drainage is provided. Wetness-tolerant grasses and legumes should be favored; these grow reasonably well if fertilizers are added according to tests. Pasture rotation and restricted use during wet periods are necessary to keep the pasture and soil in good condition.

layer is less than 10 inches thick. In other places the surface layer is silty clay loam, and a few places have silt loam overwash.

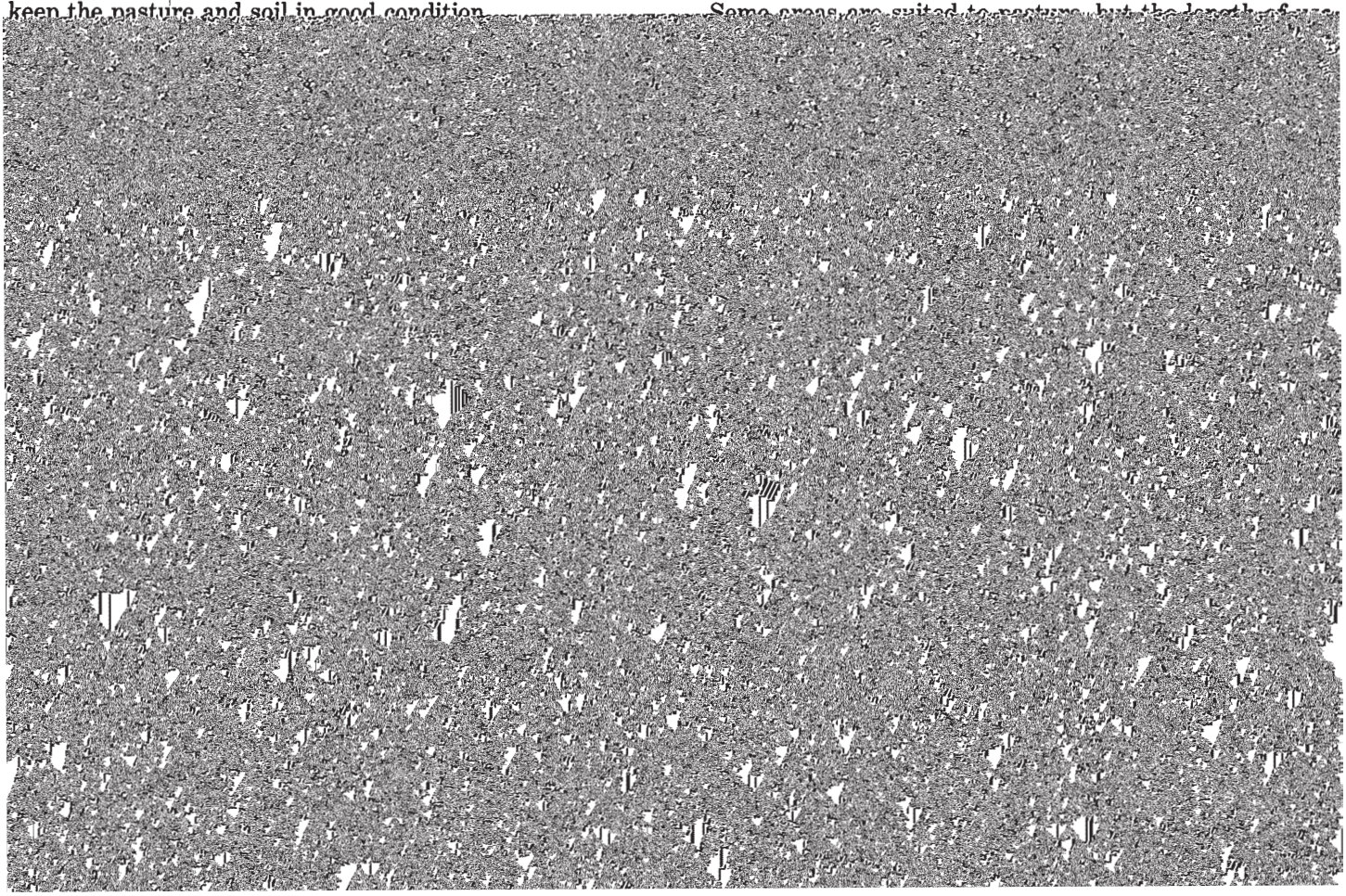
Included with this soil in mapping are areas of the same soil that do not remain wet for extended periods. Also included are areas of Jacob soils in similar positions. Inclusions make up less than 5 percent of this unit.

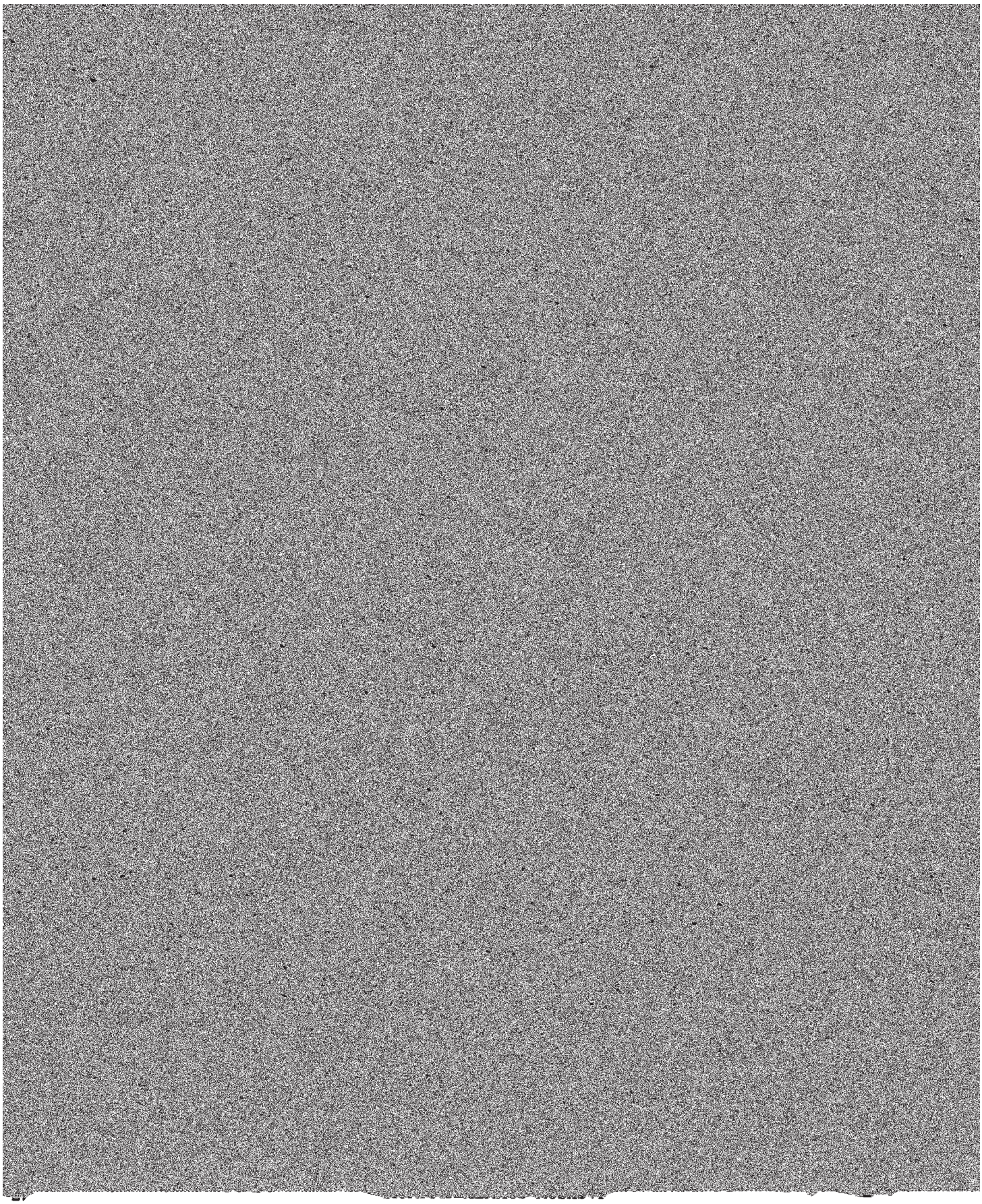
Water and air move through this soil at a very slow rate, and surface runoff is ponded. Reaction ranges from extremely acid to medium acid in the subsoil. The surface layer is very plastic when wet and very hard when dry. Shrink-swell potential is very high, and wide cracks form when the surface dries. This soil has a water level at or near the surface for extended periods and is subject to flooding. Organic-matter content is medium, and available water capacity is low to moderate.

Most areas of this soil remain in native hardwood trees. This soil has poor potential for cultivated crops, hay, and pasture and for recreation uses, poor to fair potential for most wildlife uses and for trees, and poor potential for most engineering uses.

This soil is not suited to cultivated crops, hay, or pasture because of serious wetness hazards. Drainage with ditches can improve this soil, but outlets are often not available. Deep ditches or tile inlets are usually needed to drain this soil.

Some areas are suited to pasture, but the depth of





This soil is suited to corn, soybeans, grain sorghum, wheat, and grasses and legumes for hay and pasture. The wetness hazard and tilth are the main problems limiting the use of the soil. Excess water can best be removed by land leveling and ditches. Tile systems do not function well because of the very slow permeability. In low-lying areas crops may be damaged by ponded water during some years, but this damage is normally minor. Surface tilth can be improved by plowing in the fall, by reduced tillage to avoid excess compaction, and by returning crop residue to the surface.

Grasses and legumes grow fairly well if the wetness hazard is reduced. Surface cracking during dry months affects proper root growth and reduces yields. If this soil is pastured, use should be restricted during wet periods to prevent compaction and damage to the stand.

This soil is generally unsuited to building sites because of wetness and the clayey material. Excess surface water can be removed by ditching and land leveling, but the fluctuating water level is difficult to control. If proper design and proper installation procedures are used, certain types of structures can be built on this soil. Capability subclass IIIw; woodland suitability subclass 2w.

682—Medway silty clay loam. This nearly level to gently sloping, somewhat poorly drained soil is on undulating ridges and natural levees along sloughs or overflow channels on the Mississippi River flood plain. Individual areas of this soil are elongated or irregular in shape and range from 2 to about 300 acres in size.

Typically, the surface layer is very dark brown silty clay loam about 17 inches thick. The subsoil is about 19 inches thick. The upper 10 inches is dark brown heavy loam with mottles. The lower 9 inches is dark brown loam with mottles. The substratum to a depth of about 61 inches is mottled brown and pale brown very fine sandy loam. In some places the subsoil lacks the grayish mottles and is dark brown throughout. In other places, the subsoil is thinner and the substratum is fine sand or sand.

Included with this soil in mapping are a few areas of soils with sandy overwash, a few low-lying areas of wet soils, and a few areas of soils where slopes are short and steep. Also included are a few areas of Ware, Bowdre, and Gorham soils. Ware soils are mainly on slightly higher ridgetops than Medway soils. Bowdre soils occupy similar positions as Medway soils, but the surface layer is more clayey and cracks on drying. Gorham soils are in lower positions and are poorly drained. Inclusions make up about 5 to 10 percent of this unit.

Water and air move through this soil at a moderate rate, and surface runoff is slow to medium. Reaction ranges from medium acid to mildly alkaline in the subsoil and varies in the surface layer because of local liming practices. The surface layer is friable to firm and easily tilled. Organic-matter content is medium, and available water capacity is high.

Most areas of this soil are farmed. This soil has good potential for cultivated crops, hay, pasture, trees, and special crops. The potential for most recreation uses is poor to good, for openland wildlife it is good, and for most engineering uses it is poor.

This soil is well suited to corn, soybeans, wheat, and grasses and legumes. There are no serious limitations. A few of the more sloping areas are subject to erosion but can be protected by winter cover crops, zero tillage, and contour farming. Surface tilth in the nearly level areas can be improved by plowing in the fall and by returning crop residue to the surface. Shallow ditches are often used to remove excess surface water from the undulating or low-lying areas.

Special crops, such as pumpkins, and a variety of vegetables are suited to this soil and grow well if properly fertilized.

Grasses and legumes grow well if adapted species are planted and fertilized according to their needs. Some damage by frost heave is likely if drainage is not provided. Surface drainage can be provided by ditches, and the fluctuating water level can be lowered by tile if outlets are available.

This soil is not suited to building sites because of the wetness hazard, which can be reduced by surface drains and tile. Streets and roads are subject to frost action. Onsite waste disposal filter fields will not function adequately because of the high water table. Capability class I; woodland suitability subclass 2w.

F682—Medway soils, frequently flooded. These nearly level to gently sloping, somewhat poorly drained soils are on broad, low ridges and natural levees along overflow channels that are primarily on the unprotected side of the levee on the Mississippi River flood plain. Individual areas of this unit are elongated or irregular in shape and range from 4 to about 500 acres in size.

The surface layer is about 14 inches thick and ranges from very fine sandy loam to silty clay loam. The substratum to a depth of about 65 inches is mixed dark grayish brown, grayish brown, and very dark gray layers of loam, silt loam, and silty clay loam in the upper part and yellowish brown and grayish brown loamy very fine sand in the lower part. In some places, layers of silty clay and layers of sand are in the substratum.

Included in mapping are a few areas of soils with recent sandy overwash and areas of soils where slopes are short and steep. Also included are areas of Darwin soils in low-lying, narrow overflow channels, areas of the more sandy Ware soils on knolls or at the edge of overflow channels, and a few areas on the protected side of the levee. Inclusions make up about 15 percent of this unit.

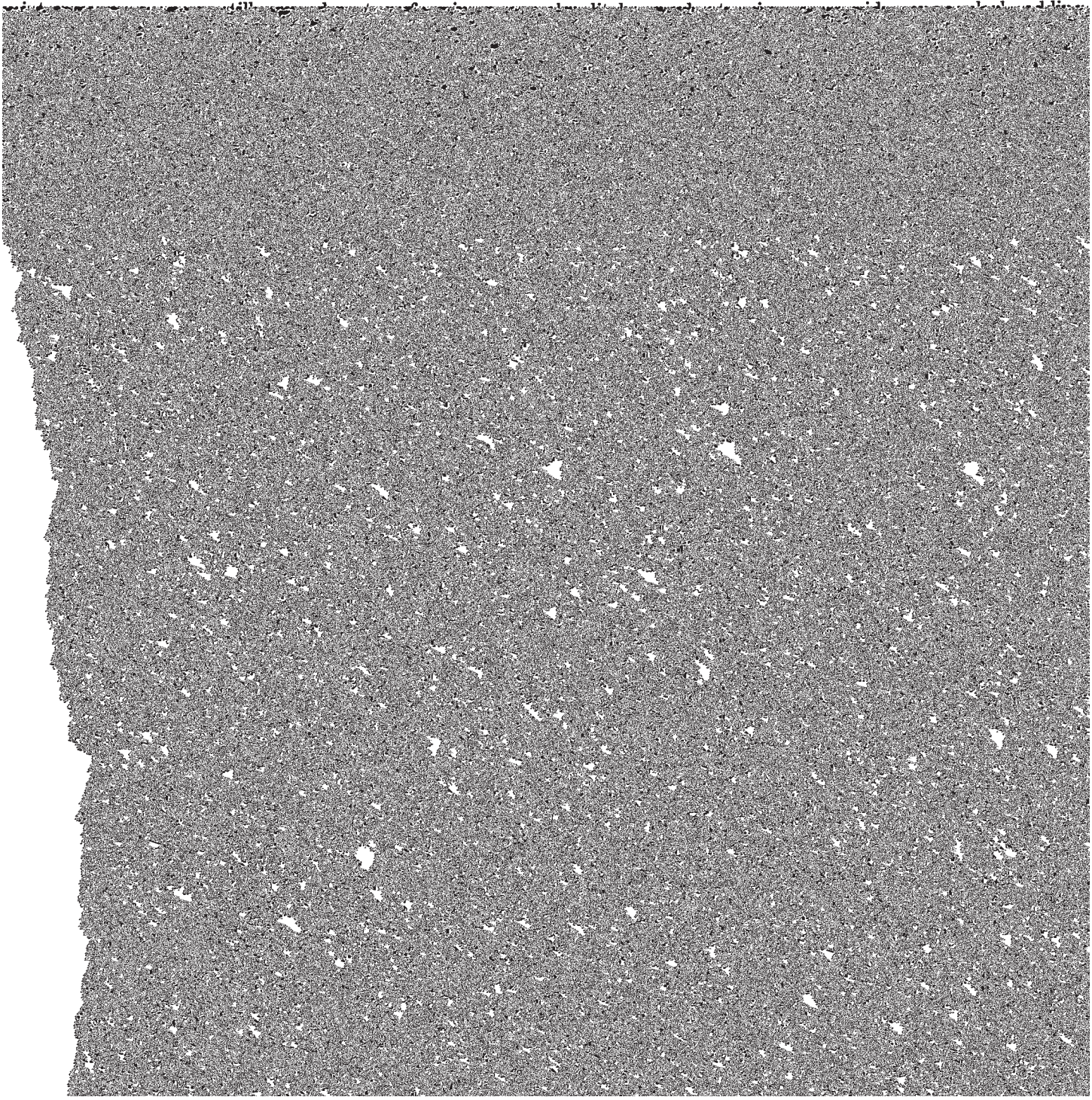
Water and air move through these soils at a moderate rate, and surface runoff is slow. Reaction ranges from neutral to moderately alkaline, and the substratum is calcareous in most places. The surface layer is friable to firm and easily tilled. Organic-matter content is medium, and available water capacity is high. These soils are flooded frequently but usually not for long periods. Included areas on the protected side of the levee are not subject to flooding.

Most areas are farmed. These soils have poor to fair potential for cultivated crops, hay, and pasture, good potential for trees, poor potential for most recreation uses, and good potential for most wildlife uses.

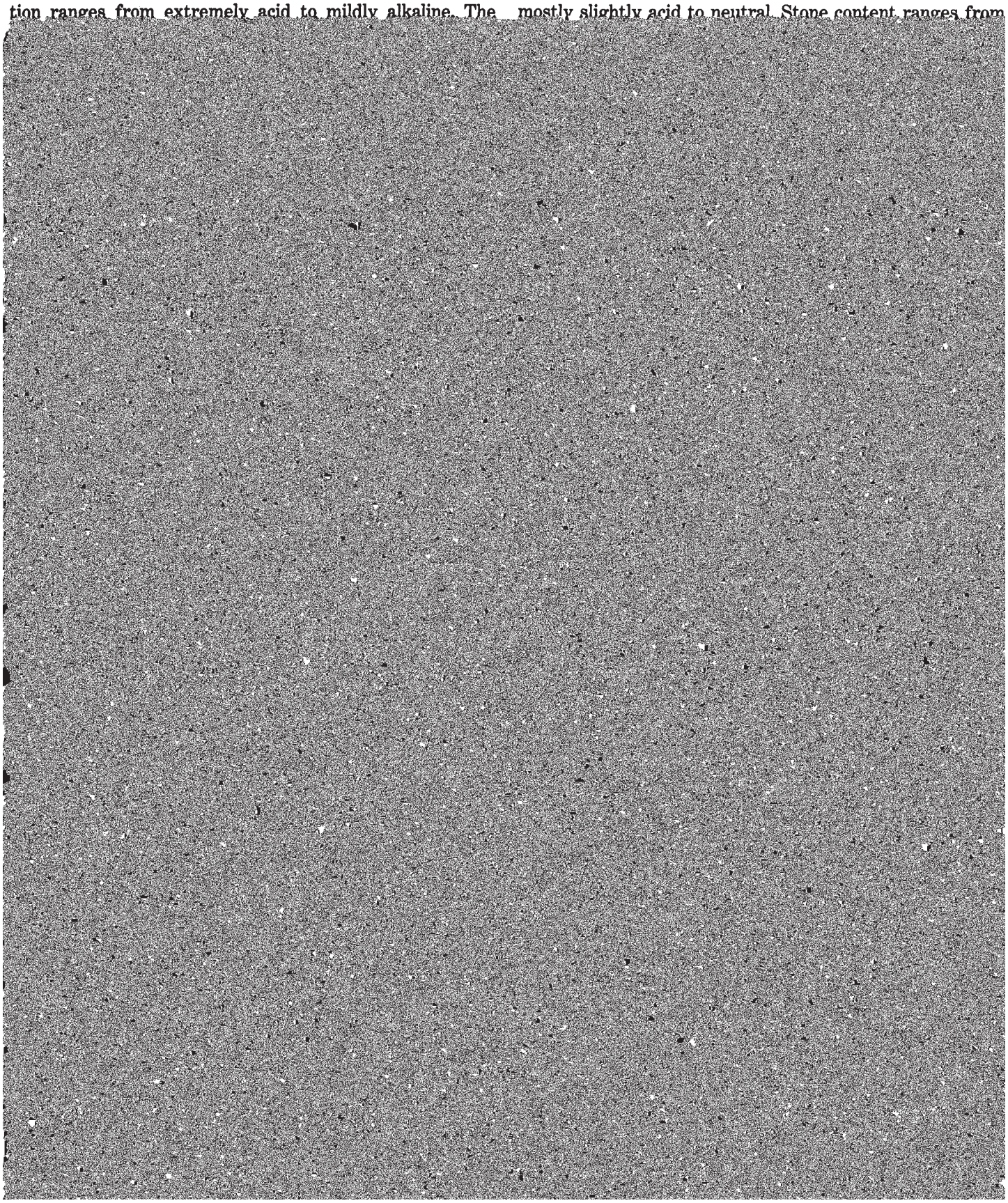
The soils are suited to corn, soybeans, grain sorghum, wheat, and grasses and legumes. The flooding hazard, however, limits use, and in some years crops are damaged or destroyed by floodwater. A few of the more sloping areas are subject to erosion but can be protected by

Most areas of this soil are farmed. This soil has fair potential for cultivated crops, hay, pasture, and trees and for recreation uses, fair to good potential for wildlife uses, and fair to poor potential for most engineering uses.

This soil is suited to corn, soybeans, grain sorghum, wheat, and grasses and legumes. The main problems are the perched water table above the dense, brittle layer, surface crusting, and lack of available water for adequate plant growth in most years. Excess water can be removed



tion ranges from extremely acid to mildly alkaline. The mostly slightly acid to neutral. Stone content ranges from



loam to silty clay. Soil reaction ranges from extremely acid to moderately alkaline.

Included with these soils are a few areas of soils that are similar, except that they have been planted to trees, have lower spoil banks, and contain smaller water areas. They would be less expensive to reclaim. Also included are soils in areas of haulage roads and mine spoil (tailings and washings), which are more uniformly extremely acid because of a high content of shale, coal, and sulphur. These soils are usually nearly level to moderately sloping and have no vegetation. The area to the southeast of Carbondale has soils that contain a higher percentage of acid shale, are generally more acid, and are more sparsely vegetated. Inclusions make up 10 to 15 percent of this unit.

Water and air move through these soils at a moderate rate, and surface runoff is very rapid. Reaction ranges from extremely acid to moderately alkaline but is mostly slightly acid to neutral. Stone content ranges from 20 to 35 about percent throughout the deposit. Organic-matter content is very low, and available water capacity is moderate.

Most areas of these soils are idle, nearly barren land, and some are pastured. These soils have poor to good potential for pasture and trees, poor potential for cultivated crops, poor potential for most recreational and wildlife uses, and poor potential for most engineering uses.

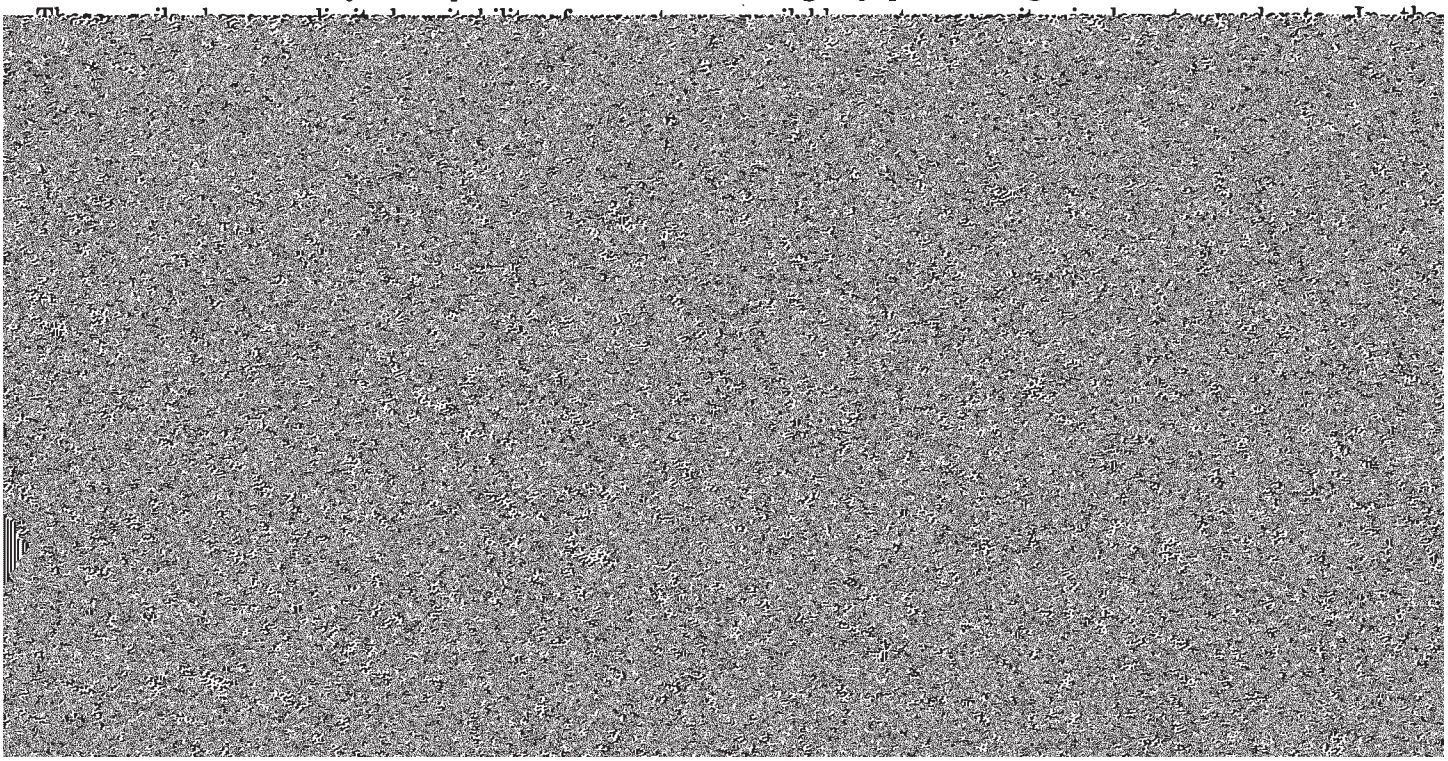
These soils are not suited to cultivated crops because of the high stone content and very steep slopes. Leveled areas of these soils require special stone-gathering equipment to alter their suitability for cropland.

805—Orthents, clayey, sloping. These nearly level to moderately steep, very poorly drained to somewhat poorly drained soils are in depressions of borrow pits and on aprons, side slopes, and ridgetops of levees along the Mississippi and Big Muddy Rivers. Individual areas are elongated in shape and range from 5 to about 1,000 acres in size.

Typically, these soils consist of mottled, dark gray silty clay or clay to a depth of about 60 inches. The areas along the Mississippi River have more sandy and silty strata, and reaction ranges from slightly acid to moderately alkaline. The areas along the Big Muddy River are more uniform clayey sediments, and reaction ranges from extremely acid to medium acid. Recent deposits in the borrow areas are variable but are characteristicly more sandy or loamy along the Mississippi River levee and more silty along the Big Muddy River levee.

Included with these soils in mapping are a few areas of soils that are similar but are more loamy or sandy. These soils occur primarily along the northwest corner of the Mississippi River flood plain. Also included are a few areas of soils on the old levee system that have mostly been leveled. Within the depressions are bodies of water, some of which remain permanently ponded. Also included in the depressional borrow pit areas are recent deposits of variable texture in layers that vary in thickness. Inclusions make up 10 to 15 percent of this unit.

Water and air move through these soils at a very slow rate, and surface runoff is rapid to ponded. Reaction ranges from extremely acid to moderately alkaline. Shrink-swell potential is very high, and wide cracks form during dry periods. Organic-matter content is low, and

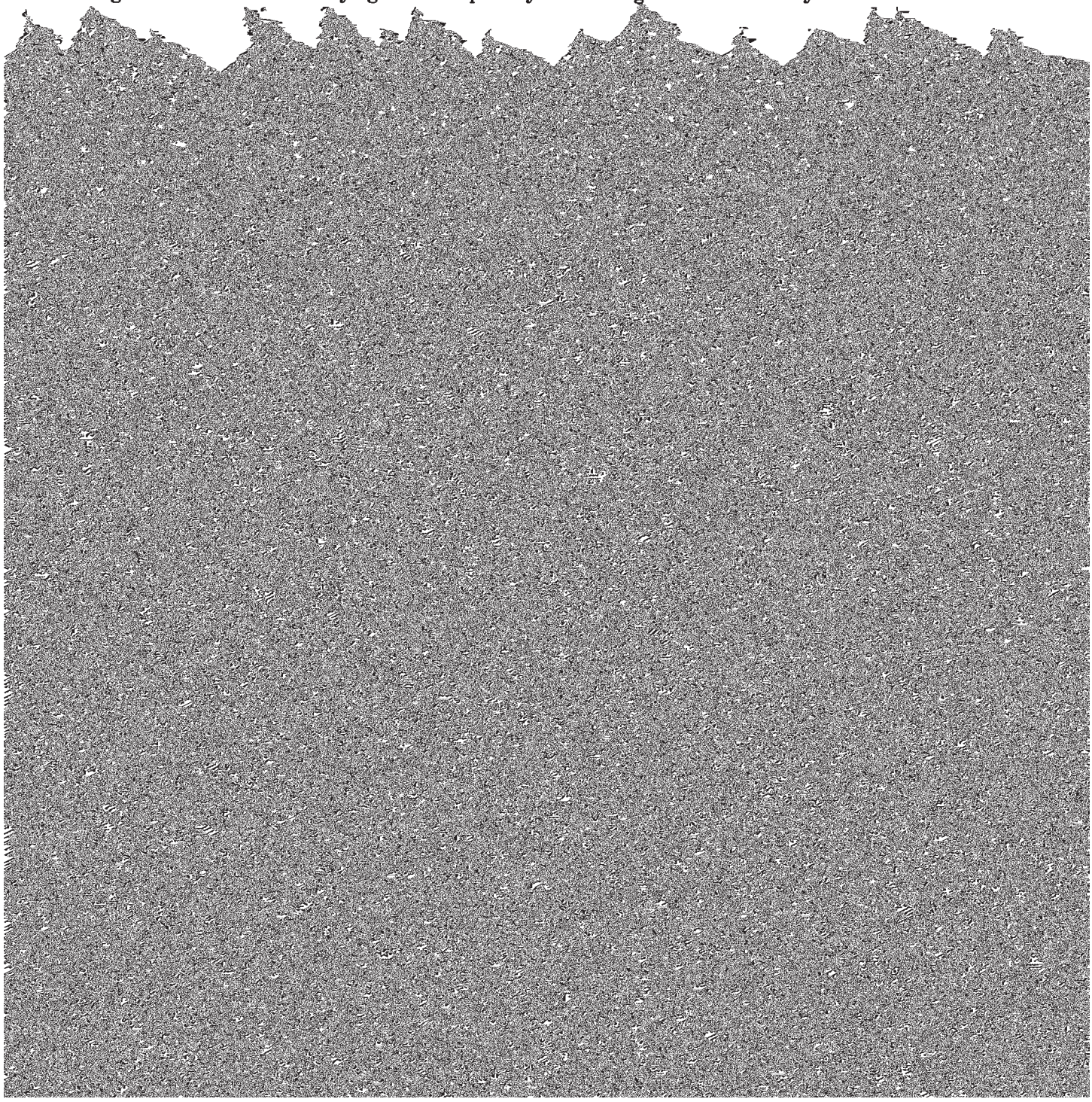


The nearly level to depressional areas are well suited to wetland wildlife because in many areas water ponds for extended periods. Depth of water could be controlled but is not easily regulated because of the flooding hazard.

These soils are not suited to use as building sites, and they are not suitable for roads because of the shrink-swell potential of the clayey material. Controlling erosion, slumping, and settling are problems in the higher areas, and flooding is a hazard in the low-lying areas. Capability

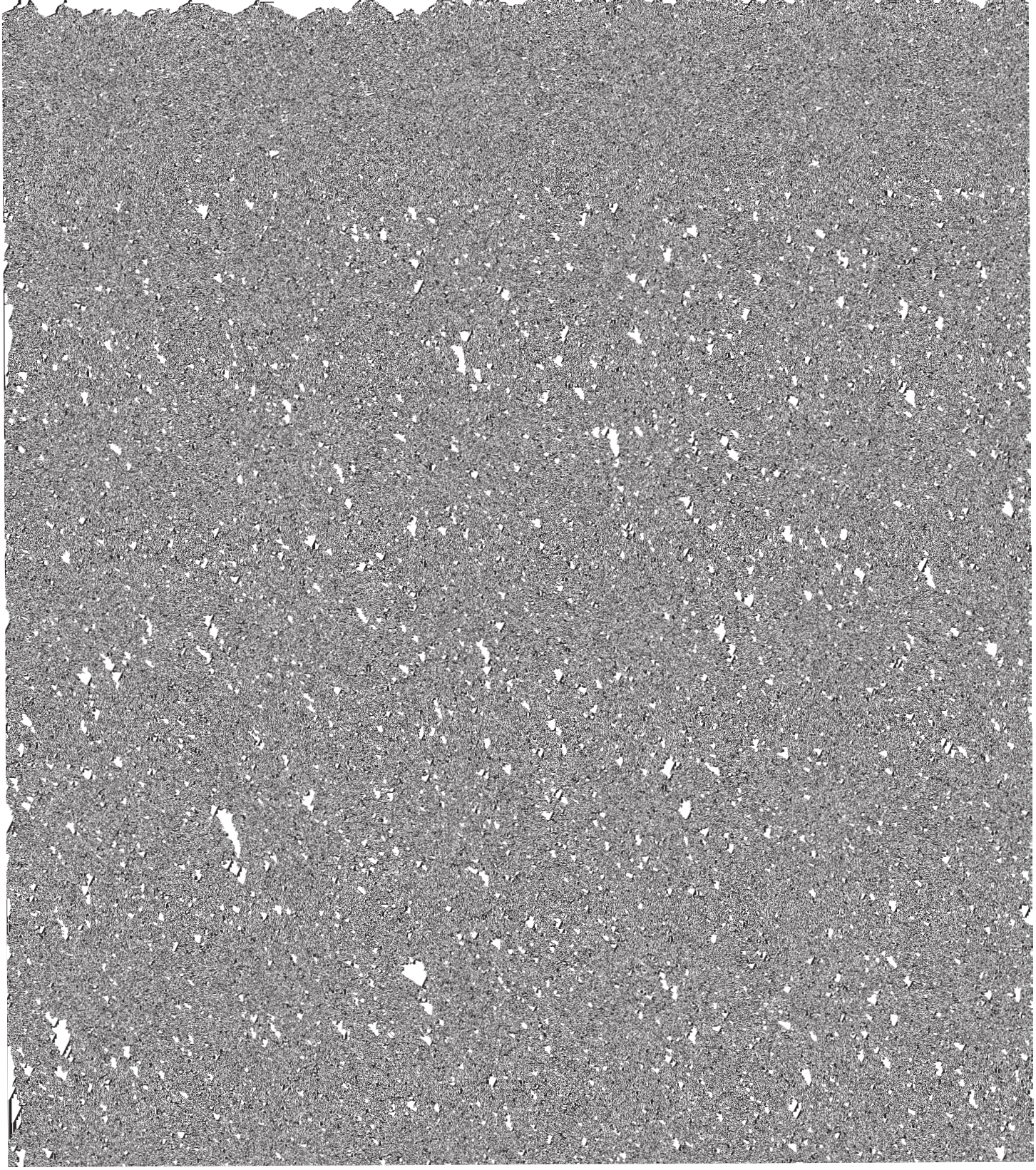
at the base of some slopes. The Belknap soils are on narrow bottom lands along drainageways. In a few areas bands of a more clayey gray soil are included. Inclusions make up about 10 percent of this unit.

Water and air move through the Hickory soil and the upper subsoil of the Hosmer soil at a moderate rate and move through the lower subsoil of the Hosmer soil at a very slow rate. Surface runoff is medium to rapid. Reaction ranges from extremely acid to neutral in the subsoil



55 percent Hickory soils. The Hickory soils are at the lower part of the slope, and the Hosmer soils are at the upper part of the slope. These soils occupy narrow bands

Legumes and grasses are very effective in controlling erosion if the soils are properly fertilized. Initial establishment is difficult and risky because of poor tilth



coatings. Below that is the very firm and compact zone, which is mottled dark yellowish brown silty clay loam grading with depth to firm silt loam. The substratum to a depth of about 60 inches is mottled yellowish brown silt loam. In many places, the upper part of the subsoil is thicker and the very firm, compact lower part is deeper and thinner.

Included with these soils in mapping are a few areas of bedrock outcrops and severely eroded areas. Also included are areas of Alford soils at the top of hillsides or on less sloping narrow spur ridges, areas of Wellston soils near the head of drainageways or at the lower part of the slope, areas of Belknap soils on narrow bottom land along drainageways, and a few bands of more clayey gray soil. In some areas the Hosmer soil makes up the entire hillside. Inclusions make up about 15 percent of this unit.

Water and air move through the Hickory soil and the upper subsoil of the Hosmer soil at a moderate rate and move through the lower subsoil of the Hosmer soil at a very slow rate. Surface runoff is rapid. Reaction ranges from extremely acid to neutral in the subsoil of the Hickory soil and from extremely acid to strongly acid in the subsoil of the Hosmer soil. The surface layer is friable and easy to till. Organic-matter content is low, and available water capacity is high in the Hickory soil and moderate in the Hosmer soil.

Most areas of this unit are in native hardwoods. These soils have poor potential for cultivated crops and hay and fair to good potential for pasture and trees. The potential for recreation and engineering uses is poor, and for openland and woodland wildlife it is fair to good.

Steep slopes and the erosion hazard limit the use of these soils for cultivated crops or hayland. In the less sloping places this mapping unit can safely be used for hayland, although the use of some types of haymaking equipment is restricted.

These soils are suited to grasses and legumes for pasture if they are fertilized. Grasses and legumes effectively control erosion once they are established, but proper establishment is a problem because of steep slopes and rapid runoff. New pastures should be seeded in a nurse crop to reduce the erosion hazard. Proper stocking rates, pasture rotation, and clipping or spraying are necessary to maintain the pasture once it is established.

This mapping unit is best suited to trees, and most areas remain in native hardwoods. Management problems include windthrow hazard, erosion hazard, and equipment limitations. Planting adapted species, which have top root systems, can reduce the windthrow hazard. The erosion hazard can be reduced by planting trees in a cover crop and by smoothing, fertilizing, and seeding logging roads and trails. The steep parts of this unit should be hand planted.

Steep slopes limit this mapping unit for use as building sites. If slopes are altered, foundations and footings should be designed to prevent structure damage caused by differential settling of the materials. Capability subclass VIe; woodland suitability subclass 2r for Hosmer soil; [illegible]

850E3—Hickory-Hosmer complex, 18 to 30 percent slopes, severely eroded. This mapping unit consists of moderately steep to steep, moderately well drained and well drained soils on side slopes along drainageways or on hillsides above bottom lands. Individual areas are mostly elongated in shape and range from 4 to 25 acres in size. They are 55 to 75 percent Hickory soils and 20 to 40 percent Hosmer soils. The Hickory soils are at the lower and mid parts of the slopes, and the Hosmer soils are at the upper part. These two soils occur as narrow bands. It is not practical to separate these soils in mapping.

Typically, the Hickory soil has a surface layer of dark yellowish brown clay loam about 2 inches thick. The subsoil is about 45 inches thick. It is yellowish brown and strong brown, firm clay loam with mottles in the lower part. The substratum to a depth of about 60 inches is pale brown loam. In some places the surface layer is silty clay loam.

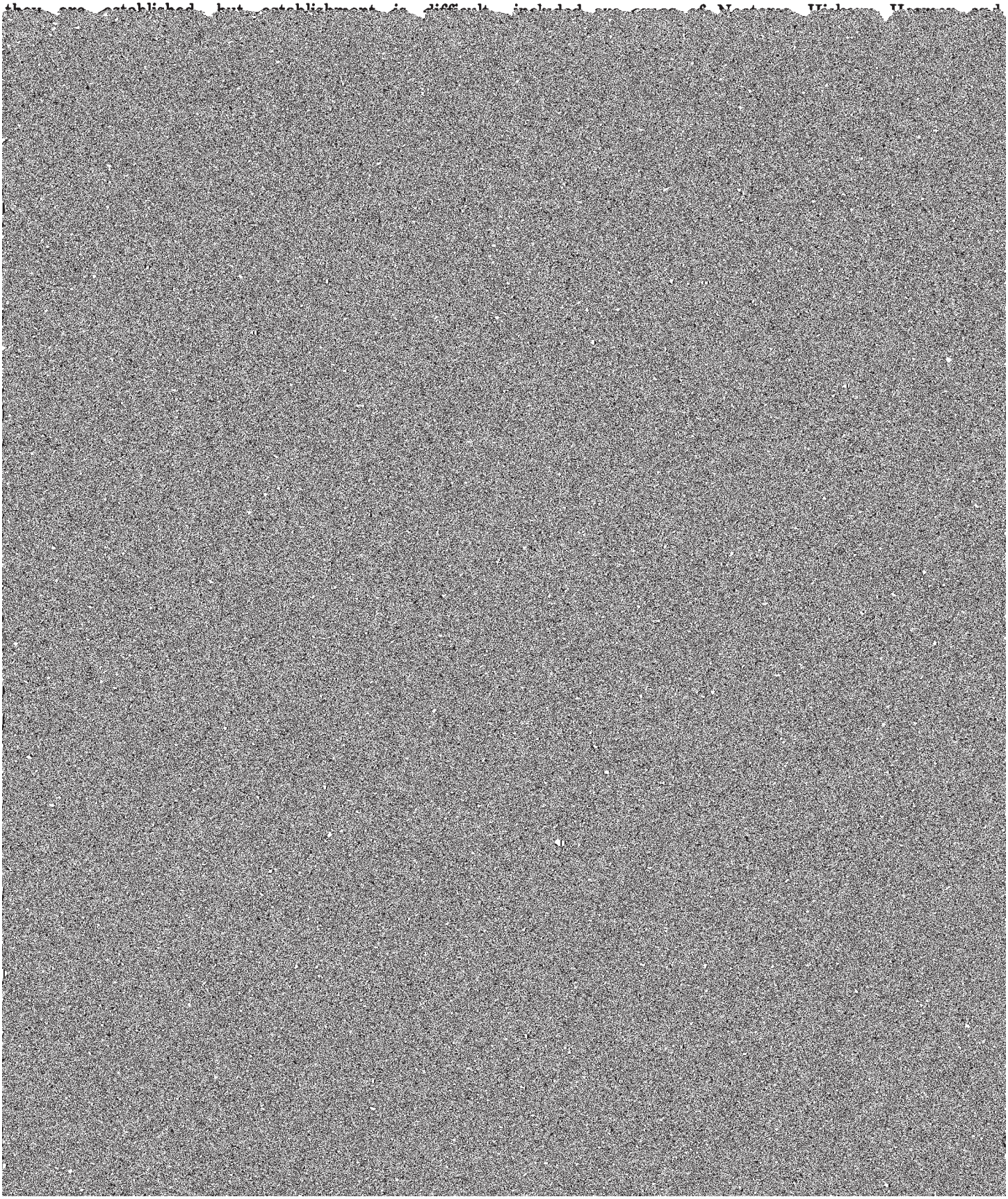
Typically, the Hosmer soil has a surface layer of dark yellowish brown silty clay loam about 2 inches thick. The subsoil is about 34 inches thick. The upper part of the subsoil is strong brown light silty clay loam grading to mottled yellowish brown heavy silt loam with depth. The lower part, which contains a firm and compact zone, is mottled dark yellowish brown silty clay loam grading to silt loam with depth. The substratum to a depth of about 60 inches is mottled strong brown silt loam. In some places the surface layer is silt loam. In other places, the upper part of the subsoil is thicker and the lower part is thinner and deeper.

Included with this unit in mapping are a few areas of Alford and Wellston soils. Alford soils are at the top of the slope and on some narrow spur ridges. Wellston soils are at the base of some slopes. Also included are areas of alluvial soils along the bottoms of narrow drainageways and a few gullied areas. In areas where glacial deposits are thin, mixing with local bedrock has resulted in textures ranging from sandy loam to silty clay. Inclusions make up about 5 to 10 percent of this unit.

Water and air move through the Hickory soil and the upper part of the Hosmer soil at a moderate rate and move through the lower subsoil of the Hosmer soil at a very slow rate. Surface runoff is very rapid. Reaction ranges from extremely acid to neutral in the subsoil of the Hickory soil and from extremely acid to strongly acid in the subsoil of the Hosmer soil. The surface layer is firm, slow to dry, and difficult to till. Organic-matter content is very low. Available water capacity is high in the Hickory soil and moderate in the Hosmer soil.

Most areas of these soils are in pasture or are idle land. The soils have poor potential for cultivated crops and hay. They have fair potential for pasture and trees. The potential for recreation uses is poor, for openland wildlife it is fair, and for most engineering uses it is poor.

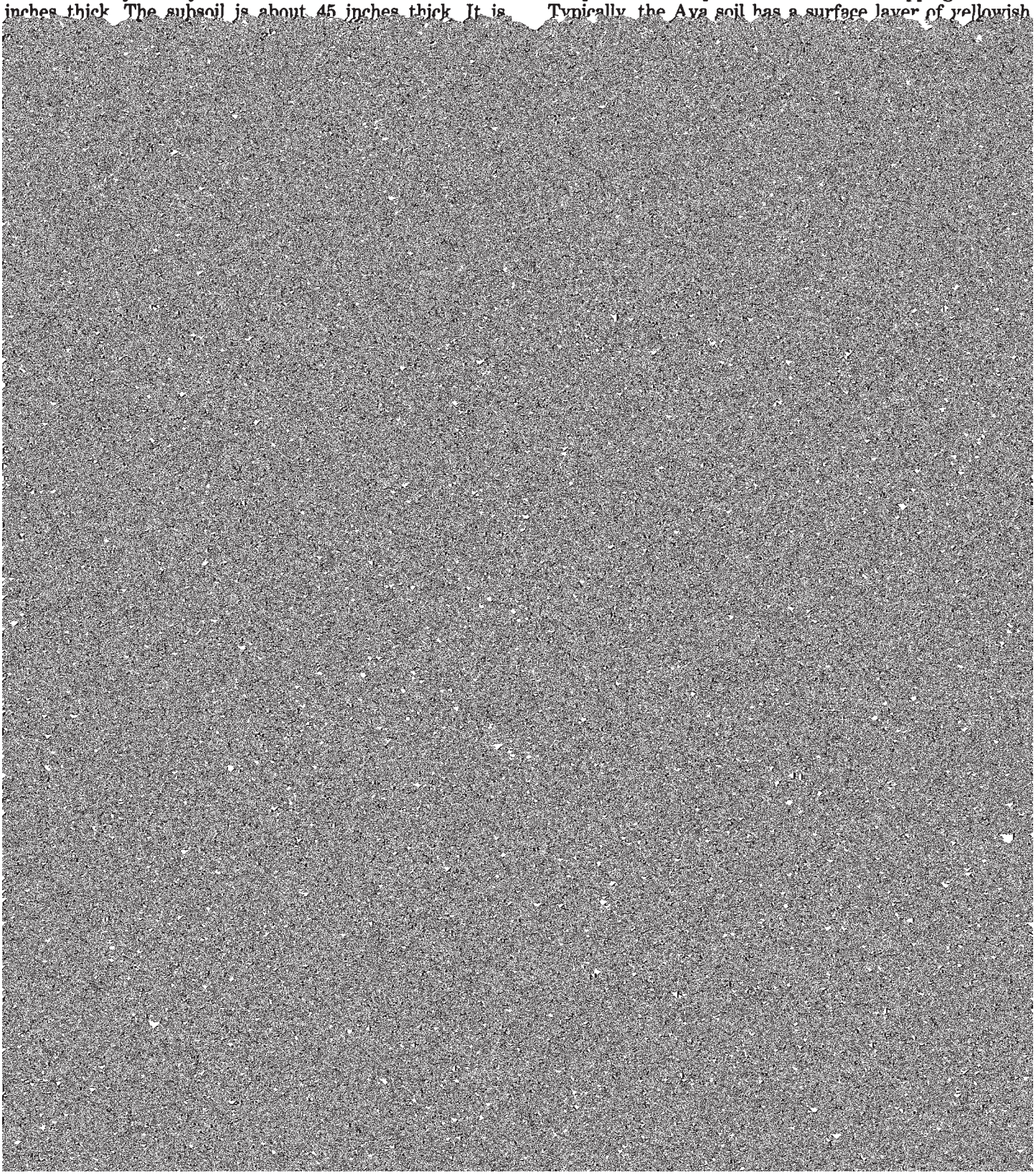
These soils are suited to grasses and legumes if they are properly fertilized. Steep slopes and the erosion hazard limit use of these soils for cultivated crops or hay-



Typically, the Alford soil has a surface layer of very dark grayish brown silt loam about 2 inches thick. The subsurface layer is yellowish brown silt loam about 5 inches thick. The subsoil is about 45 inches thick. It is

the slope, and the Ava soils are on the upper part of the slope. These soils occupy narrow bands on short slopes. It is not practical to separate these soils in mapping.

Typically, the Ava soil has a surface layer of yellowish



slopes that are smooth enough to be farmed on the contour or stripcropped.

These soils are best suited to grasses and legumes for hay and pasture. Sowing grass and legume seeds in a nurse crop of small grain aids in stand establishment. Adding fertilizers is important for establishment and maintenance of grasses and legumes. The vegetative cover can be kept in good condition by proper stocking rates, timely cutting or grazing, and restricted use during wet periods.

This mapping unit is also suited to trees, and some of the included areas remain in native hardwoods. Plant competition is the main problem. It can be controlled by proper site preparation or by spraying or cutting. There are no other problems to be concerned about when growing trees.

These soils are not well suited to use as building sites but can be used if the problems of slope and shrink-swell potential are resolved. Proper design and installation of footings and foundations are needed to prevent structure damage from shrink-swell. This mapping unit provides good water-storage sites, but careful construction of the dam is necessary to increase material strength and stability. Capability subclass IVe; woodland suitability subclass 2o for Ava soil, 1o for Hickory soil.

929D2—Hickory-Ava silt loams, 12 to 18 percent slopes, eroded. This mapping unit consists of strongly sloping, moderately well drained and well drained soils on side slopes along drainageways and hillsides above bottom land soils. Individual areas of this unit are mostly elongated in shape and range from 5 to about 75 acres in size. They are 45 to 70 percent Hickory soils and 25 to 50 percent Ava soils. The Hickory soils are on the lower and mid parts of the slope, and the Ava soils are on the upper part of the slope. These soils occupy narrow bands on short slopes. It is not practical to separate these soils in mapping.

Typically, the Hickory soil has a surface layer of brown silt loam about 6 inches thick. Some yellowish brown subsoil material has been mixed with the surface layer by plowing. The subsoil is about 54 inches thick. It is yellowish brown and strong brown, firm clay loam with mottles in the middle and lower parts. The substratum to a depth of about 65 inches is mottled pale brown loam. In some places not so eroded, the surface layer is dark grayish brown silt loam about 3 inches thick. It overlies a brown silt loam subsurface layer. In other places the upper part of the subsoil is silty clay loam. In some places that are severely eroded, the surface layer is yellowish brown clay loam.

Typically, the Ava soil has a surface layer of brown silt loam about 6 inches thick. Some yellowish brown subsoil material has been mixed with the surface layer by plowing. The subsoil is about 48 inches thick. The upper part is yellowish brown light silty clay loam with mottles in the lower part. The lower 37 inches is strong brown light silty clay loam with light gray coatings over mottled yellowish brown silty clay loam. Below this is firm and dense, mottled, strong brown silty clay loam grading to strong brown silt loam with depth. The substratum to a depth of about 68 inches is mottled dark brown silt loam. In places where this soil is severely eroded, the surface layer is yellowish brown light silty clay loam. In wooded areas a thin, brown or yellowish brown silt loam subsurface layer underlies a dark grayish brown silt loam surface layer.

Included with this unit in mapping are soils in a few areas where bedrock crops out and areas of soils that are severely eroded. Also included are escarpments of mainly Hickory soils, some areas of Bonnie and Belknap soils along the narrow drainageways, and areas of a mottled gray soil at the middle or lower parts of some slopes. Inclusions make up 10 to 15 percent of this mapping unit.

Water and air move through the Hickory soil and the upper subsoil of the Ava soil at a moderate rate and move through the lower subsoil of the Ava soil at a very slow rate. Surface runoff from cultivated areas is rapid. Reaction ranges from extremely acid to neutral in the subsoil of the Hickory soil and from extremely acid to strongly acid in the subsoil of the Ava soil. The surface layer is friable and easy to till. Organic-matter content is low, and available water capacity is high in the Hickory soil and moderate in the Ava soil.

Most areas of this unit are in pasture, and some are farmed. This unit has fair to poor potential for cultivated crops and fair to good potential for hay, pasture, and trees. The potential for most recreation and engineering uses is poor to fair, and for openland and woodland wildlife it is fair to good.

This mapping unit is not well suited to cultivated crops, but corn, soybeans, grain sorghum, and wheat can be grown in a rotation that includes grasses and legumes. The main concern of management if this unit is used for crops is the erosion hazard. Minimum tillage, zero tillage, and winter cover crops help to control erosion. A few areas are suited to contour stripcropping.

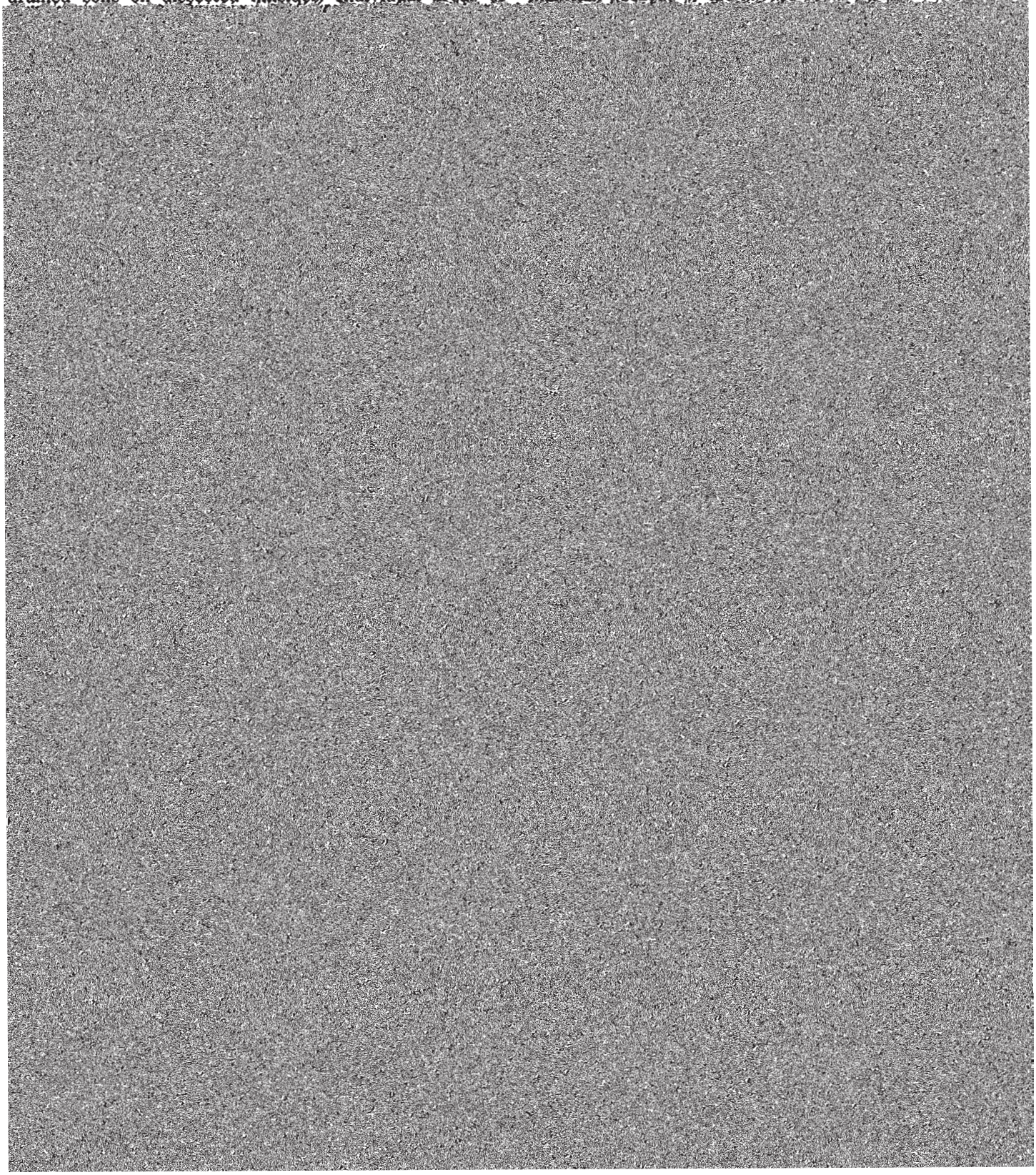
These soils are best suited to grasses and legumes for hay and pasture. Grasses and legumes are very effective in controlling erosion if the soils are fertilized. When initially establishing the stand, it is best to sow seed in a small grain crop to restrict erosion. Existing pastures can be renovated by using chemicals to kill undesirable vegetation, by disking lightly, and by sowing seed into the remaining vegetation. Competing vegetation can be kept out by clipping or spraying.

This unit is well suited to trees. The main problem is controlling or removing the competing vegetation. This can be accomplished by site preparation or by spraying, cutting, or girdling. Equipment is somewhat limited by the slopes, and some areas should be hand planted. Adapted species survive and grow well on these soils.

Steep slopes limit this mapping unit for use as building sites. If slopes are altered, foundations and footings should be designed to prevent structure damage caused by differential settling. Capability subclass IVe; woodland suitability subclass 1r for Hickory soil, 2o for Ava soil.

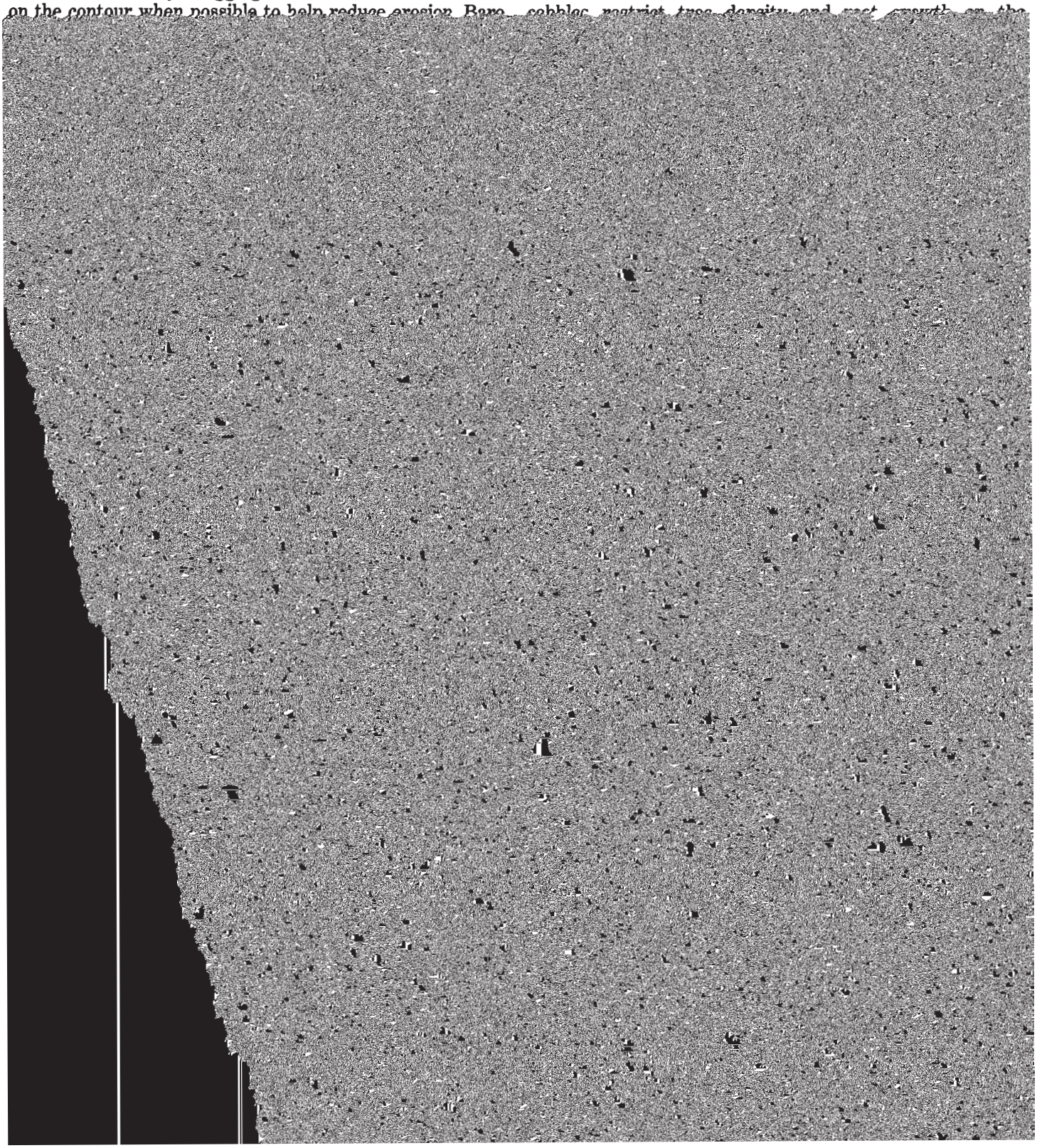
930G—Goss-Alford complex, 25 to 65 percent slopes. This mapping unit consists of steep to very steep, well drained soils on dissected hillsides. Individual areas of

The very steep slopes make this unit unsuitable for building development. Roads are difficult to build and maintain because of the severe erosion hazard in exposed



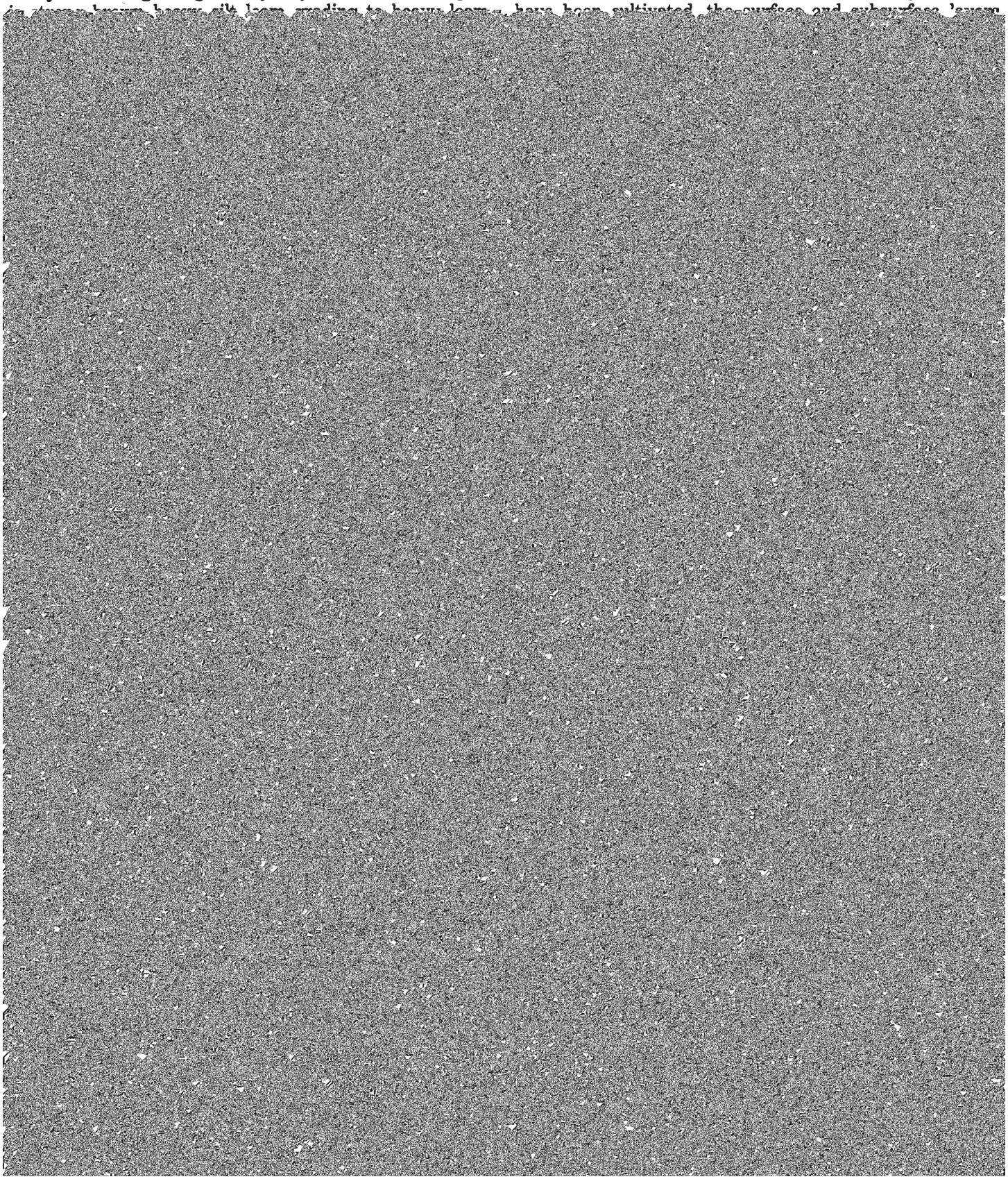
the bands of bedrock escarpments seriously restrict the use of planting and harvesting equipment. Winches help to remove logs from most slopes, but some areas have limited accessibility. Logging roads and trails should be on the contour when possible to help reduce erosion. Bare

rapid. Reaction ranges from extremely acid to strongly acid in the subsoil of these soils. Organic-matter content is low, and available water capacity is high in the Wellston soil and moderate in the Neotoma soil. Boulders and cobbles restrict tree density and root growth on the



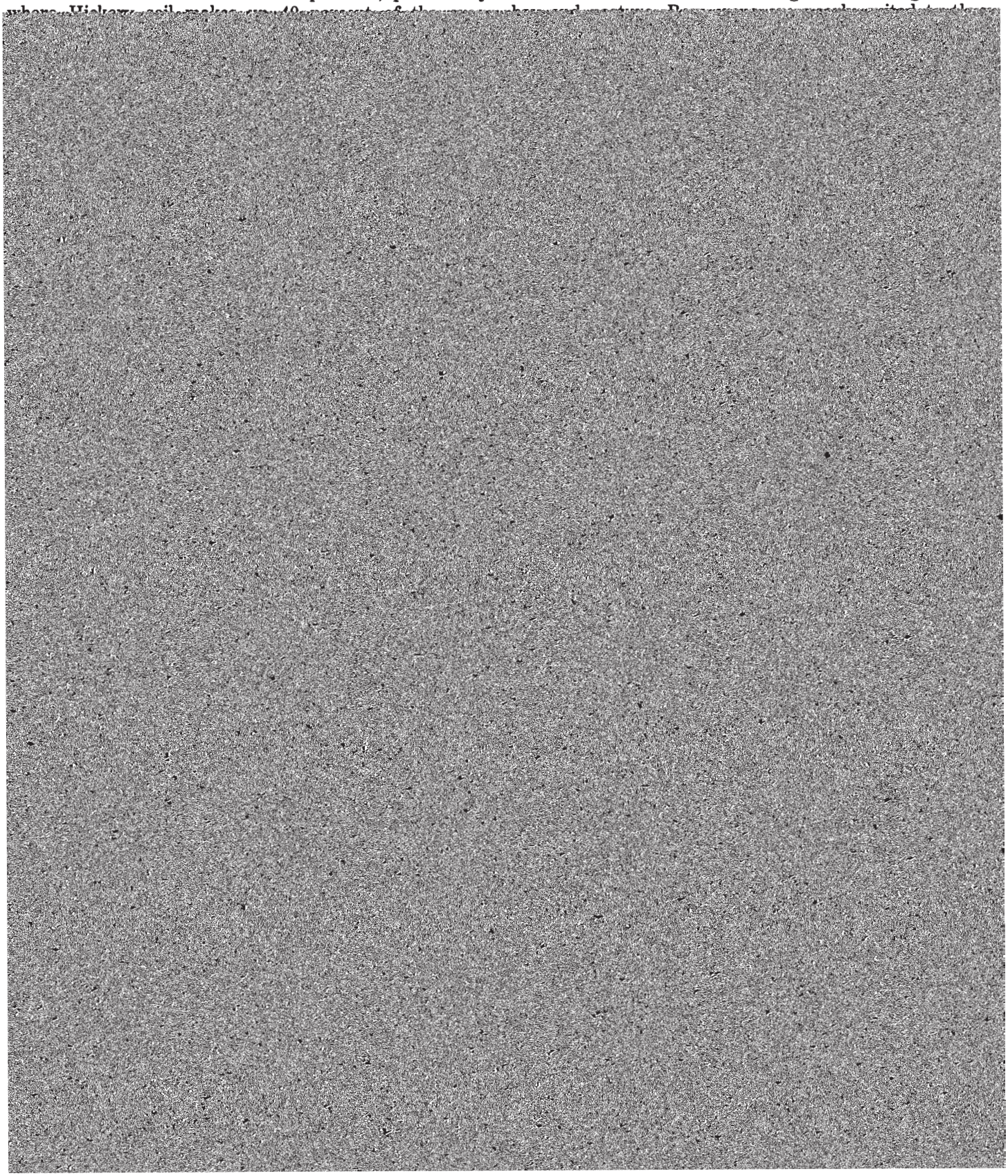
heavy silt loam grading to silty clay loam. The lower part

The substratum is brown, friable silt loam. In places that



hazard. Water reservoir sites are plentiful, particularly

These soils are best suited to grasses and legumes for



Included with these soils in mapping are a few limestone sinkholes and areas of short, steep slopes and escarpments along bottom lands. Also included are severely eroded soils, primarily in the areas of Alford soil; bedrock outcrops and bedrock escarpments, primarily in the areas of Hickory soil; some spur ridges of Alford soils at the head of some drainageways; and some areas of Wellston soils. Inclusions make up 5 to 10 percent of this unit.

Water and air move through these soils at a moderate rate, and surface runoff is rapid. Reaction in the subsoil ranges from extremely acid to neutral in the Hickory soil and from very strongly acid to medium acid in the Alford soil. Organic-matter content is low, and available water capacity is high.

Most areas of these soils are in native hardwoods. These soils have poor potential for cultivated crops and hay and fair to good potential for pasture and trees. The potential for openland and woodland wildlife is fair to good, and the potential for most engineering uses is poor.

This mapping unit is suited to grasses and legumes for pasture where trees have been cleared. Some less sloping parts of this unit can be used for hay. Grasses and legumes grow well and are effective in controlling erosion once the stand becomes established. Fertilizers are needed to promote good growth. Steep slopes limit machinery use and make site preparation, cutting or clipping, and harvesting difficult. Grazing should be closely watched, and pastures should be rotated to keep the pasture and soil in good condition.

This mapping unit is best suited to trees. Management problems are controlling plant competition, controlling erosion, and equipment limitations. Competing vegetation can be controlled by proper site preparation or by spraying, cutting, or girdling. Planting trees in a low-growing cover crop helps to control erosion. Once established, trees adequately protect this soil from excessive erosion. Areas exposed in logging operations, such as trails and roads, should be seeded with a cover crop. Mechanical planting should be on the contour where practical. Use of logging equipment is somewhat limited by steep slopes.

This soil is not well suited to building site development or onsite waste disposal systems because of steep slopes. Roads are difficult to maintain because of the erosion hazard along roadbanks and ditches. Laying roads out on the contour as much as is practical helps to control erosion. Capability subclass VIe; woodland suitability subclass 1r.

long, narrow bands. It was not practical to separate these soils in mapping.

Typically, the Hickory soil has a dark yellowish brown clay loam surface layer about 2 inches thick. The subsoil is about 45 inches thick. It is yellowish brown and strong brown, firm clay loam throughout and has mottles in the lower part. The substratum to a depth of about 60 inches is pale brown loam.

Typically, the Alford soil has a dark brown silty clay loam surface layer about 2 inches thick. The subsoil is about 40 inches thick. The upper part is strong brown silty clay loam, the middle part is brown silty clay loam, and the lower part is brown heavy silt loam. The substratum to a depth of 60 inches is brown silt loam. In some places the subsoil is thinner and is brown silt loam throughout.

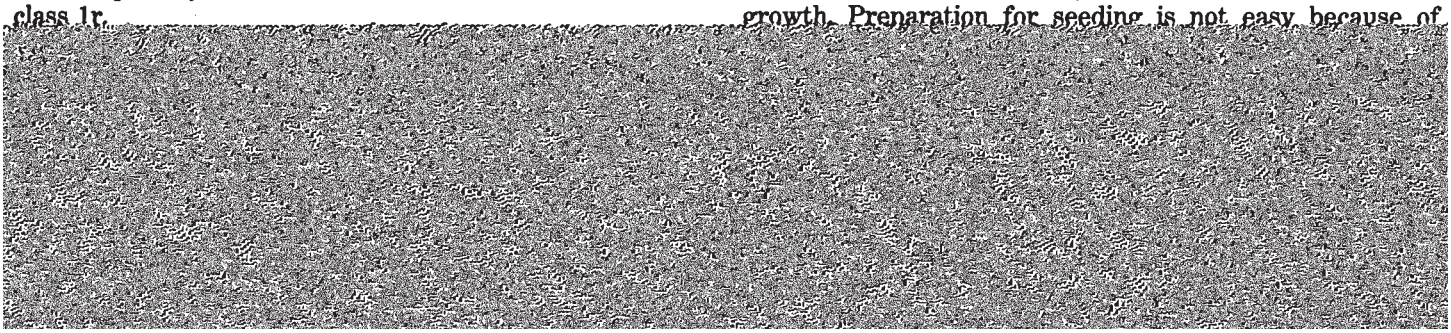
Included with this unit in mapping are a few areas of bedrock outcrops, a few areas of escarpments above bottom lands, and some narrow spur ridges of less steep Alford soils on hillsides. Also included are soils that are so severely gullied and eroded that most or all of the subsoil has been removed. In a few places a sticky, gray clayey soil occurs as bands on slopes. A few areas of silty alluvial soils are included along the narrow drainageways. Inclusions make up 5 to 15 percent of this unit.

Water and air move through these soils at a moderate rate, and surface runoff is very rapid. Reaction in the subsoil ranges from extremely acid to neutral in the Hickory soil and from very strongly acid to medium acid in the Alford soil. Organic-matter content is very low, and available water capacity is high.

Most areas of this unit are in pasture or remain as brushy, idle land. These soils have poor potential for cultivated crops and hay and fair to good potential for pasture and trees. They have fair to good potential for openland wildlife and poor potential for most recreation and engineering uses.

This mapping unit is not suited to cultivated crops because of the erosion hazard and equipment limitations on steep slopes. Hay can be grown in the less sloping areas of this unit where equipment can be safely used. Fertilizers are required to obtain good growth of grasses and legumes.

This mapping unit is suited to pasture, but establishment of grasses and legumes on these severely eroded soils is difficult. Fertilizers, in particular lime and nitrogen, are needed to improve the stand and maintain growth. Preparation for seeding is not easy because of



ford soil, are adequately protected from erosion. Some severely gullied areas, however, require land shaping, fertilizing, and planting to become stabilized and useful. These areas are usually small and irregularly shaped and are best suited to wildlife.

This unit is suited to trees. Plant competition, the erosion hazard, and equipment limitations are problems that management must overcome if this unit is used for woodland. Proper site preparation and spraying or cutting help control competing vegetation. Erosion can be controlled by planting adapted trees and applying good management when harvesting. Because of steep slopes, the use of planting equipment is somewhat restricted and hand planting is necessary on the steeper parts of this unit. Also, in some areas logging operations should be delayed during wet periods to prevent damage to the steep slopes.

These soils are not suited to use as building sites or for onsite waste disposal systems because of steep slopes and the erosion hazard. Some reshaping of the slopes is necessary if the soils are used as building sites. Erosion on bare areas of these soils is severe and very severe, and these areas are somewhat difficult to vegetate. Proper shaping, fertilizing, seeding, and mulching are required to revegetate bare areas. Capability subclass VIe; woodland suitability subclass 1r.

M.D.—Mine Dump. This nearly level to very steep mapping unit is the result of strip mining and deep shaft mining for coal. Individual areas of this unit are mostly irregular in shape and range from 2 to about 100 acres in size.

Typically, this unit consists of unconsolidated fragments of shale and coal that have been separated from coal lumps. The fragments generally are extremely acid, and the areas are devoid of vegetation.

Included with this unit in mapping are small areas that contain water and a few areas of Bluford and Wynoose soils that have not been stripped or buried under the mined materials. In some steep mined areas, Orthents, loamy, are also included.

This mapping unit has poor potential for most uses. The extreme acidity, irregular topography, and stony, clayey materials restrict suitability.

Some special recreation uses, such as motorcycle trails or tracks and shooting ranges, are possible. The main problems are excessive stoniness and steep slopes. These can be overcome with a minimum of expense.

Some special crops, such as blueberries, will grow on these materials if sufficient water is available.

Qu.—Quarry. This nearly level to very steep mapping unit occurs as areas from which limestone bedrock is extracted for commercial uses. Individual areas are irregular in shape and range to about 75 acres in size.

Typically, this unit consists of limestone bedrock exposed through quarrying. The unconsolidated material has been removed and the limestone mined, leaving a depression with a nearly level bottom and nearly perpendicular sidewalls. Piles of various sizes of crushed limestone are within the area.

Included with this unit in mapping are small areas where the overburden soil material has not been removed. These soils are similar to adjoining soils.

This unit has poor potential for most uses. Because there is little or no unconsolidated material, this unit is largely devoid of vegetation.

Special recreation facilities, such as a shooting range could be developed easily. Some areas could be developed as water recreation areas.

Use and Management of the Soils

The soil survey is a detailed inventory and evaluation of the most basic resource of the survey area—the soil. It is useful in adjusting land use, including urbanization, to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in uses of the land.

While a soil survey is in progress, soil scientists, conservationists, engineers, and others keep extensive notes about the nature of the soils and about unique aspects of behavior of the soils. These notes include data on erosion, drought damage to specific crops, yield estimates, flooding, the functioning of septic systems, and other factors affecting the productivity, potential, and limitations of the soils under various uses and management. In this way, field experience and measured data on soil properties and performance are used as a basis for predicting soil behavior.

Information in this section is useful in planning use and management of soils for crops and pasture, rangeland, and woodland, and as sites for buildings, highways and other transportation systems, sanitary facilities, parks and other recreation facilities, and wildlife habitat. From the data presented, the potential of each soil for specified land uses can be determined, soil limitations to these land uses can be identified, and costly failures in houses and other structures, caused by unfavorable soil properties, can be avoided. A site where soil properties are favorable can be selected, or practices that will overcome the soil limitations can be planned.

Planners and others using the soil survey can evaluate the impact of specific land uses on the overall productivity of the survey area or other broad planning area and on the environment. Productivity and the environment are closely related to the nature of the soil. Plans should maintain or create a land-use pattern in harmony with the natural soil.

Contractors can find information that is useful in locating sources of sand and gravel, roadfill, and topsoil. Other information indicates the presence of bedrock, wetness, or very firm soil horizons that cause difficulty in excavation.

Health officials, highway officials, engineers, and many other specialists also can find useful information in this soil survey. The safe disposal of wastes, for example, is closely related to properties of the soil. Pavements, sidewalks, campsites, playgrounds, lawns, and trees and shrubs are influenced by the nature of the soil.

Crops and Pasture

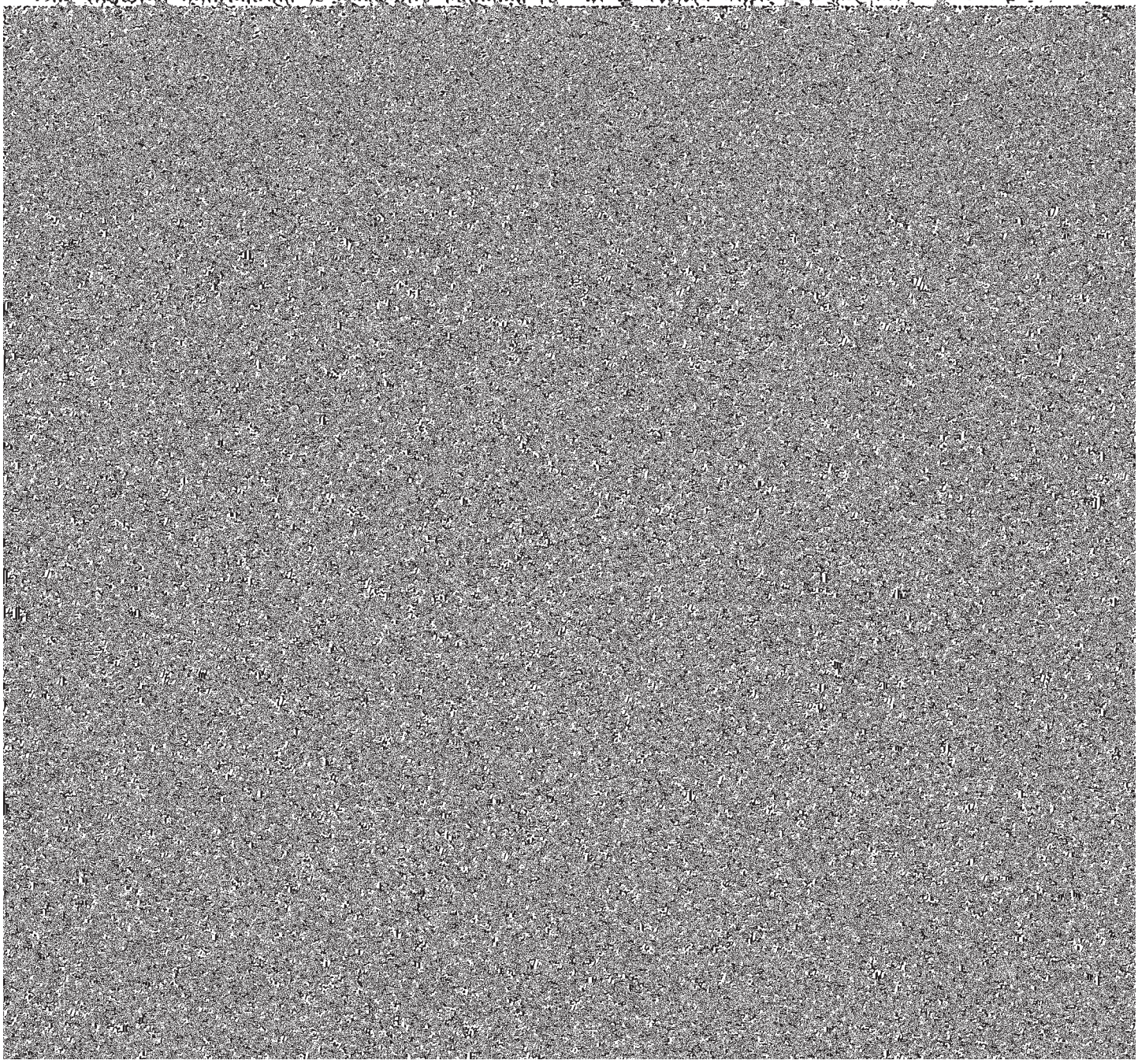
PAUL W. ICE, district conservationist, Soil Conservation Service, assisted in preparing this section.

The use and management of soils for the production of grain crops, specialty crops, hay, and pasture is covered in this section. The capability classification of soils used by the U.S. Department of Agriculture, Soil Conservation Service, is explained. The estimated yield of the principal crops for each soil is listed in table 5. This section also provides information on land use problems, trends, and the potential of soils for an increased production of crops.

This resource information is especially valuable to

Sheet erosion, or loss of the topsoil, is damaging for three reasons. First, the productivity of the soil is reduced as the topsoil is eroded and the subsoil is incorporated into the plow layer. Loss of topsoil is especially damaging on Alford, Camden, Colp, and Hickory soils or soils with layers in the subsoil that limit the depth of the root zone. Such layers include the fragipans, for example, in Ava and Hosmer soils. Erosion also reduces productivity on soils that tend to be droughty, such as Alvin and Ware soils.

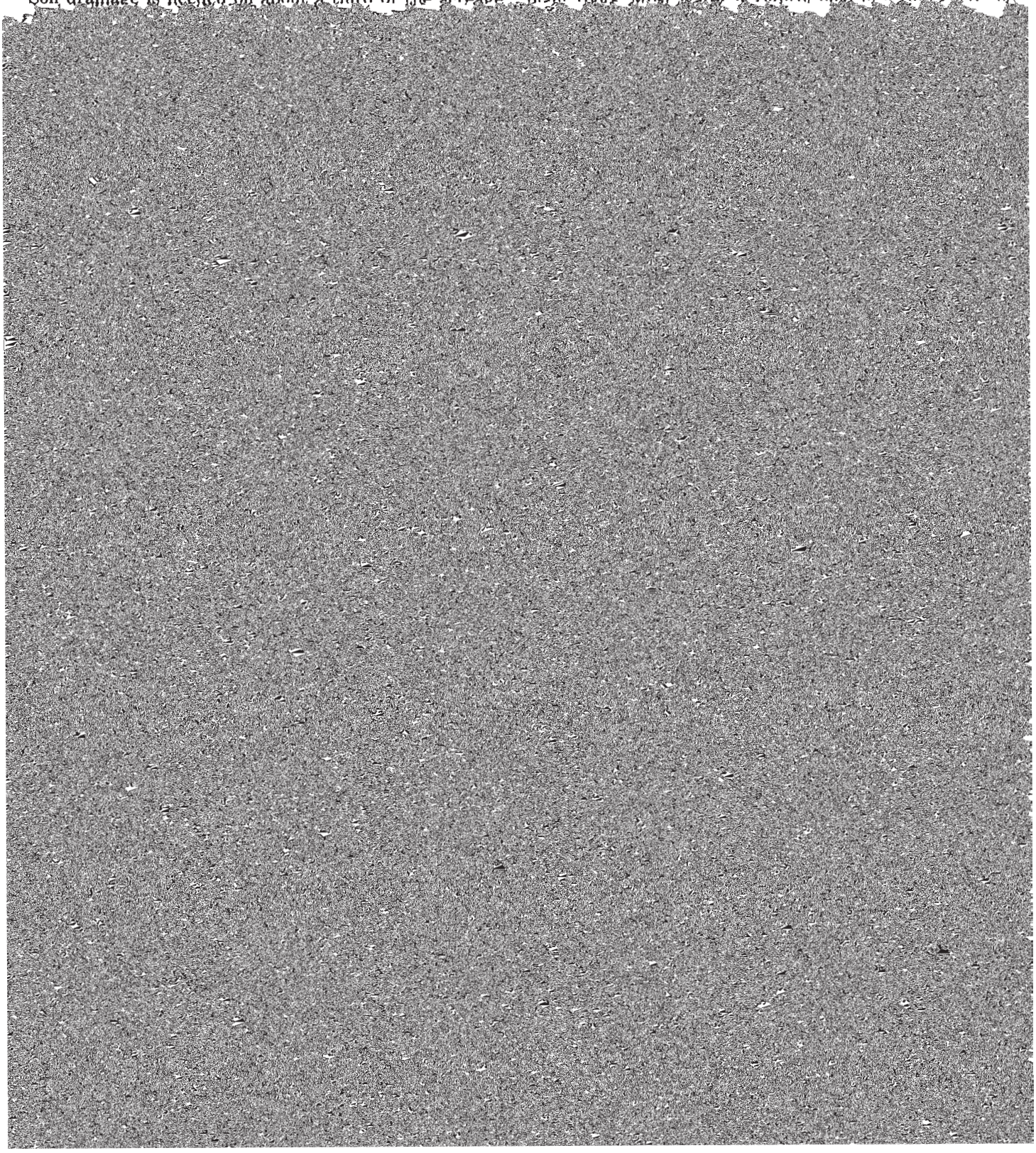
Second, severe erosion on sloping land reduces the tilth and the intake of water. Clayey surfaces tend to be cloddy if worked when wet, and they make a good seedbed



winter, or leaving the surface soil rough. Windbreaks of adapted trees or shrubs are also effective in controlling wind erosion.

Soil drainage is needed on about a third of the acreage

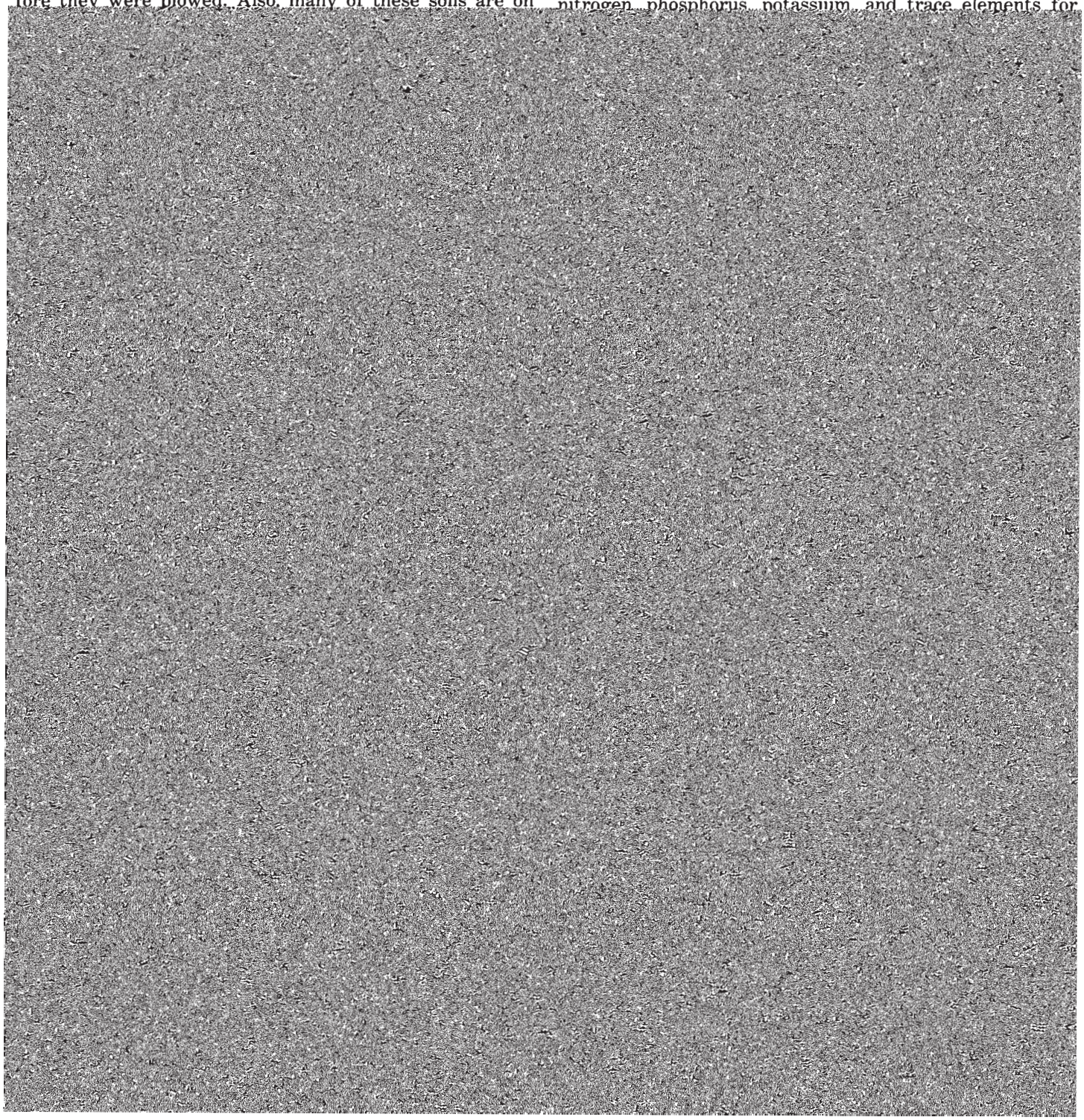
windy days. Many of the wet clayey soils have similar limitations. The Booker and Jacob soils hold large amounts of water, but little water is readily available to plant roots. Most water is tightly held in a film surround



other organic material can help improve soil structure and reduce crust formation.

Fall plowing is generally not a good practice on the county's light colored soils that have a silt loam surface layer because of the crust that forms during the winter and spring. Many of these soils are nearly as compact and hard at planting time after fall plowing as they were before they were plowed. Also, many of these soils are on

crop. Such management provides drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate tillage practices, including time of tillage and seedbed preparation and tilling when soil moisture is favorable; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for



Class III soils have severe limitations that reduce the choice of plants, or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants, or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and landforms have limitations that nearly preclude their use for commercial crop production.

CAPABILITY SUBCLASSES are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

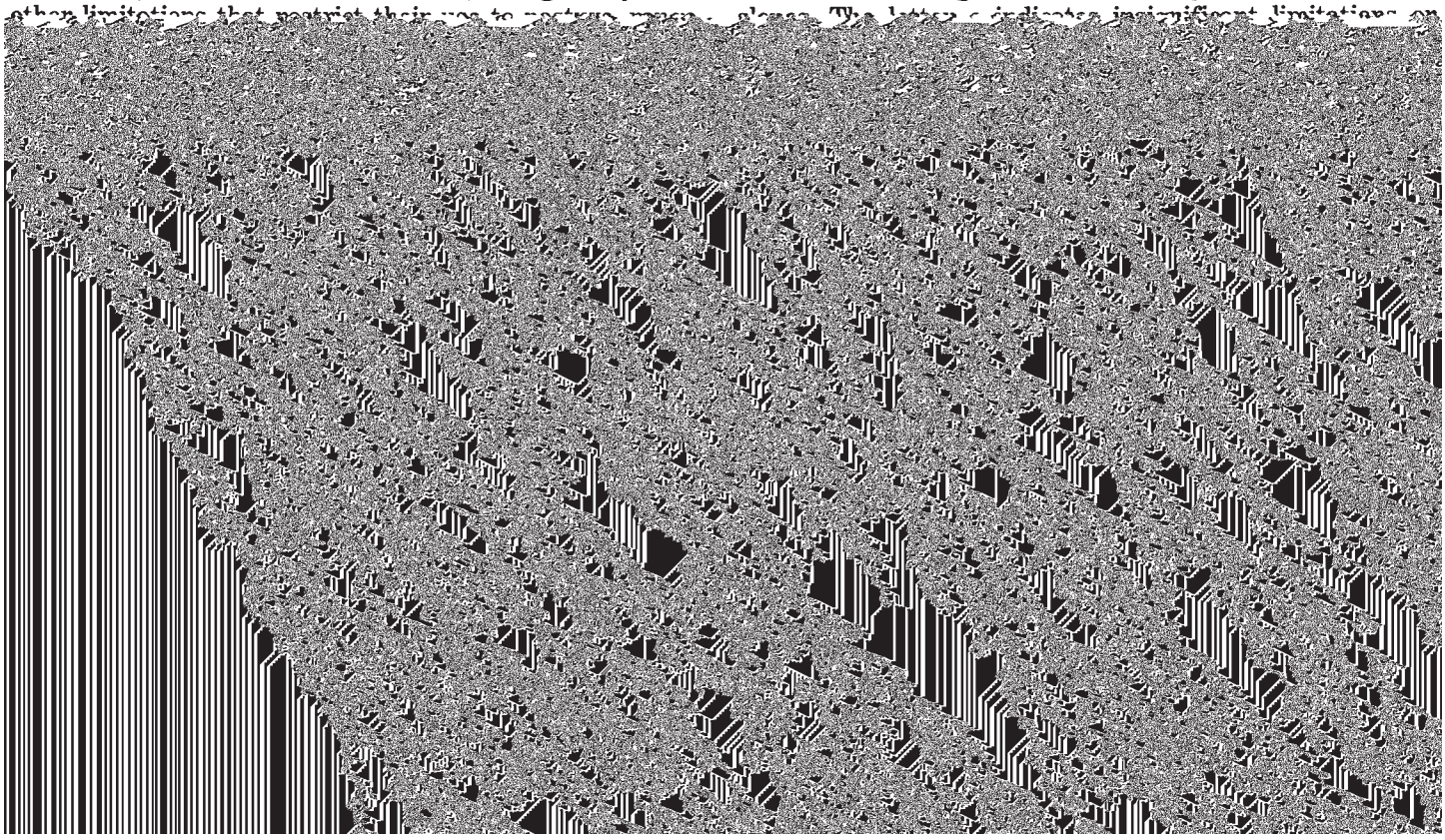
In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w*, *s*, or *c* because the soils in class V are subject to little or no erosion, though they have other limitations that restrict their use to pasture, range, [illegible]. The letter *e* indicates insignificant limitations on

Broad Land Use Planning"). The most common desirable trees on uplands are white oak, red oak, black oak, hickory, black walnut, and yellow-poplar. The main species that grow on the bottom lands are cottonwood, sycamore, sweetgum, pin oak, and pecan.

According to the Conservation Needs Inventory (*9*), much of the existing woodland would benefit from stand improvement by thinning out mature trees and undesirable species. Many areas that are naturally reforested would benefit from tree planting and weed control. Protection from grazing and fire and control of disease and insects are also needed to improve woodlands.

Table 6 contains information useful to woodland owners or forest managers planning use of soils for wood crops. Mapping unit symbols for soils suitable for wood crops are listed, and the ordination (woodland suitability) symbol for each soil is given. All soils bearing the same ordination symbol require the same general kinds of woodland management and have about the same potential productivity.

The first part of the *ordination symbol*, a number, indicates the potential productivity of the soils for important trees. The number 1 indicates very high productivity; 2, high; 3, moderately high; 4, moderate; and 5, low. The second part of the symbol, a letter, indicates the major kind of soil limitation. The letter *x* indicates stoniness or rockiness; *w*, excessive water in or on the soil; *t*, toxic substances in the soil; *d*, restricted root depth; *c*, clay in the upper part of the soil; *s*, sandy texture; *f*, high content of coarse fragments in the soil profile; and *r*, steep

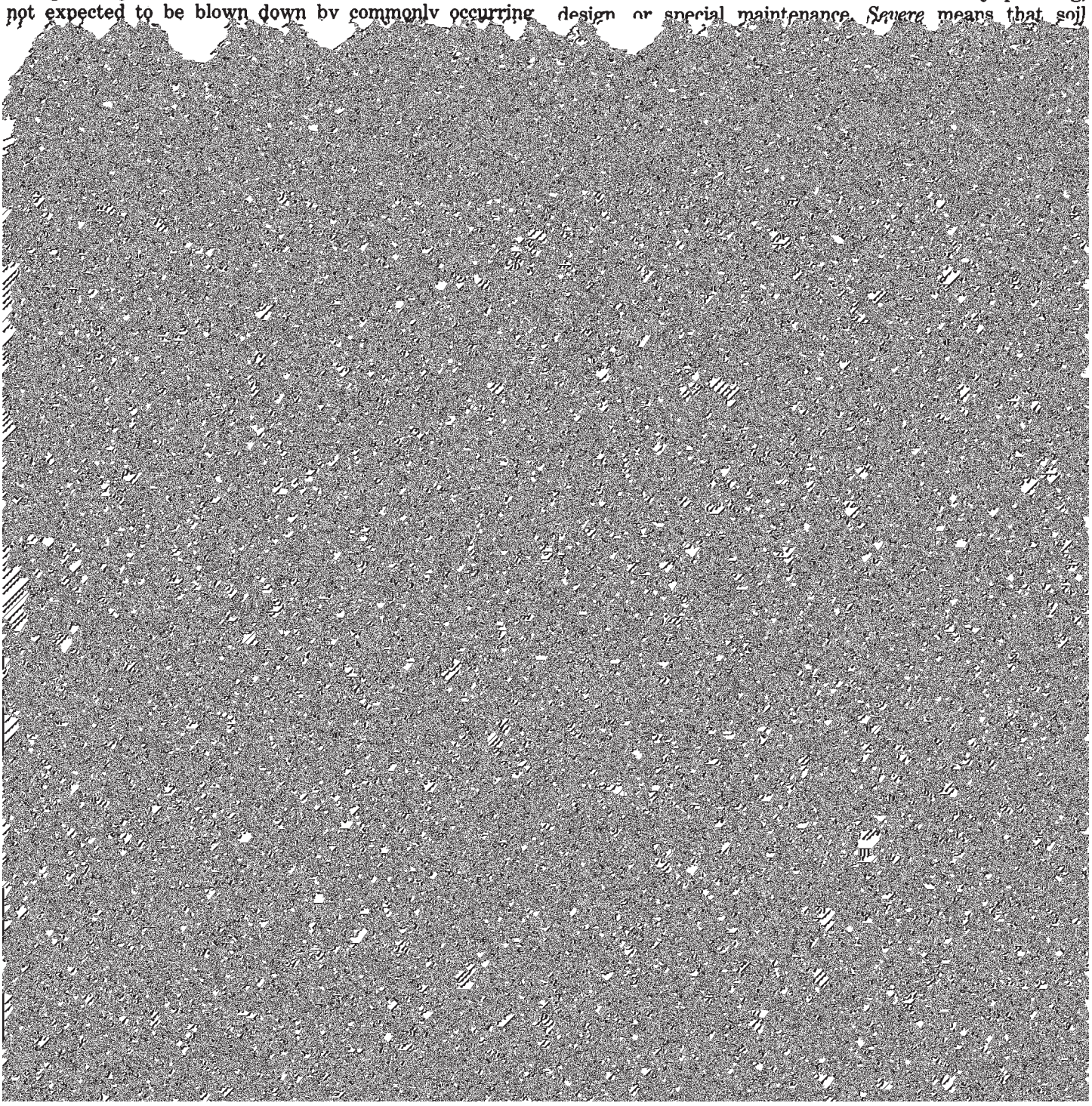


from good planting stock that are properly planted during a period of sufficient rainfall are rated. A rating of *slight* indicates that the expected mortality of the planted seedlings is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

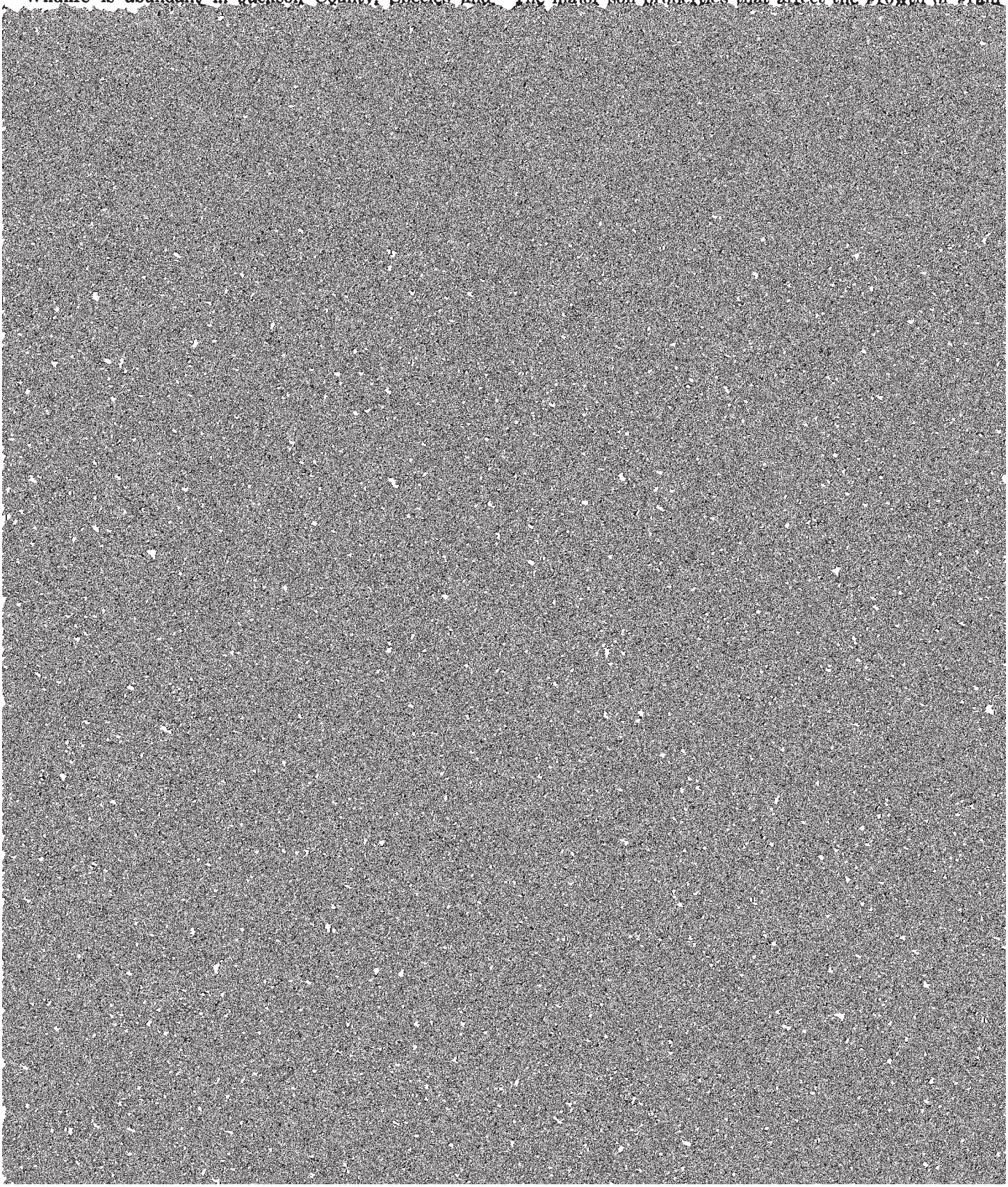
Considered in the ratings of *windthrow hazard* are characteristics of the soil that affect the development of tree roots and the ability of soil to hold trees firmly. A rating of *slight* indicates that trees in wooded areas are not expected to be blown down by commonly occurring

tion and intensity of flooding and the season when flooding occurs. Onsite assessment of height, duration, intensity, and frequency of flooding is essential in planning recreation facilities.

The degree of the limitation of the soils is expressed as slight, moderate, or severe. *Slight* means that the soil properties are generally favorable and that the limitations are minor and easily overcome. *Moderate* means that the limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil



Wildlife is abundant in Jackson County. Species and The maior soil properties that affect the growth of grain



Openland habitat consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The kinds of wildlife attracted to these areas include bobwhite quail, meadowlark, field sparrow, cotton

ticular area; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for location of sanitary landfills, onsite sewage disposal systems, and other waste disposal facilities; (5) plan detailed onsite investigations of soils and geology; (6) find sources of gravel, sand, clay, and

Shallow excavations are used for pipelines, sewerlines, communications and power transmission lines, basements, open ditches, and cemeteries. Such digging or trenching is influenced by the soil wetness of a high seasonal water table; the texture and consistence of soils; the tendency of soils to cave in or slough; and the presence of very firm, dense soil layers, bedrock, or large stones. In addition, excavations are affected by slope of the soil and the probability of flooding. Ratings do not apply to soil horizons below a depth of 6 feet unless otherwise noted.

In the soil series descriptions, the consistence of each soil horizon is defined, and the presence of very firm or extremely firm horizons, usually difficult to excavate, is indicated.

Dwellings and *small commercial buildings* referred to in table 9 are built on undisturbed soil and have foundation loads of a dwelling no more than three stories high. Separate ratings are made for small commercial buildings without basements and for dwellings with and without basements. For such structures, soils should be sufficiently stable that cracking or subsidence of the structure from settling or shear failure of the foundation does not occur. These ratings were determined from estimates of the shear strength, compressibility, and shrink-swell potential of the soil. Soil texture, plasticity and in-place density, potential frost action, soil wetness, and depth to a seasonal high water table were also considered. Soil wetness and depth to a seasonal high water table indicate potential difficulty in providing adequate drainage for basements, lawns, and gardens. Depth to bedrock, slope, and large stones in or on the soil are also important considerations in the choice of sites for these structures and were considered in determining the ratings. Susceptibility to flooding is a serious hazard.

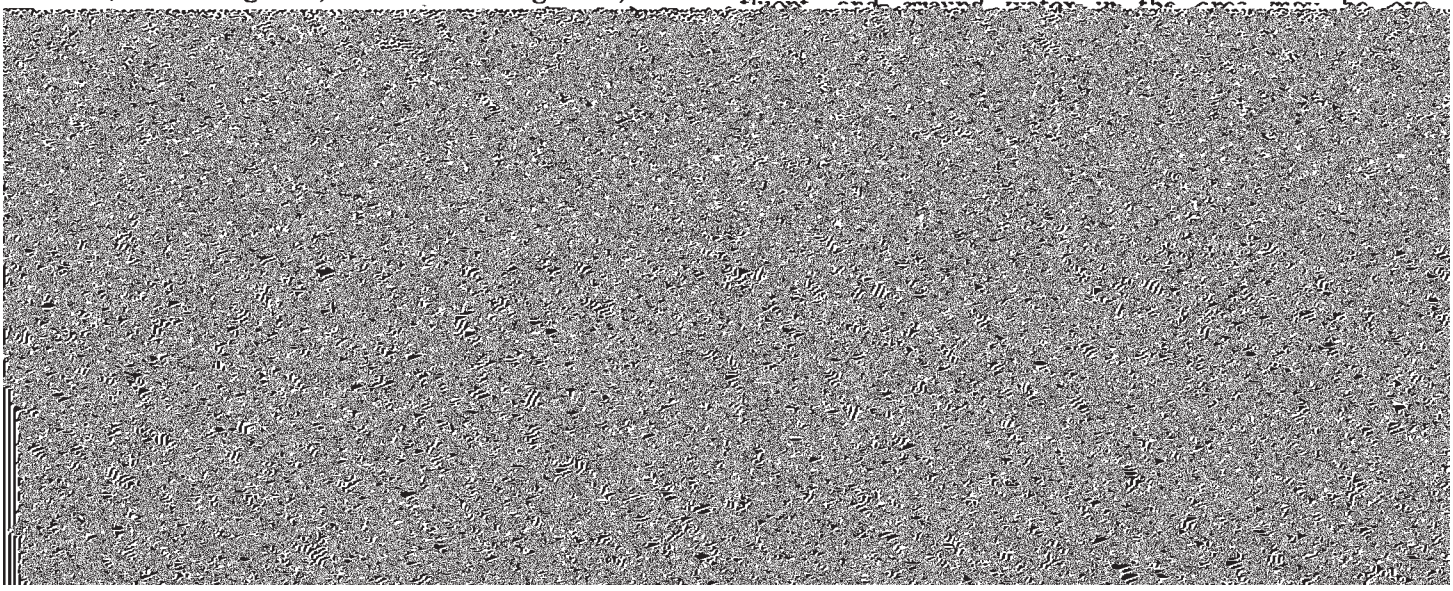
Local roads and streets referred to in table 9 have an all-weather surface that can carry light to medium traffic all year. They consist of a subgrade of the underlying soil material; a base of gravel, crushed rock fragments, or soil soil is important in selecting sites for these facilities and in identifying limiting soil properties and site features to be considered in design and installation. Also, those soil properties that affect ease of excavation or installation of these facilities will be of interest to contractors and local officials. Table 10 shows the degree and kind of limitations of each soil for such uses and for use of the soil as daily cover for landfills. It is important to observe local ordinances and regulations.

If the degree of soil limitation is expressed as *slight*, soils are generally favorable for the specified use and limitations are minor and easily overcome; if *moderate*, soil properties or site features are unfavorable for the specified use, but limitations can be overcome by special planning and design; and if *severe*, soil properties or site features are so unfavorable or difficult to overcome that major soil reclamation, special designs, or intensive maintenance is required. Soil suitability is rated by the terms *good*, *fair*, or *poor*, which mean about the same as the terms *slight*, *moderate*, and *severe*.

Septic tank absorption fields are subsurface systems of tile or perforated pipe that distribute effluent from a septic tank into the natural soil. Only the soil horizons between depths of 18 and 72 inches are evaluated for this use. The soil properties and site features considered are those that affect the absorption of the effluent and those that affect the construction of the system.

Properties and features that affect absorption of the effluent are permeability, depth to seasonal high water table, depth to bedrock, and susceptibility to flooding. Stones, boulders, and shallowness to bedrock interfere with installation. Excessive slope may cause lateral seepage and surfacing of the effluent. Also, soil erosion and soil slippage are hazards if absorption fields are installed on sloping soils.

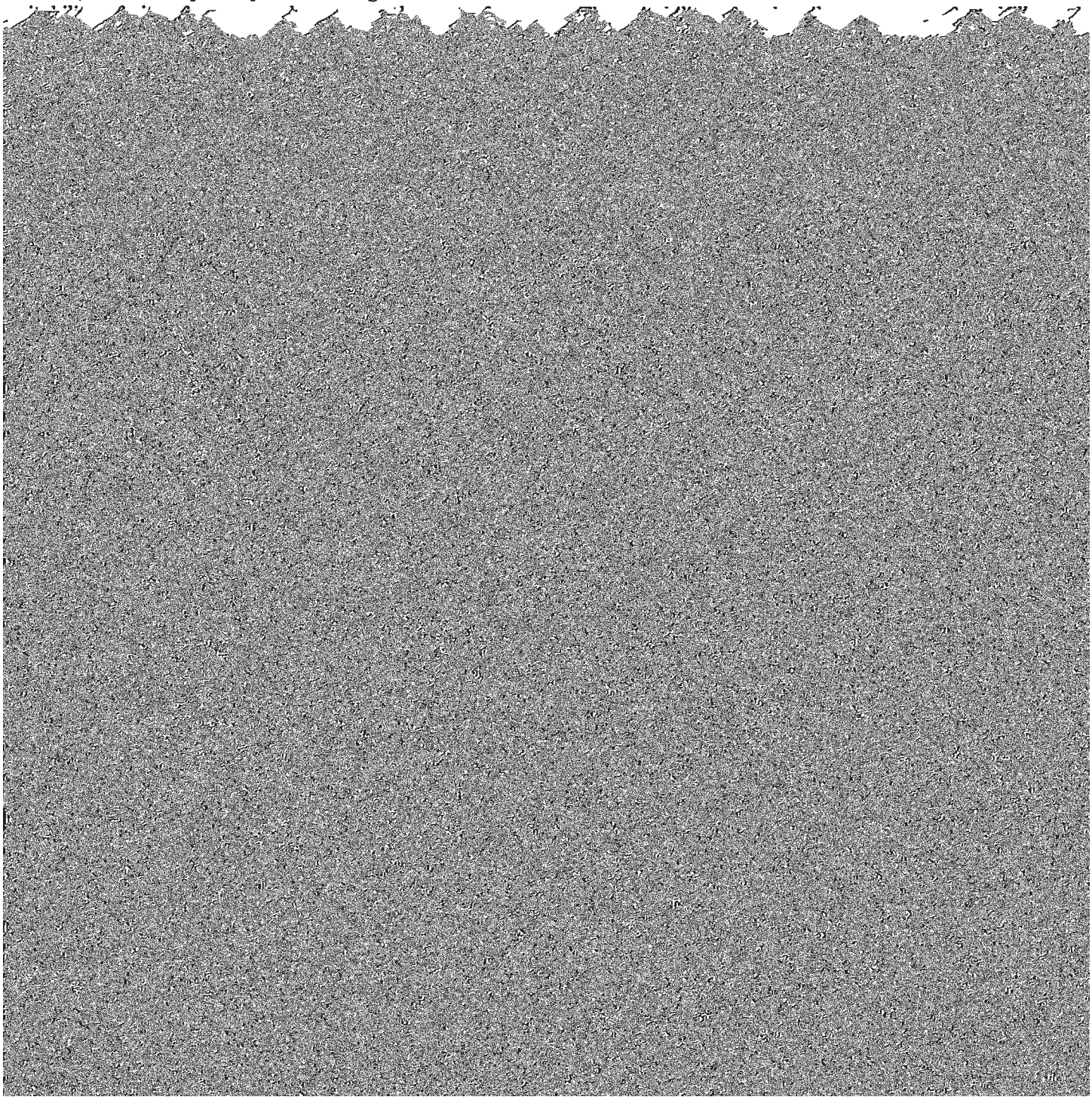
In some soils, loose sand and gravel or fractured bedrock is less than 4 feet below the tile lines. In these soils the absorption field does not adequately filter the ef-



Soils that are very high in content of organic matter and those that have cobbles, stones, or boulders are not suitable. Unless the soil has very slow permeability, contamination of ground water is a hazard where the seasonal high water table is above the level of the lagoon floor. Where the water table is seasonally high, seepage of ground water into the lagoon can seriously reduce the lagoon's capacity for liquid waste. Slope, depth to bedrock, and susceptibility to flooding also affect the

Where it is necessary to bring in soil material for daily or final cover, thickness of suitable soil material available and depth to a seasonal high water table in soils surrounding the sites should be evaluated. Other factors to be evaluated are those that affect reclamation of the borrow areas. These factors include slope, erodibility, and potential for plant growth.

Construction Materials



Topsoil is used in areas where vegetation is to be established and maintained. Suitability is affected mainly by the ease of working and spreading the soil material in preparing a seedbed and by the ability of the soil material to support plantlife. Also considered is the damage that can result at the area from which the topsoil is taken.

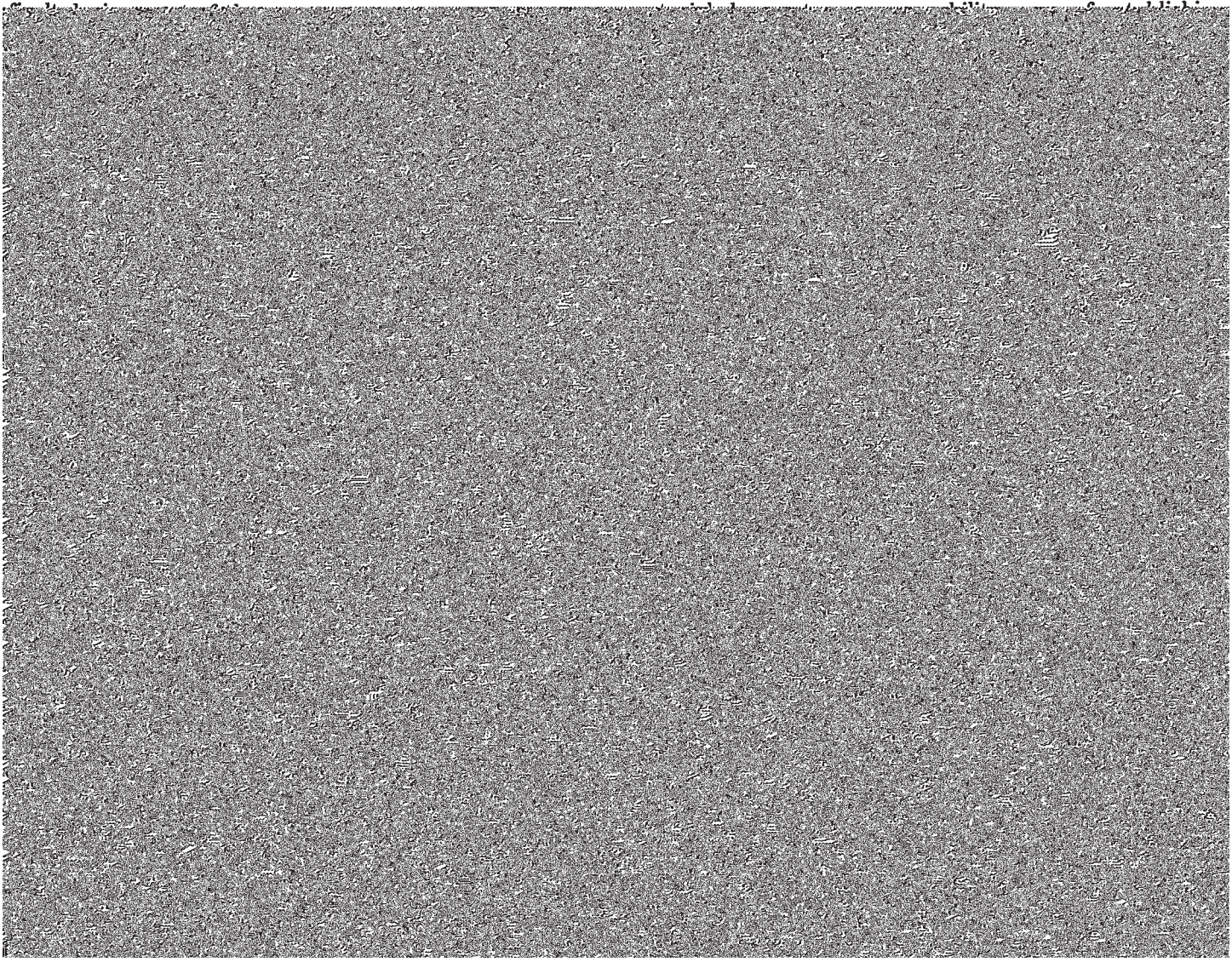
The ease of excavation is influenced by the thickness of suitable material, wetness, slopes, and amount of stones. The ability of the soil to support plantlife is determined by texture, structure, and the amount of soluble salts or toxic substances. Organic matter in the A1 or Ap horizon greatly increases the absorption and retention of moisture and nutrients. Therefore, the soil material from these horizons should be carefully preserved for later use.

Soils rated *good* have at least 16 inches of friable loamy material at their surface. They are free of stones and cobbles, are low in content of gravel, and have gentle slopes. They are low in soluble salts that can limit or prevent plant growth. They are naturally fertile or respond well to fertilizer. They are not so wet that excavation is dif-

aquifer. Excluded are ponds that are fed by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Ratings in table 12 are for ponds that are properly designed, located, and constructed. Soil properties and site features that affect aquifer-fed ponds are depth to a permanent water table, permeability of the aquifer, quality of the water, and ease of excavation.

Drainage of soil is affected by such soil properties as permeability, texture, depth to bedrock, hardpan, or other layers that affect the rate of water movement, depth to the water table, slope, stability of ditchbanks, susceptibility to flooding, salinity and alkalinity, and availability of outlets for drainage.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to intercept runoff. They allow water to soak into the soil or flow slowly to an outlet. Features that affect suitability of a soil for terraces are uniformity and steepness of slope; depth to bedrock, hardpan, or other unfavorable



gineering properties, the engineering classification, and the physical and chemical properties of each major horizon of each soil in the survey area. They also present pertinent soil and water features, engineering test data, and data obtained from physical and chemical laboratory analyses of soils.

Engineering Properties

Table 13 gives estimates of engineering properties and classifications for the major horizons of each soil in the survey area.

Most soils have, within the upper 5 or 6 feet, horizons of contrasting properties. Table 13 gives information for each of these contrasting horizons in a typical profile. *Depth* to the upper and lower boundaries of each horizon is indicated. More information about the range in depth and about other properties in each horizon is given for each soil series in the section "Soil Series and Morphology."

Texture is described in table 13 in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in soil material that is less than 2 millimeters in diameter. "Loam," for example, is soil material that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If a soil contains gravel or other particles coarser than sand, an appropriate modifier is added, for example, "gravelly loam." Other texture terms are defined in the Glossary.

The two systems commonly used in classifying soils for engineering use are the Unified Soil Classification System (Unified) (*8*) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO) (*1*).

The *Unified* system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter, plasticity index, liquid limit, and organic-matter content. Soils are grouped into 15 classes—eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt. Soils on the borderline between two classes have a dual classification symbol, for example, CL-ML.

The *AASHTO* system classifies soils according to those properties that affect their use in highway construction and maintenance. In this system a mineral soil is classified in one of seven basic groups ranging from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines. At the other extreme, in group A-7, are fine-grained soils. Highly organic soils are classified in group A-8 on the basis of visual inspection.

When laboratory data are available, the A-1, A-2, and A-7 groups are further classified as follows: A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, and A-7-6. As an additional refinement, the desirability of soils as subgrade material can be indicated by a group index number. These numbers range from 0 for the best subgrade material to 20 or higher for the poorest. The AASHTO classification for soils tested in the survey area, with group index numbers in parentheses, is given in table 16. The estimated classification, without group index numbers, is given in table 13. Also in table 13 the percentage, by weight, of rock fragments more than 3 inches in diameter is estimated for each major horizon. These estimates are determined mainly by observing volume percentage in the field and then converting that, by formula, to weight percentage.

Percentage of the soil material less than 3 inches in diameter that passes each of four sieves (U.S. standard) is estimated for each major horizon. The estimates are based on tests of soils that were sampled in the survey area and in nearby areas and on field estimates from many borings made during the survey.

Liquid limit and *plasticity index* indicate the effect of water on the strength and consistence of soil. These indexes are used in both the Unified and AASHTO soil classification systems. They are also used as indicators in making general predictions of soil behavior. Range in liquid limit and plasticity index are estimated on the basis of test data from the survey area or from nearby areas and on observations of the many soil borings made during the survey.

Physical and Chemical Properties

Table 14 shows estimated values for several soil characteristics and features that affect behavior of soils in engineering uses. These estimates are given for each major horizon, at the depths indicated, in the typical pedon of each soil. The estimates are based on field observations and on test data for these and similar soils.

Permeability is estimated on the basis of known relationships among the soil characteristics observed in the field—particularly soil structure, porosity, and gradation or texture—that influence the downward movement of water in the soil. The estimates are for vertical water movement when the soil is saturated. Not considered in the estimates is lateral seepage or such transient soil features as plowpans and surface crusts. Permeability of the soil is an important factor to be considered in planning and designing drainage systems, in evaluating the potential of soils for septic tank systems and other waste disposal systems, and in many other aspects of land use and management.

Available water capacity is rated on the basis of soil characteristics that influence the ability of the soil to hold water and make it available to plants. Important characteristics are content of organic matter, soil texture, and soil structure. Shallow-rooted plants are not likely to use

the available water from the deeper soil horizons. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design of irrigation systems.

Soil reaction is expressed as a range in pH values. The range in pH of each major horizon is based on many field checks. For many soils, the values have been verified by laboratory analyses. Soil reaction is important in selecting the crops, ornamental plants, or other plants to be grown; in evaluating soil amendments for fertility and stabilization; and in evaluating the corrosivity of soils.

Shrink-swell potential depends mainly on the amount and kind of clay in the soil. Laboratory measurements of the swelling of undisturbed clods were made for many soils. For others the swelling was estimated on the basis of the kind and amount of clay in the soil and on measurements of similar soils. The size of the load and the magnitude of the change in soil moisture content also influence the swelling of soils. Shrinking and swelling of some soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special design and added expense may be required if the planned use of the soil will not tolerate large volume changes.

Risk of corrosion pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel

1. Sands, coarse sands, fine sands, and very fine sands. These soils are extremely erodible, so vegetation is difficult to establish. They are generally not suitable for crops.

2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible, but crops can be grown if intensive measures to control soil blowing are used.

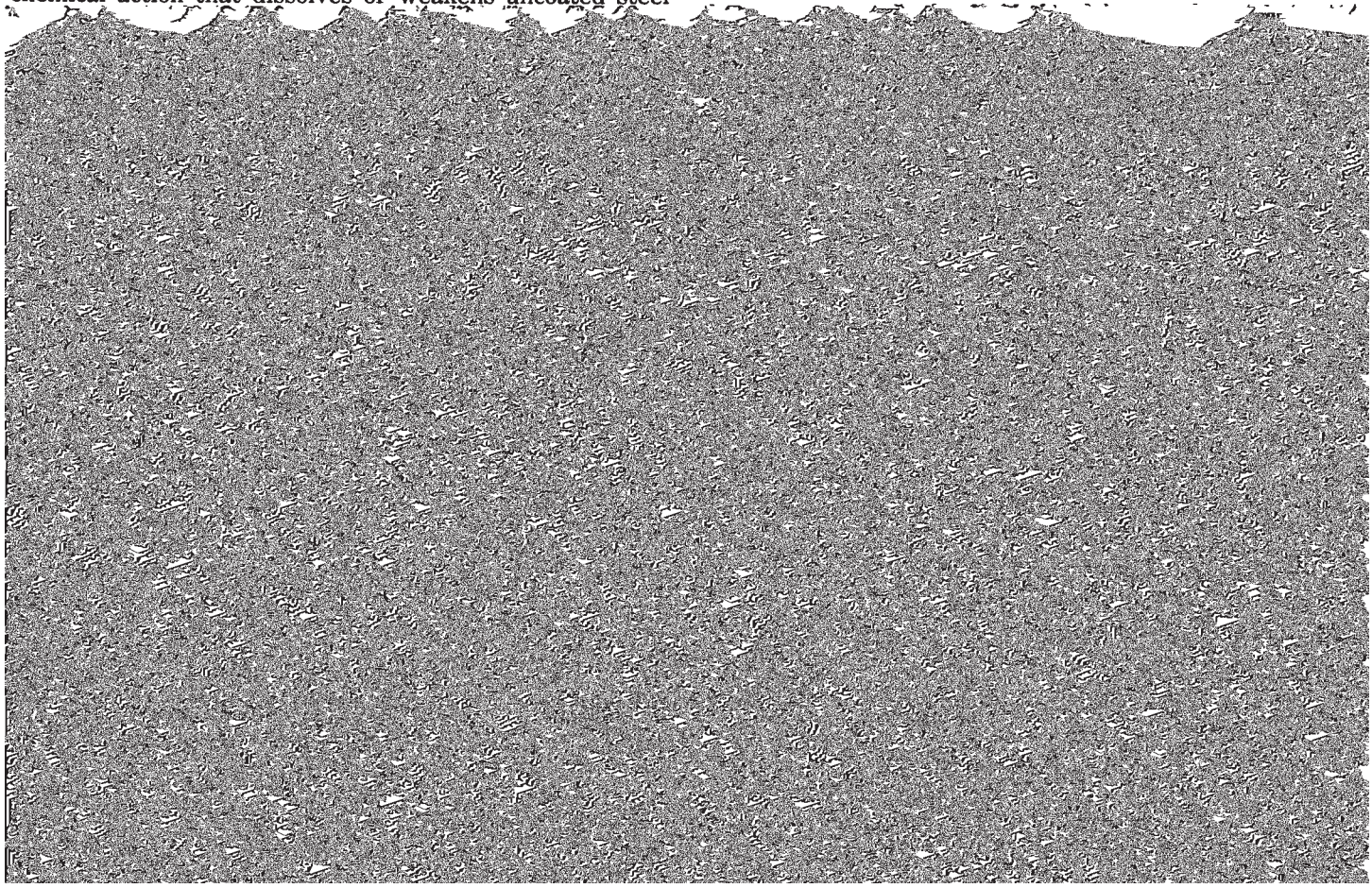
3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible, but crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible, but crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible, but crops can be grown if measures to control soil blowing are used.

5. Loamy soils that are less than 18 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible, but crops can be grown if measures to control soil blowing are used.

6. Loamy soils that are 18 to 35 percent clay and less



Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils that have a layer that impedes the downward movement of water or soils that have moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clay soils that have a high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding is the temporary covering of soil with water from overflowing streams, with runoff from adjacent slopes, and by tides. Water standing for short periods after rains or after snow melts is not considered flooding nor is water in swamps and marshes. Flooding is rated in general terms that describe the frequency and duration of flooding and the time of year when flooding is most likely. The ratings are based on evidence in the soil profile of the effects of flooding, namely thin strata of gravel, sand, silt, or, in places, clay deposited by floodwater; irregular decrease in organic-matter content with increasing depth; and absence of distinctive soil horizons that form in soils of the area that are not subject to flooding. The ratings are also based on local information about floodwater levels in the area and the extent of flooding; and on information that relates the position of each soil on the landscape to historic floods.

The generalized description of flood hazards is of value in land-use planning and provides a valid basis for land-use restrictions. The soil data are less specific, however,

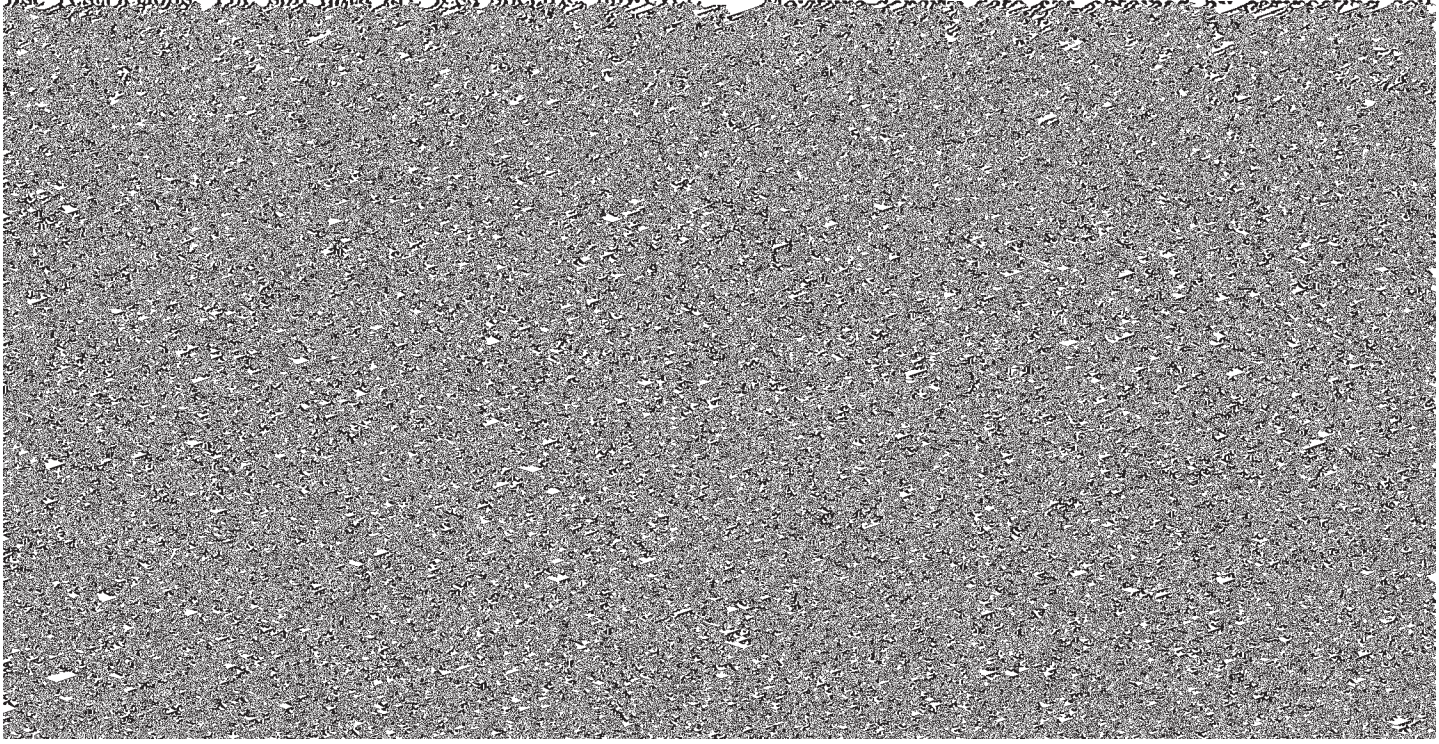
Depth to bedrock is shown for all soils that are underlain by bedrock at a depth of 5 to 6 feet or less. For many soils, the limited depth to bedrock is a part of the definition of the soil series. The depths shown are based on measurements made in many soil borings and on other observations during the soil mapping. The kind of bedrock and its hardness as related to ease of excavation is also shown. Rippable bedrock can be excavated with a single-tooth ripping attachment on a 200-horsepower tractor, but hard bedrock generally requires blasting.

Potential frost action refers to the likelihood of damage to pavements and other structures by frost heaving and low soil strength after thawing. Frost action results from the movement of soil moisture into the freezing temperature zone in the soil, which causes ice lenses to form. Soil texture, temperature, moisture content, porosity, permeability, and content of organic matter are the most important soil properties that affect frost action. It is assumed that the soil is not covered by insulating vegetation or snow and is not artificially drained. Silty and clayey soils that have a high water table in winter are most susceptible to frost action. Well drained very gravelly or sandy soils are the least susceptible.

Test Data

Table 16 shows test data for samples of several types of soil in Jackson County. The test results do not represent the entire range of characteristics of soils within the county, nor do they represent the entire range of characteristics of the soils tested. The results, nevertheless, can be used as a general guide in estimating properties of the other soils in the county.

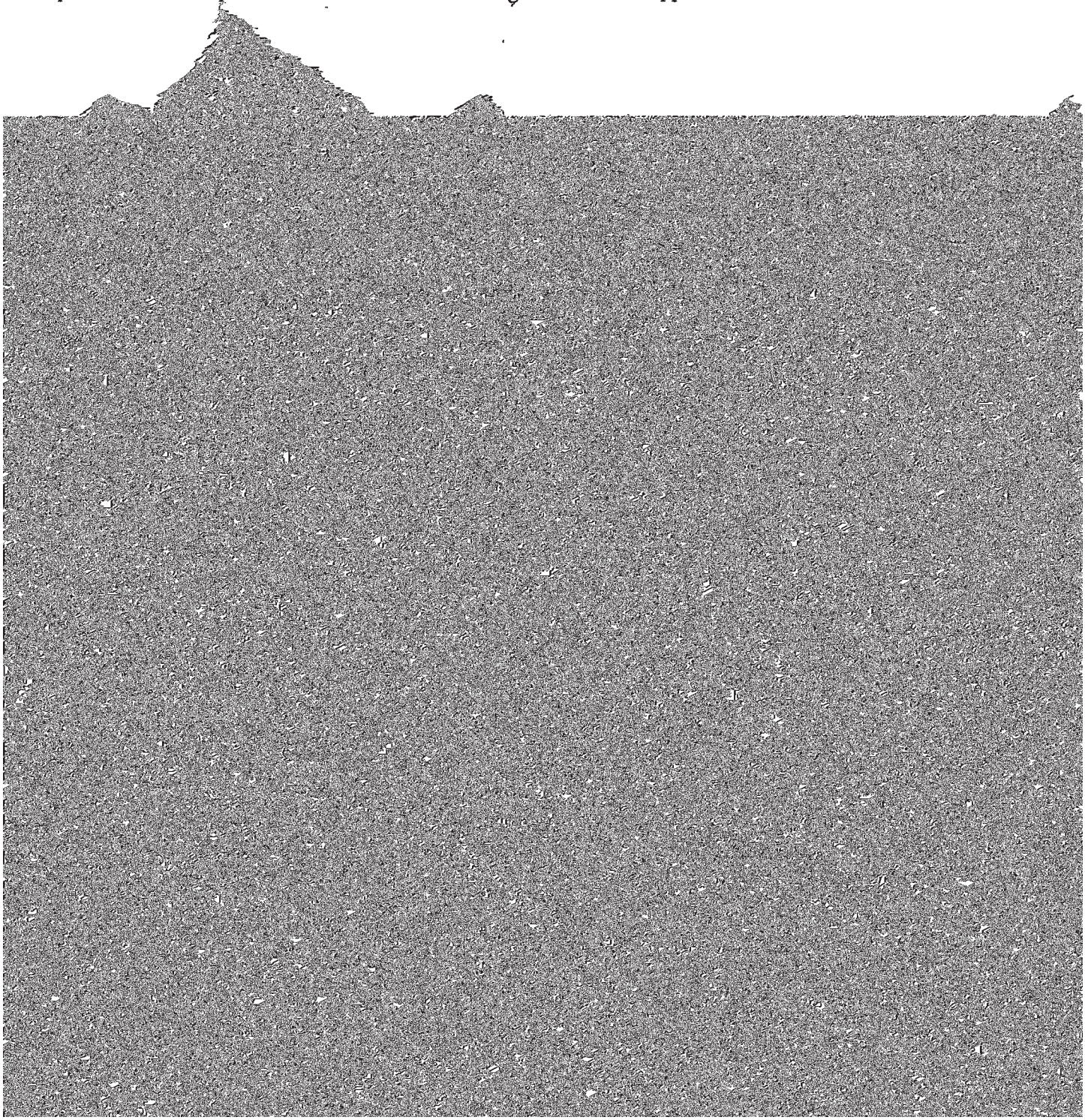
Moisture density data were obtained by compacting soil



a semisolid to a plastic state. As the moisture content is further increased, the material changes from a plastic state to a liquid. The plastic limit is the moisture content at which the soil material passes from a semisolid to a plastic state. The liquid limit is the moisture content at which the material passes from a plastic state to a liquid. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range

ford are examples of soils that formed in both loess deposits.

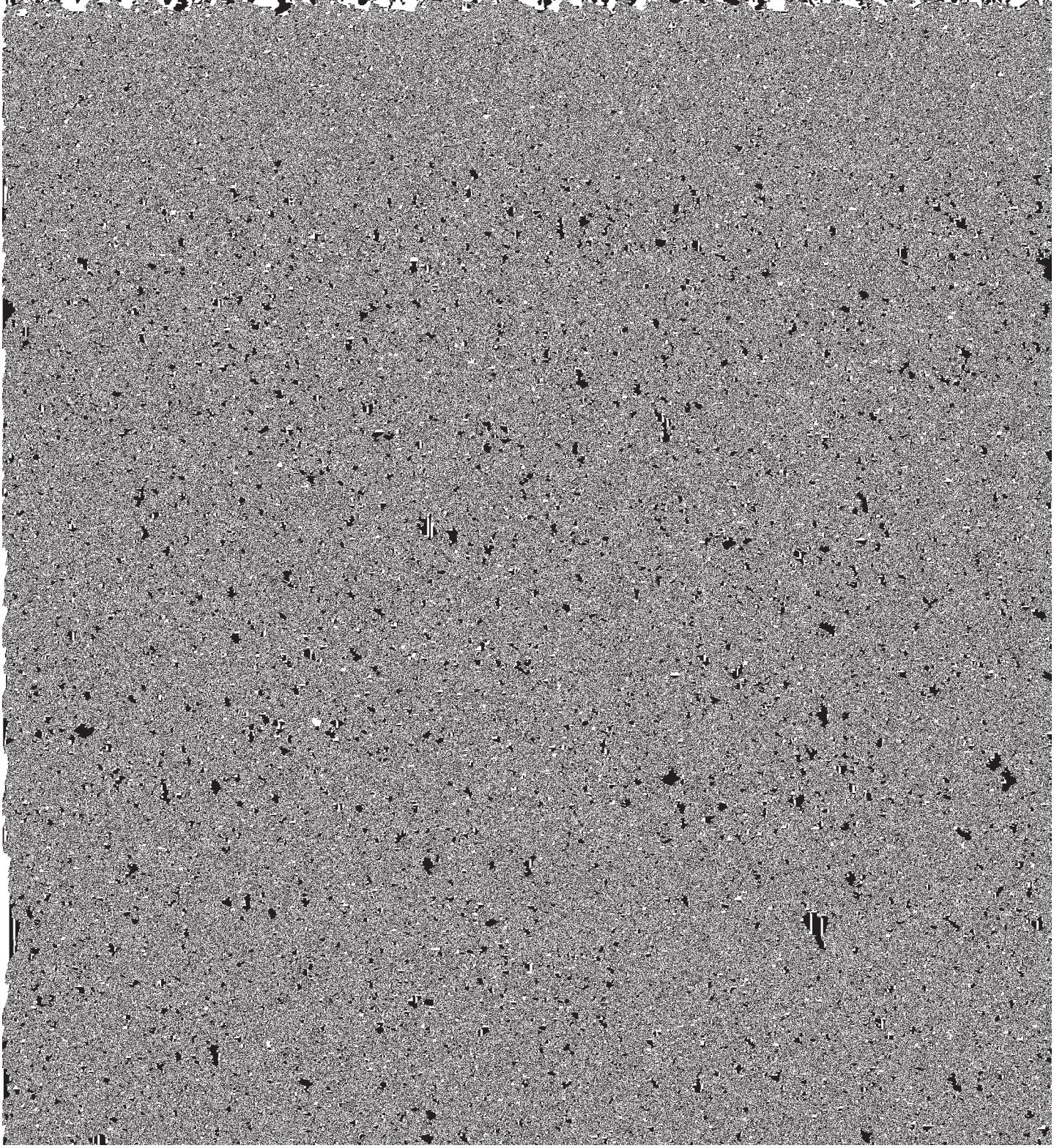
Soils on flood plains and bottom lands in the county formed in water-laid materials or alluvium. Many of these soils are still receiving sediment. These materials range from sand to clay. Darwin and Jacob soils formed in clayey alluvial sediments of the slack-water deposits from the Mississippi River. These soils are on broad flats and



Topography

Many differences among soils of the county are caused by topography. Slope, or lay of the land, affects drainage, runoff, erosion, and deposition. Slopes differ in gradient, length, shape, and exposure. Some or all of these slope

The system of classification has six categories. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. In this system the classification is based on the different soil properties that can be observed in the field or those that can be inferred either from other properties that are



SERIES. The series consists of soils that formed in a particular kind of material and have horizons that, except for texture of the surface soil or of the underlying substratum, are similar in differentiating characteristics and in arrangement in the soil profile. Among these characteristics are color, texture, structure, reaction, consistence, and mineral and chemical composition.

Soil Series and Morphology

In this section, each soil series recognized in the survey area is described in detail. The descriptions are arranged in alphabetic order by series name.

Characteristics of the soil and the material in which it formed are discussed for each series. The soil is then compared to similar soils and to nearby soils of other series. Then a pedon, a small three-dimensional area of soil typical of the soil series in the survey area, is described

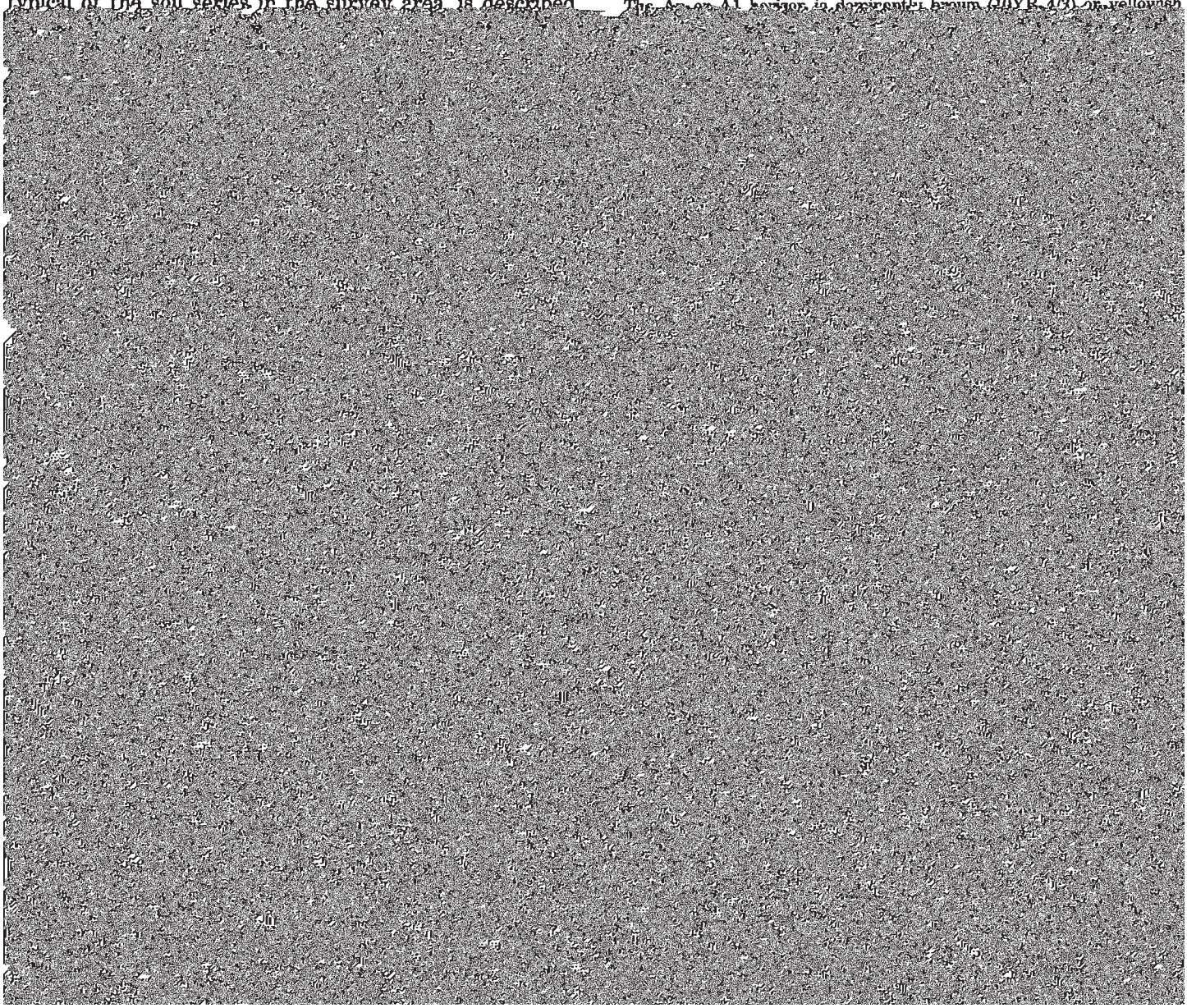
B24t—33 to 42 inches; strong brown (7.5YR 5/6) light silty clay loam; moderate medium and coarse prismatic structure parting to moderate medium and coarse subangular blocky; firm; discontinuous dark brown (7.5YR 4/4) clay films and patchy light gray (10YR 7/2 dry) uncoated silt grains on vertical faces of peds; common fine dark stains; very strongly acid; gradual smooth boundary.

B31t—42 to 52 inches; brown (7.5YR 4/4) light silty clay loam; moderate coarse prismatic structure parting to weak coarse subangular blocky; firm; continuous dark brown (7.5YR 4/4) clay films and patchy light brownish gray (10YR 6/2 dry) uncoated silt grains on vertical faces of peds; few streaks of light brownish gray (2.5Y 6/2); common fine dark stains; strongly acid; gradual smooth boundary.

B32t—52 to 66 inches; brown (7.5YR 4/4) heavy silt loam; weak coarse prismatic structure parting to weak coarse subangular blocky; firm; discontinuous dark brown (7.5YR 4/4) clay films and patchy light gray (10YR 7/2 dry) uncoated silt grains on vertical faces of peds; many fine dark stains; strongly acid.

Thickness of the solum ranges from about 45 to 72 inches. Reaction ranges from medium acid to very strongly acid throughout the pedon, except in areas where the surface layer has been limed.

The A or Ap horizon is dominantly brown (10YR 4/3) or yellowish



B23t—28 to 38 inches; dark brown (7.5YR 4/4) fine sandy loam; weak medium subangular blocky structure; firm; few roots; discontinuous dark reddish brown (5YR 3/4) clay films and discontinuous light gray (10YR 7/2 dry) uncoated silt grains on ped faces; few fine concretions (iron and manganese oxides); medium acid; clear smooth boundary.

B3t—38 to 49 inches; dark brown (7.5YR 4/4) loamy fine sand; weak coarse subangular blocky structure; friable; discontinuous dark reddish brown (5YR 3/4) clay films and light yellowish brown (10YR 6/4) sand grains on faces of peds; few fine black (N 2/0) stains and concretions (iron and manganese oxides); medium acid; abrupt smooth boundary.

C—49 to 64 inches; yellowish brown (10YR 5/4, 5/8) and light yellowish brown (10YR 6/4) fine sand; single grained; loose; noticeable stratification; medium acid.

The A horizon is very fine sandy loam or fine sandy loam. The B horizon is fine sandy loam or loam, and some pedons have thin layers of sandy clay loam. Reaction of the B horizon ranges from medium acid to very strongly acid.

Ava Series

The Ava series consists of moderately well drained, moderately slowly permeable to very slowly permeable soils that formed in loess overlying loamy material. Ava soils are on narrow and broad ridgetops and side slopes in the uplands. Slopes are mainly 2 to 12 percent but range from 2 to 18 percent.

Ava soils are on the same landscape as Bluford and Hickory soils and have pedons similar to those of Hosmer soils. Ava soils lack the gray colors of Bluford soils and have less clay in the upper part of the B2 horizon than those soils. They have a Bx horizon and have less sand and pebbles in the solum than Hickory soils. Ava soils contain more sand in the Bx horizon than Hosmer soils.

Typical pedon of Ava silt loam, 2 to 6 percent slopes, approximately 410 feet south and 990 feet east of the northwest corner of sec. 15, T. 7 S., R. 2 W., in a cultivated field:

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam; moderate medium granular structure; friable; mildly alkaline; abrupt smooth boundary.

B21t—7 to 17 inches; brownish yellow (10YR 6/6) heavy silt loam; weak fine subangular blocky structure; friable; patchy thin yellowish brown (10YR 5/6) clay films on faces of peds; very strongly acid; gradual smooth boundary.

B22t—17 to 20 inches; brownish yellow (10YR 6/6) heavy silt loam; moderate medium subangular blocky structure; firm; patchy thin yellowish brown (10YR 5/6) clay films and light gray (10YR 7/2) uncoated silt grains on faces of peds; very strongly acid; abrupt smooth boundary.

B&A—20 to 23 inches; strong brown (7.5YR 5/6) light silty clay loam (B2t) and light gray (10YR 7/2) silt (A2); moderate medium subangular blocky structure; firm; patchy thin brown (7.5YR 4/4) clay films on faces of peds; extremely acid; abrupt smooth boundary.

B'21t—23 to 27 inches; yellowish brown (10YR 5/4) silty clay loam; common medium distinct light brownish gray (10YR 6/2) and pale brown (10YR 6/3) mottles; moderate medium prismatic structure parting to moderate medium subangular blocky; firm; patchy thin brown (7.5YR 4/4) clay films and light gray (10YR 7/2) uncoated silt grains on faces of peds; very strongly acid; clear smooth boundary.

B'22t—27 to 39 inches; strong brown (7.5YR 5/6) heavy silt loam; common medium distinct light brownish gray (10YR 6/2) and pale brown (10YR 6/3) mottles; moderate medium prismatic structure parting to weak coarse subangular blocky; firm and slightly brittle; patchy thin light brown (7.5YR 6/4) clay films and light gray (10YR 7/2) uncoated silt grains on faces of peds; common dark stains; very strongly acid; gradual smooth boundary.

Bx1—39 to 48 inches; strong brown (7.5YR 5/6) heavy silt loam; many medium distinct grayish brown (10YR 5/2), light brownish gray (10YR 6/2), and pale brown (10YR 6/3) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; firm and brittle; patchy light gray (10YR 7/2) uncoated silt grains on faces of peds; common dark stains; very strongly acid; gradual smooth boundary.

IIBx2—48 to 57 inches; brown (7.5YR 5/4) silt loam; many medium prominent light brownish gray (2.5Y 6/2) mottles; weak coarse prismatic structure parting to moderate thick platy; firm and brittle; few light gray (10YR 7/2) uncoated silt grains and dark stains on faces of peds; common sand grains; strongly acid.

IICx—57 to 68 inches; dark brown (7.5YR 4/4) and pinkish gray (7.5YR 6/2) silt loam; massive in thick, platy layers; firm and brittle; dark stains along cracks; medium acid.

Depth to the Bx horizon ranges from about 24 to 40 inches. Depth to the IIBx horizon ranges from 40 to 55 inches. The B2t and Bx horizons range from extremely acid to strongly acid.

Banlic Series

The Banlic series consists of somewhat poorly drained, slowly permeable soils that formed in silty alluvium. Banlic soils are on slight rises on flood plains of bottom land. Slopes range from 0 to 3 percent.

Banlic soils are on the same flood plains as Belknap, Bonnie, Wakeland, and Haymond soils. Banlic soils have a dense or compact layer in the lower part of the solum (Bx horizon) that Belknap, Bonnie, Wakeland, and Haymond soils do not have. Also, they have browner colors than Bonnie soils and grayer colors than Haymond soils.

Typical pedon of Banlic silt loam, approximately 462 feet north and 429 feet east of the southwest corner of sec. 13, T. 9 S., R. 1 W., in a meadow:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) silt loam; common medium faint grayish brown (10YR 5/2) mottles; moderate fine granular structure; friable; few fine concretions; many fine dark yellowish brown (10YR 3/4) stains; neutral; abrupt smooth boundary.

A2—8 to 17 inches; brown (10YR 5/3) silt loam; few fine faint gray (10YR 5/1) and few medium faint light brownish gray (10YR 6/2) mottles; weak fine subangular blocky parting to moderate fine granular structure; friable; common fine and medium concretions; many fine dark yellowish brown (10YR 3/4) stains; very strongly acid; gradual smooth boundary.

B1—17 to 26 inches; brown (10YR 5/3) silt loam; many medium faint light brownish gray (10YR 6/2) and common fine and medium faint yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable to firm; many fine and medium concretions; many fine and medium dark yellowish brown (10YR 3/4) stains and soft bodies; very strongly acid; abrupt smooth boundary.

Bx1—26 to 39 inches; light brownish gray (10YR 6/2) and brown (10YR 5/3) silt loam; few fine and medium faint yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure parting to weak fine subangular blocky; firm, brittle; some pores coated with dark brown (10YR 4/3) clay films; patchy white (10YR 8/1 dry) uncoated silt grains on faces of peds; few fine concretions; many medium and coarse dark yellowish brown (10YR 3/4) soft bodies and stains; very strongly acid; clear smooth boundary.

Bx2—39 to 50 inches; light brownish gray (10YR 6/2) and brown (10YR 5/3) silt loam; many medium and coarse distinct dark brown (7.5YR 4/4) mottles; weak coarse prismatic structure parting to weak medium subangular blocky; firm, brittle; some pores coated with dark brown (10YR 4/3) clay films; patchy white (10YR 8/1 dry) uncoated silt grains on faces of peds; few fine concretions; common dark stains; very strongly acid; clear smooth boundary.

C1—50 to 57 inches; light brownish gray (10YR 6/2) and brown (10YR 5/3) silt loam; common fine faint yellowish brown (10YR 5/6) mottles; weak coarse subangular blocky structure; friable; occasional pore coated with dark brown (10YR 4/3) clay films; common dark stains; strongly acid; clear smooth boundary.

C2—57 to 62 inches; light brownish gray (10YR 6/2) silt loam; few fine distinct yellowish brown (10YR 5/6) and many medium distinct dark yellowish brown (10YR 4/4) mottles; massive; firm; patchy white (10YR 8/1 dry) uncoated silt grains; common dark stains; medium acid.

Thickness of the solum ranges from about 48 to 65 inches. Depth to the Bx horizon ranges from 20 to 36 inches. Reaction ranges from strongly acid to extremely acid throughout the solum, except in areas where the surface layer has been limed.

Color of the surface layer can be grayish brown (10YR 5/2). The A2 horizon ranges from 8 to 18 inches in thickness and dominantly has chroma of 3 in the upper part and chroma of 2 in the lower part.

The Bx horizon has weak subangular blocky or prismatic structure and patchy clay films. Matrix colors have hue of 10YR or 2.5Y, value of 4 to 6, and chroma of 2 or 3.

Belknap Series

The Belknap series consists of somewhat poorly drained, moderately permeable to moderately slowly permeable soils that formed in silty alluvium. Belknap soils are on bottom lands. Slopes range from 0 to 2 percent.

Belknap soils are on the same flood plains as Bonnie, Banlic, and Burnside soils. Belknap soils are less gray than the poorly drained Bonnie soils. They lack the dense, compact horizon of the Banlic soils and have fewer coarse fragments in the solum than Burnside soils. Belknap soils

The A horizon ranges from neutral to medium acid. The C horizon, to a depth of 40 inches or more, is strongly acid or very strongly acid. The C horizon is predominantly silt loam, but strata of loam and fine sandy loam are in some pedons.

Birds Series

The Birds series consists of poorly drained, moderately slowly permeable soils that formed in silty stream sediments. Birds soils are mainly in depressions of the larger bottom lands. Slopes are commonly less than 1 percent but range from 0 to 2 percent.

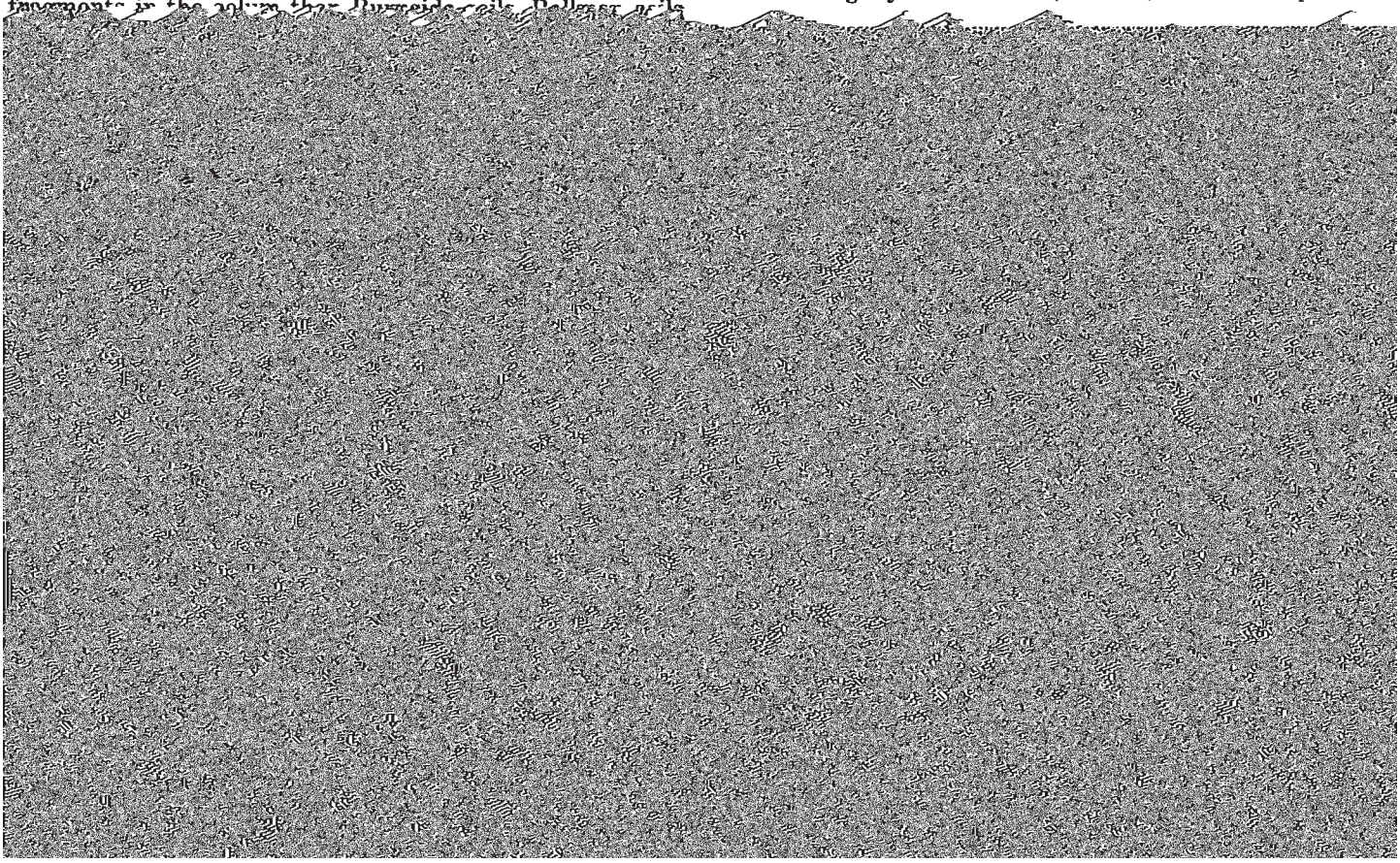
Birds soils are on the same landscape as Wakeland soils and have pedons similar to those of Bonnie and Piopolis soils. They are grayer in the solum than Wakeland soils. They are less acid than Bonnie and Piopolis soils and are less clayey than Piopolis soils.

Typical pedon of Birds silt loam, approximately 1,980 feet north and 330 feet west of the southeast corner of sec. 26, T. 7 S., R. 3 W., in a cultivated field:

Ap—0 to 7 inches; light gray (10YR 6/1) and grayish brown (10YR 5/2) silt loam; common medium distinct light yellowish brown (10YR 6/4) and few fine prominent pink (5YR 7/4) and black (N/2) mottles; weak fine granular structure; friable; many roots; neutral; clear smooth boundary.

C1g—7 to 21 inches; gray (10YR 6/1) silt loam; common medium distinct light olive brown (2.5Y 5/4) and very pale brown (10YR 7/4) mottles; weak fine granular structure and massive; friable; many roots; neutral; gradual smooth boundary.

C2g—21 to 30 inches; gray (10YR 5/1) silt loam; common medium distinct light yellowish brown (10YR 6/4) and few fine prominent



A21—8 to 13 inches; brown (10YR 5/3) and yellowish brown (10YR 5/4) silt loam; weak very thin platy structure parting to weak fine granular; friable; common fine concretions; some very dark grayish brown (10YR 3/2) worm casts; extremely acid; clear smooth boundary.

A22—13 to 18 inches; pale brown (10YR 6/3) silt loam with many fine distinct yellowish brown (10YR 5/8) mottles; weak very thin platy structure parting to weak very fine subangular blocky; friable; common fine and medium concretions; extremely acid; clear wavy boundary.

B1t—18 to 21 inches; dark yellowish brown (10YR 4/4) and yellowish brown (10YR 5/6) silty clay loam; weak fine prismatic structure parting to moderate very fine subangular blocky structure; firm; discontinuous grayish brown (10YR 5/2) clay films and thick white (10YR 8/1 dry) uncoated silt grains on faces of peds; common fine concretions; extremely acid; clear smooth boundary.

B21t—21 to 29 inches; dark yellowish brown (10YR 4/4) light silty clay; moderate fine prismatic structure parting to moderate fine angular blocky; very firm; continuous grayish brown (10YR 5/2) clay films and discontinuous white (10YR 8/1 dry) uncoated silt grains on faces of peds; common fine concretions; extremely acid; gradual smooth boundary.

B22t—29 to 37 inches; brown (10YR 5/3) heavy silty clay loam; common fine distinct yellowish brown (10YR 5/6) and common fine faint grayish brown (10YR 5/2) mottles; moderate medium prismatic structure parting to moderate fine and medium angular and subangular blocky; very firm; continuous brown (10YR 5/3) and grayish brown (10YR 5/2) clay films and discontinuous white (10YR 8/1 dry) uncoated silt grains on faces of peds; common fine concretions; very strongly acid; clear smooth boundary.

B23t—37 to 46 inches; brown (10YR 5/3) and grayish brown (10YR 5/2) silty clay loam; common fine distinct yellowish brown (10YR 5/6) mottles; weak medium prismatic structure parting to moderate medium subangular blocky; firm; brown (10YR 5/3) and dark brown (10YR 4/3) clay films and thick white (10YR 8/1 dry) uncoated silt grains on faces of peds; many fine and medium concretions and stains; very strongly acid; clear smooth boundary.

IIBx1—46 to 56 inches; brown (7.5YR 4/4) heavy silt loam; many medium distinct light brownish gray (10YR 6/2) mottles; weak medium

Typical pedon of Bonnie silt loam, approximately 165 feet north and 300 feet east of the southwest corner of sec. 16, T. 7 S., R. 1 W., in a cultivated field:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; common fine distinct yellowish brown (10YR 5/6) mottles; moderate fine granular structure; friable; many roots; strongly acid; abrupt smooth boundary.

C1g—7 to 31 inches; gray (10YR 6/1) silt loam; common fine distinct yellowish brown (10YR 5/6), strong brown (7.5YR 5/6), and yellow (10YR 7/6) mottles; massive; friable; few roots; very strongly acid; gradual smooth boundary.

C2g—31 to 45 inches; light brownish gray (10YR 6/2) silt loam; common fine distinct light gray (10YR 7/2) mottles; massive; friable; very strongly acid; gradual smooth boundary.

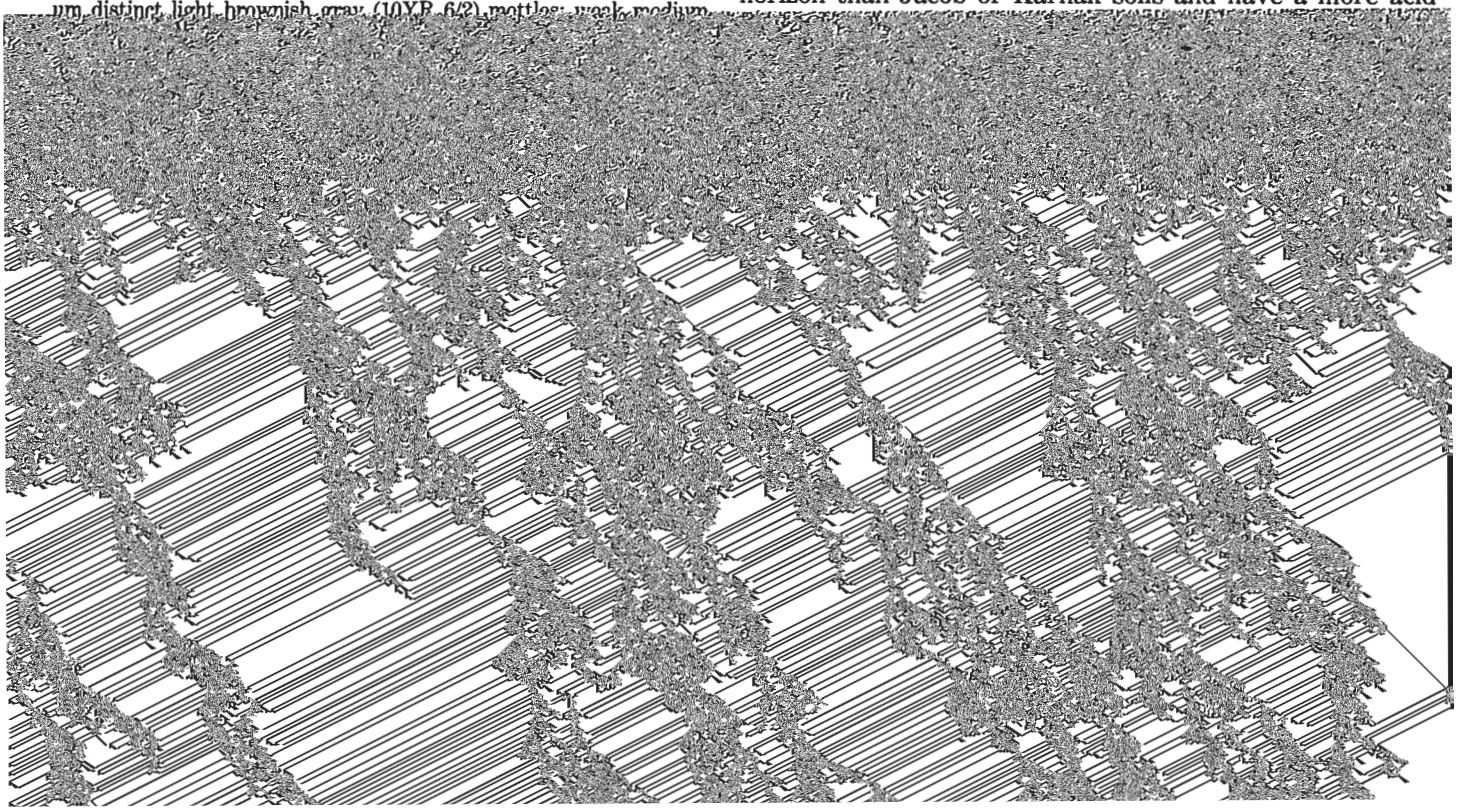
C3—45 to 60 inches; brown (10YR 5/3) silt loam; common fine faint grayish brown (10YR 5/2) and few medium distinct yellowish brown (10YR 5/6) mottles; weak fine and medium subangular blocky structure; firm and slightly brittle; few dark stains (iron and manganese oxides); few clay films in pores; very strongly acid.

The control section is strongly acid or very strongly acid, but the lower part of the C horizon is medium acid or slightly acid in some pedons. Thin strata of silty clay loam are in the C horizon of some pedons.

Booker Series

The Booker series consists of very poorly drained and poorly drained, very slowly permeable soils that formed in clayey slack-water sediments. Booker soils are on broad flats and narrow channels of the Mississippi River bottom land. Slopes range from 0 to 2 percent.

Booker soils have pedons similar to those of Jacob, Karnak, Darwin, and Cairo soils and commonly occur with those soils. Booker soils have a darker and thicker A1 horizon than Jacob or Karnak soils and have a more acid



C1g—51 to 63 inches; dark gray (5Y 4/1) clay; common fine prominent yellowish brown (10YR 5/6) mottles; massive; very firm, very plastic; few fine concretions (iron and manganese oxides); neutral; clear smooth boundary.

C2g—63 to 75 inches; dark gray (5Y 4/1) clay; many fine and medium prominent yellowish brown (10YR 5/6) mottles; massive; very firm; very plastic; few, fine concretions (iron and manganese oxides); slickensides; mildly alkaline.

The A horizon is silty clay or clay. The B2g horizon ranges from medium acid to extremely acid. The C horizon of some pedons contains strata of silty clay loam, clay loam, or sandy clay loam.

Bowdre Series

The Bowdre series consists of somewhat poorly drained, slowly permeable to moderately permeable soils that formed in clayey and loamy material. Bowdre soils are mainly on ridges along sloughs or overflow channels on the Mississippi River bottom land. Slopes range from 0 to 6 percent.

Bowdre soils are commonly on the same landscape as Cairo, Darwin, Medway, Gorham, and Ware soils. Bowdre soils are shallower to loamy material and are less gray in the solum than Cairo and Darwin soils. Bowdre soils have more clay in the upper part of the solum than Medway, Gorham, or Ware soils.

Typical pedon of Bowdre silty clay, approximately 84 feet north and 1,114 feet east of the southwest corner of sec. 21, T. 9 S., R. 4 W., in a cultivated field:

Ap—0 to 5 inches; very dark gray (10YR 3/1) silty clay; moderate fine and medium granular structure; very firm; slightly acid; clear smooth boundary.

A3—5 to 12 inches; very dark grayish brown (10YR 3/2) silty clay; moderate medium prismatic structure parting to moderate fine and medium angular blocky; very firm; very dark gray (10YR 3/1) coatings on faces of peds; slightly acid; clear smooth boundary.

B21—12 to 15 inches; dark grayish brown (10YR 4/2) silty clay; moderate medium prismatic structure parting to moderate fine and medium angular blocky; very firm; patchy very dark gray (10YR 3/1) coatings and light yellowish brown (10YR 6/4) sand grains on faces of peds; neutral; clear smooth boundary.

IIB22—15 to 19 inches; brown (10YR 5/3) light clay loam; weak medium prismatic structure parting to weak medium subangular blocky; firm; coatings of very dark grayish brown (10YR 3/2) in ped interiors; neutral; clear smooth boundary.

IIB3—19 to 28 inches; brown (10YR 4/3) very fine sandy loam; weak coarse subangular blocky structure; very friable; patchy dark brown (10YR 3/3) coatings on faces of peds; slightly acid; gradual wavy boundary.

IIC1—28 to 35 inches; yellowish brown (10YR 5/4) very fine sandy loam; very weak coarse subangular blocky structure and single grained; very friable; slightly acid; gradual wavy boundary.

IIC2—35 to 60 inches; pale brown (10YR 6/3) loamy very fine sand; single grained; very friable; pockets of fine sand; neutral.

Depth to loamy material ranges from 10 to 20 inches. Reaction ranges from slightly acid to mildly alkaline in the B horizon and from slightly acid to moderately alkaline in the C horizon. The lower part of the B2 horizon is silty clay loam, clay loam, or loam, and the B3 horizon is loam or very fine sandy loam. The C horizon is mainly very fine sandy loam or loamy very fine sand, but it can also be fine sandy loam, loamy fine sand, and sand and commonly has strata of finer material.

Burnside Series

The Burnside series consists of moderately well drained and well drained, moderately permeable soils that formed in silty stream sediments and the underlying channery or flaggy sediments that generally overlie bedrock at a depth of 4 to 7 feet. Burnside soils occur on small bottom lands. Slopes range from 0 to 4 percent.

Burnside soils are commonly on the same flood plains as Wakeland, Belknap, and Haymond soils. They contain more coarse fragments within a depth of 40 inches than Wakeland, Belknap, or Haymond soils. They are also better drained than the somewhat poorly drained Wakeland and Belknap soils.

Typical pedon of Burnside silt loam, approximately 2,510 feet north and 1,056 feet west of the southeast corner of sec. 24, T. 10 S., R. 1 W., in a wooded area:

A1—0 to 8 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; very friable; neutral; clear smooth boundary.

B1—8 to 18 inches; dark yellowish brown (10YR 4/4) silt loam; weak medium subangular blocky structure parting to weak fine granular; friable; strongly acid; abrupt smooth boundary.

IIB2—18 to 24 inches; dark brown (10YR 4/3) very channery loam; weak medium subangular blocky structure; friable; 70 percent coarse fragments, 40 percent greater than 3 inches, 10 percent greater than 10 inches; strongly acid; gradual wavy boundary.

IIC—24 to 60 inches; dark brown (10YR 4/3) very flaggy sandy loam; single grained; loose; 80 percent coarse fragments, 55 percent greater than 3 inches and 15 percent greater than 10 inches; strongly acid.

Thickness of the silt loam upper horizons ranges from 12 to about 24 inches. Grayish mottles occur in some pedons below a depth of 20 inches. The B horizon ranges from medium acid to very strongly acid in reaction. The amount of coarse fragments in the IIB horizon ranges from 35 to 80 percent.

Cairo Series

The Cairo series consists of poorly drained, very slowly permeable to moderately permeable soils that formed in clayey sediments and the underlying loamy alluvial sediments. Cairo soils are on the intermediate terrain between ridges and depressions in the Mississippi River flood plain. Slopes range from 0 to 3 percent.

Cairo soils are on the same landscape as Gorham, Medway, Darwin, and Bowdre soils. Cairo soils contain more clay than Gorham soils and have more sand within a depth of 40 inches than Darwin soils. They are deeper to loamy material (the IIB horizon) than Bowdre and Medway soils.

The Cairo soils in this survey area contain less sand in the lower part of the control section than is defined as the range for the series. This difference does not alter the use or behavior of the soils.

Typical pedon of Cairo silty clay, approximately 453 feet north and 612 feet west of the southeast corner of sec. 26, T. 9 S., R. 4 W., in a cultivated field:

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) heavy silty clay; weak fine angular blocky structure; very firm, very hard dry; common roots; medium acid; abrupt smooth boundary.

A12—8 to 12 inches; very dark grayish brown (10YR 3/2) heavy silty clay; weak fine angular blocky structure; very firm; few very dark gray (10YR 3/1) organic coatings on faces of peds; many roots; slightly acid; abrupt smooth boundary.

B21—12 to 16 inches; grayish brown (2.5Y 5/2) clay; many medium faint dark yellowish brown (10YR 4/4) mottles; moderate medium prismatic structure parting to moderate fine angular blocky; very firm; very dark gray (10YR 3/1) and dark grayish brown (10YR 4/2) organic coatings on faces of peds; common roots; neutral; clear smooth boundary.

B22—16 to 27 inches; grayish brown (2.5Y 5/2) clay; many medium faint dark yellowish brown (10YR 4/4) mottles; moderate medium prismatic structure parting to strong fine and medium angular blocky; very firm; dark gray (10YR 4/1) coatings on faces of peds; common roots; neutral; gradual smooth boundary.

B23—27 to 33 inches; dark grayish brown (10YR 4/2) (50 percent) and dark yellowish brown (10YR 4/4) (50 percent) silty clay; moderate medium prismatic structure parting to strong medium angular blocky; very firm; dark grayish brown (10YR 4/2) coatings on faces of peds; common roots; neutral; clear smooth boundary.

B24—33 to 36 inches; dark grayish brown (10YR 4/2) heavy clay loam; common medium faint dark yellowish brown (10YR 4/4) and few medium distinct yellowish brown (10YR 5/6) mottles; moderate medium prismatic structure; firm; dark grayish brown (10YR 4/2) coatings on faces of peds; common roots; neutral; abrupt smooth boundary.

IIB31—36 to 40 inches; grayish brown (10YR 5/2) (60 percent) and dark yellowish brown (10YR 3/4) (40 percent) loam; moderate coarse prismatic structure; friable; dark grayish brown (10YR 4/2) coatings

patchy thin brown (7.5YR 4/4) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); slightly acid; clear smooth boundary.

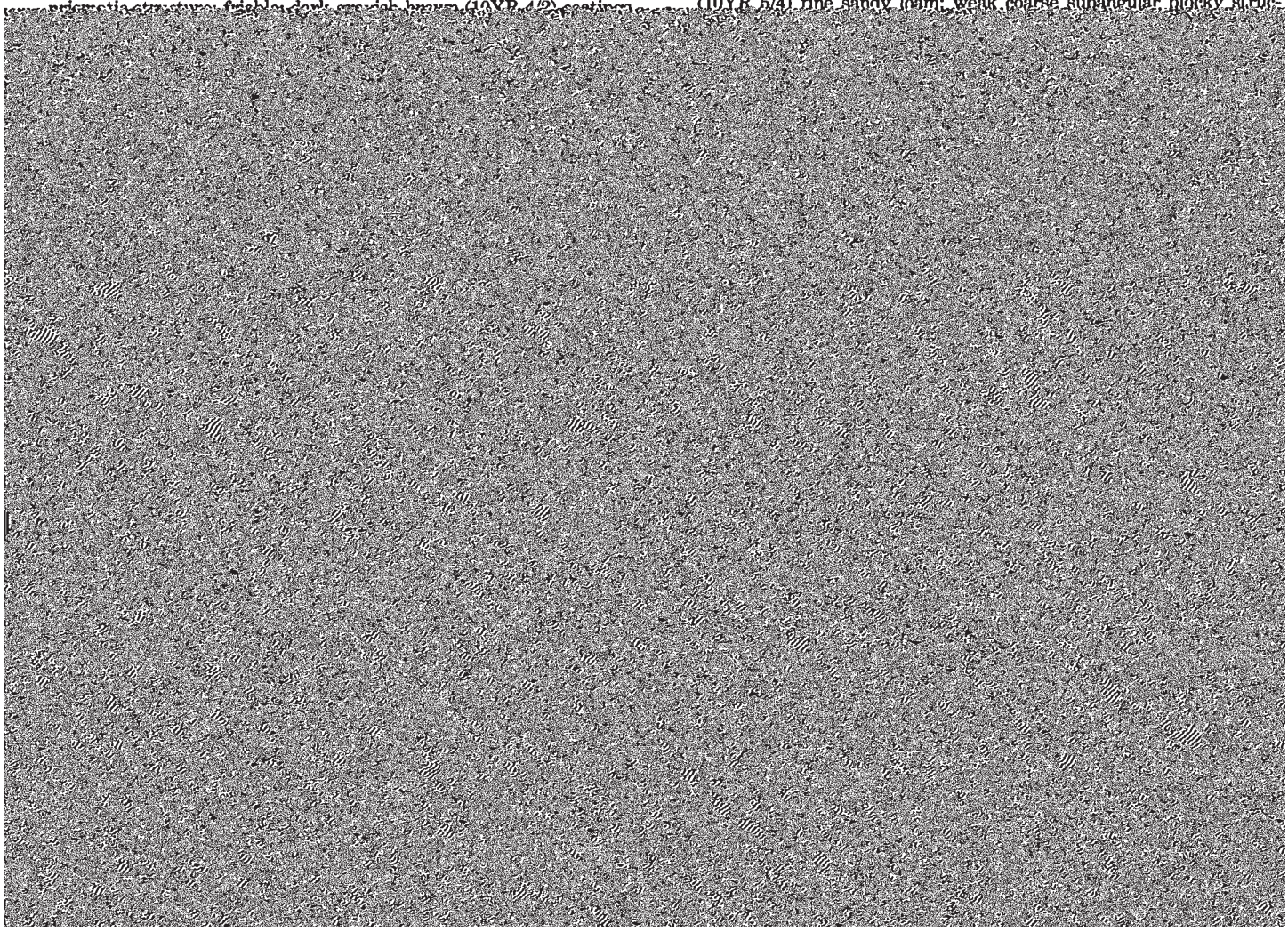
B21t—14 to 21 inches; strong brown (7.5YR 5/6) silty clay loam; moderate and strong medium subangular blocky structure; firm; continuous thin and medium brown (7.5YR 4/4) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

B22t—21 to 36 inches; strong brown (7.5YR 5/6) silty clay loam; strong moderate and coarse subangular blocky structure; firm; continuous medium brown (7.5YR 4/4) clay films on faces of peds; common fine concretions (iron and manganese oxides); strongly acid; clear smooth boundary.

IIB23t—36 to 46 inches; strong brown (7.5YR 5/6) clay loam; few medium distinct yellowish brown (10YR 5/6) and brown (10YR 5/3) mottles; moderate and strong medium and coarse subangular blocky structure; firm; continuous medium brown (7.5YR 4/4) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); strongly acid; clear smooth boundary.

IIB24t—46 to 56 inches; strong brown (7.5YR 5/6) and yellowish brown (10YR 5/4) heavy fine sandy loam; few medium faint yellowish brown (10YR 5/4) and brown (10YR 5/3) mottles; moderate medium and coarse subangular blocky structure; friable; continuous thin and medium dark yellowish brown (10YR 4/4) clay films on faces of peds; common fine dark concretions (iron and manganese oxides); medium acid; clear smooth boundary.

IIB3—56 to 65 inches; strong brown (7.5YR 5/6) and yellowish brown (10YR 5/4) fine sandy loam; weak coarse subangular blocky struc-



B21—21 to 33 inches; grayish brown (10YR 5/2) and brown (10YR 5/3) silt loam; common medium distinct yellowish brown (10YR 5/4) mottles; weak and moderate medium and coarse subangular blocky structure; neutral; clear smooth boundary.

B22—33 to 48 inches; brown (10YR 5/3) and grayish brown (10YR 5/2) silt loam with thin loam strata; common medium distinct yellowish brown (10YR 5/4) mottles; weak and moderate medium and coarse subangular blocky structure; friable; common thin light gray (10YR 7/2) uncoated silt grains on faces of peds; few dark linings in worm holes; neutral; gradual smooth boundary.

B3—48 to 64 inches; yellowish brown (10YR 5/4) and grayish brown (10YR 5/2) silt loam; few medium distinct strong brown (7.5YR 5/6) and common medium faint yellowish brown (10YR 5/6) mottles; weak coarse prismatic structure parting to weak coarse subangular blocky; friable; continuous light gray (10YR 7/2) uncoated silt grains on vertical faces of peds; neutral; gradual smooth boundary.

C—64 to 76 inches; brown (10YR 5/3) and grayish brown (10YR 5/2) silt loam; massive; patchy thin light gray (10YR 7/2) streaks of uncoated silt grains; friable; neutral.

The A horizon ranges from 10 to about 20 inches in thickness. The solum is predominantly silt loam, but strata of silty clay loam and loam are in the lower part of the B horizon and in the C horizon of some pedons. The B horizon ranges from medium acid to neutral.

Colp Series

The Colp series consists of moderately well drained, slowly permeable soils that formed in thin layers of loess or silty sediments and clayey lacustrine sediments. Colp soils are on plains, ridges, and side slopes of terraces. Slopes are commonly 0 to 15 percent but range from 0 to 20 percent.

Colp soils are on the same landscape as Hurst and St. Charles soils. They have browner colors in the upper part of the solum than Hurst soils. They have more clay in the B2t horizon than St. Charles soils.

Typical pedon of Colp silt loam, 0 to 3 percent slopes, approximately 1,500 feet north and 2,600 feet west of the southeast corner of sec. 34, T. 7 S., R. 1 W., in a cultivated field:

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) silt loam; moderate medium granular structure; friable; many roots; mildly alkaline; abrupt smooth boundary.

A2—7 to 12 inches; light brownish gray (10YR 6/2) silt loam; moderate medium granular structure; friable; mildly alkaline; clear smooth boundary.

B1—12 to 16 inches; light brownish gray (10YR 6/2) and yellowish brown (10YR 5/4) light silty clay loam; common medium faint yellowish brown (10YR 5/6) mottles; moderate fine subangular blocky structure; firm; continuous light brownish gray (10YR 6/2) uncoated silt grains on faces of peds; very strongly acid; clear smooth boundary.

IIB21t—16 to 19 inches; yellowish brown (10YR 5/4) silty clay; few medium distinct light brownish gray (10YR 6/2) and common medium faint yellowish brown (10YR 5/6) mottles; moderate fine angular [illegible] very firm; few white (10YR 8/1) stains and accumulations; very strongly acid.

The silty cap is 8 to 20 inches thick. Where the cap is thinner, the B1 horizon does not occur. The IIB2t horizon is mainly silty clay but also can be heavy silty clay loam. The B horizon ranges from extremely acid to medium acid. The B3 and C horizons have strata of silty clay loam, silt loam, and loam in some pedons.

Darwin Series

The Darwin series consists of very poorly drained or poorly drained, very slowly permeable soils that formed in clayey slack-water sediments. Darwin soils are on flood plains of the Mississippi River and large streams in the county and in a few depressions in terrace areas. Slopes are commonly less than 1 percent but range from 0 to 2 percent.

Darwin, Booker, Karnak, and Jacob soils formed in similar material. Darwin soils have pedons similar to those of Booker, Karnak, and Jacob soils, but they have a thicker and darker A horizon than Karnak and Jacob soils and are less acid than Booker and Jacob soils.

Typical pedon of Darwin silty clay, approximately 2,619 feet south and 72 feet east of center of sec. 26, T. 8 S., R. 5 W., in a cultivated field:

Ap—0 to 7 inches; very dark gray (10YR 3/1) silty clay; moderate fine subangular and angular blocky structure; surface mulch of moderate fine and medium granular structure; very firm; neutral; abrupt smooth boundary.

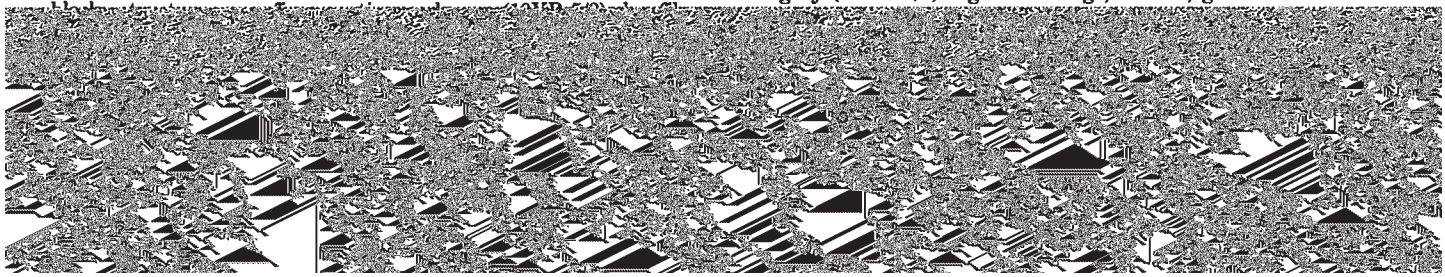
A12—7 to 11 inches; very dark gray (10YR 3/1) silty clay; common fine distinct dark brown (7.5YR 3/2) mottles; moderate fine subangular and angular blocky structure; very firm; mildly alkaline; clear wavy boundary.

B21g—11 to 17 inches; dark gray (10YR 4/1) silty clay; common fine distinct dark yellowish brown (10YR 4/4) and few medium prominent dark brown (7.5YR 4/4) mottles; moderate medium prismatic structure parting to moderate fine and medium angular blocky; very firm; very dark gray (10YR 3/1) organic coatings on faces of peds; mildly alkaline; clear smooth boundary.

B22g—17 to 26 inches; dark gray (5Y 4/1) silty clay; many fine and medium prominent dark brown (7.5YR 4/4) mottles; moderate medium prismatic structure parting to moderate medium angular blocky structure; very firm; very dark gray (10YR 3/1) and dark gray (10YR 4/1) organic coatings on faces of peds; mildly alkaline; gradual smooth boundary.

B23g—26 to 38 inches; dark gray (5Y 4/1) clay; many medium and coarse prominent dark brown (7.5YR 4/4) mottles; weak coarse prismatic structure parting to weak medium and coarse angular blocky structure; very firm, plastic; dark gray (10YR 4/1), few very dark gray (10YR 3/1), organic coatings on faces of peds; slickensides; roots to 34 inches; neutral; clear smooth boundary.

B3g—38 to 48 inches; dark gray (5Y 4/1) clay; common to many fine and medium prominent dark brown (7.5YR 4/4) mottles; weak coarse prismatic structure and massive; very firm, plastic; few very dark gray (10YR 3/1) organic coatings; neutral; gradual smooth bounda-



The C horizon is dominantly silty clay or clay but also can be silty clay loam.

The frequently flooded mapping unit included with this series in this survey area is outside the range for the Darwin series because of stratification and the range in texture. These differences do not affect use and management.

Dupo Series

The Dupo series consists of somewhat poorly drained, moderately permeable to slowly permeable soils that formed in light colored silty sediments overlying dark colored clayey sediments. Dupo soils are on the flood plain of the Mississippi River and streams of the county where recent silty stream sediments have covered a dark colored clayey soil. Slopes range from 0 to 2 percent.

Dupo soils are commonly on the same landscape as Wakeland, Coffeen, Belknap, and Darwin soils. They contain more clay in the lower part of the solum than Wakeland, Coffeen, or Belknap soils and contain less clay in the upper part of the solum than Darwin soils.

Typical pedon of Dupo silt loam, approximately 620 feet south and 200 feet west of the northeast corner of sec. 18, T. 10 S., R. 3 W., in a cultivated field:

Ap—0 to 7 inches; dark brown (10YR 4/3) light silt loam; few fine faint

soils. They have less clay in the solum than Cairo soils and have more clay and grayer colors in the solum than Medway soils.

Typical pedon of Gorham silty clay loam, approximately 1,881 feet north and 1,617 feet east of the southwest corner of sec. 24, T. 9 S., R. 4 W., in a cultivated field:

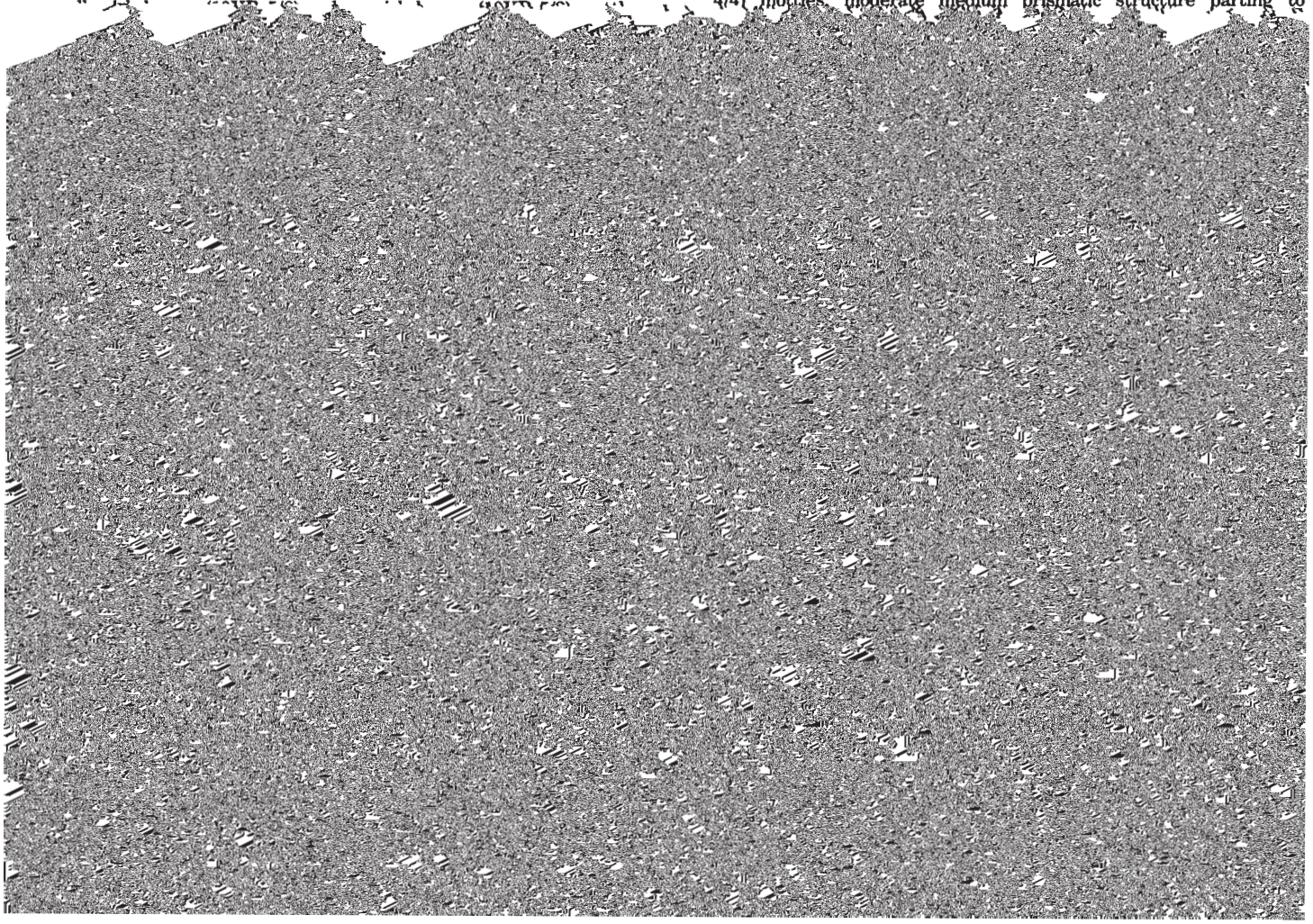
Ap—0 to 6 inches; very dark gray (10YR 3/1) silty clay loam; weak very fine and fine granular structure; firm; common roots; mildly alkaline; abrupt smooth boundary.

A12—6 to 8 inches; very dark gray (10YR 3/1) silty clay loam; moderate medium angular blocky structure; very firm; few roots; mildly alkaline; abrupt smooth boundary.

A3—8 to 13 inches; very dark grayish brown (10YR 3/2) heavy silty clay loam; common fine distinct dark brown (7.5YR 4/4) mottles; moderate medium angular blocky structure parting to moderate fine blocky; very firm; few roots; continuous very dark gray (10YR 3/1) organic clay coatings on faces of peds; neutral; clear smooth boundary.

B21—13 to 26 inches; dark grayish brown (10YR 4/2) light silty clay; common fine distinct dark yellowish brown (10YR 4/4) mottles; weak medium prismatic structure parting to moderate fine and medium angular blocky; very firm; few roots; continuous dark gray (10YR 4/1) organic clay coatings on faces of peds; few small concretions (iron and manganese oxides); neutral; abrupt smooth boundary.

B22—26 to 30 inches; dark grayish brown (10YR 4/2) silty clay loam with some sand; many fine distinct dark yellowish brown (10YR 4/4) mottles; moderate medium prismatic structure parting to



Goss Series

The Goss series consists of well drained, moderately permeable soils that formed in residuum weathered from cherty limestone. Goss soils are on steep and very steep hillsides in the uplands. Slopes range from 25 to 65 percent.

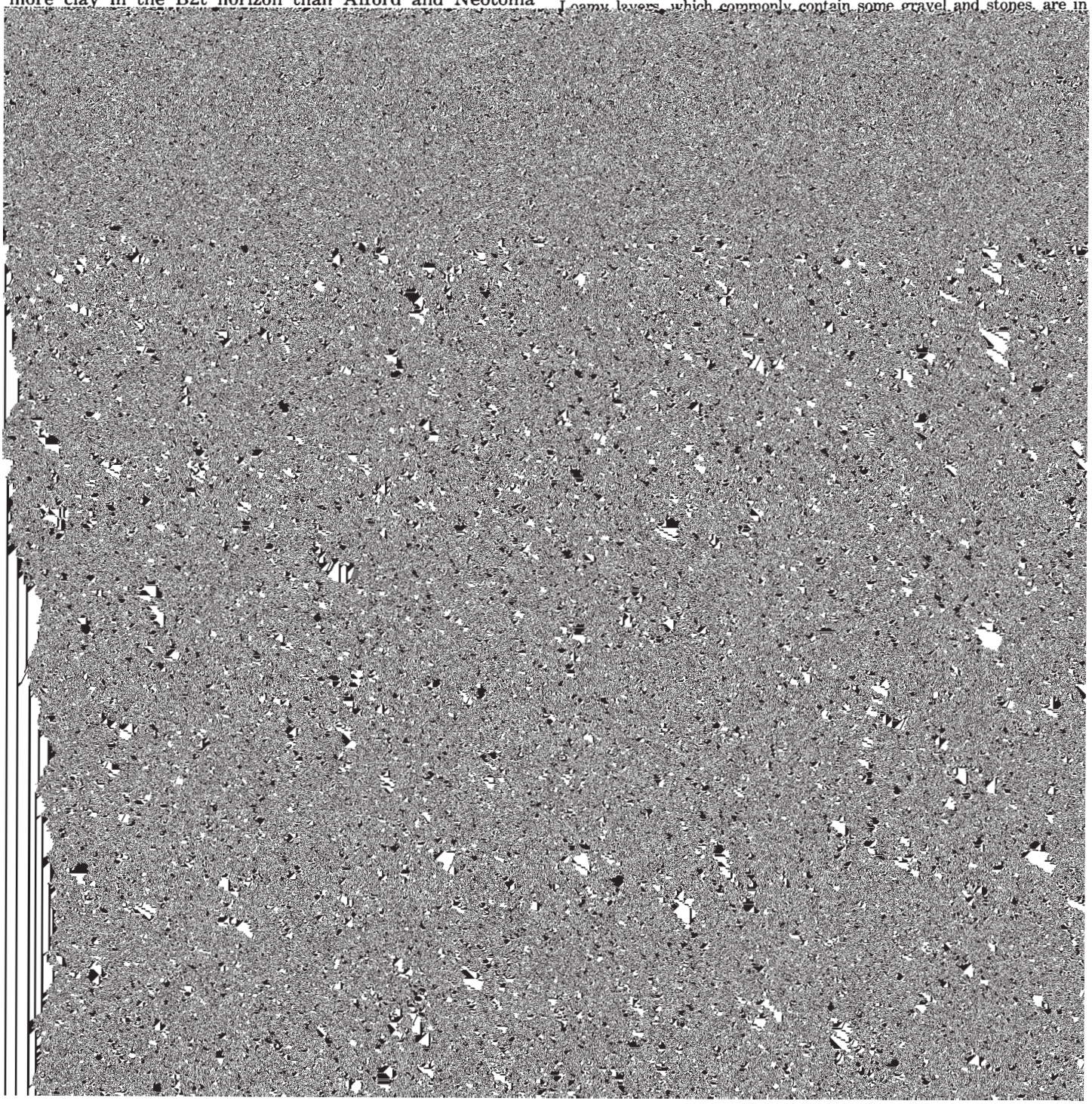
Goss soils are on the same hillsides as Alford soils and have pedons similar to those of Neotoma soils. They have more clay in the B2t horizon than Alford and Neotoma

C1—8 to 16 inches; brown (10YR 4/3) light silt loam; very weak fine granular structure to massive; very friable; neutral; clear smooth boundary.

C2—16 to 32 inches; dark yellowish brown (10YR 3/4) light silt loam; very weak fine granular structure to massive; very friable; neutral; gradual wavy boundary.

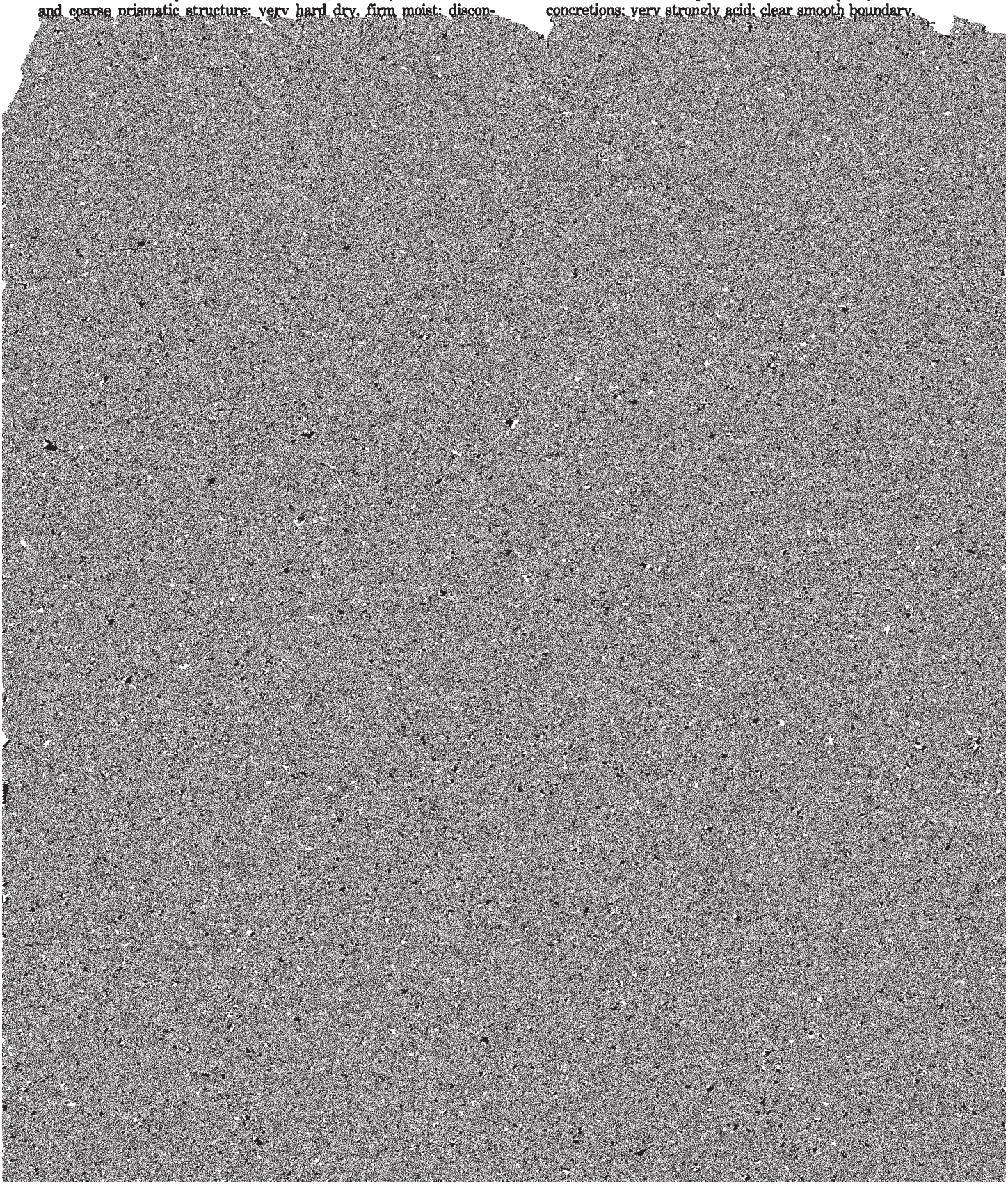
C3—32 to 60 inches; brown (10YR 4/3) light silt loam; massive; very friable; neutral.

Reaction ranges from medium acid to neutral in the control section. Few to common grayish mottles occur in the lower part of many pedons. Loamy layers, which commonly contain some gravel and stones, are in



and coarse distinct pale brown (10YR 6/3) mottles; weak medium and coarse prismatic structure; very hard dry, firm moist; discon-

brown (10YR 4/4) clay films on faces of peds; common fine dark concretions; very strongly acid; clear smooth boundary.



fine distinct strong brown (10YR 5/6) mottles; weak coarse subangular blocky structure; firm; patchy brown (10YR 5/3) clay films or

IIB3t—54 to 61 inches; grayish brown (2.5Y 5/2) silty clay loam; common fine and medium prominent strong brown (7.5YR 5/6) and some

the major streams. Slopes are commonly less than 1 percent but range from 0 to 2 percent.

Karnak, Jacob, Booker, Darwin, and Cairo soils formed in similar material. Karnak soils have pedons similar to those of Jacob, Booker, Darwin, and Cairo soils. They are less acid in the solum than Jacob soils. They have a thinner and lighter colored A horizon than Booker, Darwin, and Cairo soils and lack the loamy substratum within a 40-inch depth that is characteristic of Cairo soils.

Typical pedon of Karnak silty clay, approximately 27 feet north and 690 feet east of the center of sec. 2, T. 9 S., R. 5 W., in a cultivated field:

Ap1—0 to 3 inches; very dark gray (10YR 3/1) silty clay; moderate fine granular structure; very firm; neutral; abrupt smooth boundary.

Ap2—3 to 6 inches; very dark gray (10YR 3/1) silty clay; weak fine angular blocky structure and massive; very firm; slightly acid; abrupt smooth boundary.

B21g—6 to 17 inches; dark gray (10YR 4/1) clay; common medium distinct dark brown (7.5YR 4/4) mottles; moderate medium prismatic structure parting to moderate fine angular blocky; extremely firm; medium acid; clear smooth boundary.

B22g—17 to 38 inches; gray (5Y 5/1) clay; many medium and coarse prominent yellowish red (5YR 4/6) streaks and stains; moderate medium prismatic structure parting to weak fine angular blocky; extremely firm; strongly acid; clear smooth boundary.

B3g—38 to 54 inches; gray (5Y 5/1) clay; common medium prominent yellowish brown (10YR 5/6) mottles; weak coarse angular blocky structure; extremely firm; dark stains and concretions; slightly acid; abrupt smooth boundary.

Cg—54 to 60 inches; gray (5Y 5/1) light silty clay loam; common medium prominent strong brown (7.5YR 5/6) mottles; massive; firm; slightly acid.

The A and B horizons are silty clay or clay. The Bg horizon is mainly slightly acid or medium acid but can also be strongly acid. The C horizon includes silty clay loam, and some pedons have lenses of coarser material.

Medway Series

The Medway series consists of somewhat poorly drained, moderately permeable soils that formed in silty and loamy alluvium. Medway soils are on undulating, narrow to broad ridges and natural levees along sloughs or overflow channels of the Mississippi River flood plains. Slopes are commonly 0 to 3 percent, but some short slopes range to about 6 percent.

Medway soils are on the same flood plains as Ware, Gorham, Cairo, and Bowdre soils. Medway soils contain more clay than Ware soils and less clay than Bowdre soils. They contain less clay and are not so deep to loamy or sandy layers as Gorham and Cairo soils.

Typical pedon of Medway silty clay loam, approximate-

B22—27 to 36 inches; dark brown (10YR 4/3) loam; common medium distinct grayish brown (10YR 5/2) mottles; weak medium and coarse subangular blocky structure; friable; patchy very dark grayish brown (10YR 3/2) organic coatings on faces of peds; slightly acid; clear smooth boundary.

C—36 to 61 inches; brown (10YR 5/3) and pale brown (10YR 6/3) very fine sandy loam; common medium distinct light brownish gray (10YR 6/2) and common fine faint yellowish brown (10YR 5/4) mottles; massive; very friable; neutral.

Depth to the loamy material ranges from 15 to 30 inches. The A horizon is silty clay loam, clay loam, or silt loam. The B2 horizon can be silt loam or clay loam and ranges from slightly acid to mildly alkaline. Strata of loamy very fine sand, loamy fine sand, fine sand, and very fine sand are in the C horizon of some pedons.

Neotoma Series

The Neotoma series consists of well drained, moderately permeable to moderately rapidly permeable soils that formed in thin deposits of loess or silty colluvium and residuum that weathered from sandstone, siltstone, and shale bedrock. Neotoma soils are on steep and very steep hillsides in the uplands (fig. 14). Slopes are commonly 30 to 50 percent but range from 18 to 55 percent.

Neotoma soils occur on the same hillsides as Wellston soils but have more coarse fragments throughout the solum than those soils.

Typical pedon of Neotoma stony loam, in an area of Neotoma-Rock land complex, 25 to 55 percent slopes, approximately 458 feet north and 561 feet east of the southeast corner of sec. 12, T. 10 S., R. 2 W., in a wooded area:

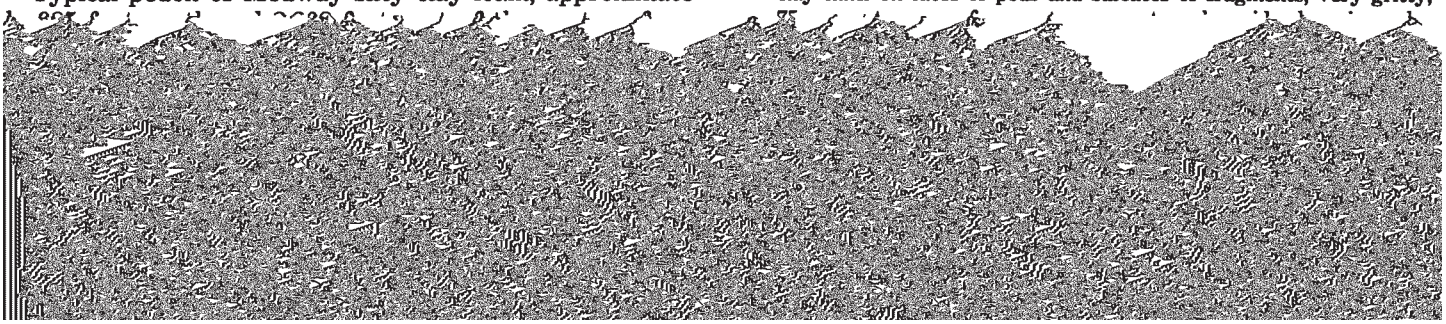
A1—0 to 2 inches; very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2) stony loam; weak fine granular structure; friable; 70 percent coarse fragments; very strongly acid; clear smooth boundary.

A2—2 to 20 inches; brown (7.5YR 5/4) very cobbly light loam; weak fine and medium granular structure; friable; 60 percent coarse fragments; very strongly acid; clear wavy boundary.

B21t—20 to 24 inches; yellowish red (5YR 5/6) cobbly loam; weak and moderate very fine and fine subangular blocky structure; friable; patchy yellowish red (5YR 4/6) clay films; 30 percent coarse fragments; very strongly acid; clear smooth boundary.

B22t—24 to 30 inches; yellowish red (5YR 5/6) cobbly clay loam; moderate very fine and fine subangular blocky structure; firm; continuous yellowish red (5YR 4/6) clay films on faces of peds and surfaces of fragments; 40 percent coarse fragments; strongly acid; clear wavy boundary.

B23t—30 to 48 inches; yellowish red (5YR 5/6) very cobbly light clay loam; few medium distinct red (2.5YR 5/8) mottles; weak medium subangular blocky structure; firm; patchy yellowish red (5YR 4/6) clay films on faces of peds and surfaces of fragments; very gritty;



Okaw Series

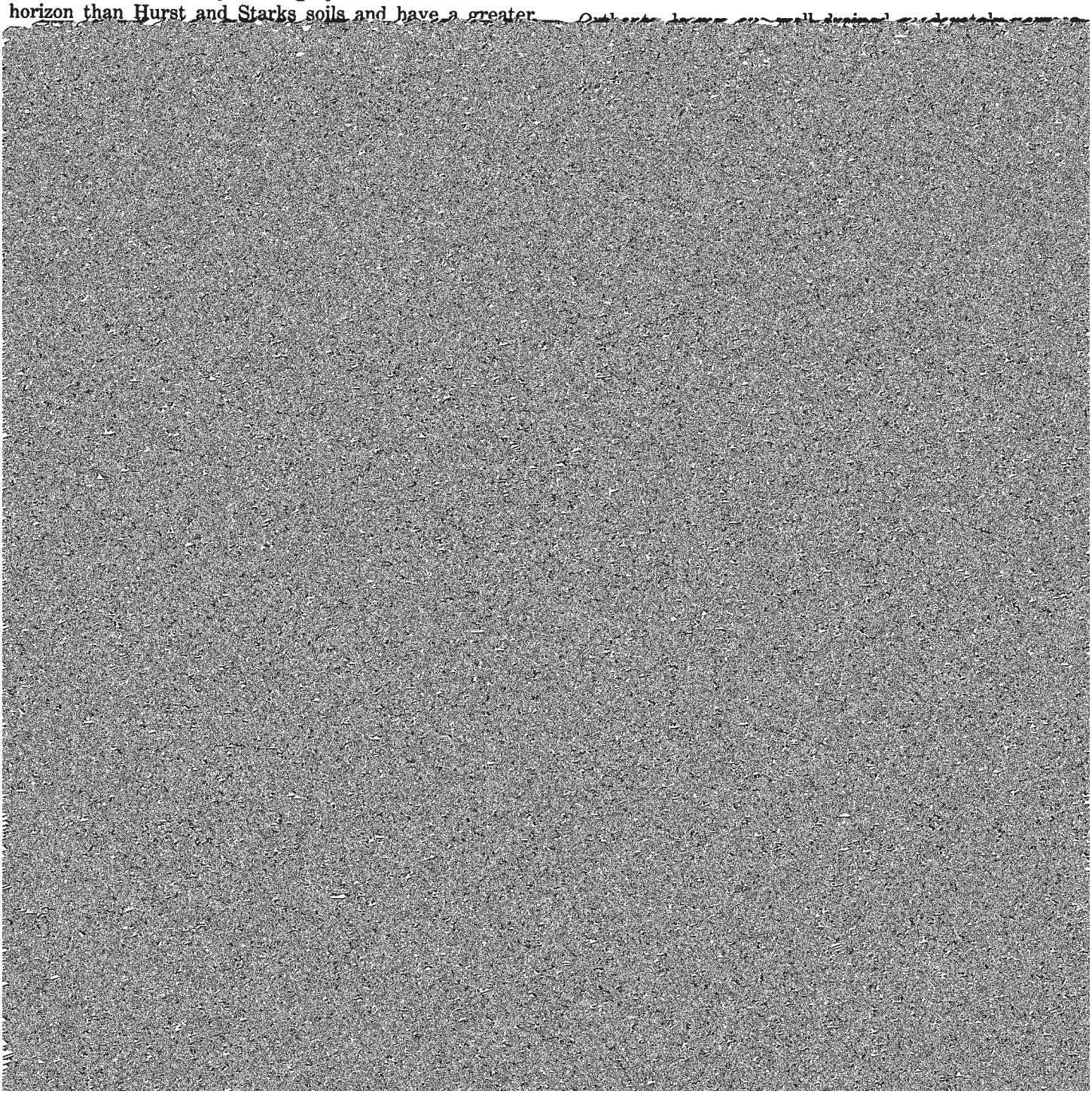
The Okaw series consists of poorly drained and very poorly drained, slowly permeable to very slowly permeable soils that formed in thin layers of loess or silty sediments over clayey lacustrine sediments. Okaw soils are on nearly level plains or drainage divides of terraces. Slopes range from 0 to 2 percent.

Okaw soils are on the same landscape as Hurst, Starks, and Sexton soils. They have grayer colors in the B2t horizon than Hurst and Starks soils and have a greater

sequence of horizons. They are classified only by the kind of soil material. The soil material is mostly dark gray, mottled silty clay or clay to a depth of about 60 inches.

Orthents, clayey, range from 35 to 75 percent clay. Pedons in depressions commonly have thin silty or loamy strata. Reaction ranges from extremely acid to moderately alkaline.

Orthents, Loamy

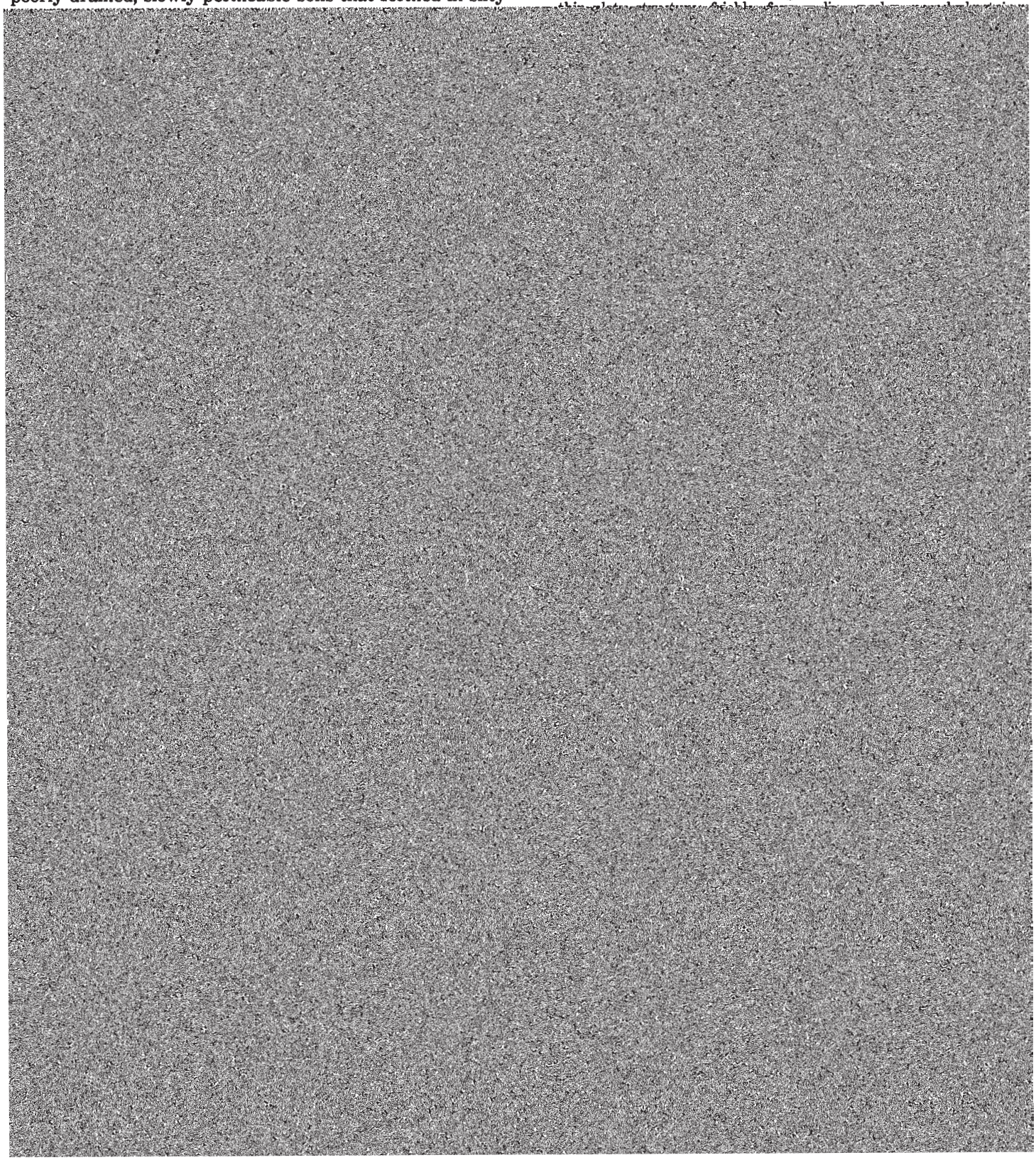


Piopolis Series

The Piopolis series consists of poorly drained and very poorly drained, slowly permeable soils that formed in silty

ture; friable; few medium concretions; extremely acid; clear smooth boundary.

A22g—14 to 25 inches; light brownish gray (10YR 6/2) silt loam; few medium and coarse distinct strong brown (7.5YR 5/6) mottles; weak

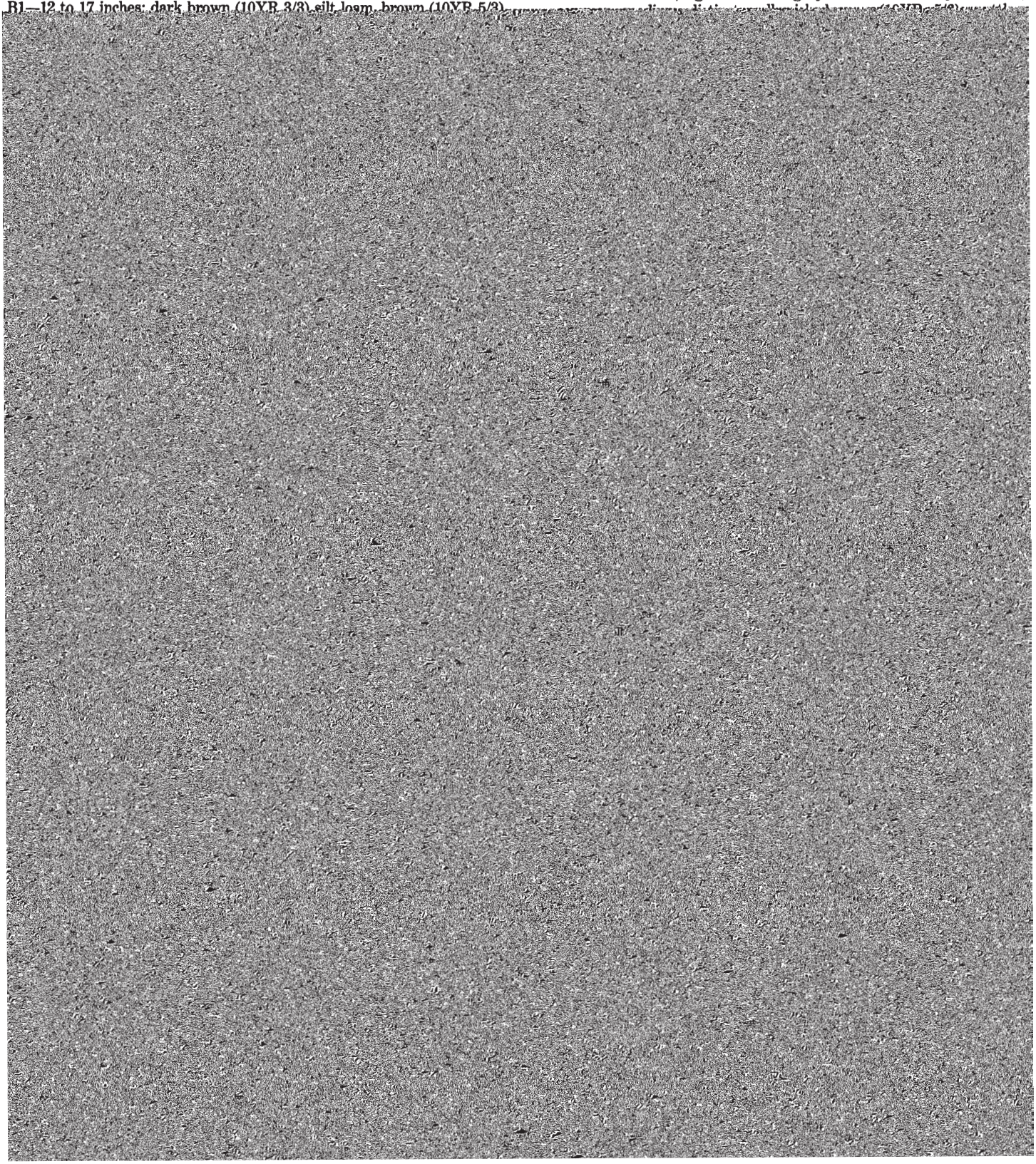


A12—7 to 12 inches; very dark grayish brown (10YR 3/2) silt loam; few grayish brown (10YR 5/2) splotches, pale brown (10YR 6/3) dry; moderate fine granular structure; friable; neutral; gradual smooth boundary.

B1—12 to 17 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3)

A21—5 to 13 inches; grayish brown (10YR 5/2) silt loam; common medium distinct yellowish brown (10YR 5/6) mottles; moderate thick platy structure; firm, compact; neutral; clear smooth boundary.

A22—13 to 15 inches; light brownish gray (10YR 6/2) heavy silt loam;



Typical pedon of Starks silt loam, approximately 85 feet north and 1,235 feet west of southeast corner of sec. 24, T. 8 S., R. 2 N., in a cultivated field:

Ap—0 to 8 inches; grayish brown (10YR 5/2) silt loam; common fine distinct dark yellowish brown (10YR 4/4) mottles; weak fine granular structure; friable; many roots; common fine sand grains; common fine concretions; mildly alkaline; abrupt smooth boundary.

A2—8 to 11 inches; pale brown (10YR 6/3) and light brownish gray (10YR 6/2) silt loam; common fine and medium distinct yellowish brown (10YR 5/6) mottles; weak thin platy structure; friable; many roots; common fine sand grains; light gray (10YR 7/2 dry) uncoated silt grains; common fine concretions; neutral; clear smooth boundary.

B1—11 to 15 inches; yellowish brown (10YR 5/4) light silty clay loam; few fine distinct light brownish gray (10YR 6/2) mottles; weak fine prismatic structure parting to moderate very fine and fine angular blocky; friable; many roots; patchy light brownish gray (10YR 6/2) coatings and light gray (10YR 7/2 dry) uncoated silt grains on faces of peds; few fine concretions; very strongly acid; clear smooth boundary.

B21t—15 to 22 inches; yellowish brown (10YR 5/4) silty clay loam; common fine distinct light brownish gray (10YR 6/2) and common fine distinct yellowish brown (10YR 5/8) mottles; moderate fine and medium prismatic structure parting to moderate fine and medium angular blocky; firm; many roots; common brown (10YR 5/3) clay films and light gray (10YR 7/2 dry) uncoated silt grains on faces of peds; common fine concretions; very strongly acid; clear smooth boundary.

B22t—22 to 31 inches; yellowish brown (10YR 5/4) silty clay loam; common fine and medium distinct yellowish brown (10YR 5/6) and common fine distinct light brownish gray (10YR 6/2) mottles; moderate medium prismatic structure parting to moderate medium angular blocky structure; firm; many roots; common brown (10YR 5/3) clay films and light gray (10YR 7/2 dry) uncoated silt grains on faces of peds; common fine concretions; very strongly acid; clear smooth boundary.

B2t horizon than Hosmer soils. They contain less clay in the B2t horizon than Bluford soils. Stoy soils have a less gray subsoil than the poorly drained Weir soils.

Typical pedon of Stoy silt loam, 2 to 4 percent slopes, approximately 320 feet south and 286 feet west of the center of sec. 29, T. 9 S., R. 1 W., in a cultivated field:

Ap—0 to 8 inches; dark grayish brown (10YR 4/2) and brown (10YR 5/3) silt loam; weak fine granular structure; friable; common fine dark concretions; mildly alkaline; abrupt smooth boundary.

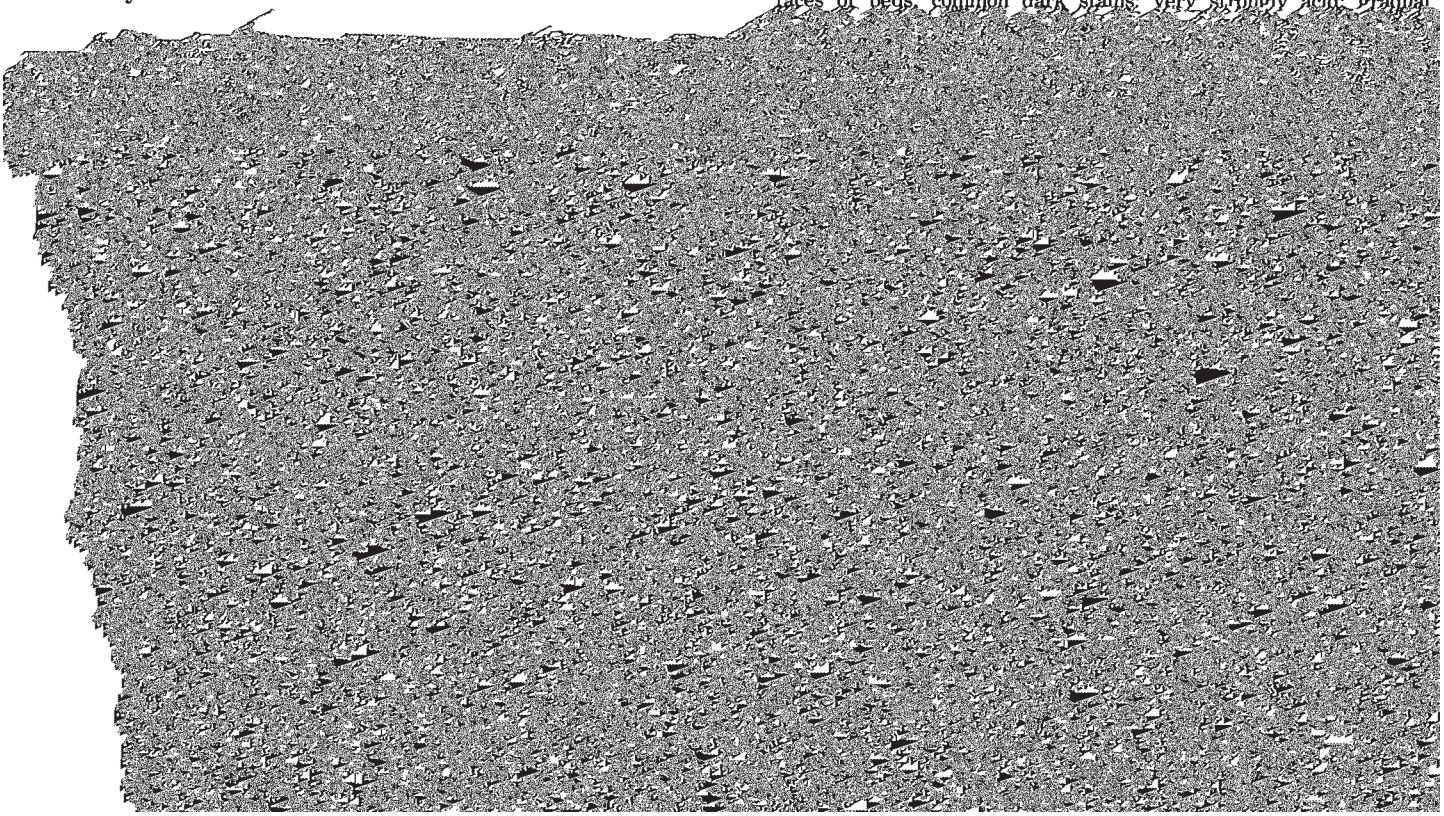
A2—8 to 14 inches; yellowish brown (10YR 5/4) silt loam; few fine and medium faint pale brown (10YR 6/3) and yellowish brown (10YR 5/6) mottles; weak thin platy structure; friable; common fine dark concretions; slightly acid; clear smooth boundary.

B&A—14 to 19 inches; yellowish brown (10YR 5/6) heavy silt loam (B2t); weak very fine subangular blocky structure; friable; pale brown (10YR 6/3) and light brownish gray (10YR 6/2) silt (A2); massive; very friable; thick white (10YR 8/1 dry) uncoated silt grains on faces of peds; many fine dark concretions; extremely acid; clear smooth boundary.

B21t—19 to 24 inches; yellowish brown (10YR 5/6) and light brownish gray (10YR 6/2) silty clay loam; common medium distinct strong brown (7.5YR 5/6) mottles; moderate fine subangular blocky structure; firm; continuous brown (10YR 5/3) clay films and thick white (10YR 8/1 dry) uncoated silt grains on faces of peds; very strongly acid; clear smooth boundary.

B22t—24 to 32 inches; strong brown (7.5YR 5/6) and light brownish gray (10YR 6/2) silty clay loam; moderate medium subangular blocky structure; firm; continuous brown (10YR 5/3) clay films and patchy white (10YR 8/1 dry) uncoated silt grains on faces of peds; very strongly acid; gradual smooth boundary.

B23t—32 to 42 inches; dark brown (7.5YR 4/4) and light brownish gray (10YR 6/2) light silty clay loam; common medium faint strong brown (7.5YR 5/6) mottles; weak medium and coarse subangular blocky structure; firm; patchy thin brown (10YR 5/3) clay films on faces of peds; common dark stains; very strongly acid; gradual

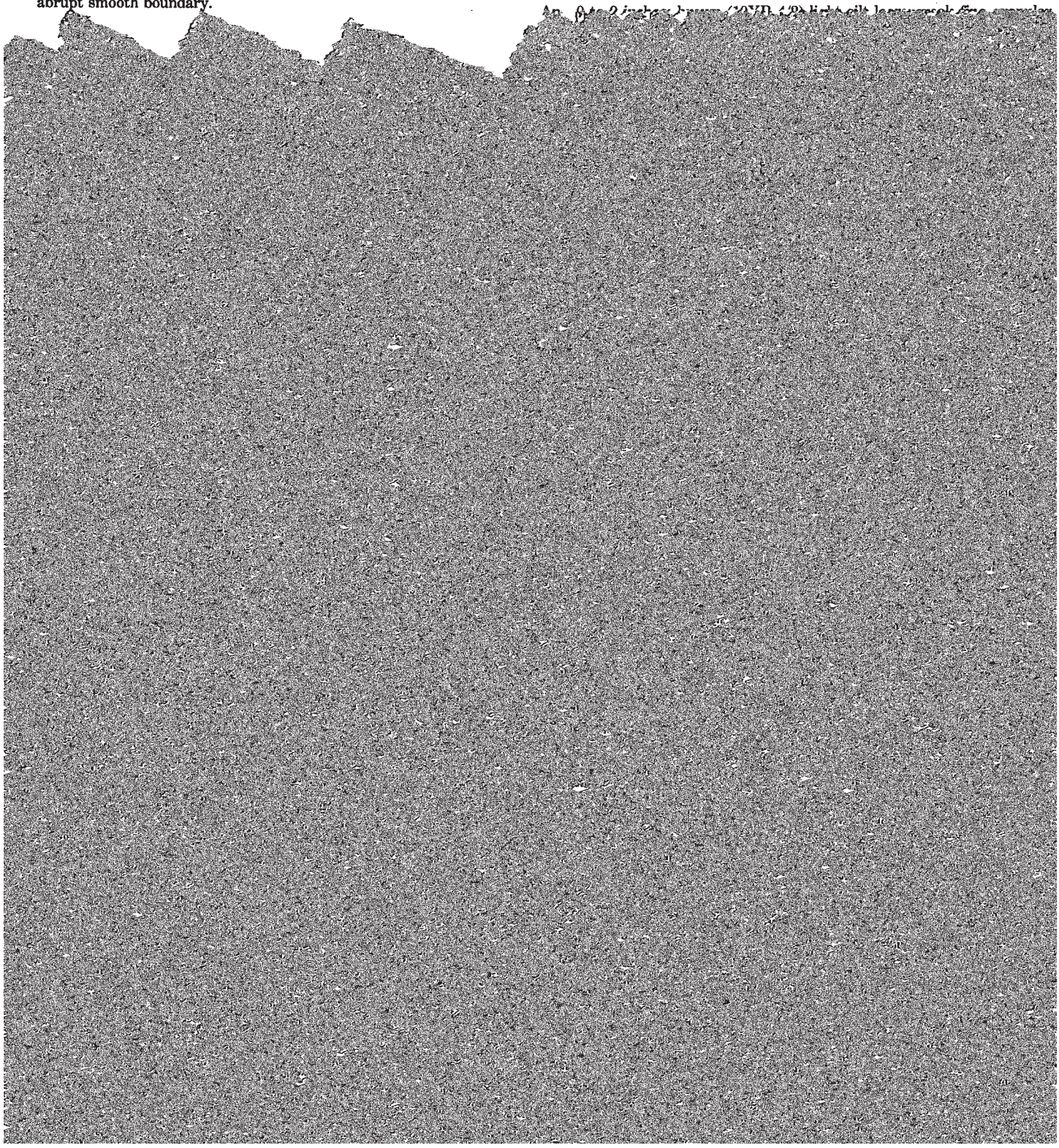


Typical pedon of St. Charles silt loam, 2 to 7 percent slopes, approximately 525 feet south and 90 feet west of the center of sec. 2, T. 8 S., R. 2 W., in a cultivated field:

Ap—0 to 7 inches; dark brown (10YR 4/3) silt loam; weak fine granular structure; friable; many roots; few fine concretions; slightly acid; abrupt smooth boundary.

than Belknap and Banlic soils and lack the dense Bx horizon of Banlic soils.

Typical pedon of Wakeland silt loam, approximately 2,580 feet south and 45 feet west of the northeast corner of sec. 26, T. 8 S., R. 5 W., in a cultivated field:



The solum ranges in texture from very fine sandy loam to silt loam. The B horizon of some pedons has loamy very fine sand and loamy fine sand layers. The C horizon ranges from silt loam to sand but is dominantly very fine sandy loam to fine sand. Reaction of the solum ranges from medium acid to neutral, and the C horizon ranges from slightly acid to moderately alkaline.

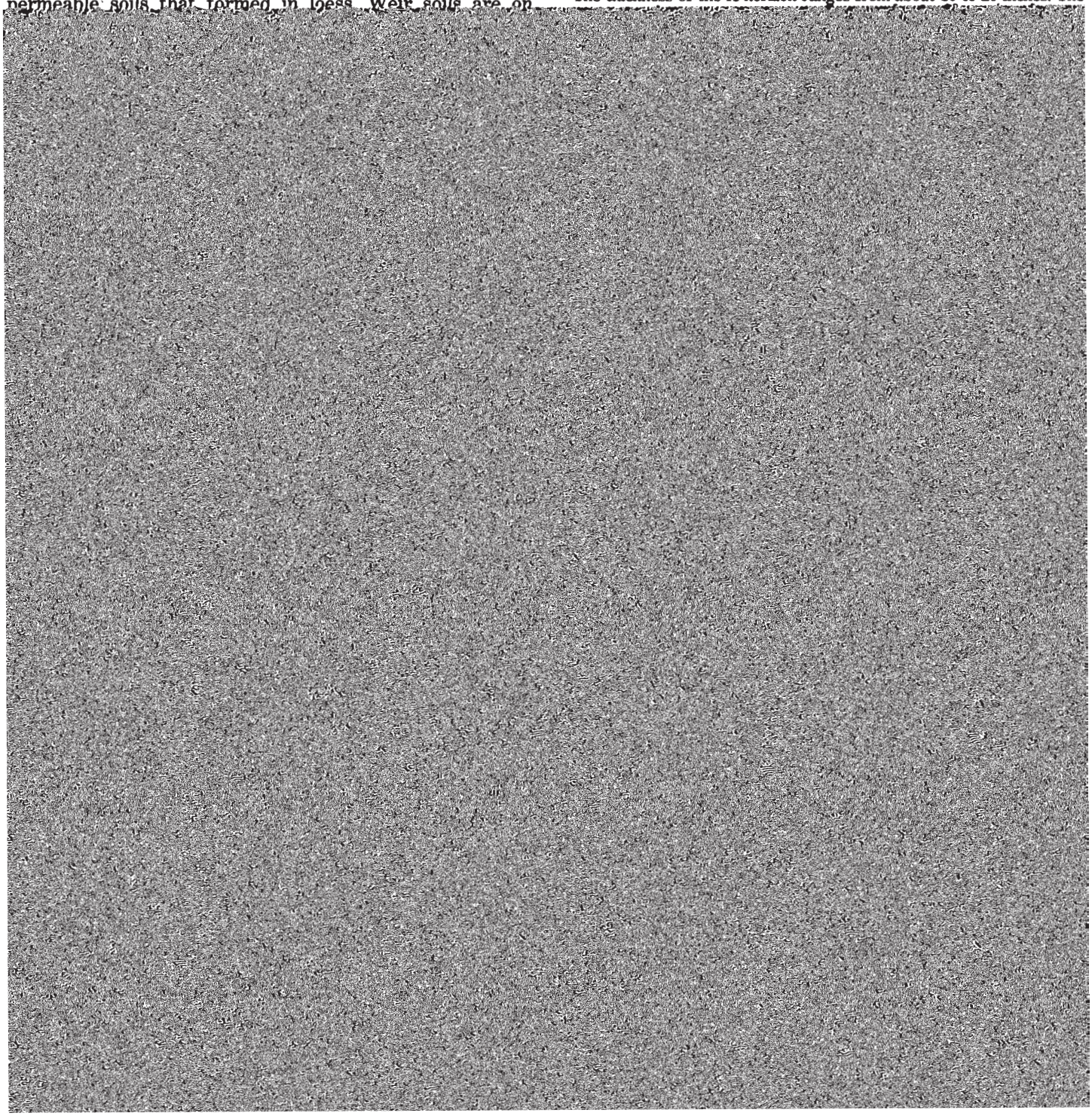
Weir Series

The Weir series consists of poorly drained, very slowly permeable soils that formed in loess. Weir soils are on

B3t—52 to 66 inches; light brownish gray (10YR 6/2) silt loam; many medium and coarse prominent strong brown (7.5YR 5/6) and yellowish red (5YR 5/6) mottles; weak coarse subangular blocky structure; firm; patchy thin grayish brown (2.5Y 5/2) clay films on faces of peds; common dark stains; medium acid; clear smooth boundary.

C—66 to 75 inches; light brownish gray (10YR 6/2) silt loam; many medium and coarse prominent strong brown (7.5YR 5/6) and yellowish red (5YR 5/6) mottles; massive; friable; common dark stains; slightly acid.

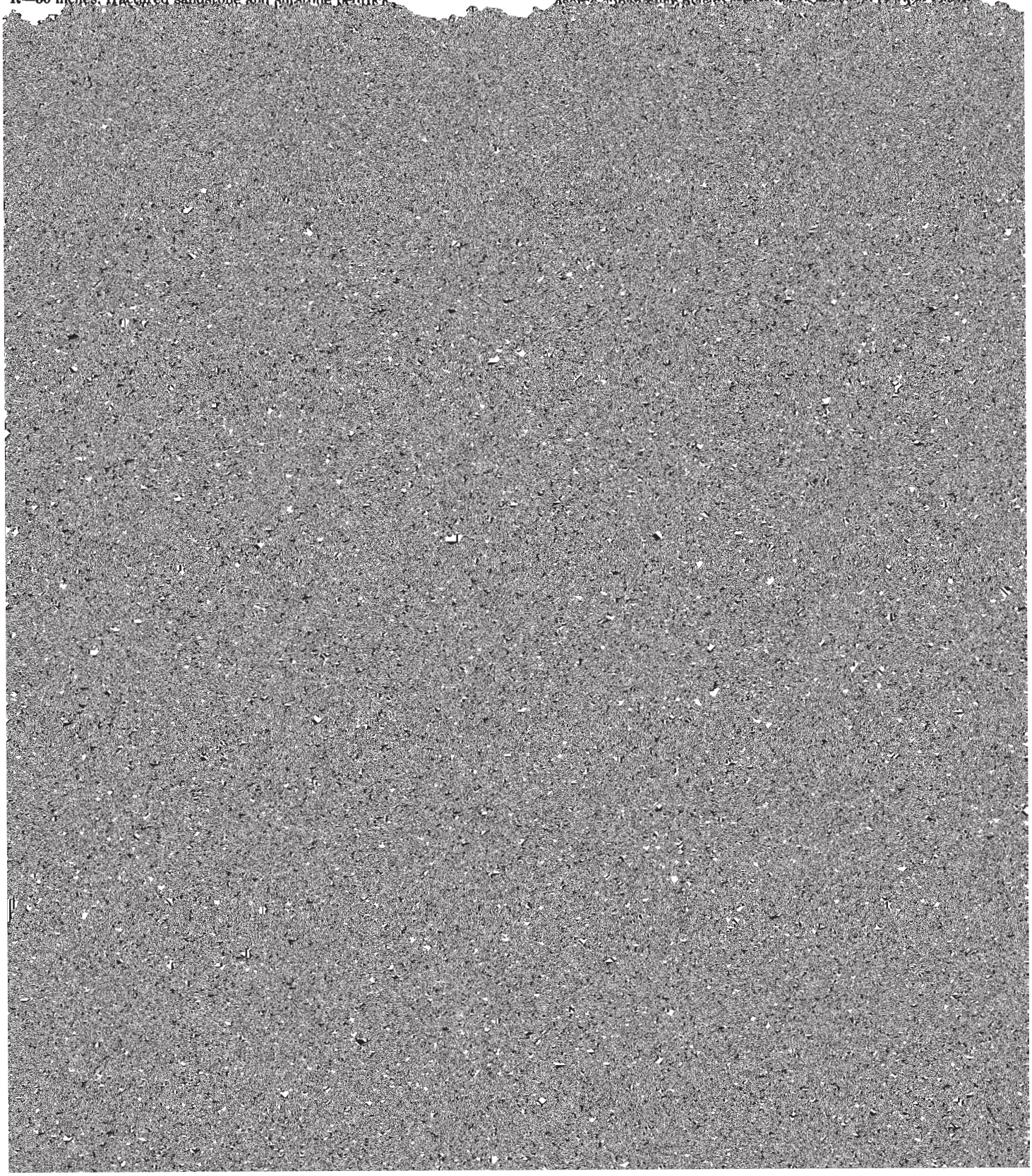
The thickness of the A horizon ranges from about 10 to 20 inches. The



and fragments; approximately 85 percent coarse fragments; very strongly acid; abrupt irregular boundary.

R—50 inches; fractured sandstone and siltstone bedrock.

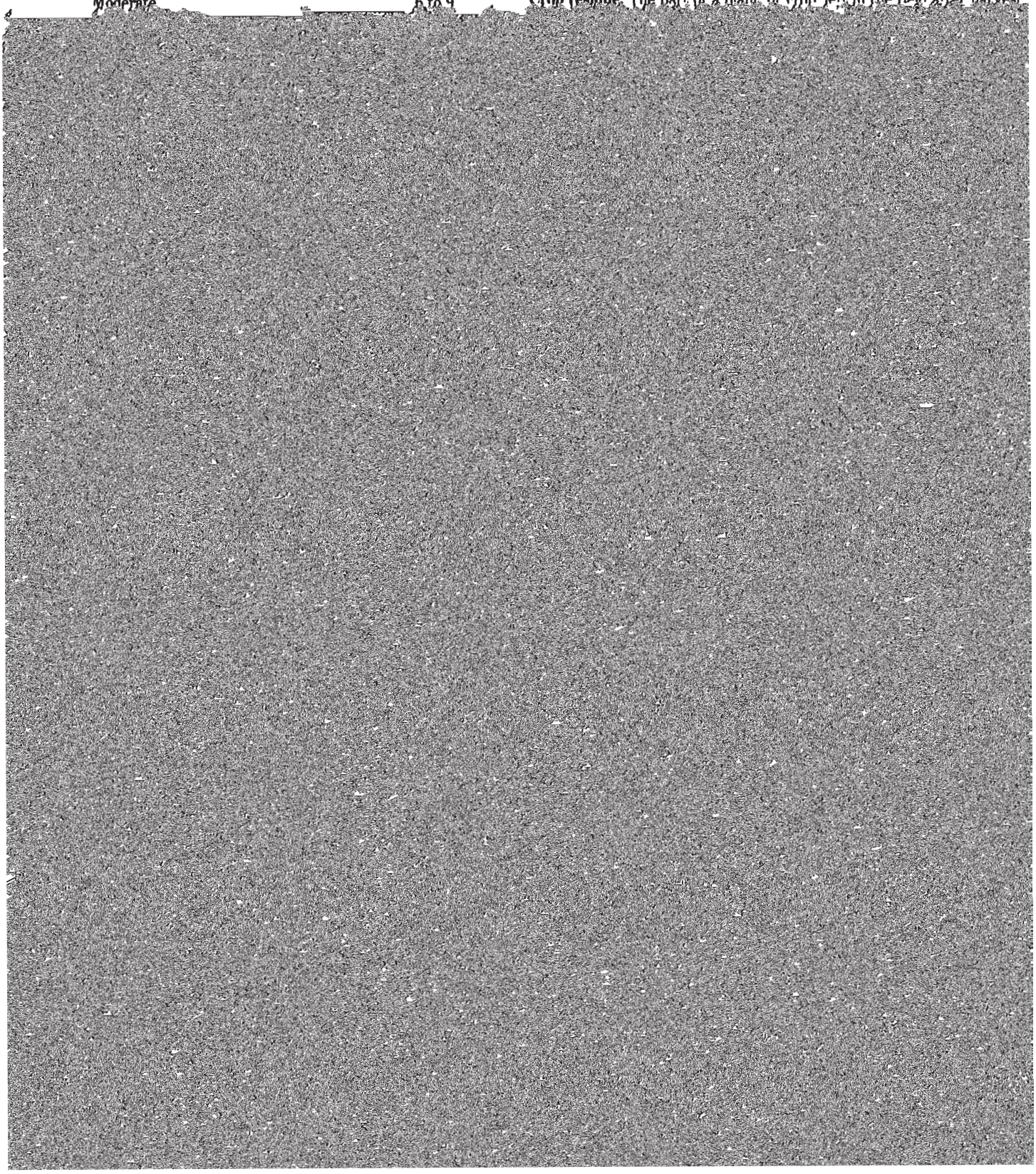
IIC—58 to 65 inches; gray (10YR 6/1) silt loam with many medium and coarse distinct yellowish brown (10YR 5/6) mottles; very weak coarse subangular blocky structure to massive; friable; neutral



	Inches
Very low	0 to 3
Low	3 to 6
Moderate	6 to 9

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue. The part of a plant or crop left in the field after harvest.



Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Excess fines. Excess silt and clay. The soil does not provide a source of gravel or sand for construction purposes.

Favorable. Favorable soil features for the specified use.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Flooding. The temporary covering of soil with water from overflowing streams, runoff from adjacent slopes, and tides. Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. None means that flooding is not probable; rare that it is unlikely but possible under unusual weather conditions; occasional that it occurs on an average of once or less in 2 years; and frequent that it occurs on an average of more than once in 2 years. Duration is [illegible]

A2 horizon.—A mineral horizon, mainly a residual concentration of sand and silt high in content of resistant minerals as a result of the loss of silicate clay, iron, aluminum, or a combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or a combination of these; (2) by prismatic or blocky structure; (3) by redder or browner colors than those in the A horizon; or (4) by a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that from which the solum is presumed to have formed. If the material is known to differ from that in the solum, the Roman numeral II precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Land leveling. The reshaping of the ground surface to make for a more uniform applicaton of irrigation water.

Landscape. All the characteristics that distinguish a certain kind of area on the earth's surface. Any one kind of soil is said to have a characteristic natural landscape, and under different uses it has one or more characteristic cultural landscapes.

Large stones. Rock fragments 10 inches (25 centimeters) or more across. Large stones adversely affect the specified use.

Leaching. The removal of soluble material from soil or other material by percolating water.

Legume. A member of the legume or pulse family (*Leguminosae*). One of the most important and widely distributed plant families. Includes many valuable forage species, such as peas, beans, peanuts, clover, alfalfa, sweet clover, lespedeza vetch, and kudzu. Practically all legumes are nitrogen-fixing plants, and many of the herbaceous species are used as cover and green-manure crops. Even some of the legumes that have no forage value (crotalaria and some lupines) are used for soil improvement. Other legumes are locust, honeylocust, redbud, mimosa, wisteria, and many tropical plants.

Lime. Chemically, calcium oxide, but also all limestone-derived materials applied to neutralize acid soils. Agricultural lime can be obtained as ground limestone, hydrated lime, or burned lime, with or without magnesium minerals. Basic slag, oystershells, and marl also contain calcium.

Lime concretion. An aggregate cemented by the precipitation of calcium carbonate.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low strength. Inadequate strength for supporting loads.

Neutral soil. A soil having a pH value between 6.6 and 7.3.

Nitrogen-fixing plant. A plant that can take in and fix the free nitrogen in the atmosphere by the aid of bacteria living in the root nodules. Legumes with the associated rhizobium bacteria in the nodules of roots are the most important nitrogen-fixing plants. Fixation brought about by the aid of bacteria in plant roots is called symbiotic fixation; if brought about by free-living organisms acting independently, it is referred to as nonsymbiotic fixation.

Nutrient, plant. Any element taken in by a plant, essential to its growth, and used by it in the production of food and tissue. Plant nutrients are nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, zinc, and perhaps other elements obtained from the soil; and carbon, hydrogen, and oxygen obtained largely from the air and water.

Open drain. A ditch constructed to remove surplus water from wet land; may also include cross-slope ditches on sloping land.

Organic matter. A general term for plant and animal material, in or on the soil, in all states of decomposition. Readily decomposed organic matter is often distinguished from the more stable forms that are past the stage of rapid decomposition.

Overgrazing. Grazing so heavy as to impair future forage production and to deteriorate plants, soil, or both. Contrasts with undergrazing.

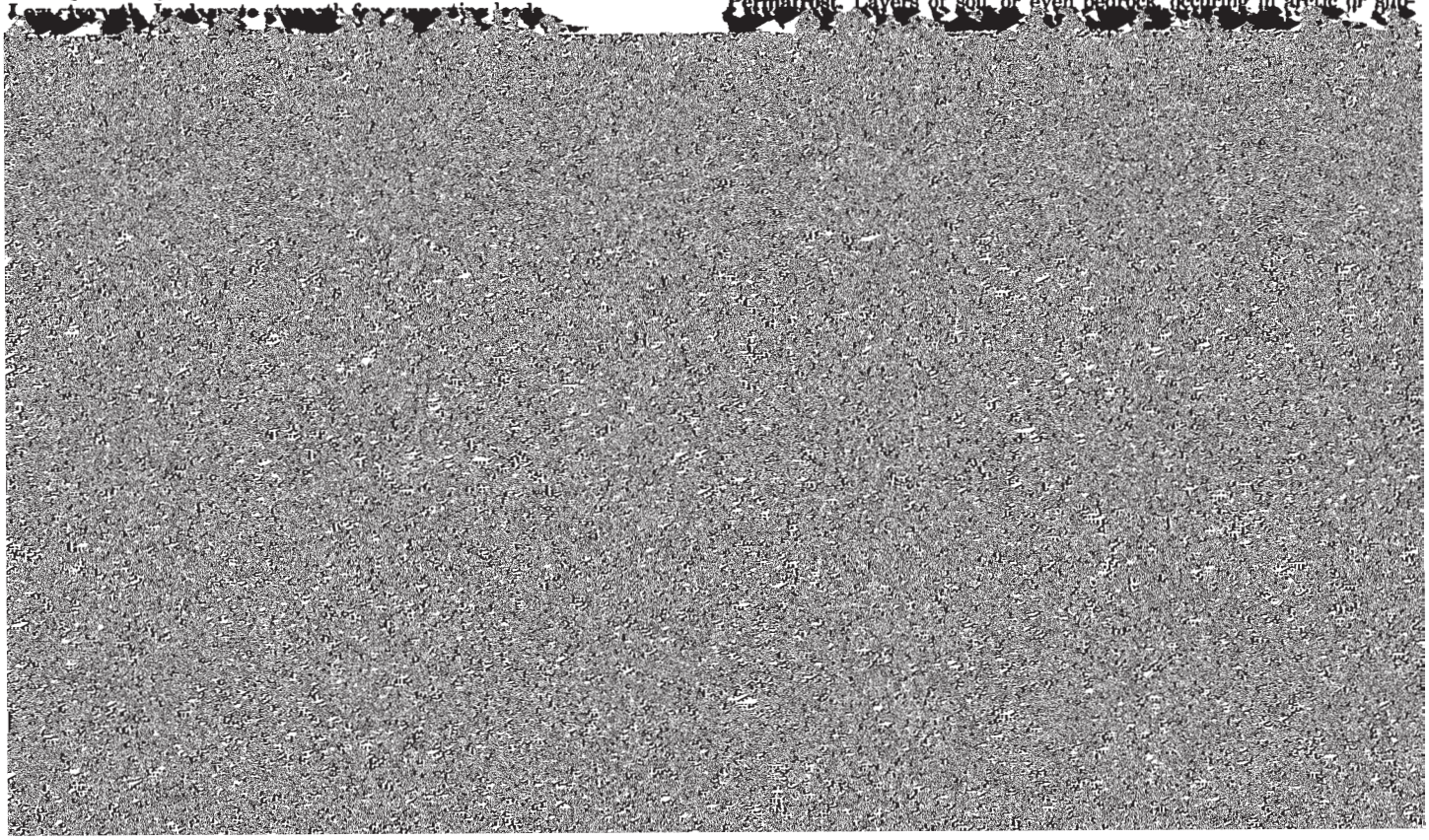
Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly. The slow movement of water through the soil adversely affecting the specified use.

Permanent pasture. Pasture that is on the soil for a long time, in contrast to rotation pasture, which is on the soil only a year or two because it is grown in rotation with other crops.

Permafrost. Layers of soil, or even bedrock, occuring in arctic or sub-



	pH
Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered col-

Slick spot. Locally, a small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil is generally silty or clayey, is slippery when wet, and is low in productivity.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slow refill. The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones. Rock fragments 3 to 10 inches (7.5 to 25 centimeters) in diameter. Small stones adversely affect the specified use.

Soil. A natural, three-dimensional body at the earth's surface that is

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea. A stream terrace is frequently called a second bottom, in contrast with a flood plain, and is seldom subject to overflow. A marine terrace, generally wide, was deposited by the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand*, *loamy sand*, *sandy loam*, *loam*, *silt*, *silt loam*, *sandy clay loam*, *clay loam*, *silty clay loam*, *sandy clay*, *silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer. Otherwise suitable soil material too thin for the specified use.

Tile drain. Concrete or pottery pipe placed at suitable spacings and depths in the soil or subsoil to provide water outlets from the soil.

Tilth, soil. The condition of the soil, especially the soil structure, as related to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Topsoil (engineering). Presumably fertile soil or soil material, ordinarily rich in organic matter or humus, used to topdress roadbanks, lawns, and gardens.

Unified soil classification. A system of classifying soils according to their texture and plasticity, adapted from the airfield classification developed by Casagrande and modified for broader use. It is the mechanical soil classification of the Corps of Engineers, Department of the Army. Used by the Soil Conservation Service, the Bureau of Reclamation, and other agencies that use soils in construction.

Upland (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Unstable fill. Risk of caving or sloughing in banks of fill material.

Value (color). One of three variables of color. Value increases as the relative intensity of reflected light increases. See Munsell notation.

Water table. The upper limit of the soil or underlying rock material that is wholly saturated with water.

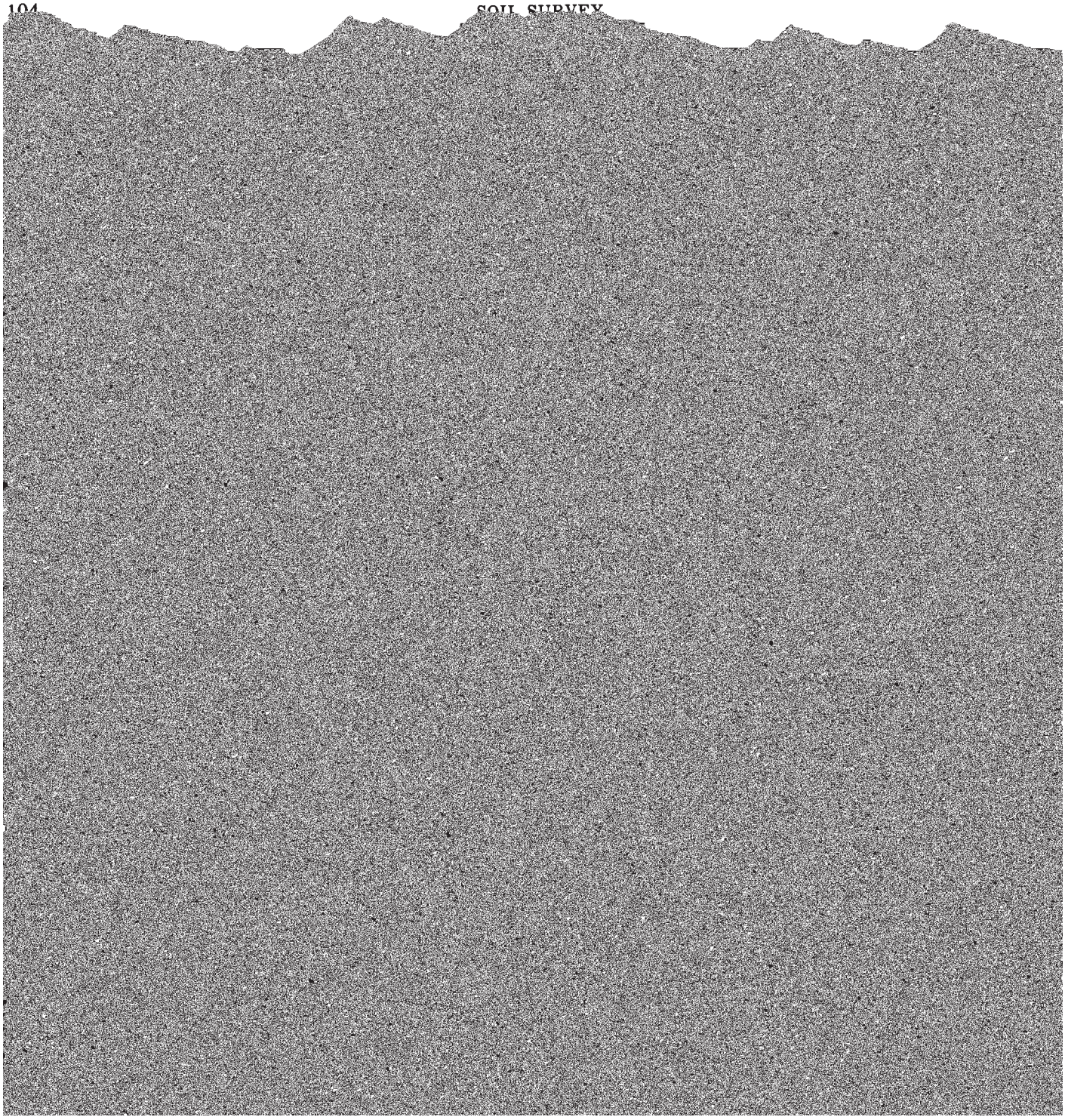
Water table, apparent. A thick zone of free water in the soil. An apparent water table is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

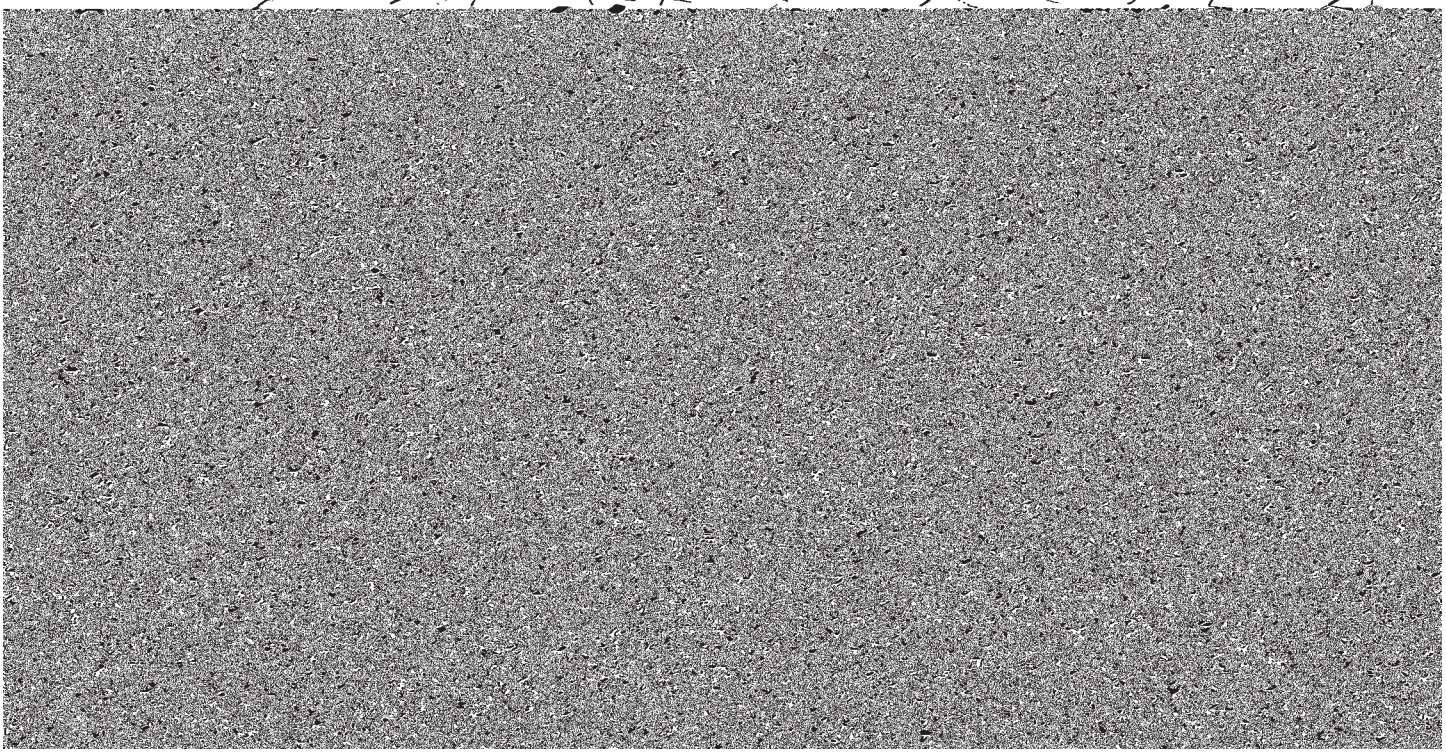
Water table, artesian. A water table under hydrostatic head, generally beneath an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole.

Water table, perched. A water table standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower one by a dry zone.

Weathering. All physical and chemical changes produced in rocks or

Illustrations




Darwin
Ware
Medway
Ware

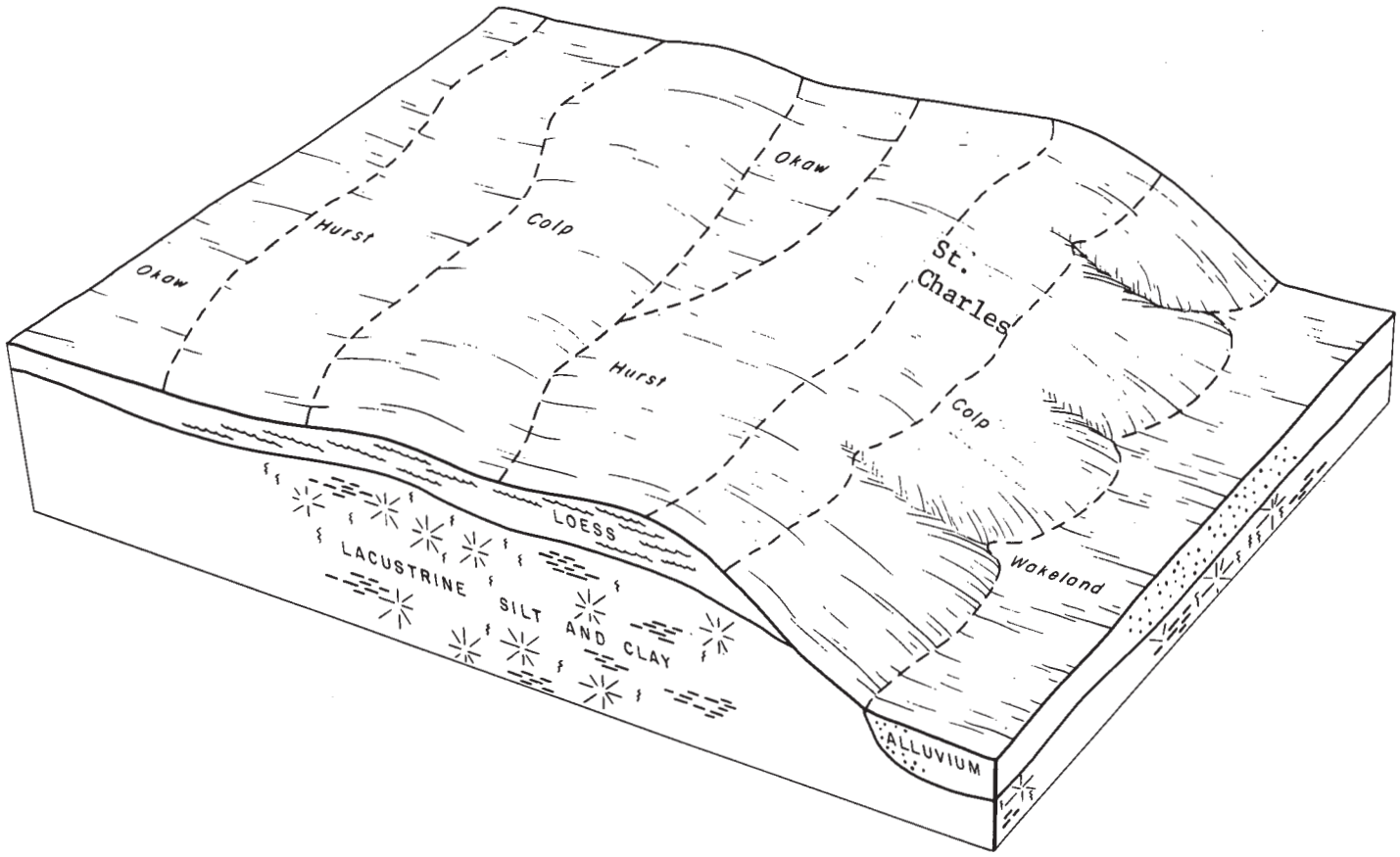
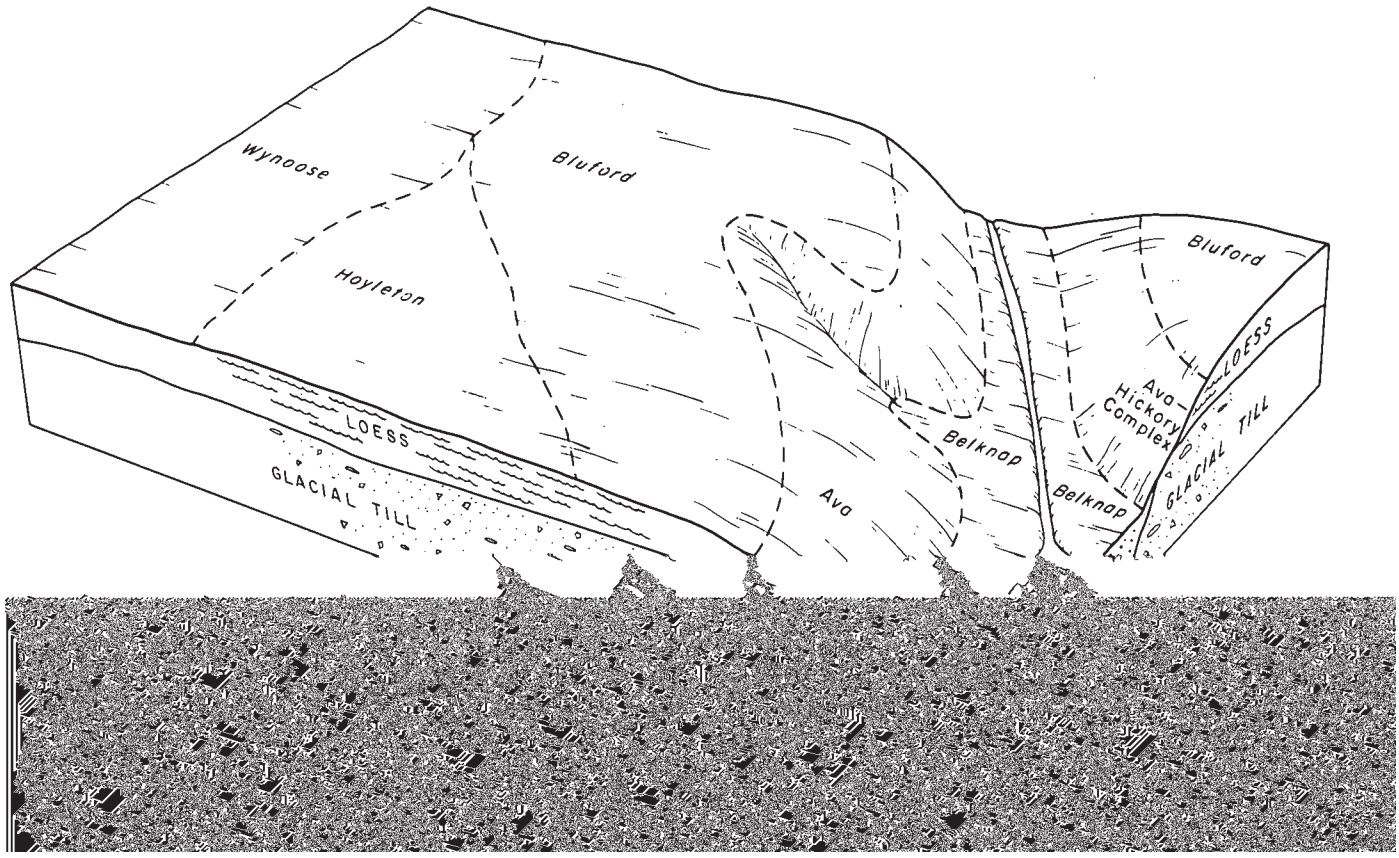


Figure 3.—Typical pattern of soils and underlying material in Hurst-Colp-St. Charles association.


Wynoose
Bluford
Hoyleton
LOESS
GLACIAL TILL
Avo
Belknap
Bluford
LOESS
Avo-Hickory Complex
GLACIAL TILL
Belknap

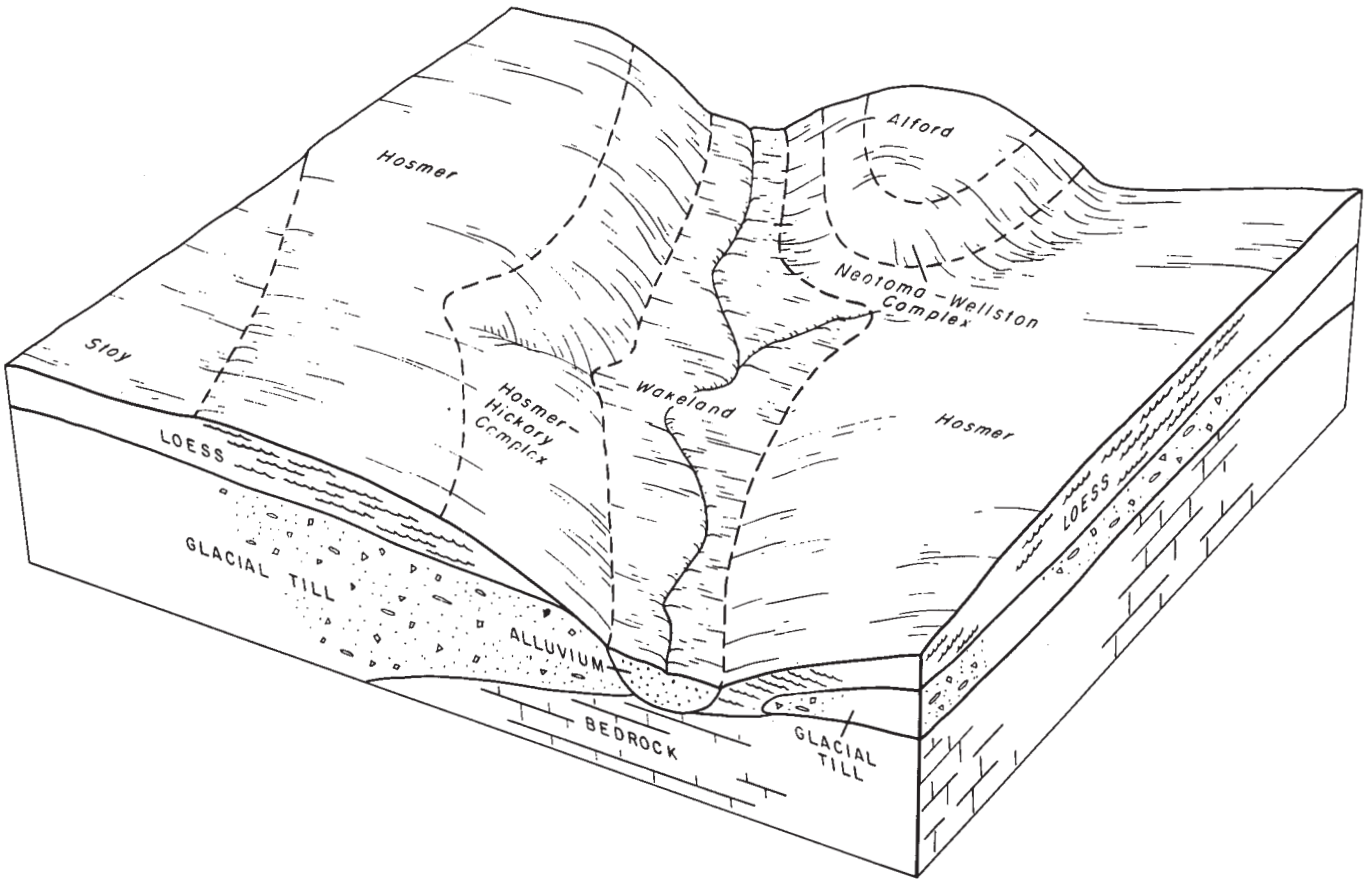
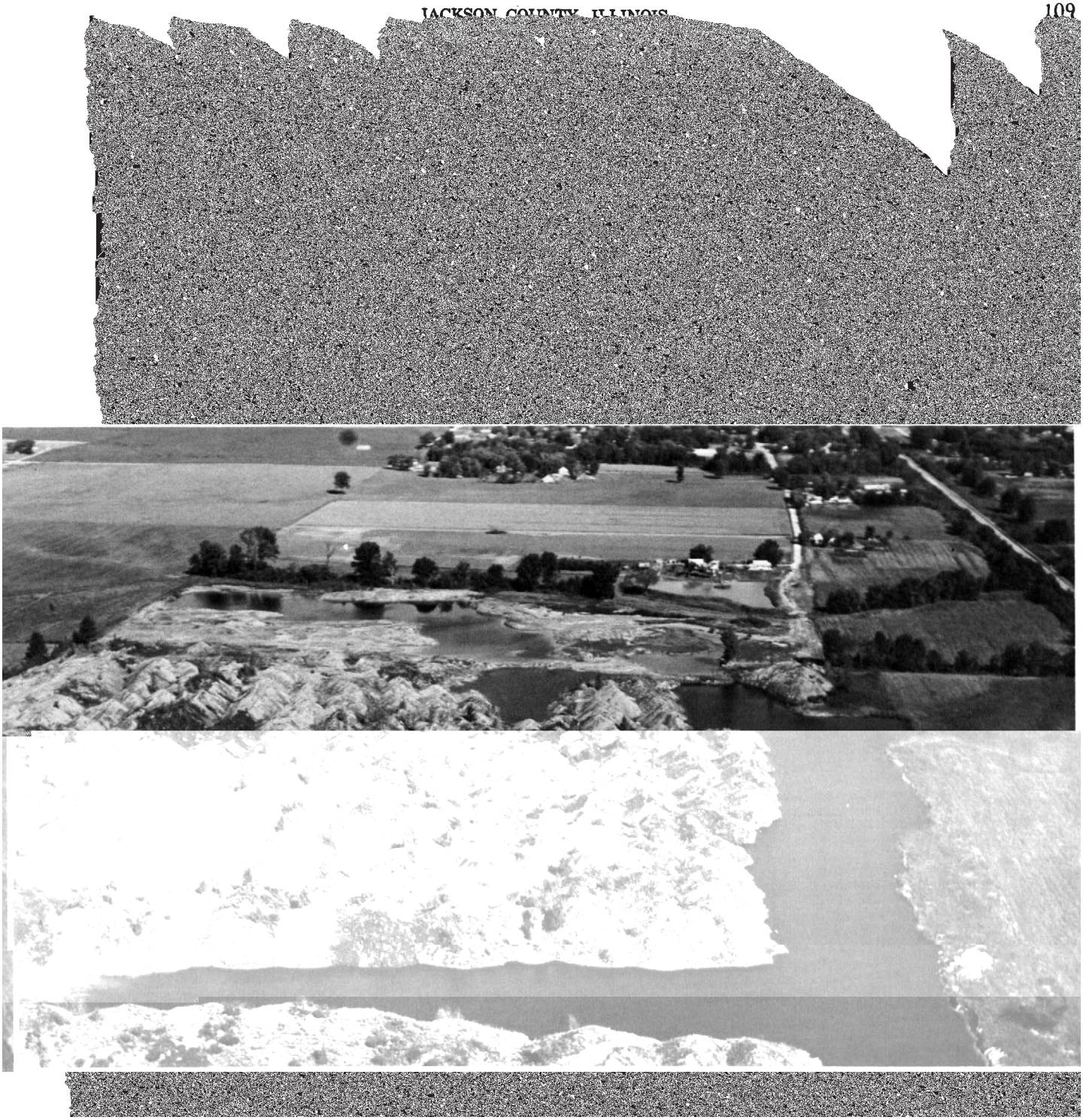


Figure 5.—Typical pattern of soils and underlying material in Hosmer association.



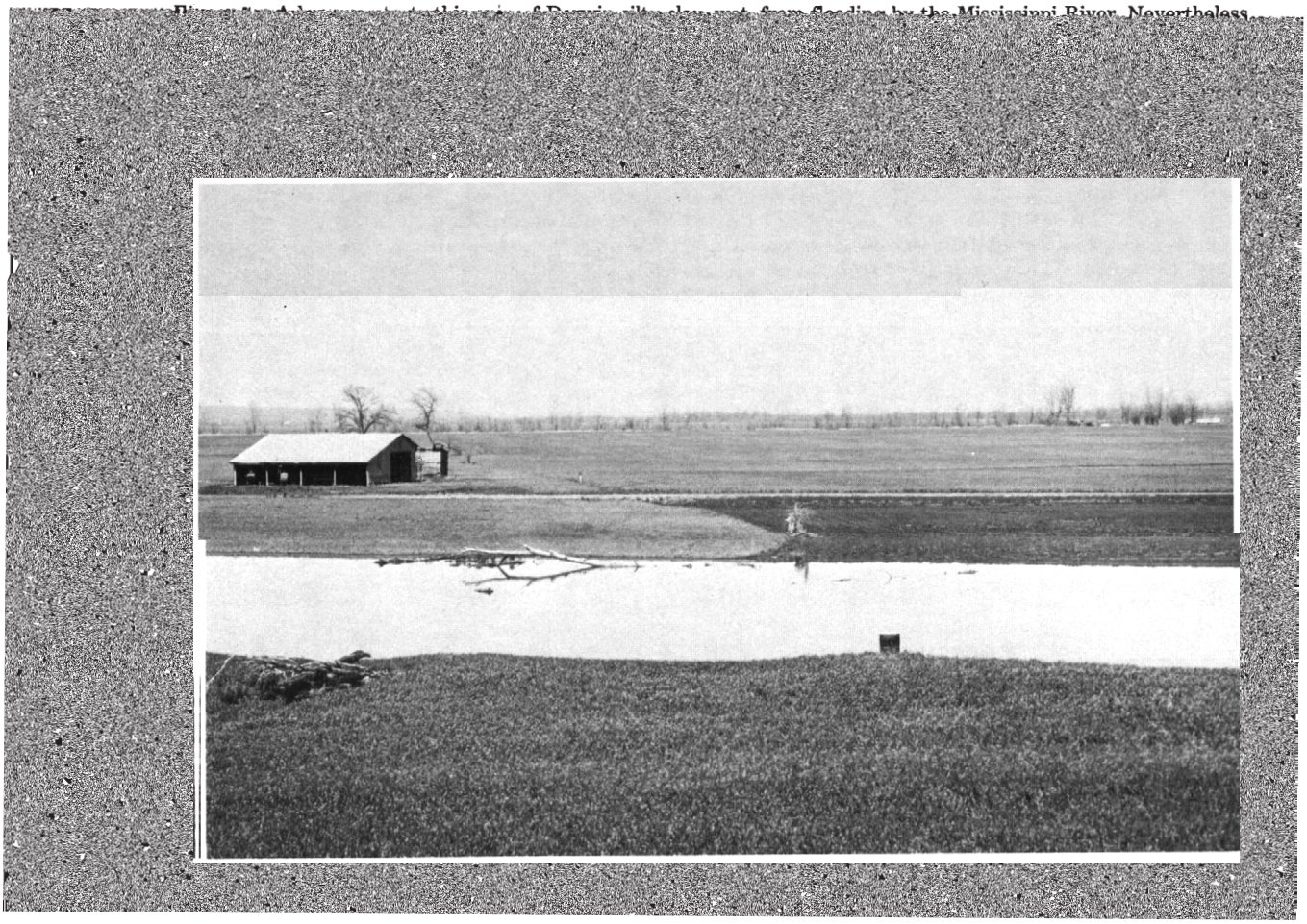


Figure 9.—Leveling and ditches can remove excess water in this area of Jacob clay.

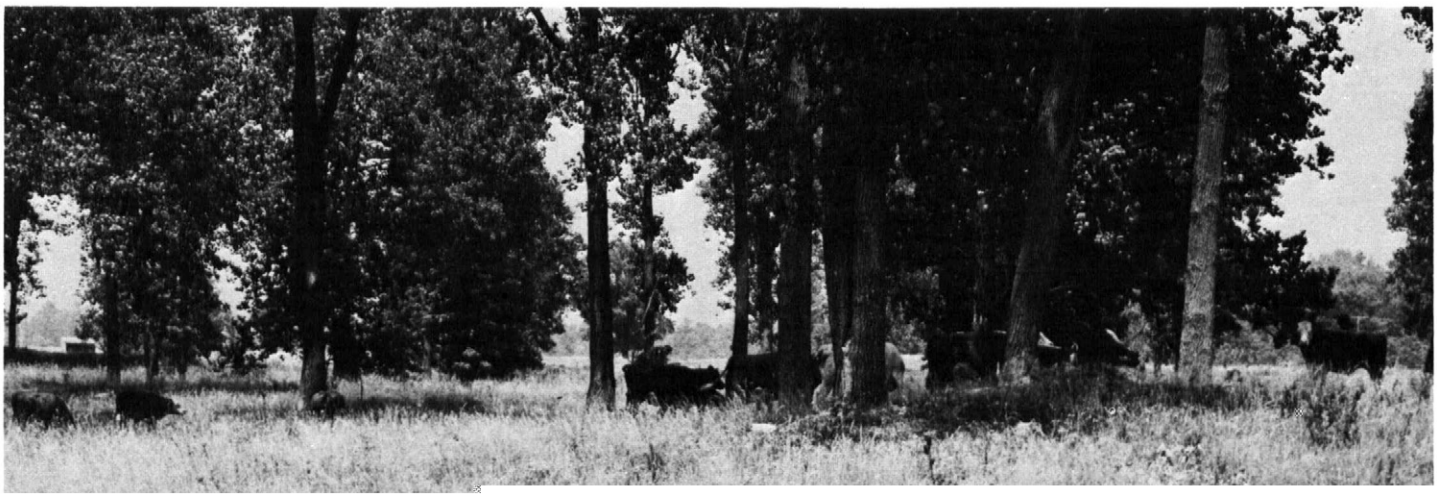


Figure 10.—Orthents, loamy, hilly, used for pasture, is well suited to grasses and legumes if stones are removed.

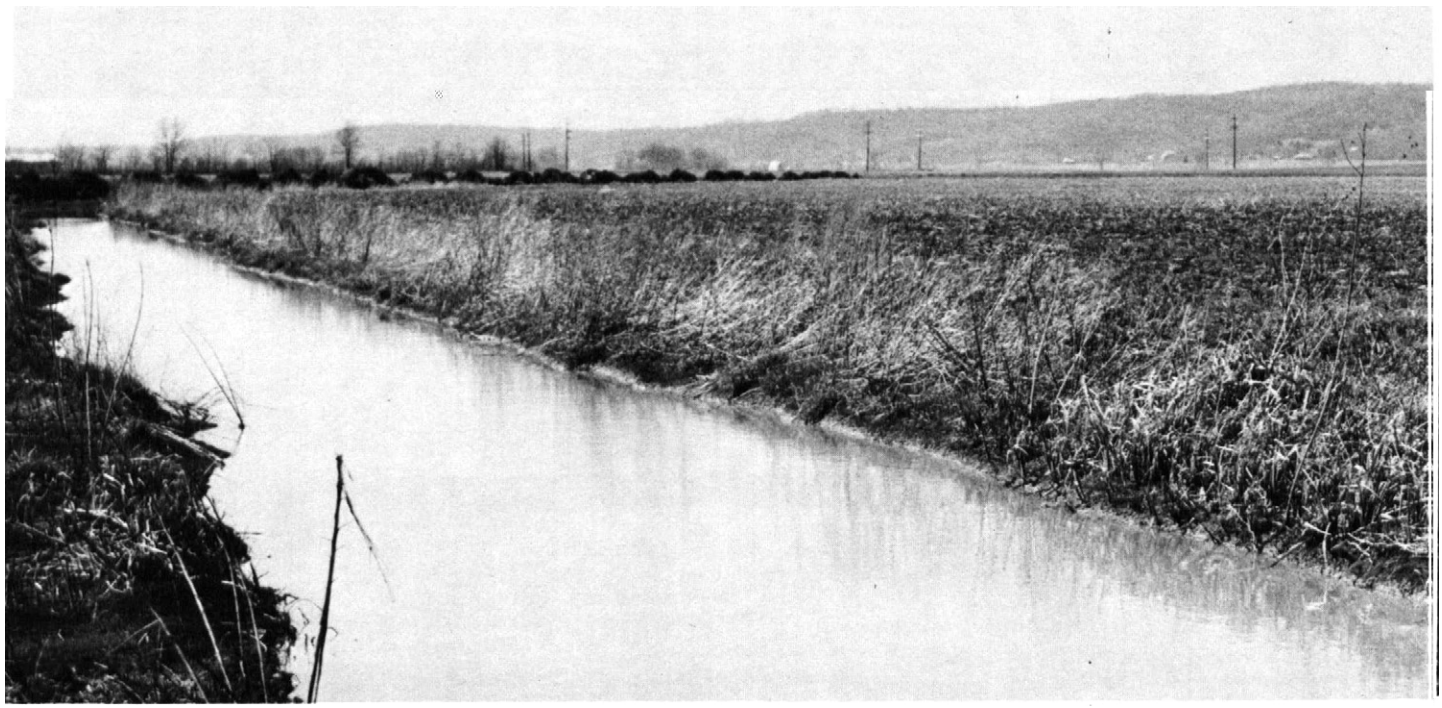


Figure 11. -Because drainage is the major problem on about one-third of the acreage, ditches are commonly used to remove excess water from clayey, slowly or very slowly permeable soils.

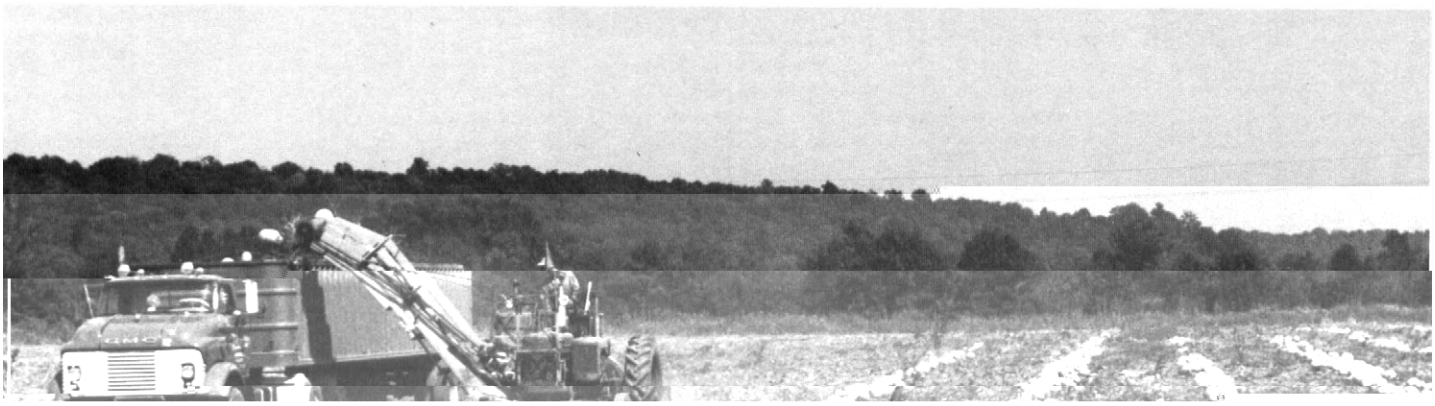


Figure 12.—Cairo silty clay, on the Mississippi River flood plain, is suited to corn, soybeans, wheat, and grasses and

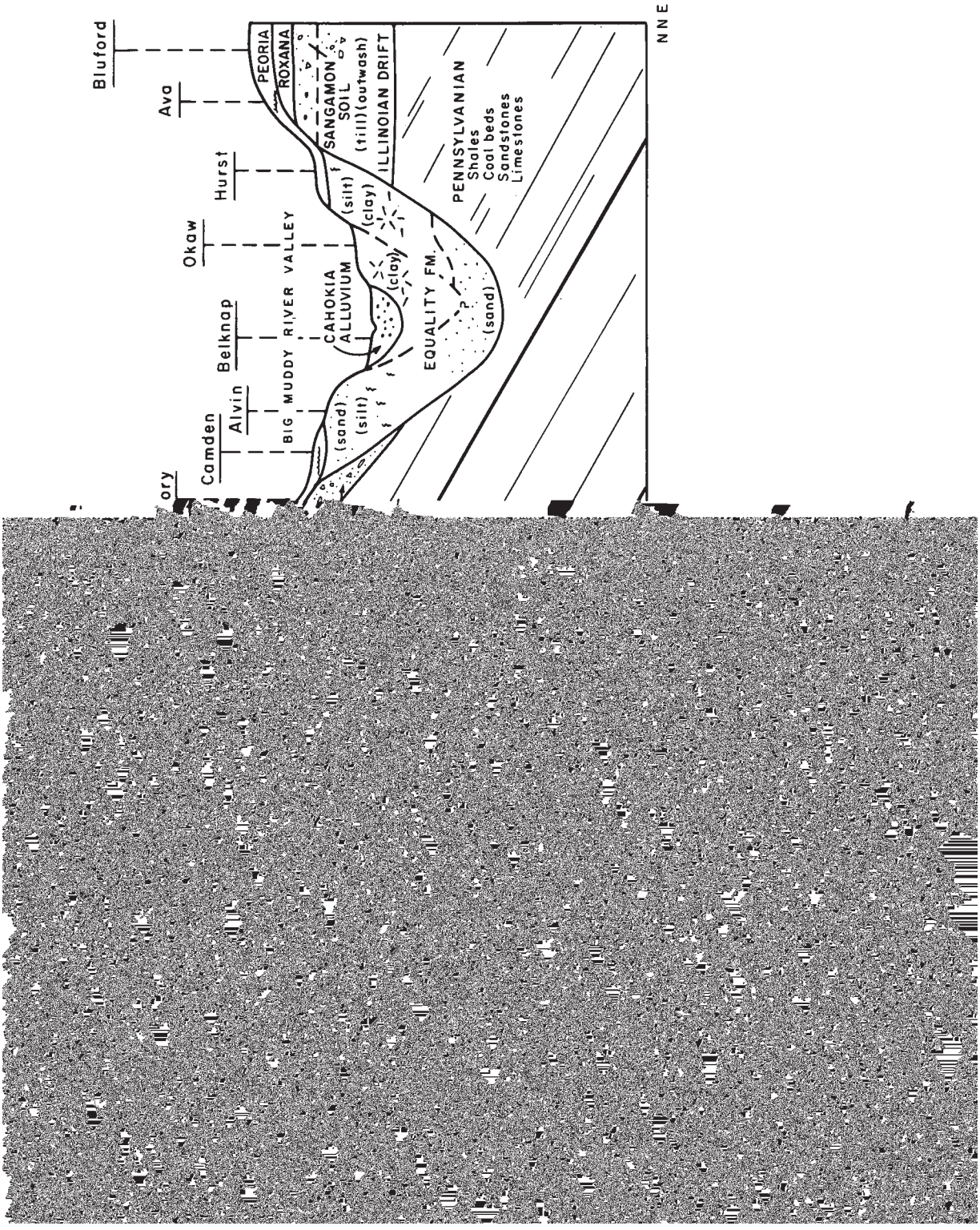

Bluford
Ava
Hurst
Okaw
Belknap
Alvin
Camden
ory
PEORIA
ROXANA
SANGAMON SOIL
(till)(outwash)
ILLINOIAN DRIFT
(silt)
(clay)
(clay)
(sand)
(silt)
(sand)
BIG MUDDY RIVER VALLEY
CAHOKIA ALLUVIUM
EQUALITY FM.
PENNSYLVANIAN
Shales
Coal beds
Sandstones
Limestones
NNE

Figure 14.—Neotoma stony loam in a roadcut. This soil consists of more than 35 percent coarse fragments.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION DATA

Month	Temperature[1]						Precipitation				
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days[2]	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
January	42.8	23.8	33.3	68	-5	37	2.76	1.44	3.83	6	3.1
February	47.5	27.2	37.4	71	-1	82	2.92	1.57	4.01	6	3.0
March	56.6	34.7	45.7	81	11	250	4.24	2.29	5.83	8	2.5
April	69.5	45.9	57.7	88	24	531	4.19	2.63	5.59	8	.4
May	78.6	54.0	66.3	93	34	815	4.60	2.57	6.25	7	.0
June	86.9	62.8	74.9	99	46	1,047	3.93	2.60	5.13	6	.0
July	89.9	66.4	78.1	100	50	1,181	3.82	1.64	5.57	6	.0
August	88.8	63.9	76.4	100	48	1,128	3.47	1.78	4.84	5	.0
September	82.7	56.8	69.8	97	36	894	3.17	1.40	4.61	5	.0
October	72.5	45.0	58.8	91	25	583	2.33	1.00	3.43	4	.0
November	57.2	34.9	46.1	79	13	204	3.69	1.81	5.21	6	.9
December	46.0	28.1	37.0	70	2	99	3.34	1.61	4.74	7	2.0
Year	68.3	45.3	56.8	102	-8	6,851	42.46	35.58	49.03	74	11.9

[1]Recorded in the period 1951-74 at Carbondale, Ill.

[2]A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40° F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

Probability	Temperature[1]		
	24° F or lower	28° F or lower	32° F or lower
Last freezing			

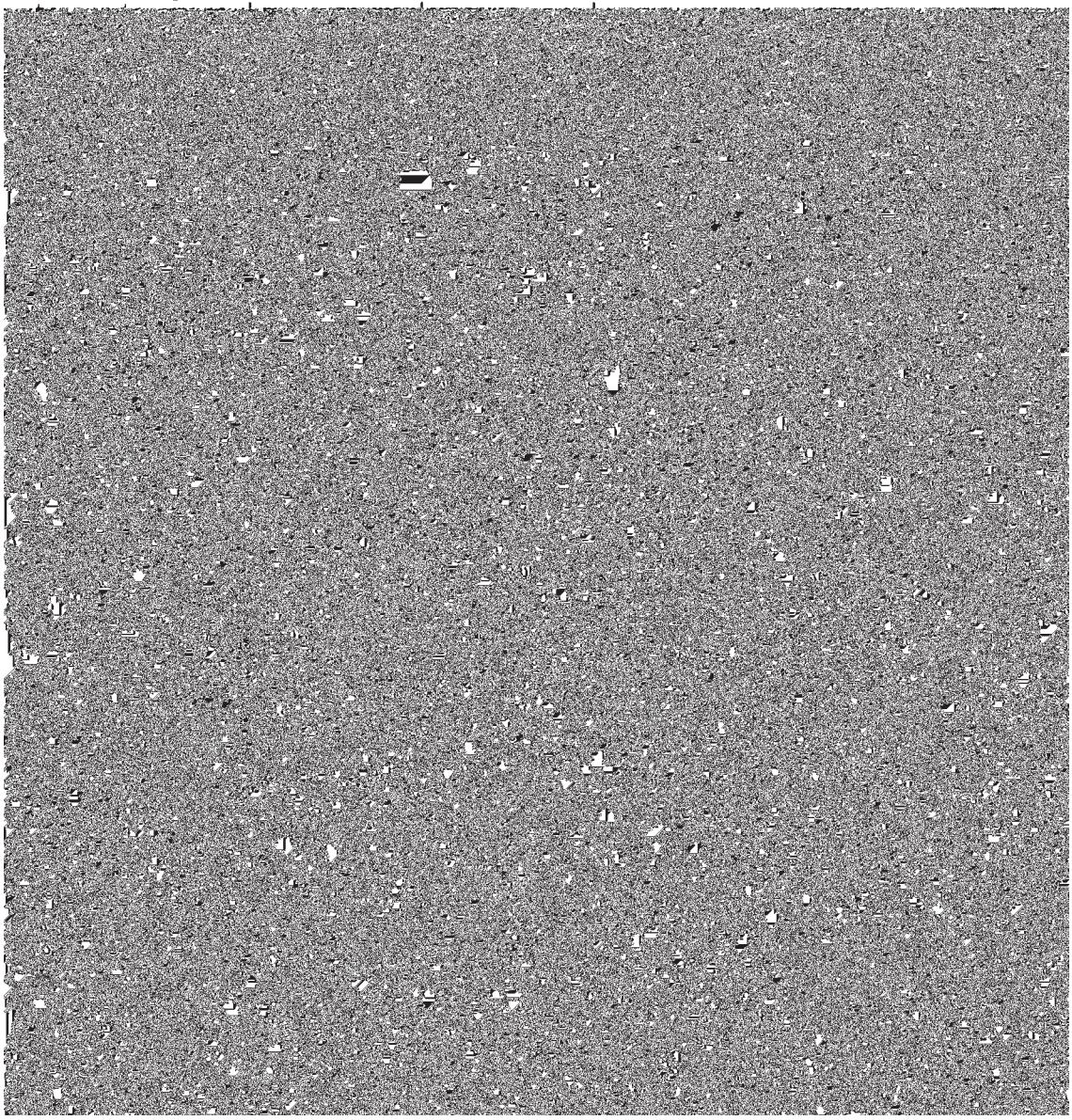


TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
3A	Hoyleton silt loam, 0 to 3 percent slopes	1,610	0.4
3B2	Hoyleton silt loam, 3 to 6 percent slopes, eroded	976	0.3
8E	Hickory silt loam, 18 to 30 percent slopes	2,886	0.7
8E3	Hickory soils, 15 to 30 percent slopes, severely eroded	434	0.1
8G	Hickory silt loam, 30 to 50 percent slopes	965	0.2
12	Wynoose silt loam	3,368	0.9
13A	Bluford silt loam, 0 to 2 percent slopes	2,331	0.6
13B	Bluford silt loam, 2 to 4 percent slopes	3,154	0.8
14B	Ava silt loam, 2 to 6 percent slopes	3,416	0.9
14C3	Ava silty clay loam, 6 to 12 percent slopes, severely eroded	484	0.1
71	Darwin silty clay	10,004	2.6
71+	Darwin silt loam	1,644	0.4
F71	Darwin silty clay, frequently flooded	1,337	0.3
W71	Darwin silty clay, wet	1,263	0.3
84	Okaw silt loam	12,728	3.2
85	Jacob clay	10,156	2.6
W85	Jacob clay, wet	4,464	1.2
108	Bonnie silt loam	8,374	2.2
109	Racoon silt loam	1,250	0.3
122A	Colp silt loam, 0 to 3 percent slopes	3,105	0.8

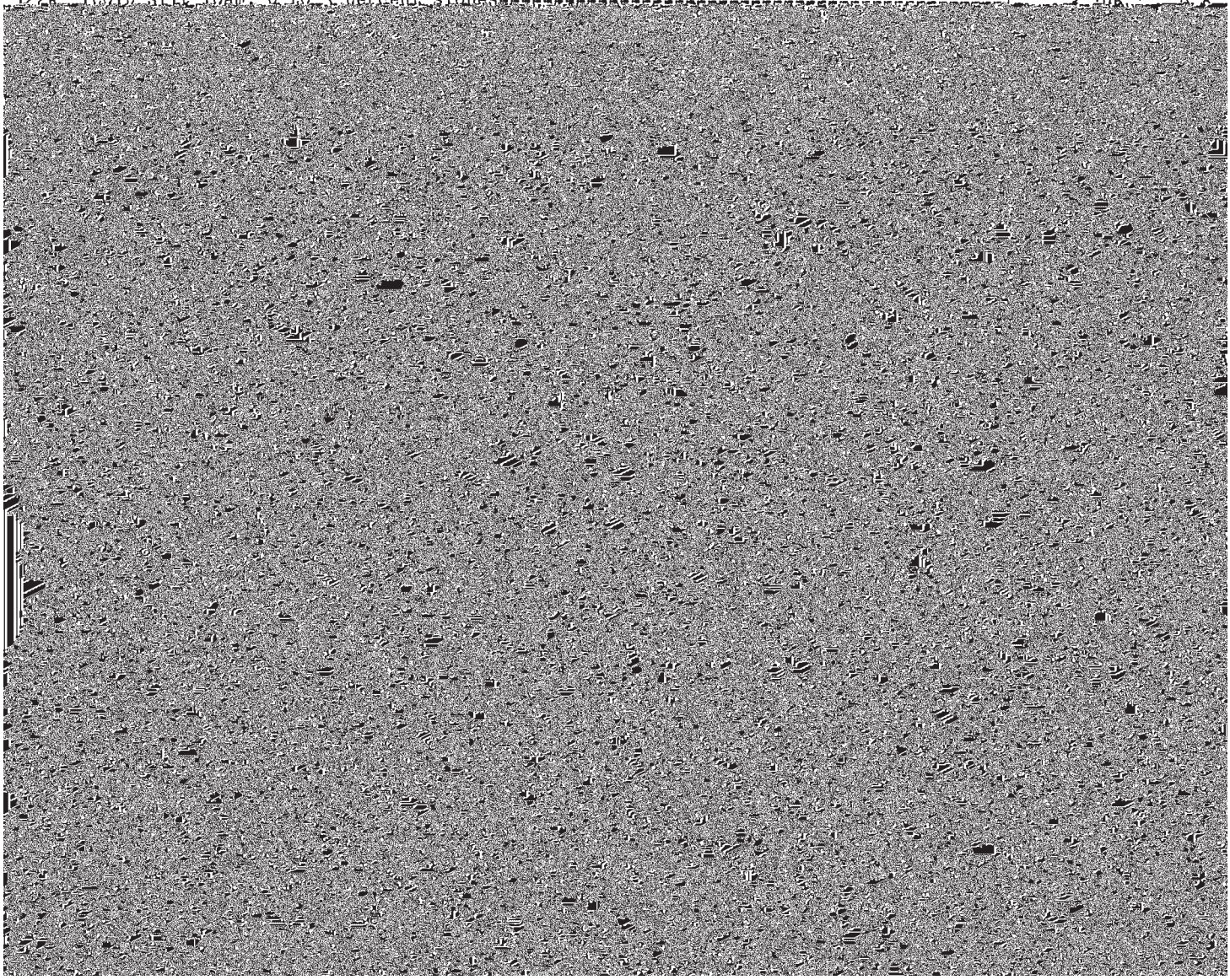


TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
590	Cairo silty clay	5,328	1.4
682	Medway silty clay loam	3,493	0.9
F682	Medway soils, frequently flooded	2,736	0.7
787	Banlic silt loam	3,673	0.9
801	Orthents, silty, sloping	1,711	0.4
802C	Orthents, loamy, hilly	1,040	0.3
802G	Orthents, loamy, very steep	4,295	1.1
805	Orthents, clayey, sloping	2,386	0.6
850D	Hosmer-Hickory silt loams, 12 to 18 percent slopes	899	0.2
850D3	Hosmer-Hickory complex, 12 to 18 percent slopes, severely eroded	6,874	1.8
850E	Hickory-Hosmer silt loams, 18 to 30 percent slopes	1,265	0.3
850E3	Hickory-Hosmer complex, 18 to 30 percent slopes, severely eroded	479	0.1
852E	Alford-Wellston silt loams, 15 to 30 percent slopes	21,130	5.5
852G	Alford-Wellston silt loams, 30 to 50 percent slopes	2,206	0.6
929C3	Ava-Hickory complex, 7 to 12 percent slopes, severely eroded	1,024	0.3
929D2	Hickory-Ava silt loams, 12 to 18 percent slopes, eroded	279	0.1
930G	Goss-Alford complex, 25 to 65 percent slopes	1,094	0.3
976G	Neotoma-Rock outcrop complex, 25 to 55 percent slopes	2,281	0.6
977E	Neotoma-Wellston complex, 18 to 30 percent slopes	1,082	0.3
977G	Neotoma-Wellston complex, 30 to 50 percent slopes	6,069	1.6
999D	Alford-Hickory silt loams, 12 to 18 percent slopes	1,006	0.3
999D3	Alford-Hickory complex, 12 to 18 percent slopes, severely eroded	2,725	0.7
999E	Hickory-Alford silt loams, 18 to 30 percent slopes	8,047	2.1
999E3	Hickory-Alford complex, 18 to 30 percent slopes, severely eroded	1,221	0.3
MD	Mine dump	326	0.1
QU	Quarry	74	(1)
SL	Sewage lagoon	76	(1)
W	Water	4,847	1.3
	Total	387,200	100.0

[1]Less than 0.1 percent.

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE

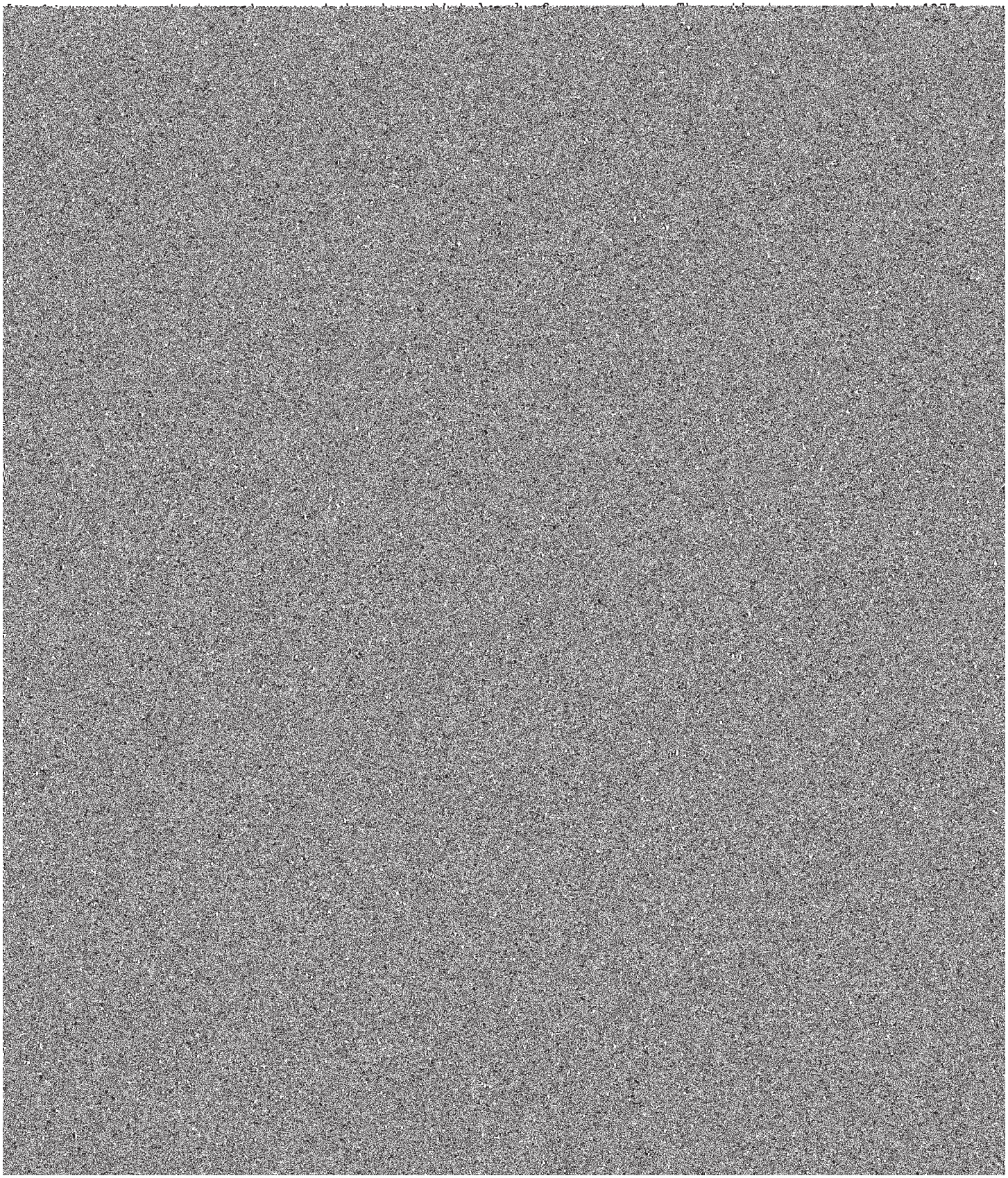


TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Soybeans	Wheat, winter	Oats	Grass-legume hay	Grass-clover
	Bu	Bu	Bu	Bu	Ton	AUM[1]
Camden:						
134A	110	38	---	65	5.0	8.3
134B2	100	35	---	55	4.5	7.5
134C2, 134C3	95	32	---	55	4.2	7.0
134D	80	---	---	50	4.0	6.6
Gorham:						
2162	115	40	---	---	4.5	7.0
Stoy:						
164A	97	32	---	---	4.1	7.0
164B, 164C2	93	28	---	---	4.0	6.5
Weir:						
165	90	31	39	---	3.5	5.5
Dupo:						
180	112	37	46	---	4.3	7.0
Sexton:						
208	104	34	42	59	3.9	6.0
Hosmer:						
214B	105	37	47	---	3.4	6.2
214C2	85	30	38	---	2.8	5.6
214C3	75	26	34	---	2.5	5.0
214D2	70	24	32	---	2.3	4.6
214D3	---	---	27	---	2.0	4.0
St. Charles:						
243B	112	38	47	66	4.6	8.0
Alford:						
308B2	120	42	48	---	4.0	7.5
308C2	110	38	44	---	3.6	7.0
308C3	105	37	42	---	3.4	6.5
308D2	95	33	38	---	3.1	6.5
308D3	---	---	---	---	3.0	6.0
308E	---	---	---	---	1.5	5.0
308E3, 308G	---	---	---	---	2.6	3.0
Haymond:						
331	90	34	35	---	3.2	7.3
Wakeland:						
333	135	47	54	---	4.4	8.0
Birds:						
334	115	39	45	---	4.3	6.6
Hurst:						
208A						

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Soybeans	Wheat, winter	Oats	Grass-legume hay	Grass-clover

TABLE 5.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Corn	Soybeans	Wheat, winter	Oats	Grass-legume hay	Grass-clover
	Bu	Bu	Bu	Bu	Ton	AUM[1]
Hickory:						
3929D2	---	---	---	---	---	3.2
Goss:						
3930G	---	---	---	---	---	4.0
Neotoma:						
4976G	---	---	---	---	---	3.5
3977E	---	---	---	---	---	3.8
3977G	---	---	---	---	---	3.5
Alford:						
3999D	---	---	---	---	---	6.5
3999D3	---	---	---	---	---	6.0
Hickory:						
3999E	---	---	---	---	3.4	3.4
3999E3	---	---	---	---	3.0	3.0
Mine dump:						
M.D.						
Quarry:						
Qu.						

[1]Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for a period of 30 days.

[2]Yields are for areas protected from flooding.

[3]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed in this table. Absence of an entry in a column indicates that the information was not available]

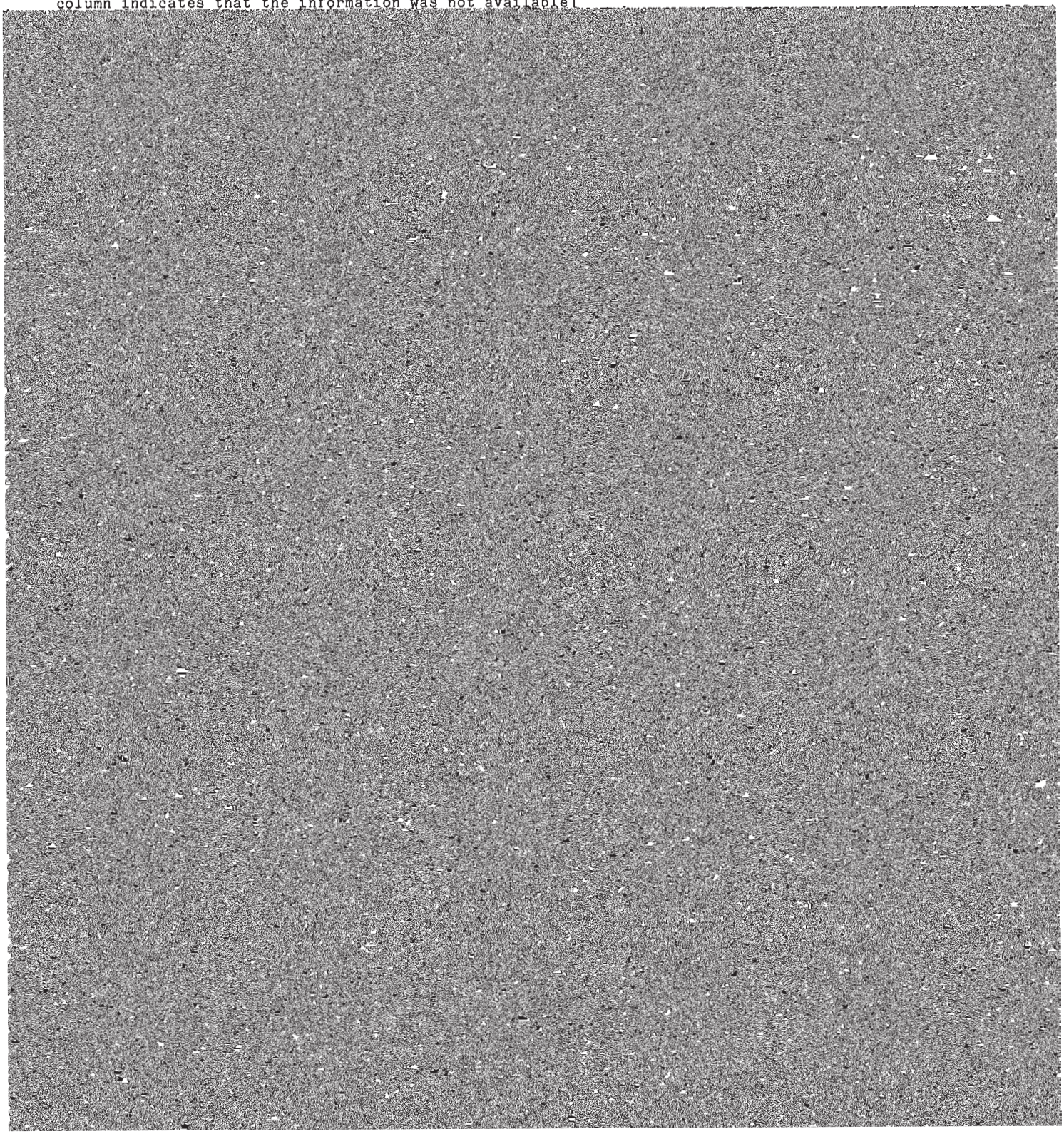


TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Important trees	Site index	
Bonnie:								
108	2w	Slight	Moderate	Moderate	Severe	Pin oak	90	Eastern cottonwood, red maple, American sycamore, sweetgum, baldcypress, pin oak.
						Eastern cottonwood	100	
						Sweetgum	---	
						Cherrybark oak	---	
						American sycamore	---	
Racoon:								
109	3w	Slight	Moderate	Moderate	Slight	Pin oak	80	Baldcypress, pin oak, water tupelo, red maple.
						Post oak	80	
						Green ash	---	
						White oak	---	
Colp:								
122A, 122B2, 122C2	3o	Slight	Slight	Slight	Slight	White oak	70	Shortleaf pine, loblolly pine, eastern white pine, eastern redcedar.
						Northern red oak	70	
						White ash	---	
						Bur oak	70	
122C3, 122D	3r	Moderate	Moderate	Moderate	Slight	White oak	70	Shortleaf pine, loblolly pine, eastern white pine, eastern redcedar.
						Northern red oak	70	
						White ash	---	
						Bur oak	70	
Alvin:								
131B, 131C3	2o	Slight	Slight	Slight	Slight	White oak	80	Green ash, black walnut, yellow-poplar, white oak, eastern white pine, American sycamore, sugar maple.
						Northern red oak	80	
						Black walnut	---	
						Yellow-poplar	90	
131E	2r	Moderate	Moderate	Slight	Slight	White oak	80	Green ash, black walnut, yellow-poplar, white oak, eastern white pine, American sycamore, sugar maple.
						Northern red oak	80	
						Black walnut	---	
						Yellow-poplar	90	
Starks:								
132	2o	Slight	Slight	Slight	Slight	White oak	80	Black walnut, American sycamore, yellow-poplar, white oak, green ash, sugar maple.
						Northern red oak	80	
						Yellow-poplar	90	
						Black walnut	---	
Camden:								
134A, 134B2, 134C2, 134C3	1o	Slight	Slight	Slight	Slight	Yellow-poplar	95	White oak, black walnut, green ash, eastern white pine, red pine, yellow-poplar, black locust, white ash.
						White oak	85	
						Northern red oak	85	
						Sweetgum	---	
						Green ash	---	
134D	1r	Moderate	Moderate	Slight	Slight	Yellow-poplar	95	White oak, black walnut, green ash, eastern white pine, red pine, yellow-poplar, black locust, white ash.
						White oak	85	
						Northern red oak	85	
						Sweetgum	---	
						Green ash	---	

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Important trees	Site index	
Gorham:								
162	2w	Slight	Moderate	Moderate	Slight	Pin oak	90	Eastern cottonwood, red maple, American sycamore, pin oak, sweetgum.
						Eastern cottonwood	100	
						Sweetgum	---	
						Cherrybark oak	---	
						American sycamore	---	
Stoy:								
164A, 164B, 164C2	3o	Slight	Slight	Slight	Slight	White oak	70	Shortleaf pine, loblolly pine, eastern white pine, Scotch pine, eastern redcedar.
						Southern red oak	70	
						White ash	---	
						Bur oak	---	
Weir:								
165	4w	Slight	Moderate	Moderate	Slight	Pin oak	70	Baldcypress, pin oak, water tupelo, red maple.
						White oak	---	
						Black oak	---	
						Pignut hickory	---	
Dupo:								
180	---	---	---	---	---		---	Black walnut, American sycamore, eastern cottonwood, green ash, yellow-poplar, red maple, cherrybark oak.
Sexton:								
208	3w	Slight	Moderate	Moderate	Slight	Pin oak	80	Baldcypress, pin oak, water tupelo, red maple.
						White oak	---	
						Green ash	---	
						Yellow-poplar	80	
Hosmer:								
214B, 214C2, 214C3	2o	Slight	Slight	Slight	Slight	White oak	75	Eastern white pine, shortleaf pine, red pine, yellow-poplar, white ash.
						Yellow-poplar	90	
						Virginia pine	75	
						Sugar maple	75	
214D2, 214D3	2r	Moderate	Moderate	Slight	Slight	White oak	75	Eastern white pine, shortleaf pine, red pine, yellow-poplar, white ash.
						Yellow-poplar	90	
						Virginia pine	75	
						Sugar maple	75	
St. Charles:								
243B	1o	Slight	Slight	Slight	Slight	Yellow-poplar	95	White oak, black walnut, sugar maple, eastern white pine, red pine.
						White oak	85	
						Northern red oak	85	
						Sweetgum	---	
						Green ash	---	
Alford:								
308B2, 308C2, 308C3, 308D2, 308D3	1o	Slight	Slight	Slight	Slight	White oak	90	Eastern white pine, red pine, black walnut, yellow-poplar, white ash, black locust.
						Yellow-poplar	98	
						Sweetgum	76	
308E, 308E3	1r	Moderate	Moderate	Slight	Slight	White oak	90	Eastern white pine, red pine, black walnut, yellow-poplar, white ash, black locust.
						Yellow-poplar	98	
						Sweetgum	76	

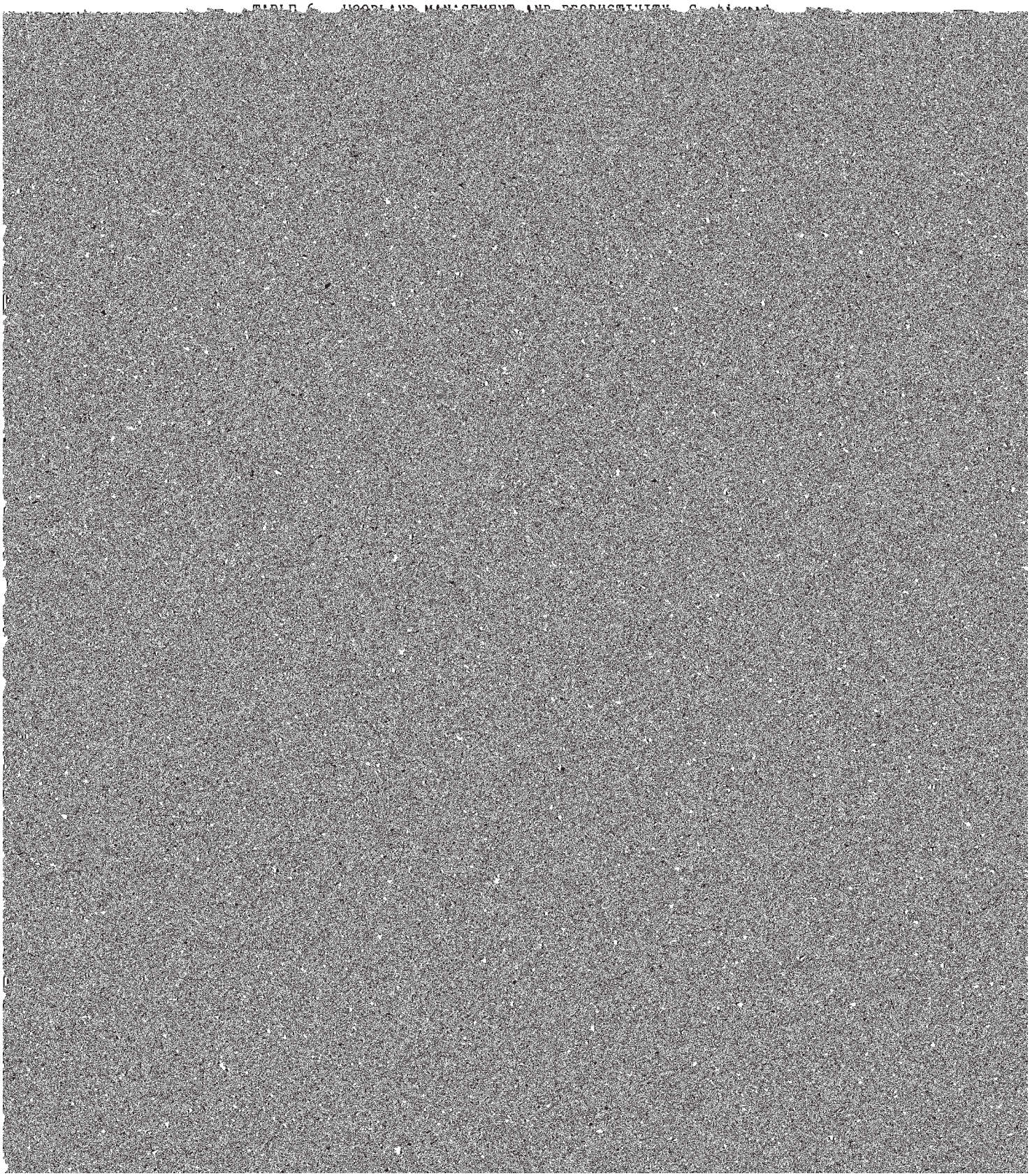


TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Important trees	Site index	
Coffeen: 428	2w	Slight	Moderate	Slight	Slight	Eastern cottonwood Yellow-poplar Pin oak American sycamore Sweetgum	100 90 90 --- ---	Eastern cottonwood, yellow-poplar, pin oak, American sycamore, sweetgum, red maple.
Raddle: 430A	---	---	---	---	---		---	Black walnut, green ash, yellow-poplar, red maple, eastern cottonwood.
Ware: 456, F456	---	---	---	---	---		---	Eastern cottonwood, yellow-poplar, American sycamore, black walnut, sweetgum, green ash, eastern white pine.
Booker: 457, W457	4w	Slight	Severe	Severe	Severe	Eastern cottonwood	85	Eastern cottonwood, pin oak, pecan, green ash, sweetgum, willow oak, baldcypress, silver maple.
Bowdre: 589	2w	Slight	Severe	Moderate	Slight	Cherrybark oak Eastern cottonwood Sweetgum Water oak	90 110 95 95	Eastern cottonwood, sweetgum, American sycamore.

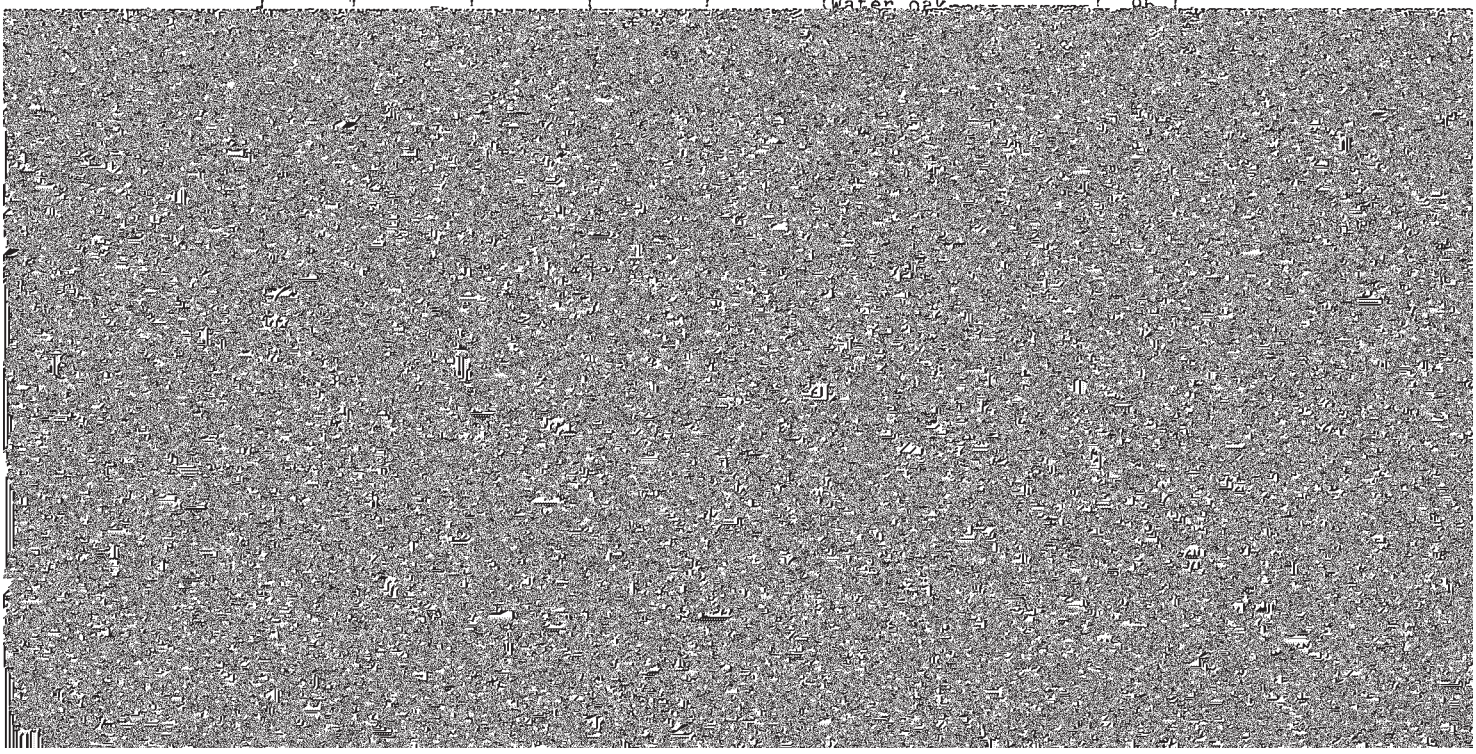


TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Important trees	Site index	
Orthents, loamy:								
802C, 802G	---	---	---	---	---		---	Shortleaf pine, eastern white pine, eastern redcedar, eastern cottonwood, Amur maple.
Hosmer:								
[1]850D:								
Hosmer part	2r	Moderate	Moderate	Slight	Slight	White oak	75	Eastern white pine,
						Yellow-poplar	90	shortleaf pine,
						Virginia pine	75	red pine,
						Sugar maple	75	yellow-poplar, white ash.
Hickory part	1r	Moderate	Moderate	Slight	Slight	White oak	85	Eastern white pine,
						Northern red oak	85	red pine,
						Black oak	---	yellow-poplar,
						Green ash	---	sugar maple,
						Bitternut hickory	---	white oak,
						Yellow-poplar	95	black walnut.
[1]850D3:								
Hosmer part	2r	Moderate	Moderate	Slight	Slight	White oak	75	Eastern white pine,
						Yellow-poplar	90	shortleaf pine,
						Virginia pine	75	red pine,
						Sugar maple	75	yellow-poplar, white ash.
Hickory part	1r	Moderate	Moderate	Slight	Slight	White oak	85	Eastern white pine,
						Northern red oak	85	red pine,
						Black oak	---	yellow-poplar,
						Green ash	---	sugar maple,
						Bitternut hickory	---	white oak,
						Yellow-poplar	95	black walnut.
Hickory:								
[1]850E:								
Hickory part	1r	Moderate	Moderate	Slight	Slight	White oak	85	Eastern white pine,
						Northern red oak	85	red pine,
						Black oak	---	yellow-poplar,
						Green ash	---	sugar maple,
						Bitternut hickory	---	white oak,
						Yellow-poplar	95	black walnut.
Hosmer part	2r	Moderate	Moderate	Slight	Slight	White oak	75	Eastern white pine,
						Yellow-poplar	90	shortleaf pine,
						Virginia pine	75	red pine,
						Sugar maple	75	yellow-poplar, white ash.
[1]850E3:								
Hickory part	1r	Moderate	Moderate	Slight	Slight	White oak	85	Eastern white pine,
						Northern red oak	85	red pine,
						Black oak	---	yellow-poplar,
						Green ash	---	sugar maple,
						Bitternut hickory	---	white oak,
						Yellow-poplar	95	black walnut.
Hosmer part	2r	Moderate	Moderate	Slight	Slight	White oak	75	Eastern white pine,
						Yellow-poplar	90	shortleaf pine,
						Virginia pine	75	red pine,
						Sugar maple	75	yellow-poplar, white ash.

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Important trees	Site index	
Alford:								
[1]852E:								
Alford part-----	1r	Moderate	Moderate	Slight	Slight	White oak----------	90	Eastern white pine, red pine, black walnut, yellow-poplar, white ash, black locust.
						Yellow-poplar-------	98	
						Sweetgum----------	76	
Wellston part---	2r	Moderate	Moderate	Slight	Slight	Northern red oak----	81	Eastern white pine, black walnut, yellow poplar.
						Yellow-poplar-------	97	
						Virginia pine-------	76	
[1]852G:								
Alford part-----	1r	Severe	Severe	Slight	Slight	White oak----------	90	Eastern white pine, red pine, black walnut, yellow-poplar, white ash, black locust.
						Yellow-poplar-------	98	
						Sweetgum----------	76	
Wellston part---	2r	Severe	Severe	Slight	Slight	Northern red oak----	81	Eastern white pine, black walnut, yellow-poplar.
						Yellow-poplar-------	97	
						Virginia pine-------	76	
Ava:								
[1]929C3:								
Ava part--------	2o	Slight	Slight	Slight	Slight	White oak----------	75	Black walnut, eastern cottonwood, sweetgum, yellow-poplar, white oak, American sycamore.
						Northern red oak----	80	
						Yellow-poplar-------	90	
						Black walnut--------	---	
Hickory part----	1o	Slight	Slight	Slight	Slight	White oak----------	85	Eastern white pine, red pine, yellow-poplar, sugar maple, white oak, black walnut.
						Northern red oak----	85	
						Black oak----------	---	
						Green ash----------	---	
						Bitternut hickory---	---	
						Yellow-poplar-------	95	
Hickory:								
[1]929D2:								
Hickory part----	1r	Moderate	Moderate	Slight	Slight	White oak----------	85	Eastern white pine, red pine, yellow-poplar, sugar maple, white oak, black walnut.
						Northern red oak----	85	
						Black oak----------	---	
						Green ash----------	---	
						Bitternut hickory---	---	
						Yellow-poplar-------	95	
Ava part--------	2o	Slight	Slight	Slight	Slight	White oak----------	75	Black walnut, eastern cottonwood, sweetgum, yellow-poplar, white oak, American sycamore.
						Northern red oak----	80	
						Yellow-poplar-------	90	
						Black walnut--------	---	
Goss:								
[1]930G:								
Goss part--------	4f	Moderate	Severe	Severe	Slight	White oak----------	60	Sweetgum, yellow-poplar, green ash.
						Shortleaf pine------	---	
						Post oak-----------	---	
						Blackjack oak-------	---	
						Black oak----------	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Important trees	Site index	
Goss:								
Alford part-----	1r	Severe	Severe	Slight	Slight	White oak----------	90	Eastern white pine, red pine, black walnut, yellow-poplar, white ash, black locust.
						Yellow-poplar-------	98	
						Sweetgum-----------	76	
Neotoma:								
[2]976G----------	1r	Severe	Severe	Slight	Slight	Northern red oak----	85	Eastern white pine, yellow-poplar.
						Yellow-poplar-------	105	
[1]977E:								
Neotoma part----	1r	Moderate	Moderate	Slight	Slight	Northern red oak----	85	Eastern white pine, yellow-poplar.
						Yellow-poplar-------	105	
Wellston part---	2r	Moderate	Moderate	Slight	Slight	Northern red oak----	81	Eastern white pine, black walnut, yellow-poplar.
						Yellow-poplar-------	97	
						Virginia pine-------	76	
[1]977G:								
Neotoma part----	1r	Severe	Severe	Slight	Slight	Northern red oak----	85	Eastern white pine, yellow-poplar.
						Yellow-poplar-------	105	
Wellston part---	2r	Severe	Severe	Slight	Slight	Northern red oak----	81	Eastern white pine, black walnut, yellow-poplar.
						Yellow-poplar-------	97	
						Virginia pine-------	76	
Alford:								
[1]999D:								
Alford part-----	1o	Slight	Slight	Slight	Slight	White oak----------	90	Eastern white pine, red pine, black walnut, yellow-poplar, white ash, black locust.
						Yellow-poplar-------	98	
						Sweetgum-----------	76	
Hickory part----	1r	Moderate	Moderate	Slight	Slight	White oak----------	85	Eastern white pine, red pine, yellow-poplar, sugar maple, white oak, black walnut.
						Northern red oak----	85	
						Black oak----------	---	
						Green ash----------	---	
						Bitternut hickory---	---	
						Yellow-poplar-------	95	
[1]999D3:								
Alford part-----	1o	Slight	Slight	Slight	Slight	White oak----------	90	Eastern white pine, red pine, black walnut, yellow-poplar, white ash, black locust.
						Yellow-poplar-------	98	
						Sweetgum-----------	76	
Hickory part----	1r	Moderate	Moderate	Slight	Slight	White oak----------	85	Eastern white pine, red pine, yellow-poplar, sugar maple, white oak, black walnut.
						Northern red oak----	85	
						Black oak----------	---	
						Green ash----------	---	
						Bitternut hickory---	---	
						Yellow-poplar-------	95	
Hickory:								
[1]999E:								
Hickory part----	1r	Moderate	Moderate	Slight	Slight	White oak----------	85	Eastern white pine, red pine,
						Northern red oak----	85	

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Soil name and map symbol	Ordination symbol	Management concerns				Potential productivity		Trees to plant
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Important trees	Site index	
Hickory:								
Alford part-----	1r	Moderate	Moderate	Slight	Slight	White oak---------- Yellow-poplar------- Sweetgum----------	90 98 76	Eastern white pine, red pine, black walnut, yellow-poplar, white ash, black locust.
[1]999E3:								
Hickory part-----	1r	Moderate	Moderate	Slight	Slight	White oak---------- Northern red oak---- Black oak---------- Green ash---------- Bitternut hickory--- Yellow-poplar-------	85 85 --- --- --- 95	Eastern white pine, red pine, yellow-poplar, sugar maple, white oak, black walnut.
Alford part------	1r	Moderate	Moderate	Slight	Slight	White oak---------- Yellow-poplar------- Sweetgum----------	90 98 76	Eastern white pine, red pine, black walnut, yellow-poplar, white ash, black locust.

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior characteristics of the mapping unit.

[2]Rock outcrop part not assigned an ordination symbol.

TABLE 7.--RECREATIONAL DEVELOPMENT

["Percs slowly" and other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Hoyleton:				
3A, 3B2	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness, percs slowly.	Moderate: wetness.
Hickory:				
8E, 8E3	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
8G	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wynoose:				
12	Severe: percs slowly, wetness.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.
Bluford:				
13A, 13B	Moderate: percs slowly, wetness.	Moderate: wetness.	Moderate: percs slowly.	Moderate: wetness.
Ava:				
14B	Moderate: percs slowly.	Slight	Moderate: slope, percs slowly.	Slight.
14C3	Moderate: percs slowly, slope.	Moderate: slope.	Severe: slope.	Slight.
Darwin:				
71, 71+, F71, W71	Severe: wetness, floods, percs slowly.	Severe: wetness, too clayey.	Severe: wetness, too clayey.	Severe: wetness.
Okaw:				
84	Severe: wetness, percs slowly, floods.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.
Jacob:				
85, W85	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: wetness.
Bonnie:				
108	Severe: wetness, floods.	Severe: wetness.	Severe: wetness, floods.	Severe: wetness.
Racoon:				
109	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Colp:				
122A	Moderate: percs slowly.	Slight	Moderate: percs slowly.	Slight.
122B2	Moderate: percs slowly.	Slight	Moderate: slope, percs slowly.	Slight.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Colp:				
122C2	Moderate: slope, percs slowly.	Moderate: slope.	Severe: slope.	Slight.
122C3	Moderate: slope, percs slowly.	Moderate: too clayey, slope.	Severe: slope.	Moderate: too clayey.
122D	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Alvin:				
131B	Slight	Slight	Moderate: slope.	Slight.
131C3	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
131E	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Starks:				
132	Moderate: wetness, percs slowly.	Moderate: wetness.	Moderate: wetness.	Slight.
Camden:				
134A, 134B2	Moderate: slope.	Slight	Moderate: slope.	Slight.
134C2, 134C3	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
134D	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Gorham:				
162	Severe: floods, wetness.	Severe: wetness, floods.	Severe: wetness, too clayey.	Severe: wetness.
Stoy:				
164A, 164B, 164C2	Moderate: wetness.	Moderate: wetness.	Moderate: wetness, slope.	Moderate: wetness.
Weir:				
165	Severe: wetness, floods, percs slowly.	Severe: wetness.	Severe: wetness, floods, percs slowly.	Severe: wetness.
Dupo:				
180	Severe: floods, wetness.	Moderate: wetness, floods.	Moderate: floods, wetness.	Moderate: wetness.
Sexton:				
208	Severe: wetness.	Severe: wetness.	Severe: wetness, percs slowly.	Severe: wetness.
Hosmer:				
214B	Moderate: percs slowly.	Moderate: wetness.	Moderate: percs slowly, slope.	Slight.
214C2, 214C3	Moderate: percs slowly, slope.	Moderate: wetness, slope.	Severe: slope.	Slight.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Hosmer: 214D2, 214D3	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
St. Charles: 243B	Slight	Slight	Moderate: slope.	Slight.
Alford: 308B2	Slight	Slight	Moderate: slope.	Slight.
308C2, 308C3	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
308D2, 308D3, 308E3,	Severe:	Severe:	Severe:	Moderate:

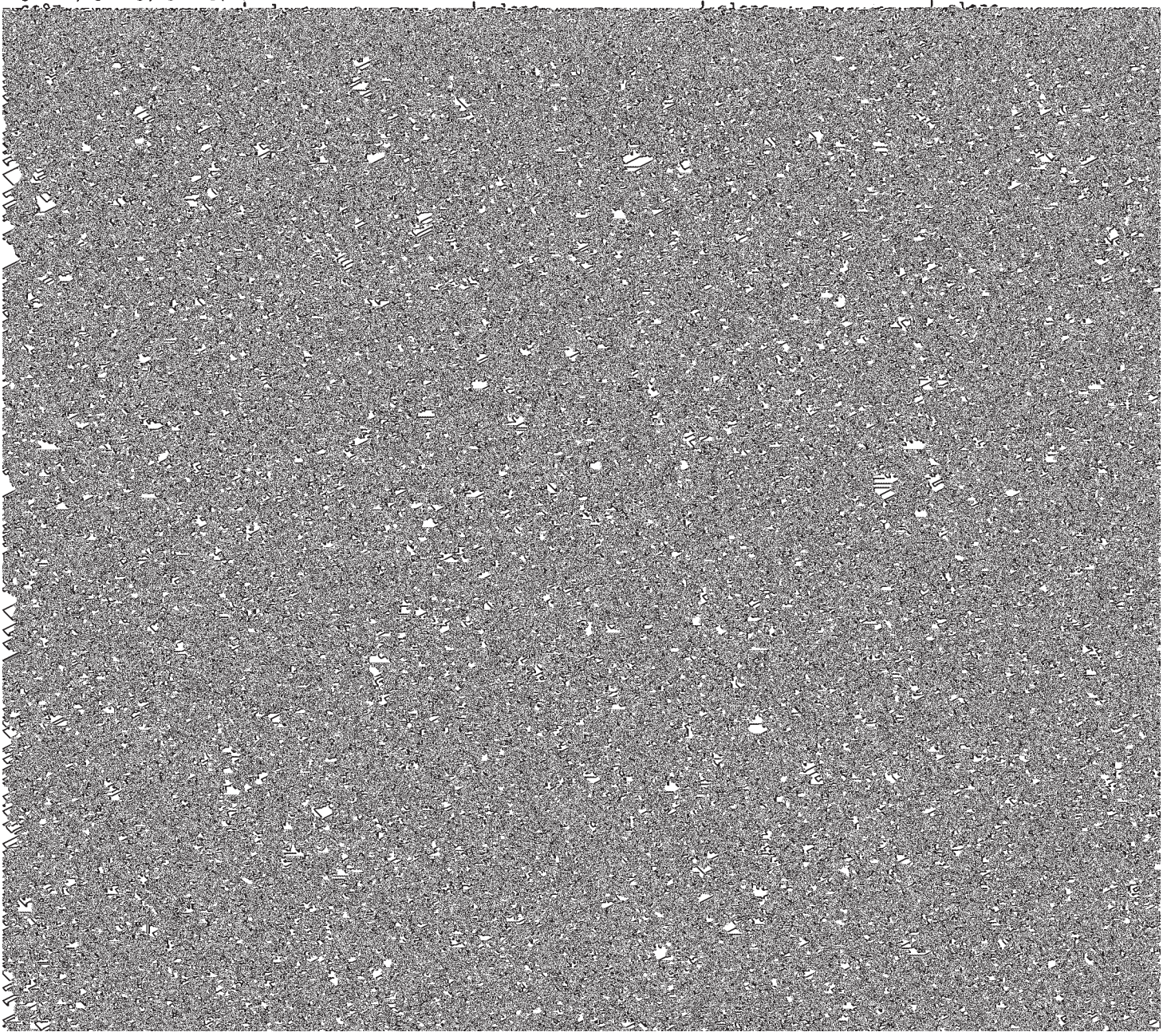


TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Booker: 457	Severe: wetness, percs slowly, too clayey.	Severe: wetness, too clayey.	Severe: wetness, too clayey, percs slowly.	Severe: wetness, too clayey.
W157	Severe:	Severe:	Severe:	Severe:

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Hickory:				
Hosmer part	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
[1]850E3:				
Hickory part	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Hosmer part	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Alford:				
[1]852E:				
Alford part	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Wellston part	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
[1]852G:				
Alford part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wellston part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Ava:				
[1]929C3:				
Ava part	Moderate: percs slowly, slope.	Moderate: slope.	Severe: slope.	Slight.
Hickory part	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight.
Hickory:				
[1]929D2:				
Hickory part	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Ava part	Moderate: percs slowly.	Moderate: slope.	Severe: slope.	Slight.
Goss:				
[1]930G:				
Goss part	Severe: slope.	Severe: slope.	Severe: small stones.	Severe: slope.

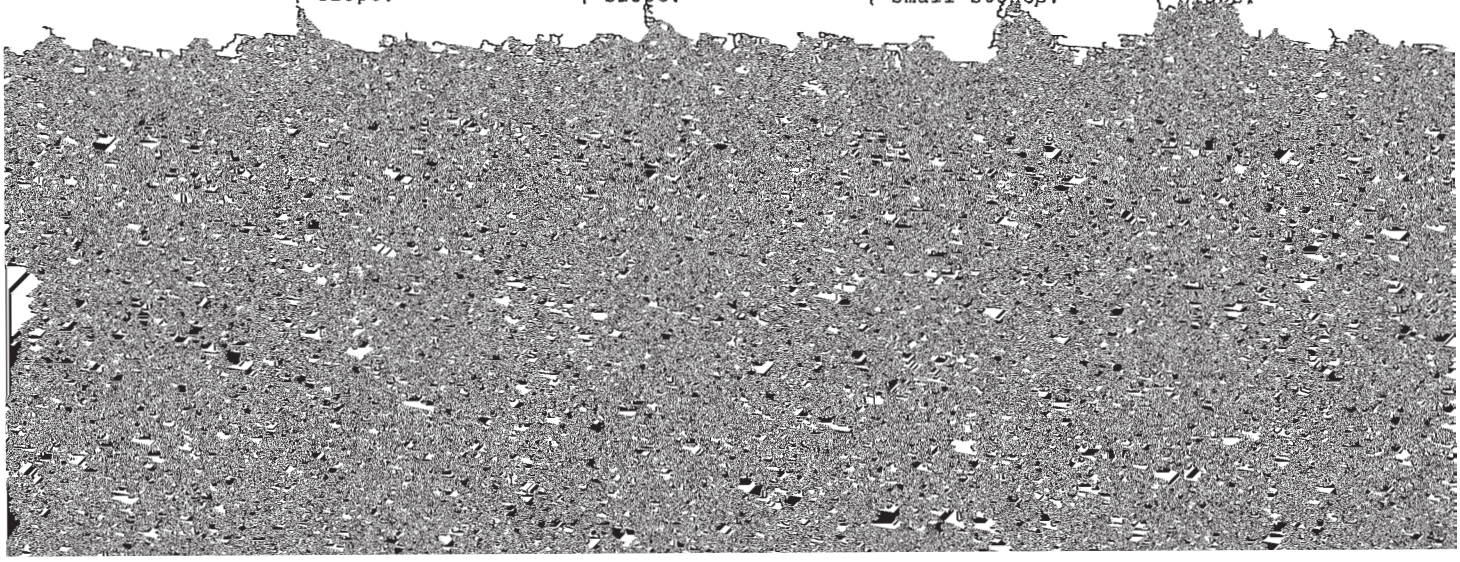


TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails
Neotoma:				
Wellston part------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Alford:				
[1]999D:				
Alford part--------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Hickory part-------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
[1]999D3:				
Alford part--------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Hickory part-------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Hickory:				
[1]999E:				
Hickory part-------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Alford part--------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
[1]999E3:				
Hickory part-------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Alford part--------	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.
Mine dump:				
M.D.				
Quarry:				
Qu.				

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior characteristics of the mapping unit.

[2]Rock outcrop part not rated.

TABLE 8.--WILDLIFE HABITAT POTENTIALS

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

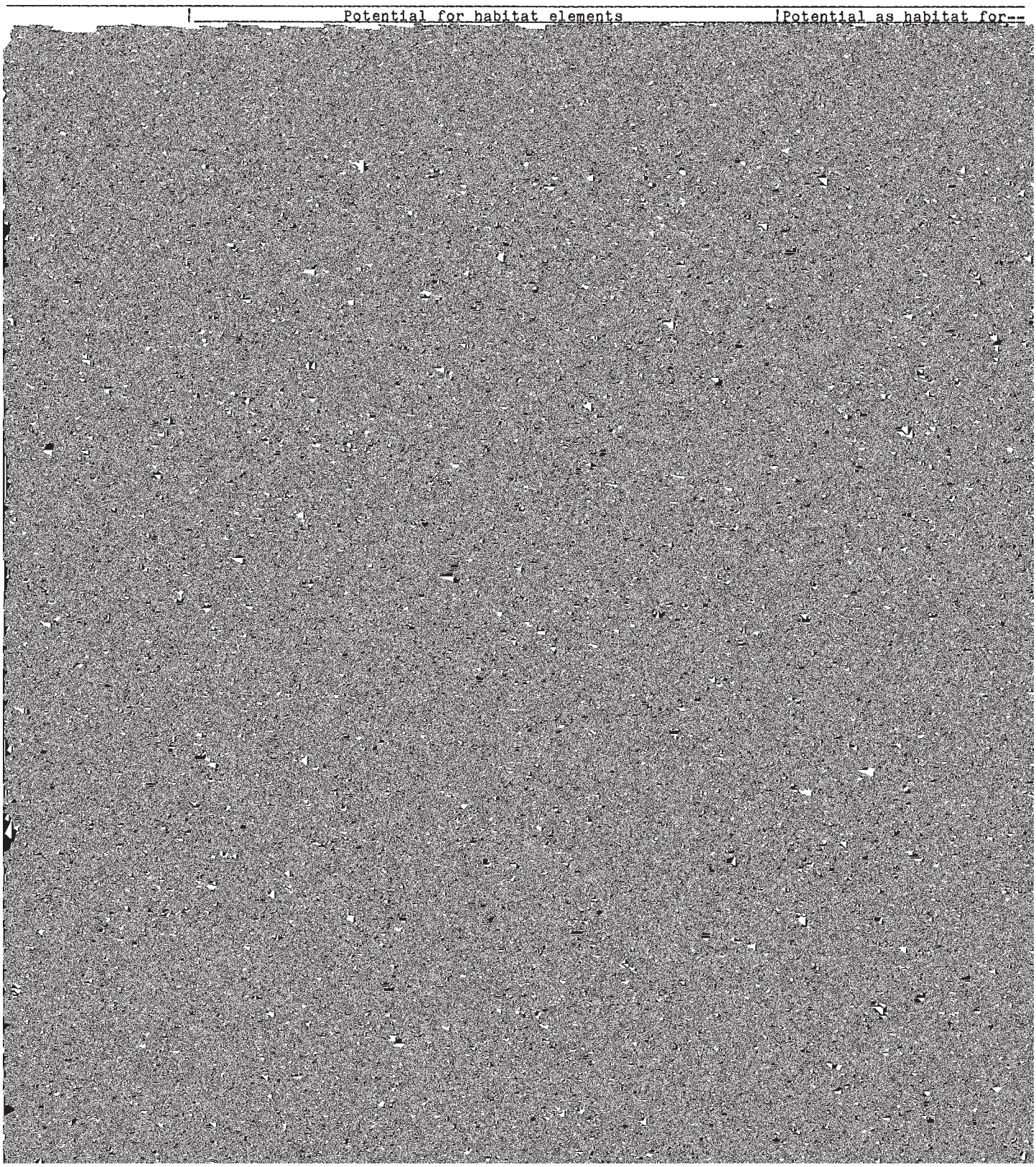


TABLE 8.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Camden:										
134A	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
134B2	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
134C2, 134C3	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
134D	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Gorham:										
162	Poor	Fair	Good	Fair	Fair	Good	Fair	Fair	Fair	Good.
Stoy:										
164A	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
164B, 164C2	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Weir:										
165	Fair	Fair	Fair	Fair	Poor	Poor	Poor	Fair	Fair	Poor.
Dupo:										
180	Fair	Good	Good	Good	Good	Fair	Good	Good	Good	Fair.
Sexton:										
208	Fair	Fair	Fair	Fair	Fair	Poor	Poor	Fair	Fair	Poor.
Hosmer:										
214B	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
214C2, 214C3	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
214D2, 214D3	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
St. Charles:										
243B	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Alford:										
308B2	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
308C2, 308C3	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
308D2, 308D3, 308E 308E3	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
308G	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Haymond:										
331	Poor	Fair	Fair	Good	Good	Poor	Poor	Fair	Good	Poor.
Wakeland:										
333	Poor	Fair	Fair	Good	Good	Fair	Fair	Fair	Good	Fair.
Birds:										
334	Fair	Fair	Fair	Fair	Fair	Good	Good	Fair	Fair	Good.
Hurst:										
338A	Fair	Good	Good	Good	Fair	Fair	Fair	Good	Good	Fair.
338B2	Fair	Good	Good	Good	Fair	Fair	Poor	Good	Good	Poor.

TABLE 8.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Belknap: 382	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Piopolis: 420, W420	Poor	Fair	Fair	Fair	Poor	Good	Good	Fair	Fair	Good.
Karnak: 426	Very poor.	Poor	Poor	Fair	Very poor.	Poor	Good	Poor	Fair	Fair.
Burnside: 427	Fair	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Coffeen: 428	Good	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Raddle: 430A	Good	Good	Good	Good	Good	Poor	Very poor.	Good	Good	Very poor.
Ware: 456	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
F456	Fair	Good	Good	Good	Good	Fair	Poor	Good	Good	Fair.
Booker: 457, W457	Poor	Poor	Fair	Poor	Poor	Poor	Good	Poor	Poor	Fair.
Urban land: 533.										
Bowdre: 589	Fair	Good	Good	Good	Good	Fair	Fair	Fair	Good	Fair.
Cairo: 590	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair	Fair.
Medway: 682, F682	Good	Good	Good	Good	Good	Poor	Poor	Good	Good	Poor.
Banlic: 787	Fair	Good	Good	Good	Good	Fair	Fair	Good	Good	Fair.
Orthents, silty: 801	Fair	Good	Good	Fair	Fair	Poor	Poor	Good	Fair	Poor.
Orthents, loamy: 802C	Poor	Fair	Fair	Fair	Good	Very poor.	Very poor.	Fair	Fair	Very poor.
802G	Very poor.	Poor	Fair	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Orthents, clayey: 805	Fair	Fair	Fair	Fair	Poor	Poor	Poor	Fair	Poor	Poor.
Hosmer: [1]850D: Hosmer part	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Hickory part	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]850D3: Hosmer part	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnotes at end of table.

TABLE 8.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Hosmer:										
Hickory part----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Hickory:										
[1]850E:										
Hickory part----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Hosmer part-----	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]850E3:										
Hickory part----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Hosmer part-----	Very poor.	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Alford:										
[1]852E:										
Alford part-----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Wellston part---	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]852G:										
Alford part-----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Wellston part---	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Ava:										
[1]929C3:										
Ava part--------	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Hickory part----	Fair	Good	Good	Good	Good	Very poor.	Very poor.	Good	Good	Very poor.
Hickory:										
[1]929D2:										
Hickory part----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Ava part--------	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Goss:										
[1]930G:										
Goss part-------	Very poor.	Poor	Fair	Fair	Fair	Very poor.	Very poor.	Poor	Fair	Very poor.
Alford part-----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Neotoma:										
[2]976G----------	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
[1]977E:										
Neotoma part----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Wellston part---	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.

See footnotes at end of table.

TABLE 8.--WILDLIFE HABITAT POTENTIALS--Continued

Soil name and map symbol	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
Neotoma:										
[1]977G:										
Neotoma part----	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Wellston part---	Very poor.	Poor	Good	Good	Good	Very poor.	Very poor.	Poor	Good	Very poor.
Alford:										
[1]999D:										
Alford part-----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Hickory part----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]999D3:										
Alford part-----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Hickory part----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Hickory:										
[1]999E:										
Hickory part----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Alford part-----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
[1]999E3:										
Hickory part----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Alford part-----	Poor	Fair	Good	Good	Good	Very poor.	Very poor.	Fair	Good	Very poor.
Mine dump:										
M.D.										
Quarry:										
Qu.										

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior characteristics of the mapping unit.
[2]Rock outcrop part not rated.

TABLE 9.--BUILDING SITE DEVELOPMENT

["Shrink-swell" and some of the other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry means soil was not rated]

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Hoyleton: 3A, 3B2	Severe: wetness.	Severe: shrink-swell.	Severe: wetness.	Severe: shrink-swell.	Severe: frost action, shrink-swell, low strength.
Hickory: 8E, 8E3, 8G	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
Wynoose: 12	Severe: wetness, too clayey.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell, frost action.
Bluford: 13A, 13B	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: wetness.	Moderate: shrink-swell, wetness.	Severe: frost action, shrink-swell.
Ava: 14B	Moderate: wetness.	Moderate: shrink-swell.	Moderate: shrink-swell, wetness.	Moderate: shrink-swell, slope.	Severe: frost action, low strength.

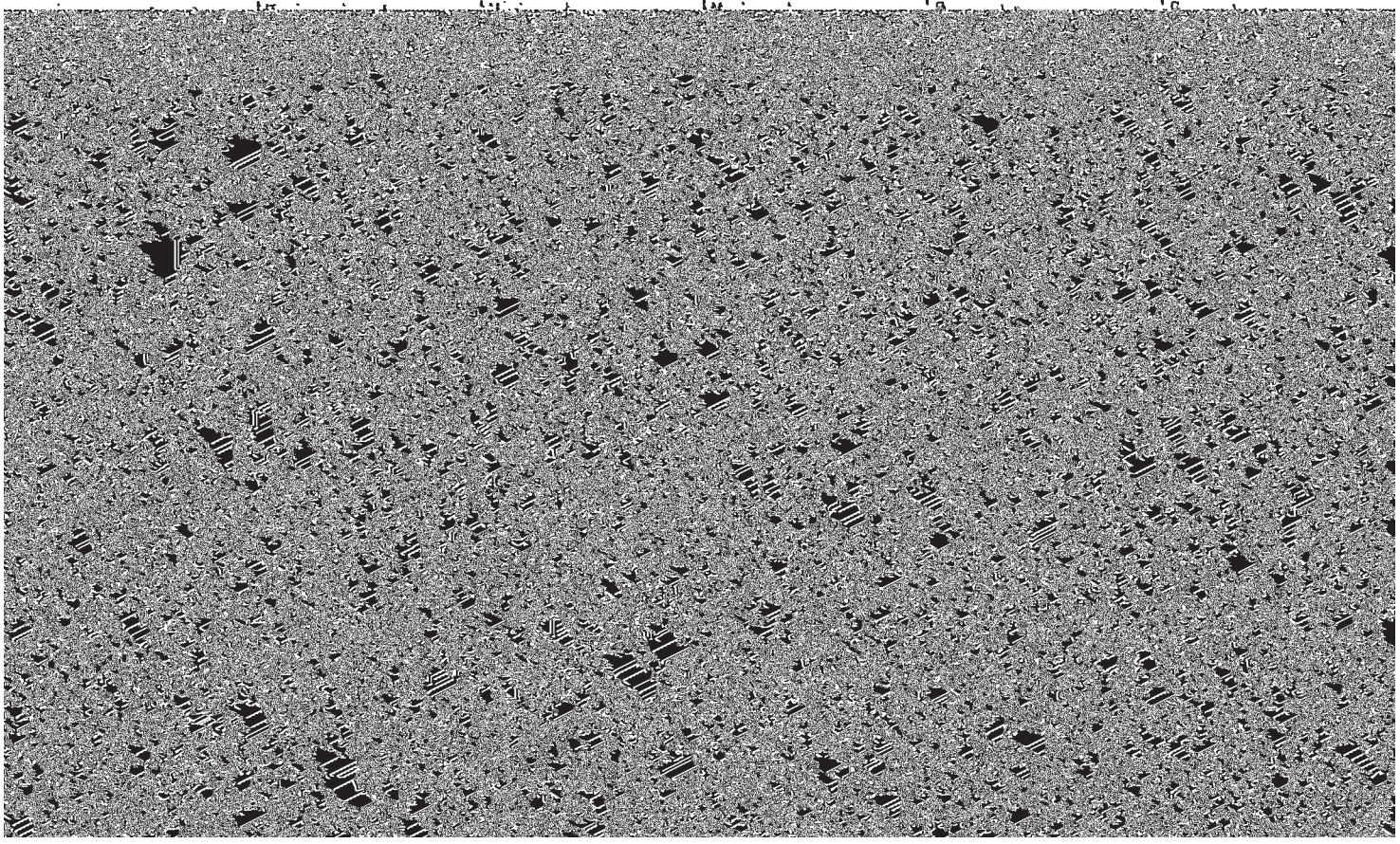


TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Colp:					
122C2, 122C3	Severe: too clayey.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength, slope.	Severe: shrink-swell, frost action, low strength.
122D	Severe: too clayey, slope.	Severe: shrink-swell, low strength.	Severe: shrink-swell, low strength, slope.	Severe: shrink-swell, low strength, slope.	Severe: shrink-swell, frost action, low strength.
Alvin:					
131B	Slight	Slight	Slight	Moderate: slope.	Moderate: frost action.
131C3	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: frost action, slope.
131E	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Starks:					
132	Severe: wetness.	Moderate: shrink-swell.	Severe: wetness.	Moderate: shrink-swell.	Severe: frost action, low strength.
Camden:					
134A	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell.	Severe: frost action, low strength.
134B2	Slight	Moderate: shrink-swell.	Slight	Moderate: shrink-swell, slope.	Severe: frost action, low strength.
134C2, 134C3	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope.	Severe: slope.	Severe: frost action, low strength.
134D	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, low strength, slope.
Gorham:					
162	Severe: wetness, floods.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: wetness, frost action, low strength.
Stoy:					
164A, 164B, 164C2	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Moderate: wetness, shrink-swell.	Severe: frost action, low strength.
Weir:					
165	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, frost action, shrink-swell.
Dupo:					
180	Severe: wetness, floods.	Severe: floods, shrink-swell.	Severe: floods, wetness, shrink-swell.	Severe: floods, shrink-swell.	Severe: floods, frost action, shrink-swell.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Sexton: 208	Severe: wetness.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, shrink-swell, frost action.
Hosmer: 214B	Moderate: wetness.	Slight	Moderate: wetness.	Moderate: slope.	Severe: frost action.
214C2, 214C3	Moderate: wetness, slope.	Moderate: slope.	Moderate: wetness, slope.	Severe: slope.	Severe: frost action.
214D2, 214D3	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, slope.
St. Charles: 243B	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: slope, shrink-swell.	Severe: frost action.
Alford: 308B2	Slight	Moderate:	Moderate:	Moderate:	Severe:

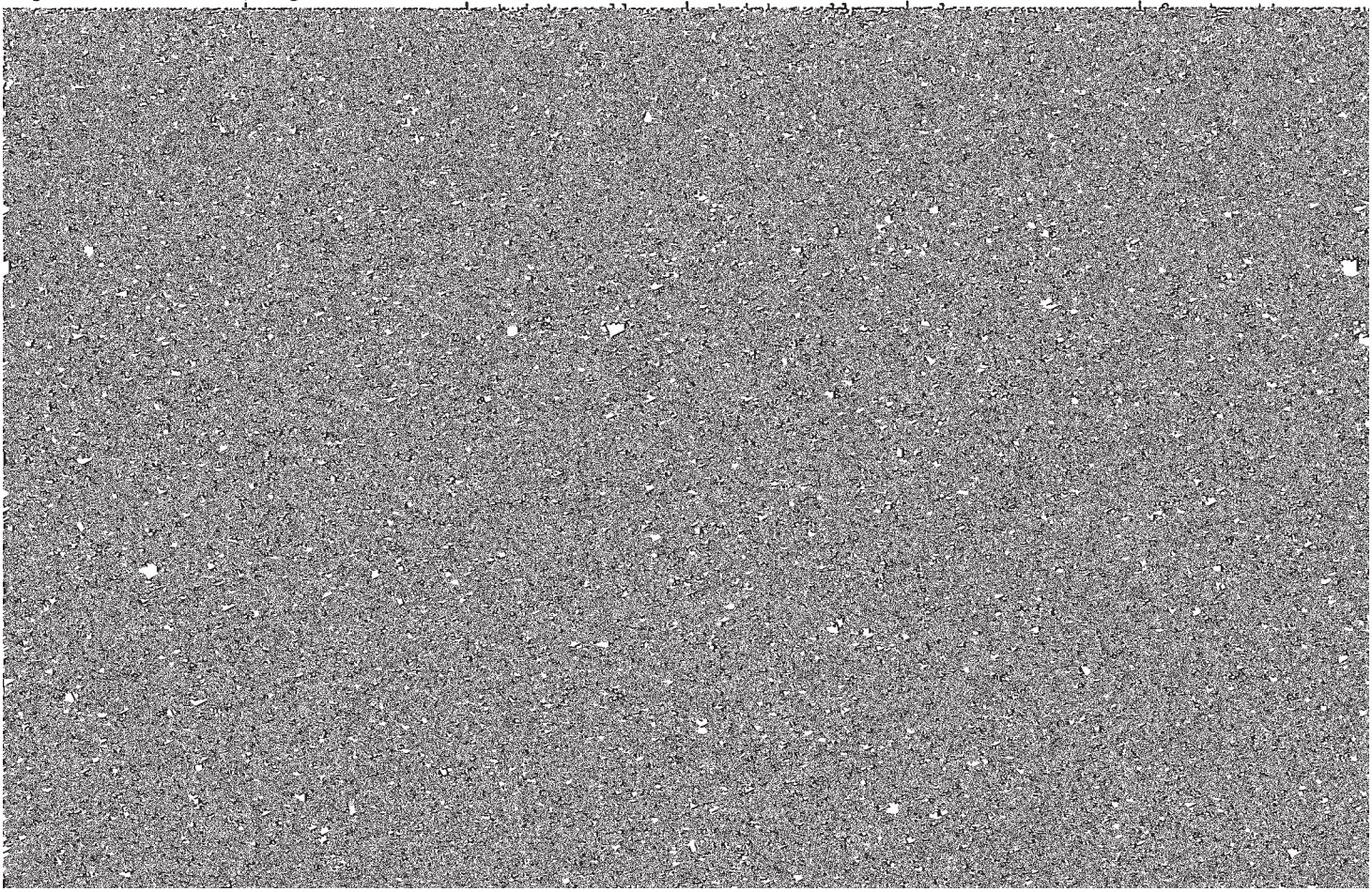


TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Karnak: 426	Severe: floods, too clayey, wetness.	Severe: low strength, wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.	Severe: low strength, wetness, shrink-swell.
Burnside: 427	Severe: floods, large stones.	Severe: floods.	Severe: floods, depth to rock.	Severe: floods.	Severe: floods.
Coffeen: 428	Severe: floods, wetness.	Severe: floods.	Severe: floods, wetness.	Severe: floods.	Severe: floods, frost action.
Raddle: 430A	Moderate: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: frost action.
Ware: 456	Severe: cutbanks cave.	Severe: floods.	Severe: floods.	Severe: floods.	Moderate: floods.
F456	Severe: floods, cutbanks cave.	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.
Booker: 457	Severe: wetness, too clayey.	Severe: wetness, shrink-swell, low strength.	Severe: wetness, shrink-swell, low strength.	Severe: wetness, shrink-swell, low strength.	Severe: wetness, shrink-swell, low strength.
W457	Severe: wetness, floods, too clayey.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, shrink-swell.
Urban land: 533.					
Bowdre: 589	Severe: wetness, too clayey.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.
Cairo: 590	Severe: wetness, floods, too clayey.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, shrink-swell.	Severe: wetness, floods, shrink-swell.
Medway: 682, F682	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, frost action.
Banlic: 787	Severe: wetness.	Severe: floods.	Severe: floods, wetness.	Severe: floods.	Severe: frost action.
Orthents, silty: 801	Moderate: wetness.	Moderate: wetness.	Severe: wetness.	Severe: slope.	Severe: frost action.
Orthents, loamy: 802C	Moderate: large stones	Moderate: large stones	Moderate: large stones	Severe:	Moderate:

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Orthents, clayey: 805	Severe: floods, too clayey.	Severe: floods, shrink-swell.	Severe: floods, shrink-swell.	Severe: floods, shrink-swell.	Severe: floods, shrink-swell.
Hosmer: [1]850D: Hosmer part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, slope.
Hickory part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
[1]850D3: Hosmer part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, slope.
Hickory part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
Hickory: [1]850E: Hickory part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
Hosmer part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, slope.
[1]850E3: Hickory part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
Hosmer part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, slope.
Alford: [1]852E: Alford part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, slope.
Wellston part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.
[1]852G: Alford part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, slope.
Wellston part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.
Ava: [1]929C3: Ava part	Moderate: wetness, slope.	Moderate: slope.	Moderate: shrink-swell, wetness, slope.	Severe: slope.	Severe: frost action, low strength.

See footnotes at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Ava:					
Hickory part---	Moderate: too clayey, slope.	Moderate: shrink-swell, low strength, slope.	Moderate: shrink-swell, low strength, slope.	Severe: slope.	Severe: low strength.
Hickory:					
[1]929D2:					
Hickory part---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
Ava part-------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, low strength.
Goss:					
[1]930G:					
Goss part------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Alford part----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, slope.
Neotoma:					
[2]976G----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
[1]977E:					
Neotoma part---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wellston part--	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.
[1]977G:					
Neotoma part---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Wellston part--	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope, frost action.
Alford:					
[1]999D:					
Alford part----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, slope.
Hickory part---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
[1]999D3:					
Alford part----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, slope.
Hickory part---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
Hickory:					
[1]999E:					
Hickory part---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.

See footnotes at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets
Hickory:					
Alford part----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, slope.
[1]999E3:					
Hickory part---	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.
Alford part----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: frost action, slope.
Mine dump: M.D.					
Quarry: Qu.					

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the

TABLE 10.--SANITARY FACILITIES

["Percs slowly" and other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated]

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Hoyleton:					
3A	Severe: percs slowly, wetness.	Slight	Severe: wetness.	Severe: wetness.	Fair: too clayey.
3B2	Severe: percs slowly, wetness.	Moderate: slope.	Severe: wetness.	Severe: wetness.	Fair: too clayey.
Hickory:					
8E, 8E3	Severe: slope.	Severe: slope.	Moderate: too clayey.	Severe: slope.	Poor: slope.
8G	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Wynoose:					
12	Severe: percs slowly, wetness.	Slight	Severe: wetness.	Severe: wetness.	Poor: wetness.
Bluford:					
13A	Severe: percs slowly, wetness.	Slight	Moderate: wetness.	Moderate: wetness.	Fair: too clayey.
13B	Severe:	Moderate:	Moderate:	Moderate:	Fair:

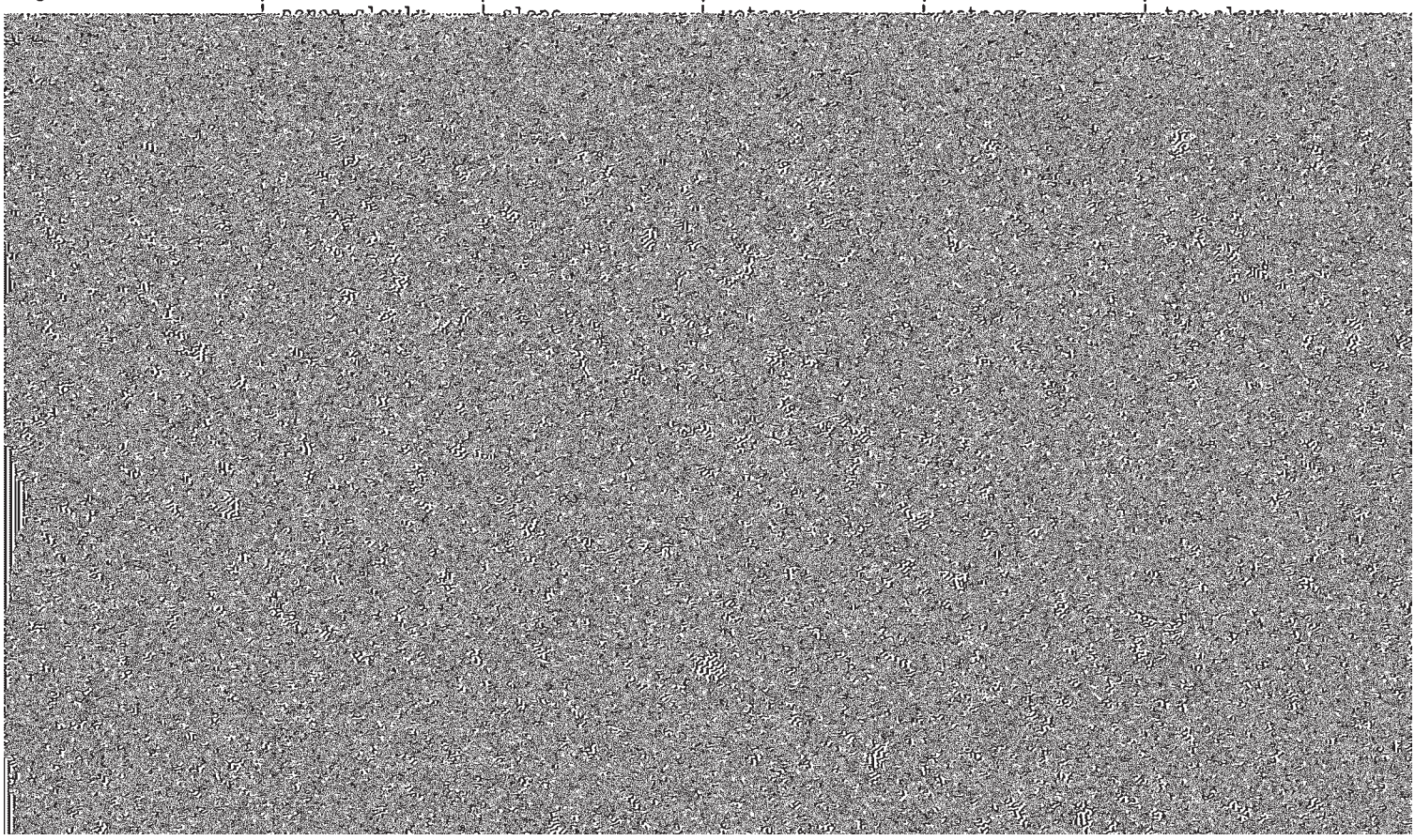


TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Colp:					
122A	Severe: percs slowly.	Slight	Severe: too clayey.	Slight	Poor: too clayey.
122B2	Severe: percs slowly.	Moderate: slope.	Severe: too clayey.	Slight	Poor: too clayey.
122C2, 122C3	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey.
122D	Severe: percs slowly,	Severe: slope.	Severe: too clayey.	Severe: slope.	Poor: too clayey.

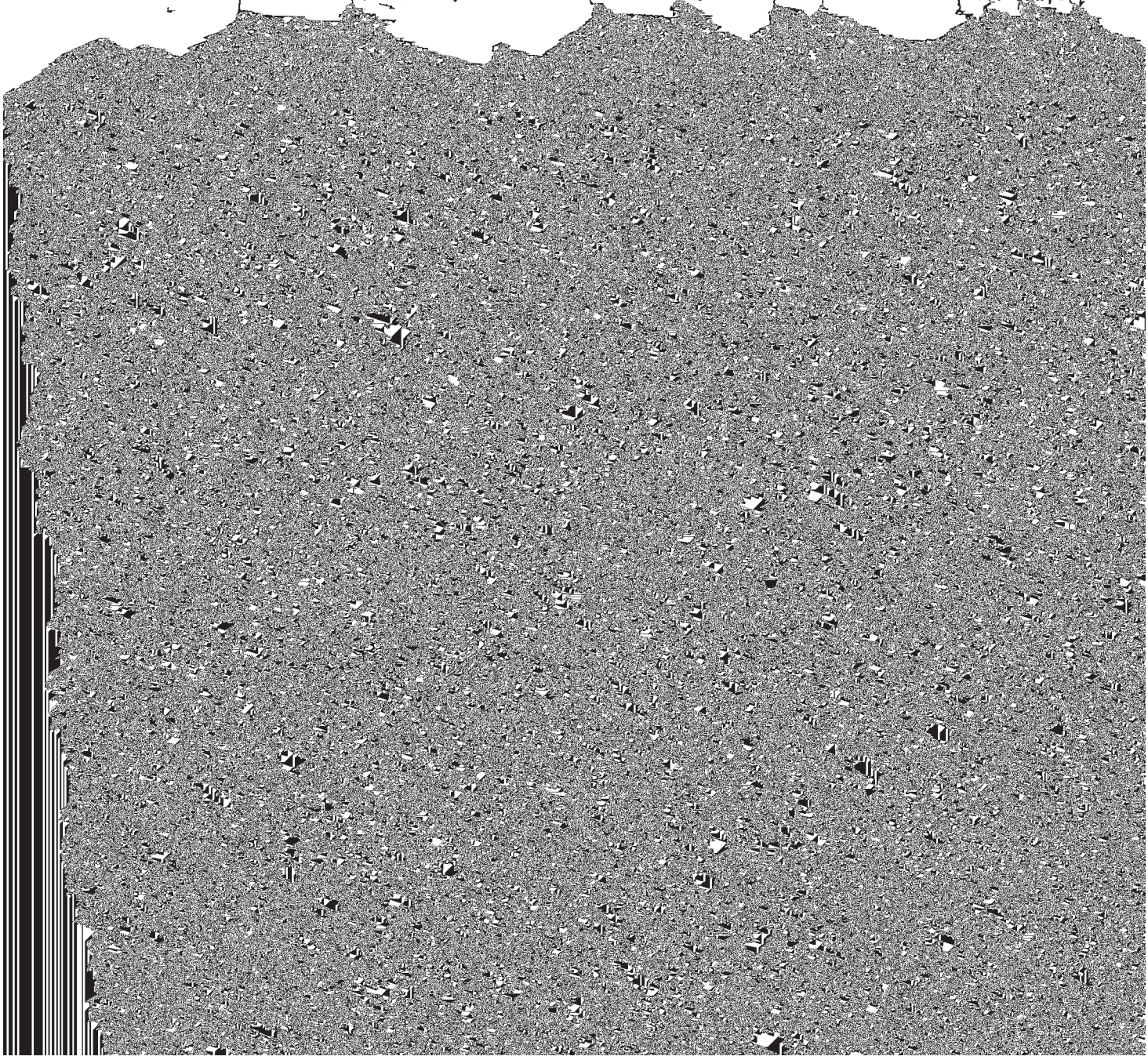


TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Hosmer:					
214B	Severe: percs slowly.	Moderate: slope.	Slight	Slight	Good.
214C2, 214C3	Severe: percs slowly.	Severe: slope.	Slight	Moderate: slope.	Fair: slope.
214D2, 214D3	Severe: percs slowly, slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.
St. Charles:					
243B	Slight	Moderate: seepage, slope.	Slight	Slight	Fair: too clayey.
Alford:					
308B2	Slight	Moderate: seepage, slope.	Slight	Slight	Good.
308C2, 308C3	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.	Fair: slope.
308D2, 308D3, 308E, 308E3	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.
308G	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Haymond:					
331	Severe: floods.	Severe: floods.	Severe: floods.	Severe: floods.	Good.
Wakeland:					
333	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness.	Good.
Birds:					
334	Severe: wetness, floods.	Severe: wetness, floods.	Severe: floods.	Severe: floods, wetness.	Poor: wetness.
Hurst:					
338A	Severe: percs slowly, wetness.	Slight	Severe: too clayey, wetness.	Severe: wetness.	Poor: too clayey.
338B2	Severe: percs slowly, wetness.	Moderate: slope.	Severe: too clayey, wetness.	Severe: wetness.	Poor: too clayey.
Belknap:					
382	Severe: floods.	Severe: wetness, floods.	Severe: floods.	Severe: wetness, floods.	Good.
Piopolis:					
420, W420	Severe: percs slowly, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Severe: wetness, floods.	Poor: wetness.
Karnak:					
426	Severe: percs slowly, floods, wetness.	Severe: floods, wetness.	Severe: too clayey, wetness, floods.	Severe: floods, wetness.	Poor: wetness, too clayey.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Burnside: 427	Severe: floods, depth to rock.	Severe: floods, depth to rock.	Severe: floods, depth to rock.	Severe: floods.	Poor: large stones.
Coffeen: 428	Severe: floods, wetness.	Severe: floods, wetness, seepage.	Severe: floods.	Severe: floods, wetness.	Good.
Raddle: 430A	Moderate: floods.	Moderate: seepage.	Moderate: floods.	Moderate: floods.	Good.
Ware: 456	Moderate: wetness.	Severe: seepage.	Severe: seepage.	Moderate: floods.	Fair: thin layer, too sandy.
F456	Severe: floods.	Severe: floods, seepage.	Severe: floods, seepage.	Severe: floods.	Fair: thin layer, too sandy.
Booker: 457	Severe: percs slowly, wetness.	Slight	Severe: wetness, too clayey.	Severe: wetness.	Poor: wetness, too clayey.
W457	Severe: percs slowly, floods, wetness.	Severe: floods, wetness.	Severe: floods, wetness, too clayey.	Severe: floods, wetness.	Poor: wetness, too clayey.
Urban land: 533.					
Bowdre: 589	Severe: wetness, percs slowly.	Severe: wetness, seepage.	Severe: too clayey, wetness.	Severe: wetness.	Poor: too clayey.
Cairo: 590	Severe: percs slowly, wetness, floods.	Severe: seepage, wetness, floods.	Severe: wetness, floods, seepage.	Severe: wetness, floods.	Poor: too clayey, wetness.
Medway: 682, F682	Severe:	Severe:	Severe:	Severe:	Good.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Orthents, clayey:					
805	Severe: floods, wetness, percs slowly.	Severe: slope.	Severe: floods, too clayey.	Severe: floods.	Poor: too clayey.
Hosmer:					
[1]850D:					
Hosmer part	Severe: percs slowly, slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.
Hickory part	Severe: slope.	Severe: slope.	Moderate: too clayey.	Severe: slope.	Poor: slope.
[1]850D3:					
Hosmer part	Severe: percs slowly, slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.
Hickory part	Severe: slope.	Severe: slope.	Moderate: too clayey.	Severe: slope.	Poor: slope.
Hickory:					
[1]850E:					
Hickory part	Severe: slope.	Severe: slope.	Moderate: too clayey.	Severe: slope.	Poor: slope.
Hosmer part	Severe: percs slowly, slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.
[1]850E3:					
Hickory part	Severe: slope.	Severe: slope.	Moderate: too clayey.	Severe: slope.	Poor: slope.
Hosmer part	Severe: percs slowly, slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.
Alford:					
[1]852E:					
Alford part	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.
Wellston part	Severe: slope.	Severe: slope.	Severe: depth to rock.	Severe: slope.	Poor: slope.
[1]852G:					
Alford part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Wellston part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Ava:					
[1]929C3:					
Ava part	Severe: percs slowly.	Severe: slope.	Severe: wetness.	Moderate: slope.	Fair: thin layer, slope.
Hickory part	Moderate: percs slowly, slope.	Severe: slope.	Moderate: too clayey.	Moderate: slope.	Fair: too clayey, slope.
Hickory:					
[1]929D2:					
Hickory part	Severe: slope.	Severe: slope.	Moderate: too clayey.	Severe: slope.	Poor: slope.

See footnotes at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
Hickory:					
Ava part	Severe: percs slowly.	Severe: slope.	Severe: wetness.	Moderate: slope.	Fair: too clayey.
Goss:					
[1]930G:					
Goss part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope, area reclaim.
Alford part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Neotoma:					
[2]976G	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, slope, seepage.	Severe: slope, seepage.	Poor: slope, small stones.
[1]977E:					
Neotoma part	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage.	Severe: slope, seepage.	Poor: slope, small stones.
Wellston part	Severe: slope.	Severe: slope.	Severe: depth to rock.	Severe: slope.	Poor: slope.
[1]977G:					
Neotoma part	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, slope, seepage.	Severe: slope, seepage.	Poor: slope, small stones.
Wellston part	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Alford:					
[1]999D:					
Alford part	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.
Hickory part	Severe: slope.	Severe: slope.	Moderate: too clayey.	Severe: slope.	Poor: slope.
[1]999D3:					
Alford part	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.
Hickory part	Severe: slope.	Severe: slope.	Moderate: too clayey.	Severe: slope.	Poor: slope.
Hickory:					
[1]999E:					

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
[1]999E3:					
Hickory part-----	Severe: slope.	Severe: slope.	Moderate: too clayey.	Severe: slope.	Poor: slope.
Alford part------	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.	Poor: slope.
Mine dump: M.D.					
Quarry: Qu.					

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior characteristics of the mapping unit.

[2]Rock outcrop part not rated.

TABLE 11.--CONSTRUCTION MATERIALS

["Shrink-swell" and some of the other terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and "poor." Absence of an entry indicates that the soil was not rated.]

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Hoyleton: 3A, 3B2	Poor: shrink-swell, low strength.	Unsuited	Unsuited	Fair: thin layer.
Hickory: 8E, 8E3	Poor: low strength.	Unsuited	Unsuited	Poor: slope.
8G	Poor: low strength, slope.	Unsuited	Unsuited	Poor: slope.
Wynoose: 12	Poor: shrink-swell, frost action.	Unsuited	Unsuited	Poor: wetness.
Bluford: 13A, 13B	Poor: frost action, shrink-swell.	Unsuited	Unsuited	Fair: area reclaim, thin layer.
Ava: 14B	Poor: frost action, low strength.	Unsuited	Unsuited	Good.
14C3	Poor: frost action, low strength.	Unsuited	Unsuited	Fair: slope.
Darwin: 71, 71+, F71, W71	Poor: shrink-swell, wetness, low strength.	Unsuited	Unsuited	Poor: too clayey, wetness.
Okaw: 84	Poor: low strength, shrink-swell, frost action.	Unsuited	Unsuited	Poor: wetness, area reclaim.
Jacob: 85, W85	Poor: shrink-swell, wetness, low strength.	Unsuited	Unsuited	Poor: too clayey, wetness.
Bonnie: 108	Poor: frost action, wetness.	Unsuited	Unsuited	Poor: wetness.
Racoon: 109	Poor: wetness, shrink-swell, low strength.	Unsuited	Unsuited	Poor: wetness.
Colp: 122A, 122B2	Poor: shrink-swell, low strength.	Unsuited	Unsuited	Fair: thin layer.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Colp:				
122C2	Poor: shrink-swell, low strength.	Unsuited	Unsuited	Fair: thin layer, slope.
122C3	Poor: shrink-swell, low strength.	Unsuited	Unsuited	Fair: too clayey, slope.
122D	Poor: shrink-swell, low strength.	Unsuited	Unsuited	Poor: slope.
Alvin:				
131B	Fair: frost action.	Fair: excess fines.	Unsuited	Good.
131C3	Fair: frost action.	Fair: excess fines.	Unsuited	Fair: slope.
131E	Fair: frost action, slope.	Fair: excess fines.	Unsuited	Poor: slope.
Starks:				
132	Poor: frost action, low strength.	Poor: excess fines.	Unsuited	Fair: thin layer.
Camden:				
134A, 134B2	Poor: frost action, low strength.	Unsuited: excess fines.	Unsuited	Fair: thin layer.
134C2, 134C3	Poor: frost action, low strength.	Unsuited: excess fines.	Unsuited	Fair: thin layer, slope.
134D	Poor: frost action, low strength.	Unsuited: excess fines.	Unsuited	Poor: slope.
Gorham:				
162	Poor: frost action, wetness.	Poor: excess fines.	Unsuited	Poor: wetness.
Stoy:				
164A, 164B, 164C2	Poor: frost action, low strength.	Unsuited	Unsuited	Fair: thin layer.
Weir:				
165	Poor: wetness, frost action.	Unsuited	Unsuited	Poor: wetness.
Dupo:				
180	Poor: frost action.	Unsuited	Unsuited	Fair: thin layer.
Sexton:				
208	Poor: wetness, frost action, low strength.	Unsuited	Unsuited	Poor: wetness.
Hosmer:				
214B	Poor: frost action.	Unsuited	Unsuited	Good.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Hosmer:				
214C2, 214C3	Poor: frost action.	Unsuited	Unsuited	Fair: slope.
214D2, 214D3	Poor: frost action.	Unsuited	Unsuited	Poor: slope.

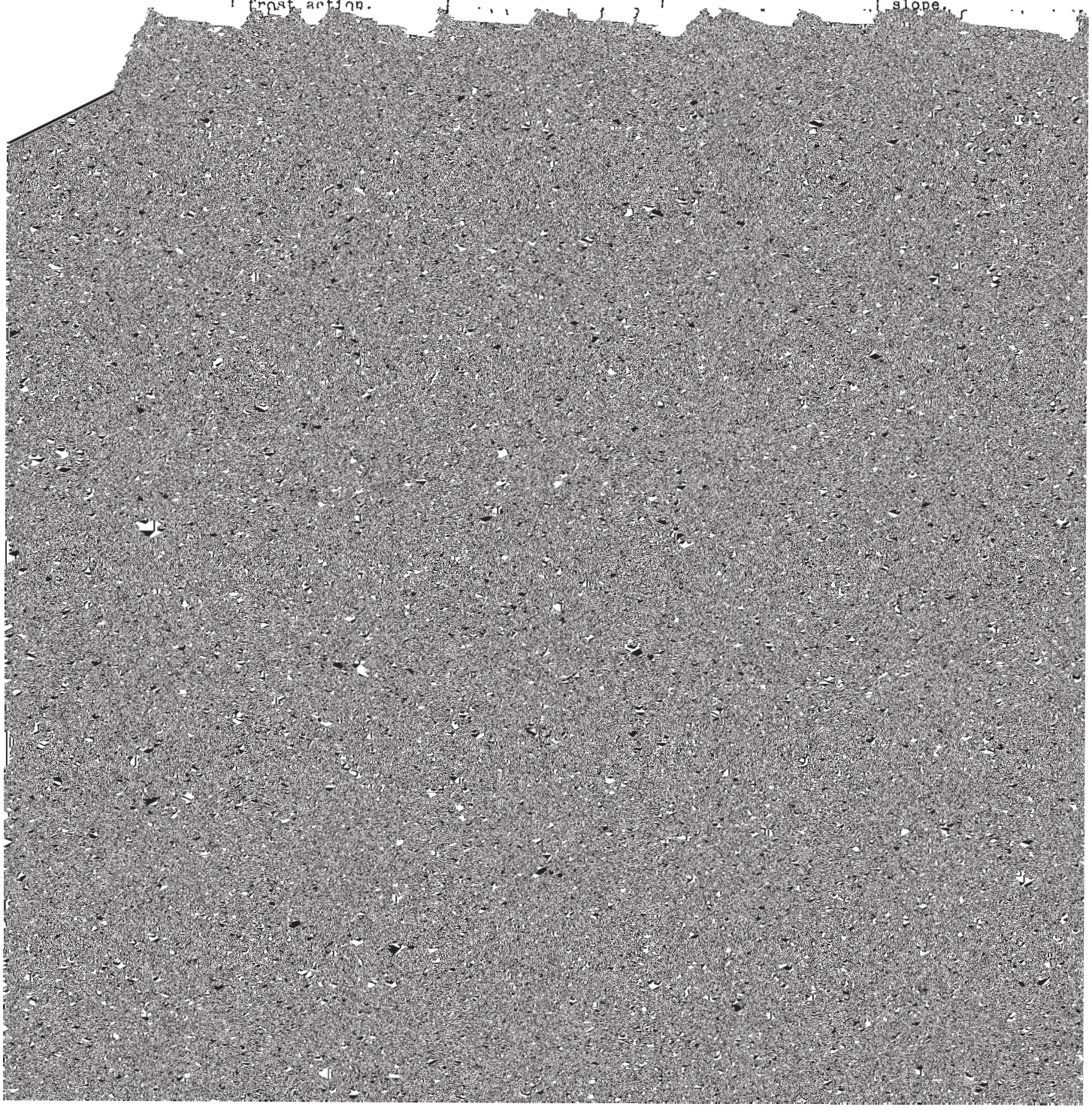


TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Ware: 456, F456	Fair: frost action.	Fair: excess fines.	Unsuited	Good.
Booker: 457, W457	Poor: wetness, shrink-swell, low strength.	Unsuited	Unsuited	Poor: wetness, too clayey.
Urban land: 533.				
Bowdre: 589	Poor: shrink-swell.	Unsuited	Unsuited	Poor: too clayey.
Cairo: 590	Poor: wetness, shrink-swell, low strength.	Poor: excess fines.	Unsuited	Poor: too clayey, wetness, area reclaim.
Medway: 682, F682	Poor: frost action.	Unsuited	Unsuited	Good.
Banlic: 787	Poor: frost action.	Unsuited	Unsuited	Good.
Orthents, silty: 801	Poor: frost action.	Unsuited	Unsuited	Poor: thin layer.
Orthents, loamy: 802C	Fair: frost action, shrink-swell.	Unsuited	Unsuited	Poor: large stones.
802G	Poor: slope.	Unsuited	Unsuited	Poor: large stones.
Orthents, clayey: 805	Poor: shrink-swell.	Unsuited	Unsuited	Poor: too clayey.
Hosmer: [1]850D:				
Hosmer part	Poor: frost action.	Unsuited	Unsuited	Poor: slope.
Hickory part	Poor: low strength.	Unsuited	Unsuited	Poor: slope.
[1]850D3:				
Hosmer part	Poor: frost action.	Unsuited	Unsuited	Poor: slope.
Hickory part	Poor: low strength.	Unsuited	Unsuited	Poor: slope.
Hickory: [1]850E:				
Hickory part	Poor: low strength.	Unsuited	Unsuited	Poor: slope.
Hosmer part	Poor: frost action.	Unsuited	Unsuited	Poor: slope.

See footnotes at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Hickory:				
[1]850E3:				
Hickory part	Poor: low strength.	Unsuited	Unsuited	Poor: slope.
Hosmer part	Poor: frost action.	Unsuited	Unsuited	Poor: slope.
Alford:				
[1]852E:				
Alford part	Poor: frost action.	Unsuited	Unsuited	Poor: slope.
Wellston part	Poor: frost action.	Unsuited	Unsuited	Poor: slope.
[1]852G:				
Alford part	Poor: frost action, slope.	Unsuited	Unsuited	Poor: slope.
Wellston part	Poor: slope, frost action.	Unsuited	Unsuited	Poor: slope.
Ava:				
[1]929C3:				
Ava part	Poor:	Unsuited	Unsuited	Fair:

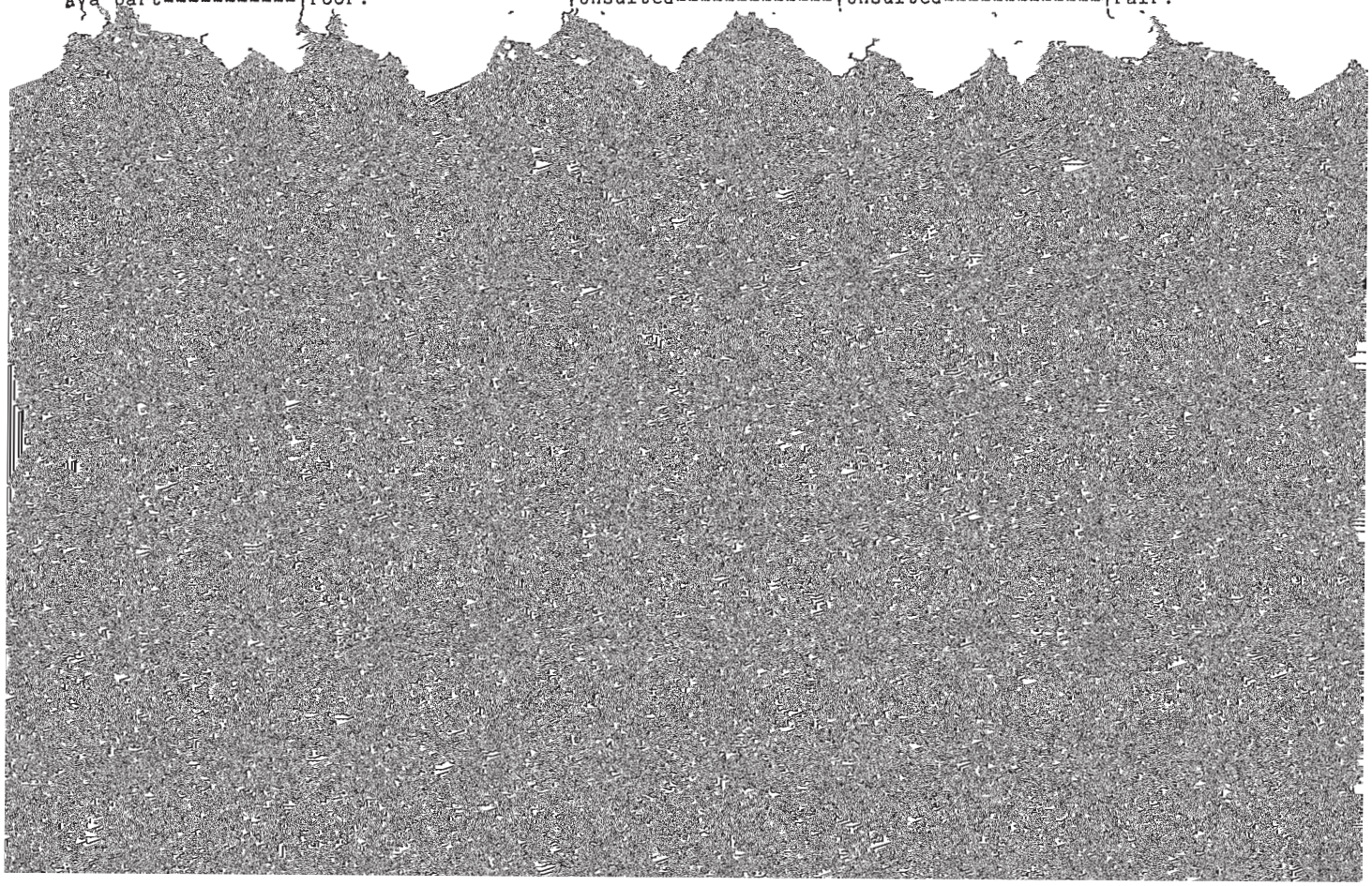


TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
Neotoma:				
[1]977G:				
Neotoma part	Poor: slope.	Unsuited	Unsuited	Poor: slope, small stones.
Wellston part	Poor: slope, frost action.	Unsuited	Unsuited	Poor: slope.
Alford:				
[1]999D:				
Alford part	Poor: frost action.	Unsuited	Unsuited	Poor: slope.
Hickory part	Poor: low strength.	Unsuited	Unsuited	Poor: slope.
[1]999D3:				
Alford part	Poor: frost action.	Unsuited	Unsuited	Poor: slope.
Hickory part	Poor: low strength.	Unsuited	Unsuited	Poor: slope.
Hickory:				
[1]999E:				
Hickory part	Poor: low strength.	Unsuited	Unsuited	Poor: slope.
Alford part	Poor: frost action.	Unsuited	Unsuited	Poor: slope.
[1]999E3:				
Hickory part	Poor:	Unsuited	Unsuited	Poor:

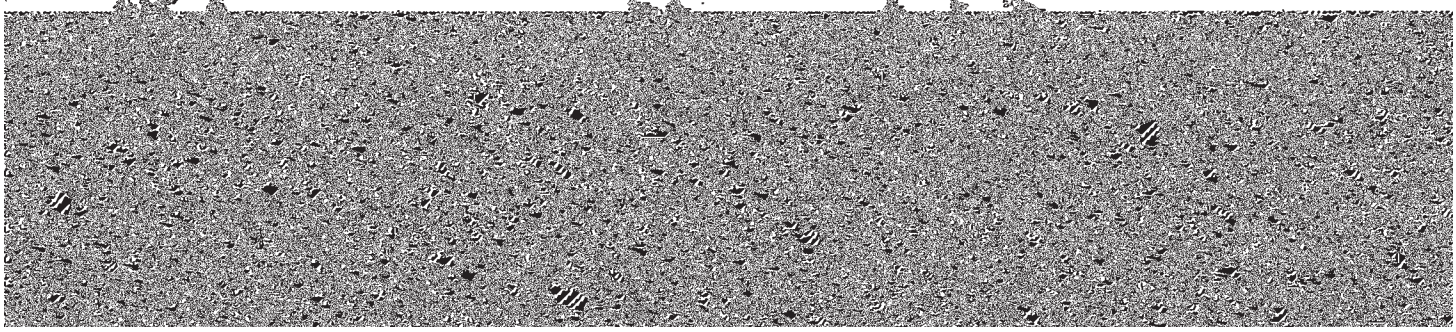


TABLE 12.--WATER MANAGEMENT

["Seepage" and some of the other terms that describe restrictive soil features are defined in the Glossary. Absence of an entry means soil was not evaluated]

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
Hoyleton: 3A, 3B2	Favorable	Low strength	Deep to water	Percs slowly, wetness.	Percs slowly, erodes easily.	Wetness.
Hickory: 8E, 8E3, 8G	Slope	Low strength, shrink-swell.	No water	Not needed	Slope, erodes easily.	Slope, erodes easily.
Wynoose: 12	Favorable	Low strength	Favorable	Percs slowly	Not needed	Not needed

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
Dupo: 180	Favorable	Shrink-swell	Favorable	Percs slowly, floods.	Not needed	Not needed.
Sexton: 208	Favorable	Low strength	Favorable	Percs slowly	Not needed	Not needed.
Hosmer: 214B, 214C2, 214C3, 214D2, 214D3	Favorable	Low strength, piping, erodes easily.	Deep to water	Not needed	Percs slowly, erodes easily, complex slope.	Percs slowly, erodes easily.
St. Charles: 243B	Seepage	Shrink-swell	No water	Not needed	Favorable	Favorable.
Alford: 308B2, 308C2, 308C3, 308D2, 308D3, 308E, 308E3, 308G	Seepage	Low strength, erodes easily.	No water	Not needed	Complex slope, erodes easily.	Erodes easily.
Haymond: 331	Seepage	Piping, low strength.	Deep to water	Not needed	Not needed	Not needed.
Wakeland: 333	Seepage	Piping, low strength.	Deep to water	Frost action, floods, wetness.	Not needed	Not needed.
Birds: 334	Favorable	Low strength, piping.	Favorable	Wetness, floods, percs slowly.	Not needed	Not needed.
Hurst: 338A, 338B2	Favorable	Hard to pack, low strength, shrink-swell.	Deep to water	Percs slowly	Percs slowly	Percs slowly.
Belknap: 382	Favorable	Hard to pack, piping.	Favorable	Floods	Not needed	Not needed.
Piopolis: 420, W420	Favorable	Low strength	Favorable	Floods, wetness.	Not needed	Not needed.
Karnak: 426	Favorable	Compressible, low strength, shrink-swell.	Slow refill	Poor outlets, percs slowly, wetness.	Not needed	Not needed.
Burnside: 427	Seepage, depth to rock.	Large stones	Deep to water	Not needed	Not needed	Favorable.
Coffeen: 428	Seepage	Low strength, piping.	Deep to water	Floods, wetness.	Piping, wetness.	Not needed.
Raddle: 430A	Seepage	Low strength, piping, erodes easily.	Deep to water	Not needed	Erodes easily, piping.	Favorable.
Ware: 456, F456	Seepage	Piping	Deep to water, cutbanks cave.	Not needed	Not needed	Favorable.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
Booker: 457	Favorable	Shrink-swell, compressible, low strength.	Slow refill	Percs slowly, wetness.	Percs slowly, wetness.	Percs slowly, wetness.
W457	Favorable	Shrink-swell, compressible, low strength.	Slow refill	Floods, percs slowly, wetness.	Percs slowly, wetness.	Percs slowly, wetness.
Urban land: 533.						
Bowdre: 589	Seepage	Seepage, piping.	Deep to water	Wetness, percs slowly.	Percs slowly, wetness.	Percs slowly, wetness.
Cairo: 590	Seepage	Shrink-swell	Favorable	Floods, wetness, percs slowly.	Not needed	Not needed.
Medway: 682, F682	Seepage	Piping	Deep to water	Floods, poor outlets.	Not needed	Not needed.
Banlic: 787	Favorable	Low strength, piping.	Slow refill	Percs slowly	Not needed	Favorable.
Orthents, silty: 801	Favorable	Low strength, piping.	Deep to water	Favorable	Erodes easily	Favorable.
Orthents, loamy: 802C, 802G	Favorable	Large stones	No water	Not needed	Not needed	Not needed.

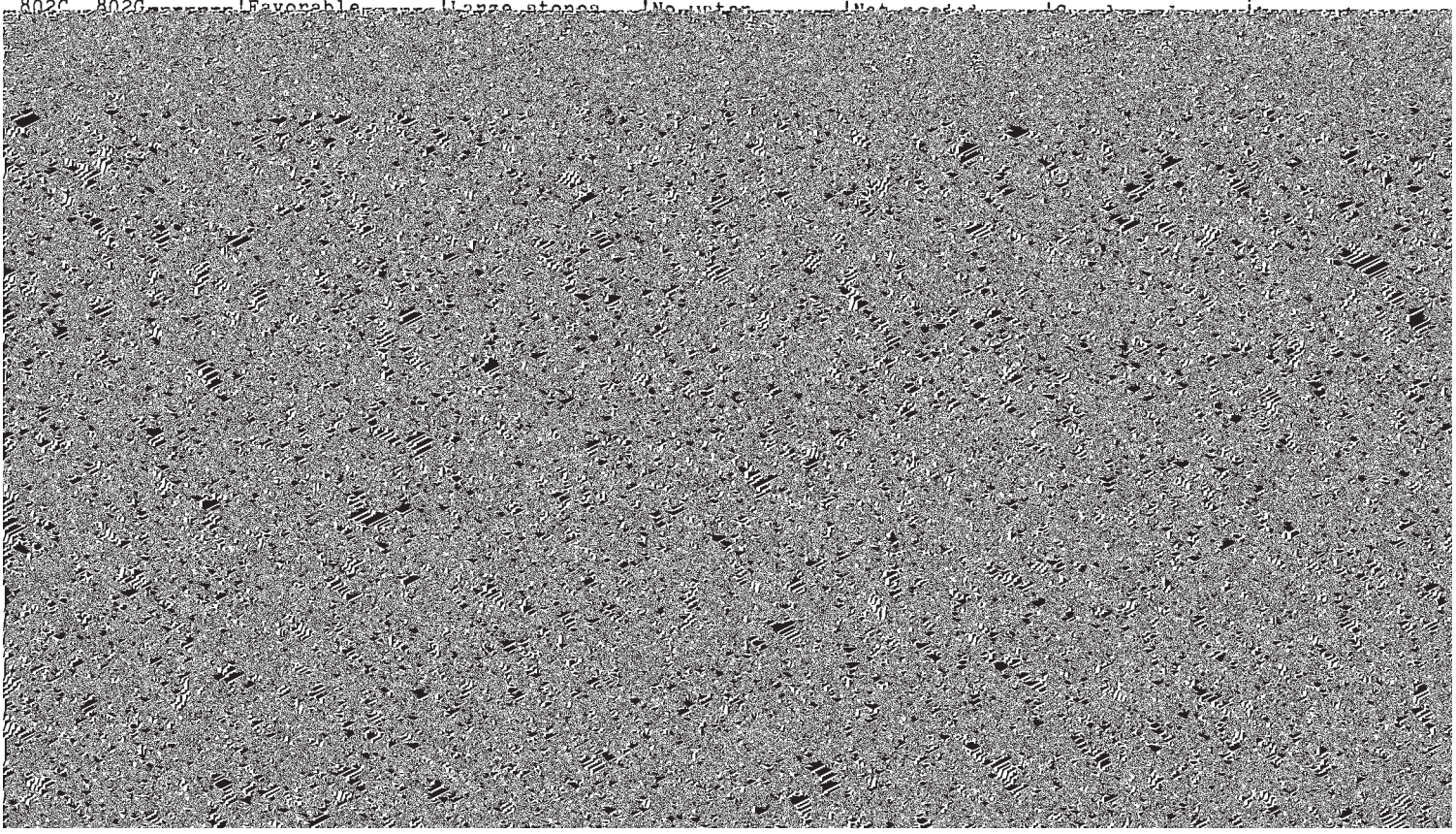


TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
Hickory:						
Hosmer part----	Favorable------	Low strength, piping, erodes easily.	Deep to water	Not needed-----	Percs slowly, erodes easily, complex slope.	Percs slowly, erodes easily.
Alford:						
852E:						
Alford part----	Seepage--------	Low strength, erodes easily.	No water--------	Not needed-----	Complex slope, erodes easily.	Erodes easily.
Wellston part--	Seepage, depth to rock.	Piping, hard to pack, erodes easily.	No water--------	Not needed-----	Depth to rock, slope, erodes easily.	Erodes easily, slope.
852G:						
Alford part----	Seepage--------	Low strength, erodes easily.	No water--------	Not needed-----	Complex slope, erodes easily.	Erodes easily.
Wellston part--	Seepage, depth to rock.	Piping, hard to pack, erodes easily.	No water--------	Not needed-----	Depth to rock, slope, erodes easily.	Erodes easily, slope.
Ava:						
929C3:						
Ava part-------	Favorable------	Low strength---	Deep to water	Not needed-----	Erodes easily, percs slowly.	Erodes easily, slope.
Hickory part---	Slope----------	Low strength,	No water--------	Not needed-----	Slope,	Slope,

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Terraces and diversions	Grassed waterways
Alford:						
Hickory part---	Slope----------	Low strength, shrink-swell.	No water-------	Not needed-----	Slope, erodes easily.	Slope, erodes easily.
[1]999D3:						
Alford part----	Seepage--------	Low strength, erodes easily.	No water-------	Not needed-----	Complex slope, erodes easily.	Erodes easily.
Hickory part---	Slope----------	Low strength, shrink-swell.	No water-------	Not needed-----	Slope, erodes easily.	Slope, erodes easily.
Hickory:						
[1]999E:						
Hickory part---	Slope----------	Low strength, shrink-swell.	No water-------	Not needed-----	Slope, erodes easily	Slope, erodes easily.
Alford part----	Seepage--------	Low strength, erodes easily.	No water-------	Not needed-----	Complex slope, erodes easily.	Erodes easily.
[1]999E3:						
Hickory part---	Slope----------	Low strength, shrink-swell.	No water-------	Not needed-----	Slope, erodes easily.	Slope, erodes easily.
Alford part----	Seepage--------	Low strength, erodes easily.	No water-------	Not needed-----	Complex slope, erodes easily.	Erodes easily.
Mine dump:						
M.D.						
Quarry:						
Qu.						

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior characteristics of the mapping unit.

[2]Rock outcrop part not evaluated.

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS

[The symbol < means less than and > means more than. Absence of an entry indicates that data were not estimated]

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Hoyleton:											
3A, 3B2	0-19	Silt loam	CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	25-35	5-15
	19-46	Silty clay loam, silty clay.	CL, CH	A-7	0	100	100	95-100	90-100	40-55	20-30
	46-60	Silt loam, loam, clay loam.	CL	A-6, A-7	0	100	95-100	90-100	80-95	30-45	15-25
Hickory:											
8E, 8E3, 8G	0-8	Silt loam	CL-ML, CL	A-6, A-4	0-5	95-100	90-100	90-100	85-95	20-35	5-15
	8-47	Clay loam	CL	A-6, A-7	0-5	95-100	90-100	80-95	75-90	30-50	15-30
	47-60	Clay loam, sandy loam, loam.	CL-ML, CL	A-4, A-6	0-5	85-100	85-95	80-95	60-80	20-40	5-20
Wynoose:											
12	0-14	Silt loam	CL-ML, CL	A-4, A-6	0	100	95-100	90-100	75-95	20-35	5-15
	14-32	Silty clay, clay, silty clay loam.	CL	A-7, A-6	0	100	95-100	90-100	80-95	30-50	15-30
	32-58	Silty clay loam, silt loam.	CL, CL-ML	A-6, A-4	0	100	95-100	90-100	75-90	25-40	5-15
	58-60	Clay loam, loam	CL	A-6, A-7	0-10	100	90-100	90-100	75-90	20-45	10-25
Bluford:											
13A, 13B	0-18	Silt loam	CL, CL-ML	A-6, A-4	0	100	95-100	95-100	85-100	20-35	5-15
	18-46	Silty clay loam, silty clay.	CL	A-7, A-6	0	100	95-100	95-100	80-100	30-45	10-25
	46-60	Silt loam, loam, clay loam.	CL-ML, CL	A-6, A-4	0-5	100	95-100	90-100	70-95	25-40	5-20
Ava:											
14B	0-7	Silt loam	CL, CL-ML	A-6	0	100	95-100	95-100	85-100	25-40	5-15
	7-27	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	95-100	30-45	15-25
	27-60	Silty clay loam, silt loam, loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	70-90	20-45	5-20
14C3	0-7	Silty clay loam	CL	A-6, A-7	0	100	100	95-100	95-100	30-50	15-30
	7-27	Silty clay loam, silt loam.	CL	A-6, A-7	0	100	100	95-100	95-100	30-45	15-25
	27-60	Silty clay loam, silt loam, loam.	CL, CL-ML	A-4, A-6, A-7	0	100	95-100	90-100	70-90	20-45	5-20
Darwin:											
71, F71, W71	0-11	Silty clay	CH	A-7	0	100	100	100	95-100	50-85	30-55
	11-48	Silty clay, clay	CH	A-7	0	100	100	100	95-100	50-85	30-55
	48-60	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0	100	100	95-100	90-100	35-70	20-45
71+	0-11	Silt loam	ML, CL, CL-ML	A-4, A-6	0	100	100	95-100	90-100	20-35	3-15
	11-48	Silty clay, clay	CH	A-7	0	100	100	100	95-100	50-85	30-55
	48-60	Silty clay loam, silty clay.	CL, CH	A-7, A-6	0	100	100	95-100	90-100	35-70	20-45
Okaw:											
84	0-15	Silt loam	CL, CL-ML	A-4, A-6	0	100	100	95-100	90-100	25-40	5-15
	15-54	Silty clay, clay, silty clay loam.	CH	A-7	0	100	95-100	95-100	90-100	50-80	30-55
	54-60	Silty clay loam, silty clay, clay.	CL, CH	A-7	0	100	100	95-100	90-100	40-60	20-40
Jacob:											
85, W85	0-4	Clay	CH	A-7	0	100	100	100	95-100	54-70	33-45
	4-50	Clay, silty clay	CH	A-7	0	100	100	100	95-100	50-70	30-45

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Bonnie:											
108	0-7	Silt loam	CL	A-4, A-6	0	100	100	95-100	90-100	27-34	8-12
	7-31	Silt loam	CL	A-4, A-6	0	100	100	95-100	90-100	27-34	8-12
	31-60	Stratified sand to silty clay.	ML, CL, SM, SC	A-2, A-4, A-6	0	100	100	90-100	30-90	20-39	NP-15
Racoon:											
109	0-25	Silt loam	CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	25-35	5-15
	25-61	Silty clay loam	CL	A-7, A-6	0	100	100	95-100	90-100	35-50	15-30
	61-66	Stratified loamy fine sand to silty clay.	SM, ML, CL, SC	A-2, A-4, A-6, A-7	0	100	90-100	55-98	25-90	<45	NP-25
Colp:											
122A, 122B2, 122C2, 122D	0-12	Silt loam	CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	25-35	5-15
	12-60	Silty clay loam, clay, silty clay.	CL, CH	A-7	0	100	100	95-100	95-100	40-65	20-45
122C3	0-12	Silty clay loam	CL	A-7, A-6	0	100	100	95-100	90-100	30-48	15-25
	12-60	Silty clay loam, clay, silty clay.	CL, CH	A-7	0	100	100	95-100	95-100	40-65	20-45
Alvin:											
131B, 131C3, 131E-	0-11	Very fine sandy loam.	SM, ML	A-4, A-2	0	100	100	80-95	30-60	<25	NP-4
	11-38	Very fine sandy loam, sandy	SC, CL, SM, ML	A-4, A-6	0	100	100	90-100	20-80	15-38	NP-13

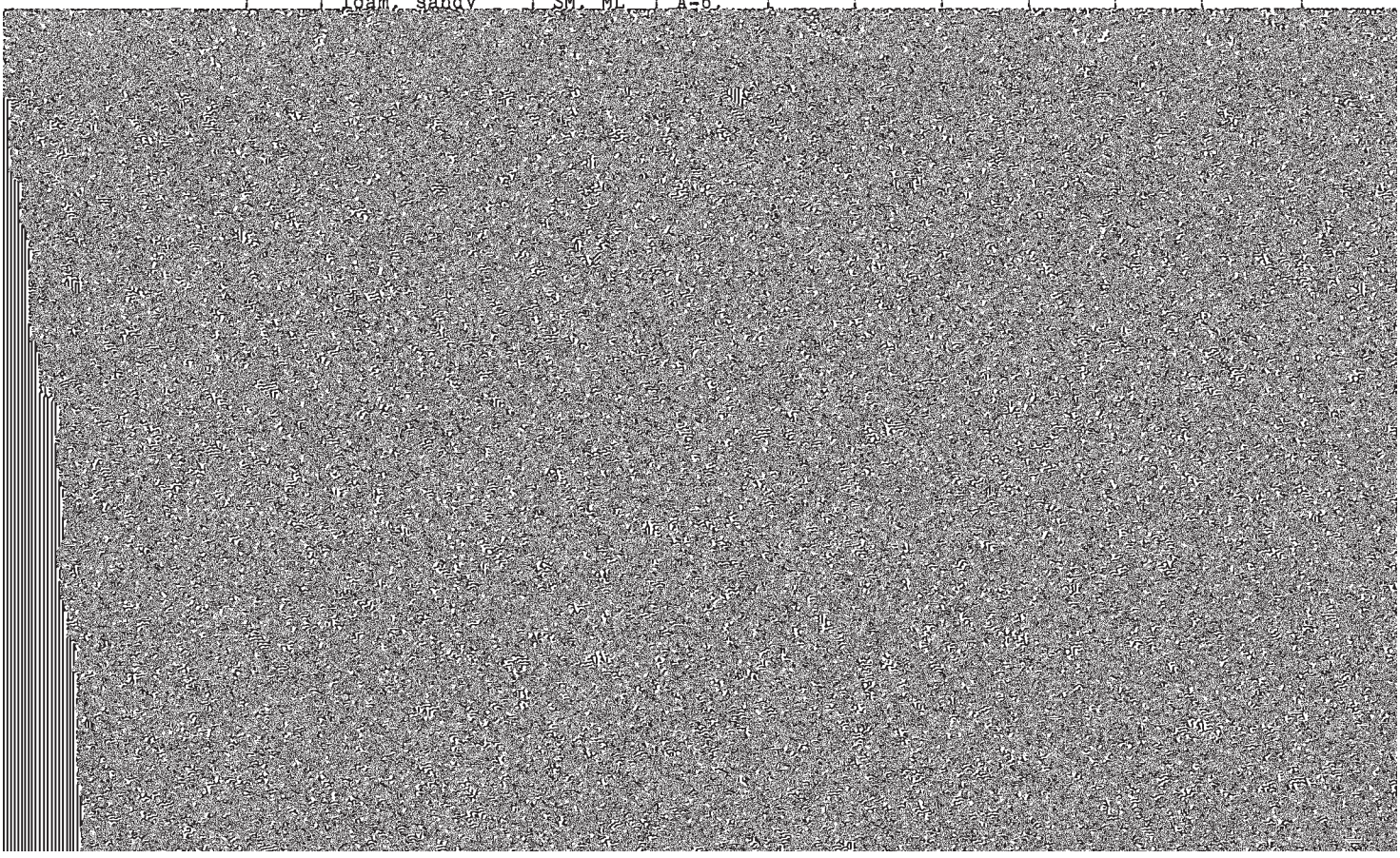


TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Weir:											
165	0-13	Silt loam	CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	23-35	6-17
	13-52	Silty clay loam	CL	A-7, A-6	0	100	100	95-100	90-100	35-50	15-29
	52-60	Silt loam	CL	A-4, A-6	0	100	100	95-100	90-100	22-30	9-16
Dupo:											
180	0-7	Silt loam	ML, CL, CL-ML	A-4, A-6	0	100	100	100	95-100	20-35	1-15
	7-29	Silt loam	ML, CL, CL-ML	A-4, A-6	0	100	100	100	95-100	20-35	5-15
	29-60	Silty clay, clay, silty clay loam.	CL, CH	A-7, A-6	0	100	100	100	98-100	35-55	15-30
Sexton:											
208	0-15	Silt loam	CL-ML, CL	A-4, A-6	0	100	100	95-100	90-100	25-40	6-17
	15-42	Silty clay loam	CL	A-7, A-6	0	100	100	95-100	90-100	35-50	15-28
	42-60	Stratified sandy loam to silty clay loam.	ML, CL, SM, SC	A-4, A-2, A-6	0	100	90-100	60-90	25-90	3-40	NP-25
Hosmer:											
214B, 214C2, 214D2	0-9	Silt loam	CL, CL-ML	A-4, A-6	0	100	100	90-100	80-100	25-35	5-15
	9-25	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	100	100	90-100	80-100	25-35	5-15
	25-60	Silt loam	CL, CL-ML	A-4, A-6	0	100	100	90-100	80-100	25-35	5-15
214C3, 214D3	0-9	Silt loam	CL, CL-ML	A-4, A-6	0	100	100	90-100	80-100	25-35	5-15
	9-25	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	100	100	90-100	80-100	25-35	5-15
	25-60	Silt loam	CL, CL-ML	A-4, A-6	0	100	100	90-100	80-100	25-35	5-15
St. Charles:											
243B	0-10	Silt loam	CL-ML, CL	A-4, A-6	0	100	100	95-100	95-100	20-35	5-15
	10-55	Silty clay loam, silt loam.	CL	A-6	0	100	100	95-100	90-100	25-40	10-25
	55-60	Stratified silt	ML, SC	A-2, A-4	0-5	90-100	80-90	60-90	30-70	<25	3-10

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Belknap:											
382	0-8	Silt loam	ML, CL, CL-ML	A-4	0	100	95-100	90-100	80-95	21-29	2-8
	8-60	Silt loam	ML, CL-ML, CL	A-4	0	100	95-100	90-100	80-95	22-32	NP-10
Piopolis:											
420, W420	0-7	Silty clay loam	CL	A-6	0	100	100	90-100	75-95	30-40	15-20
	7-60	Silty clay loam	CL	A-6	0	100	100	90-100	75-95	30-40	15-20
	49-60	Silty clay loam, silt loam.	CL	A-6	0	100	100	90-100	70-95	30-40	15-20
Karnak:											
426	0-6	Silty clay	CH, CL	A-7	0	100	100	100	95-100	45-80	25-45
	6-60	Silty clay, clay	CH, MH	A-7	0	100	100	100	95-100	50-80	23-38
Burnside:											
427	0-18	Silt loam	ML, CL, CL-ML	A-4	0-10	100	100	80-95	75-95	20-35	2-10
	18-60	Flaggy loam, flaggy sandy loam, flaggy silt loam.	SC, GC, SM, GM	A-2, A-4	10-60	35-80	30-60	30-50	26-45	<20	NP-10
Coffeen:											
428	0-17	Silt loam	ML, CL	A-4, A-6	0	100	100	90-100	85-100	25-40	3-15
	17-48	Silt loam	ML, CL	A-4	0	100	100	90-100	80-95	25-35	3-10
	48-60	Stratified silt loam to sandy loam.	ML, SM, SC, CL	A-4, A-2	0	100	90-100	85-100	30-85	20-30	3-10
Raddle:											
430A	0-12	Silt loam	CL	A-4, A-6	0	100	100	95-100	85-100	25-35	8-15
	12-60	Silt loam	CL, CL-ML	A-4, A-6	0	100	100	90-100	80-100	20-30	4-14
Ware:											
456	0-21	Loam	ML, CL-ML, CL	A-4	0	100	100	95-100	50-70	20-36	2-10
	21-60	Stratified silt loam to sand.	SM, ML, SM-SC, CL-ML	A-4, A-2	0	100	100	60-90	10-60	<25	NP-6
F456	0-21	Sandy loam	SM, SM-SC	A-2	0	100	100	80-95	20-30	<20	NP-5
	21-60	Stratified silt loam to sand.	SM, ML, SM-SC, CL-ML	A-4, A-2	0	100	100	60-90	10-60	<25	NP-6
Booker:											
457, W457	0-12	Silty clay	CL, CH	A-7	0	100	100	95-100	95-100	45-70	30-45
	12-60	Clay	CH	A-7	0	100	100	100	95-100	50-75	35-55
Urban land:											
533.											
Bowdre:											
589	0-15	Silty clay	MH, CH	A-7	0	100	100	95-100	90-95	51-65	28-40
	15-19	Silt loam, loam	CL-ML, CL, ML	A-4, A-6	0	100	100	90-100	70-90	25-35	5-12
	19-35	Sandy loam, silt loam, loam.	SM, CL, CL-ML, SM-SC	A-2, A-4	0	100	100	60-100	30-90	20-30	5-10
	35-60	Loamy sand, sandy loam.	SM, SM-SC	A-2, A-4	0	100	100	60-75	15-40	<25	NP-5

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

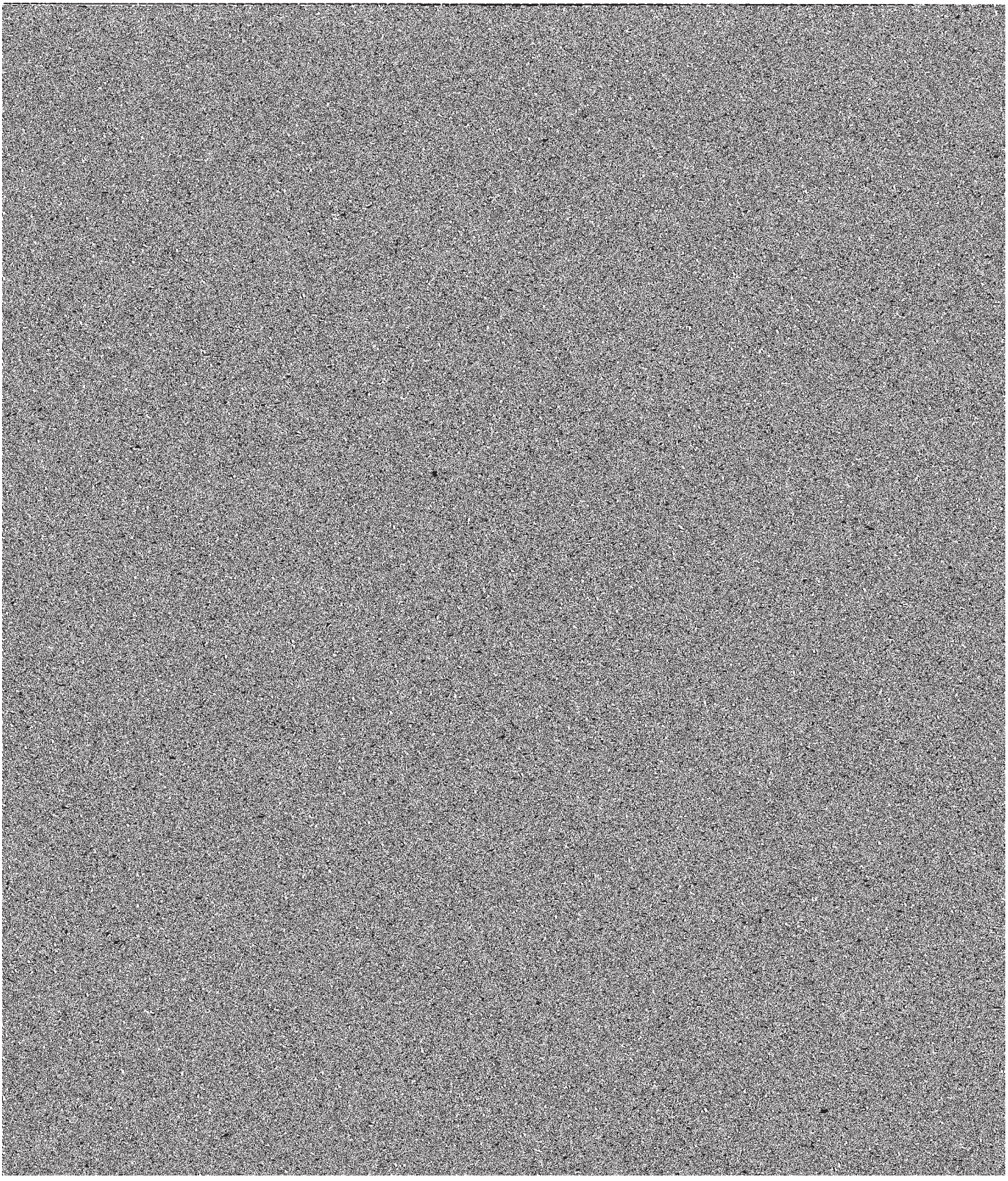


TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Hickory:											
Hosmer part-----	0-9	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	100	90-100	80-100	25-35	5-15
	9-25	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	100	100	90-100	80-100	25-35	5-15
	25-60	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	100	90-100	80-100	25-35	5-15
[1]850E3:											
Hickory part----	0-8	Clay loam-------	CL	A-6, A-7	0-5	95-100	90-100	80-95	75-90	30-50	15-30
	8-47	Clay loam-------	CL	A-6, A-7	0-5	95-100	90-100	80-95	75-90	30-50	15-30
	47-60	Clay loam, sandy loam, loam.	CL-ML, CL	A-4, A-6	0-5	85-100	85-95	80-95	60-80	20-40	5-20
Hosmer part-----	0-9	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	100	90-100	80-100	25-35	5-15
	9-25	Silt loam, silty clay loam.	CL, CL-ML	A-4, A-6	0	100	100	90-100	80-100	25-35	5-15
	25-60	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	100	90-100	80-100	25-35	5-15
Alford:											
[1]852E:											
Alford part-----	0-8	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-100	25-40	5-15
	8-52	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	80-100	30-50	15-30
	52-60	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-100	25-40	5-15
Wellston part---	0-6	Silt loam-------	ML	A-4	0	95-100	90-100	85-100	70-95	25-35	3-10
	6-40	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0-5	75-100	70-100	60-95	60-90	25-40	5-20
	40-50	Silt loam, loam	CL-ML	A-4, A-6	0-10	65-90	65-90	60-90	40-65	20-35	5-15

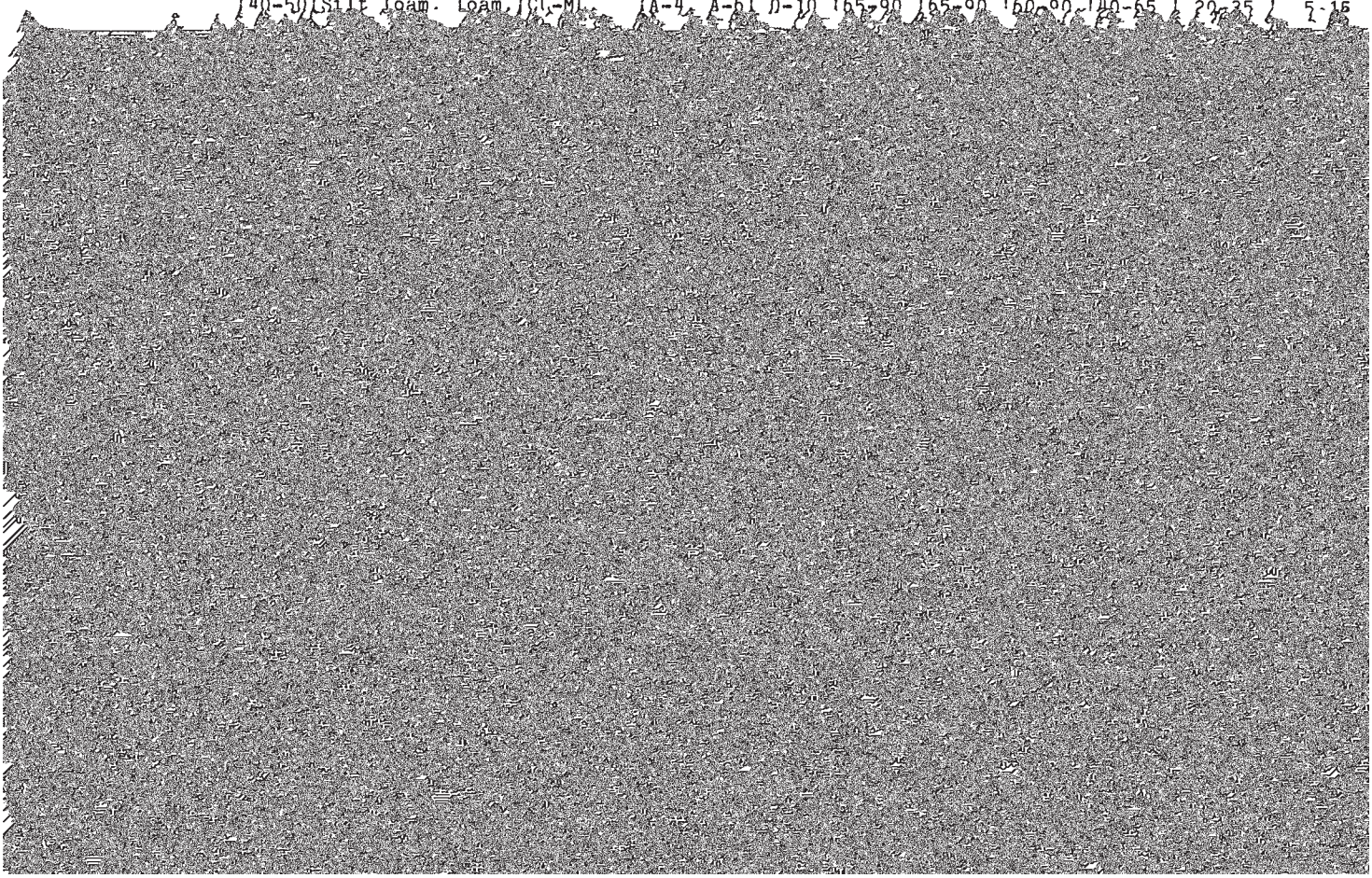


TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Hickory:											
Ava part	0-7	Silt loam	CL, CL-ML	A-6	0	100	95-100	95-100	85-100	25-40	5-15

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
Neotoma:											
[1]977G:											
Neotoma part----	0-20	Channery loam---	ML, SM, GM	A-4	10-30	55-85	50-80	50-75	45-70	30-40	5-10
	20-30	Channery silt loam, channery loam, very channery silt loam.	ML, SM, GM	A-4	10-50	50-80	45-80	45-70	40-60	25-40	3-10
	30-48	Very flaggy loam, very flaggy sandy loam, channery silt loam.	GM	A-2, A-4	40-85	40-65	35-60	30-50	25-45	<35	NP-8
	48	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Wellston part---	0-6	Silt loam-------	ML	A-4	0	95-100	90-100	85-100	70-95	25-35	3-10
	6-29	Silt loam, silty clay loam.	CL, CL-ML	A-6, A-4	0-5	75-100	70-100	60-95	60-90	25-40	5-20
	29-50	Silt loam, loam, gravelly loam.	CL-ML, CL, SC, SM-SC	A-4, A-6	0-10	65-90	65-90	60-90	40-65	20-35	5-15
	50	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Alford:											
[1]999D:											
Alford part-----	0-8	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-100	25-40	5-15
	8-52	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	80-100	30-50	15-30
	52-60	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-100	25-40	5-15
Hickory part----	0-8	Silt loam-------	CL-ML, CL	A-6, A-4	0-5	95-100	90-100	90-100	85-95	20-35	5-15
	8-47	Clay loam-------	CL	A-6, A-7	0-5	95-100	90-100	80-95	75-90	30-50	15-30
	47-60	Clay loam, sandy loam, loam.	CL-ML, CL	A-4, A-6	0-5	85-100	85-95	80-95	60-80	20-40	5-20
[1]999D3:											
Alford part-----	0-8	Silty clay loam	CL	A-7, A-6	0	100	100	90-100	80-100	30-50	15-30
	8-52	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	80-100	30-50	15-30
	52-60	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-100	25-40	5-15
Hickory part----	0-8	Clay loam-------	CL	A-6, A-7	0-5	95-100	90-100	80-95	75-90	30-50	15-30
	8-47	Clay loam-------	CL	A-6, A-7	0-5	95-100	90-100	80-95	75-90	30-50	15-30
	47-60	Clay loam, sandy loam, loam.	CL-ML, CL	A-4, A-6	0-5	85-100	85-95	80-95	60-80	20-40	5-20
Hickory:											
[1]999E:											
Hickory part----	0-8	Silt loam-------	CL-ML, CL	A-6, A-4	0-5	95-100	90-100	90-100	85-95	20-35	5-15
	8-47	Clay loam-------	CL	A-6, A-7	0-5	95-100	90-100	80-95	75-90	30-50	15-30
	47-60	Clay loam, sandy loam, loam.	CL-ML, CL	A-4, A-6	0-5	85-100	85-95	80-95	60-80	20-40	5-20
Alford part-----	0-8	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-100	25-40	5-15
	8-52	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	80-100	30-50	15-30
	52-60	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-100	25-40	5-15

TABLE 13.--ENGINEERING PROPERTIES AND CLASSIFICATIONS--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
[1]999E3:											
Hickory part----	0-8	Clay loam-------	CL	A-6, A-7	0-5	95-100	90-100	80-95	75-90	30-50	15-30
	8-47	Clay loam-------	CL	A-6, A-7	0-5	95-100	90-100	80-95	75-90	30-50	15-30
	47-60	Clay loam, sandy loam, loam.	CL-ML, CL	A-4, A-6	0-5	85-100	85-95	80-95	60-80	20-40	5-20
Alford part-----	0-8	Silty clay loam	CL	A-7, A-6	0	100	100	90-100	80-100	30-50	15-30
	8-52	Silty clay loam	CL	A-6, A-7	0	100	100	90-100	80-100	30-50	15-30
	52-60	Silt loam-------	CL, CL-ML	A-4, A-6	0	100	100	90-100	70-100	25-40	5-15
Mine dump: M.D.											
Quarry: Qu.											

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior characteristics of the mapping unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS

[The symbol < means less than. The erosion tolerance factor (T) is for the entire profile. Absence of an entry means data were not estimated. Dashes indicate that data were not available]

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion		Erosion factors		Wind erodibility group
						Uncoated steel	Concrete	K	T	
	In	In/hr	In/in	pH						
Hoyleton:										
3A, 3B2	0-19	0.6-2.0	0.22-0.24	4.5-5.5	Moderate	High	High	0.37	3	6
	19-46	0.06-0.2	0.13-0.20	4.5-5.5	High	High	High	0.37		
	46-60	0.06-0.2	0.17-0.22	5.1-6.5	Moderate	High	Moderate	0.37		
Hickory:										
8E, 8E3, 8G	0-8	0.6-2.0	0.20-0.22	4.5-6.0	Low	Low	High	0.32	5	6
	8-47	0.6-2.0	0.15-0.19	5.1-5.5	Moderate	Moderate	Moderate	0.32		
	47-60	0.6-2.0	0.11-0.19	5.1-8.4	Low	Low	Low	0.32		

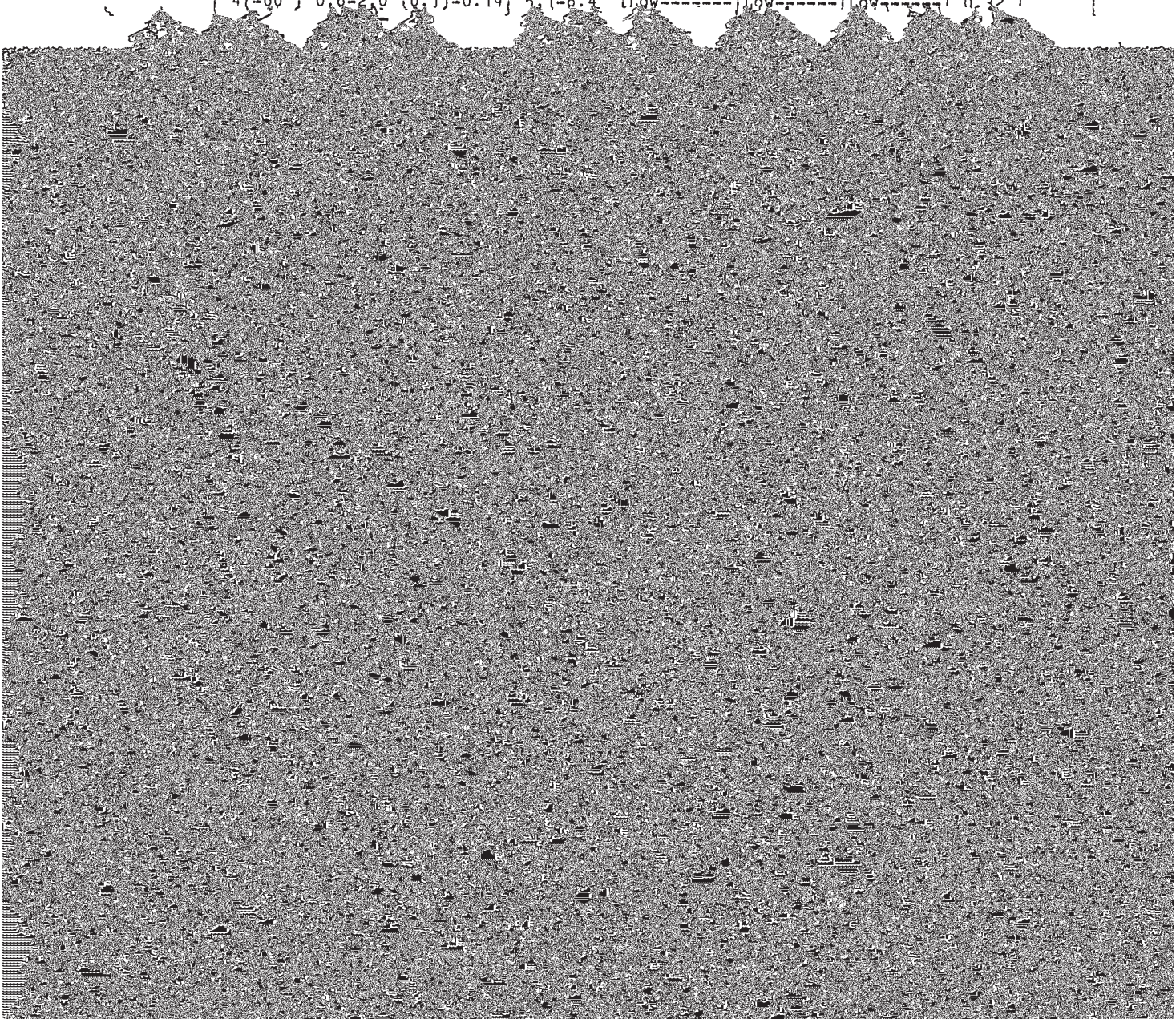


TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion		Erosion factors		Wind erodibility group
						Uncoated steel	Concrete	K	T	
	In	In/hr	In/in	pH						
Alvin:										
131B, 131C3, 131E-	0-11	2.0-6.0	0.14-0.20	5.1-6.5	Low--------	Low-------	High------	0.24	5	3
	11-38	0.6-6.0	0.12-0.20	4.5-6.0	Low--------	Low-------	High------	0.24		
	38-60	6.0-20	0.05-0.13	5.1-7.8	Low--------	Low-------	High------	0.24		
Starks:										
132----------	0-11	0.6-2.0	0.22-0.24	5.6-6.5	Moderate	High------	Moderate	0.37	5	6
	11-36	0.2-0.6	0.18-0.20	5.1-6.0	Moderate	High------	Moderate	0.37		
	36-50	0.6-2.0	0.16-0.19	5.1-6.0	Moderate	High------	Moderate	0.37		
	50-60	2.0-6.0	0.08-0.18	5.6-7.3	Very low--	Low-------	Moderate	0.37		
Camden:										
134A, 134B2,										
134C2, 134C3, 134D	0-9	0.6-2.0	0.22-0.24	5.1-6.0	Low--------	Low-------	Moderate	0.37	5-4	6
	9-47	0.6-2.0	0.16-0.20	5.1-6.0	Moderate	Low-------	Moderate	0.37		
	47-60	0.6-6.0	0.12-0.18	5.6-7.3	Low--------	Low-------	Low-------	0.37		

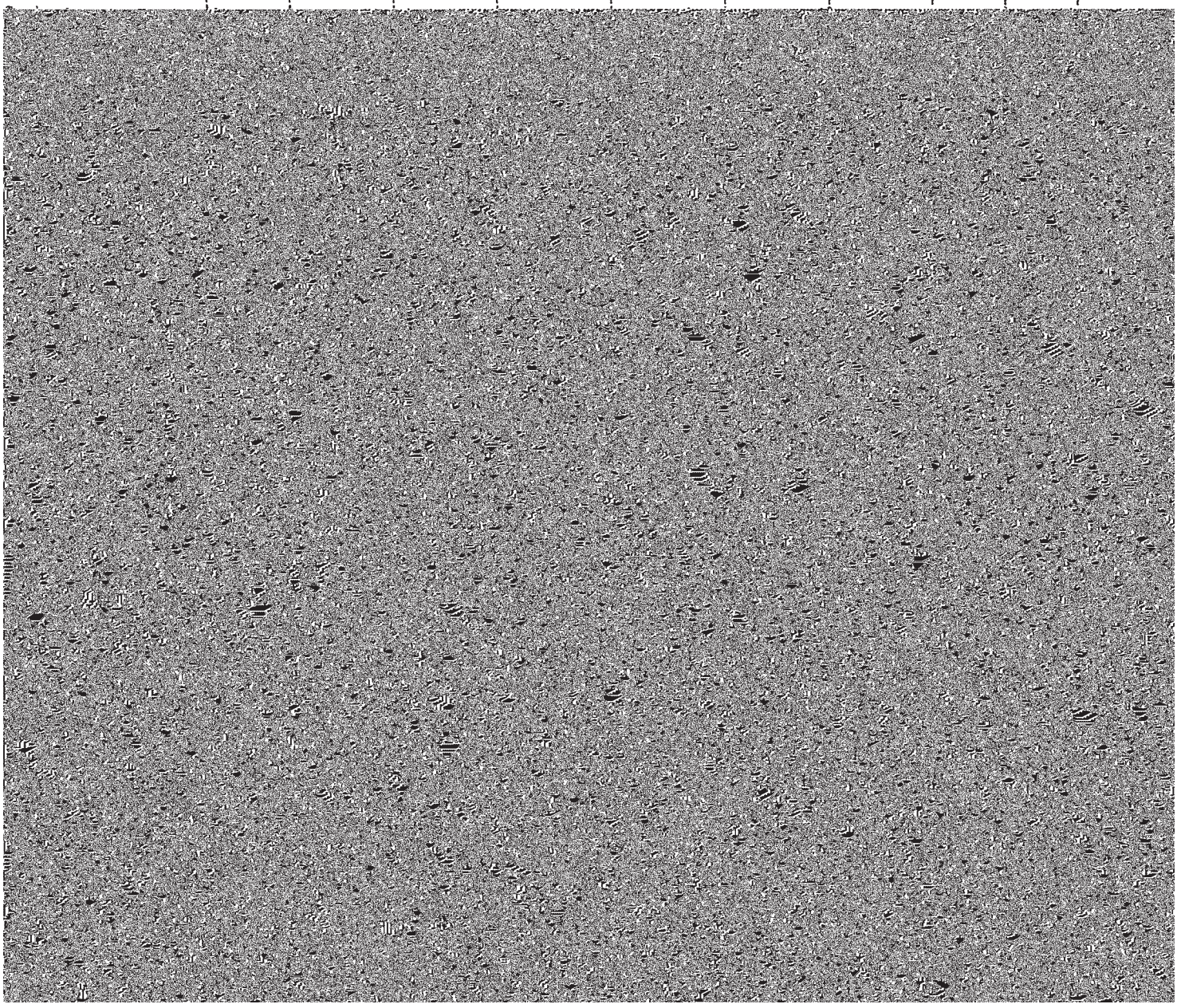


TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion		Erosion factors		Wind erodibility group
						Uncoated steel	Concrete	K	T	
	In	In/hr	In/in	pH						
Birds:										
334	0-7	0.06-0.6	0.20-0.24	5.6-7.8	Low	High	Moderate	---	---	6
	7-60	0.06-0.6	0.20-0.24	5.6-7.8	Low	High	Moderate	---		
Hurst:										
338A, 338B2	0-20	0.2-0.6	0.22-0.24	4.5-5.5	Moderate	High	High	0.43	3	6
	20-60	<0.06	0.10-0.20	4.5-7.3	High	High	High	0.32		
Belknap:										
382	0-8	0.2-2.0	0.22-0.24	4.5-5.5	Low	High	High	---	---	5
	8-60	0.2-2.0	0.20-0.22	4.5-6.0	Low	High	High	---		
Piopolis:										
420, W420	0-7	0.06-0.2	0.21-0.23	5.1-5.5	Moderate	High	Moderate	---	---	7
	7-60	0.06-0.2	0.18-0.20	5.1-5.5	Moderate	High	Moderate	---		
	49-60	0.06-0.2	0.18-0.20	6.6-7.3	Moderate	High	Low	---		
Karnak:										
426	0-6	0.06-0.2	0.11-0.14	5.6-6.0	High	High	Moderate	---	---	4
	6-60	<0.2	0.09-0.13	5.6-7.3	High	High	Moderate	---		
Burnside:										
427	0-18	0.6-2.0	0.22-0.24	4.5-6.0	Low	Low	High	---	---	5
	18-60	0.6-2.0	0.10-0.16	4.5-5.5	Low	Low	High	---		
Coffeen:										
428	0-17	0.6-2.0	0.22-0.24	5.6-7.3	Low	High	Moderate	---	---	6
	17-48	0.6-2.0	0.20-0.22	5.6-7.3	Low	High	Moderate	---		
	48-60	0.6-6.0	0.14-0.22	5.6-7.3	Low	High	Moderate	---		
Raddle:										
430A	0-12	0.6-2.0	0.22-0.24	5.6-7.3	Low	Low	Moderate	0.32	5	6
	12-60	0.6-2.0	0.20-0.22	5.6-7.3	Low	Moderate	Moderate	0.43		
Ware:										
456, F456	0-21	0.6-2.0	0.15-0.24	5.6-8.4	Low	Low	Moderate	---	---	5
	21-60	2.0-20.0	0.07-0.19	6.1-7.8	Very low	Low	Low	---		
Booker:										
457, W457	0-12	<0.06	0.12-0.14	5.6-7.3	Very high	High	Moderate	---	---	4
	12-60	<0.06	0.09-0.11	5.6-6.5	Very high	High	Moderate	---		
Urban land:										
533.										
Bowdre:										
589	0-15	0.06-0.2	0.15-0.20	5.6-7.3	High	High	Low	---	---	---
	15-19	0.2-0.6	0.19-0.22	6.1-8.4	Low	High	Low	---		
	19-35	0.6-2.0	0.15-0.22	6.1-8.4	Low	High	Low	---		
	35-60	2.0-6.0	0.05-0.15	6.1-8.4	Low	High	Low	---		
Cairo:										
590	0-36	<0.06	0.09-0.13	6.1-7.8	High	High	Low	0.28	4	4
	36-60	6.0-20	0.08-0.18	6.1-7.8	Low	High	Moderate	0.17		
Medway:										
682, F682	0-17	0.6-2.0	0.17-0.22	6.5-7.5	Low	Low	Low	---	---	---
	17-36	0.6-2.0	0.14-0.18	6.5-7.5	Low	Low	Low	---		
	36-60	6.0-20.0	0.08-0.15	6.5-7.8	Low	Moderate	Low	---		
Banlic:										
787	0-17	0.2-0.6	0.22-0.24	4.5-6.5	Low	High	High	---	---	5
	17-50	0.06-0.2	0.20-0.22	4.5-6.0	Low	High	High	---		
	50-60	0.06-0.2	0.11-0.12	4.5-6.0	Low	High	High	---		
Orthents, silty:										
801	0-60	0.06-2.0	0.18-0.22	5.1-6.5	Low	High	Moderate	0.43	4	6
Orthents, loamy:										
802C, 802G	0-60	0.6-2.0	0.10-0.18	3.6-7.8	Moderate	Moderate	High	0.43	4	6
Orthents, clayey:										
805	0-60	<0.06	0.08-0.14	3.6-8.4	Very high	High	High	0.32	3	4

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion		Erosion factors		Wind erodibility group
						Uncoated steel	Concrete	K	T	
	In	In/hr	In/in	pH						

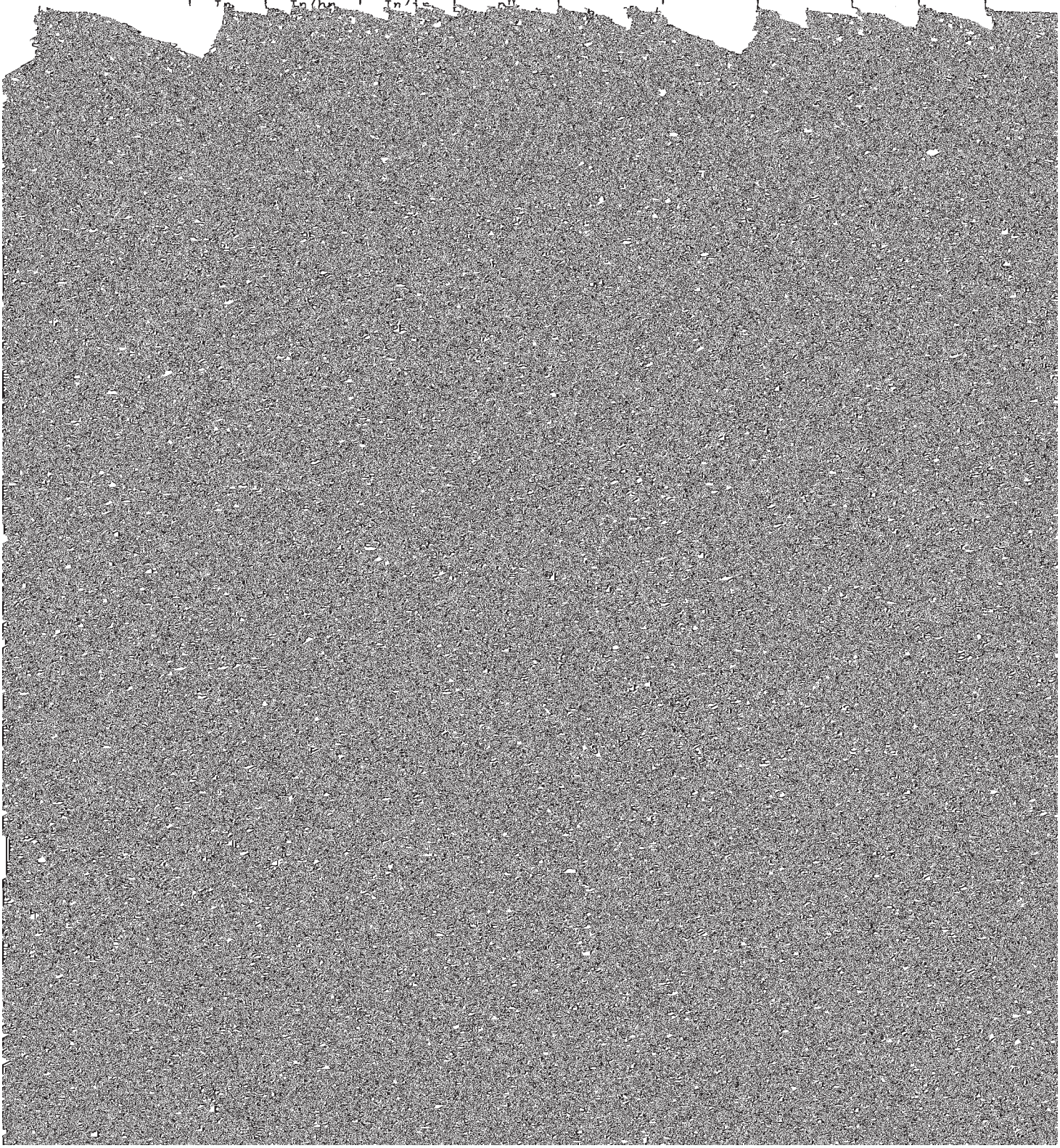


TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion		Erosion factors		Wind erodibility group
						Uncoated steel	Concrete	K	T	
	In	In/hr	In/in	pH						
Hickory:										
[1]929D2:										
Hickory part----	0-8	0.6-2.0	0.20-0.22	4.5-6.0	Low--------	Low-------	High------	0.32	5	6
	8-47	0.6-2.0	0.15-0.19	5.1-5.5	Moderate	Moderate	Moderate	0.32		
	47-60	0.6-2.0	0.11-0.19	5.1-8.4	Low--------	Low-------	Low-------	0.32		
Ava part--------	0-7	0.2-0.6	0.22-0.24	3.6-5.5	Moderate	Moderate	High------	0.43	4	6
	7-27	0.2-0.6	0.18-0.20	3.6-5.5	Moderate	Moderate	High------	0.43		
	27-60	<0.06	0.09-0.10	3.6-5.5	Moderate	Moderate	High------	0.43		
Goss:										
[1]930G:										
Goss part--------	0-3	2.0-6.0	0.06-0.17	5.1-6.0	Low--------	Low-------	Moderate	0.24	2	7
	3-23	2.0-6.0	0.06-0.10	5.1-6.0	Low--------	Low-------	Moderate	0.24		
	23-60	0.6-2.0	0.04-0.09	5.1-6.0	Moderate	Low-------	Moderate	0.24		
Alford part------	0-8	0.6-2.0	0.22-0.24	5.1-7.3	Low--------	Moderate	Moderate	0.37	5	5
	8-52	0.6-2.0	0.18-0.20	4.5-6.5	Moderate	Moderate	Moderate	0.37		
	52-60	0.6-2.0	0.20-0.22	5.6-7.3	Low--------	Moderate	Moderate	0.37		
Neotoma:										
[1]976G----------	0-20	0.6-6.0	0.14-0.20	5.6-6.5	Low--------	Low-------	Moderate	0.20	3	8
	20-30	0.6-6.0	0.10-0.16	5.1-6.5	Low--------	Low-------	Moderate	0.20		
	30-48	2.0-6.0	0.05-0.09	5.1-6.5	Low--------	Low-------	Moderate	0.20		
	48	---	---	---	----------	---------	---------	---		
[1]977E:										
Neotoma part-----	0-20	0.6-6.0	0.14-0.20	5.6-6.5	Low--------	Low-------	Moderate	0.20	3	8
	20-30	0.6-6.0	0.10-0.16	5.1-6.5	Low--------	Low-------	Moderate	0.20		
	30-48	2.0-6.0	0.05-0.09	5.1-6.5	Low--------	Low-------	Moderate	0.20		
	48	---	---	---	----------	---------	---------	---		
Wellston part----	0-6	0.6-2.0	0.18-0.22	5.1-6.5	Low--------	Moderate	Moderate	0.37	4	6
	6-29	0.6-2.0	0.17-0.21	4.5-6.0	Low--------	Moderate	High------	0.37		
	29-50	0.6-2.0	0.12-0.17	4.5-6.0	Low--------	Moderate	High------	0.37		
	50	---	---	---	----------	---------	---------	---		
[1]977G:										
Neotoma part-----	0-20	0.6-6.0	0.14-0.20	5.6-6.5	Low--------	Low-------	Moderate	0.20	3	8
	20-30	0.6-6.0	0.10-0.16	5.1-6.5	Low--------	Low-------	Moderate	0.20		
	30-48	2.0-6.0	0.05-0.09	5.1-6.5	Low--------	Low-------	Moderate	0.20		
	48	---	---	---	----------	---------	---------	---		
Wellston part----	0-6	0.6-2.0	0.18-0.22	5.1-6.5	Low--------	Moderate	Moderate	0.37	4	6
	6-29	0.6-2.0	0.17-0.21	4.5-6.0	Low--------	Moderate	High------	0.37		
	29-50	0.6-2.0	0.12-0.17	4.5-6.0	Low--------	Moderate	High------	0.37		
	50	---	---	---	----------	---------	---------	---		
Alford:										
[1]999D:										
Alford part------	0-8	0.6-2.0	0.22-0.24	5.1-7.3	Low--------	Moderate	Moderate	0.37	5	5
	8-52	0.6-2.0	0.18-0.20	4.5-6.5	Moderate	Moderate	Moderate	0.37		
	52-60	0.6-2.0	0.20-0.22	5.6-7.3	Low--------	Moderate	Moderate	0.37		
Hickory part-----	0-8	0.6-2.0	0.20-0.22	4.5-6.0	Low--------	Low-------	High------	0.32	5	6

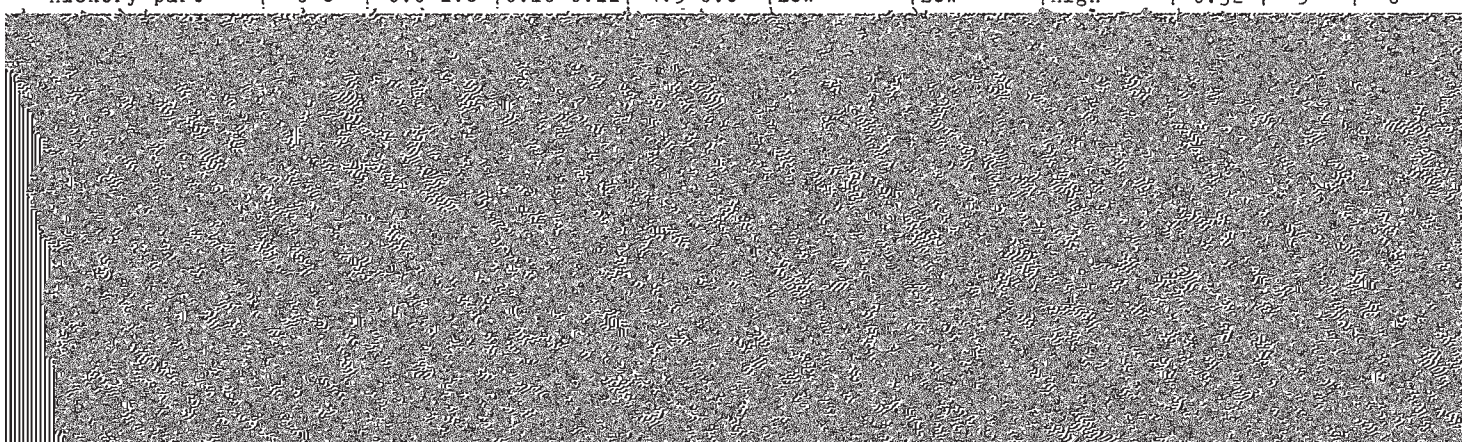


TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF SOILS--Continued

Soil name and map symbol	Depth	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Risk of corrosion		Erosion factors		Wind erodibility group
						Uncoated steel	Concrete	K	T	
	In	In/hr	In/in	pH						
Hickory:										
Alford part-----	0-8	0.6-2.0	0.22-0.24	5.1-7.3	Low--------	Moderate	Moderate	0.37	4	5
	8-52	0.6-2.0	0.18-0.20	4.5-6.5	Moderate	Moderate	Moderate	0.37		
	52-60	0.6-2.0	0.20-0.22	5.6-7.3	Low--------	Moderate	Moderate	0.37		
[1]999E3:										
Hickory part----	0-8	0.6-2.0	0.20-0.22	4.5-6.0	Low--------	Low-------	High------	0.32	4	6
	8-47	0.6-2.0	0.15-0.19	5.1-5.5	Moderate	Moderate	Moderate	0.32		
	47-60	0.6-2.0	0.11-0.19	5.1-8.4	Low--------	Low-------	Low-------	0.32		

TABLE 15.--SOIL AND WATER FEATURES

[The definitions of "flooding" and "water table" in the Glossary explain the terms "brief," "apparent," and "perched." The symbol > means more than. Absence of an entry indicates that the feature is not a concern]

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	
					Ft			In		
Hoyleton: 3A, 3B2	C	None	---	---	1.0-3.0	Apparent	Mar-Jun	>60	---	High.
Hickory: 8E, 8E3, 8G	C	None	---	---	>6.0	---	---	>60	---	Moderate.
Wynoose: 12	D	None	---	---	0-2.0	Apparent	Mar-Jun	>60	---	High.
Bluford: 13A, 13B	D	None	---	---	1.0-3.0	Perched	Mar-Jun	>60	---	High.
Ava: 14B, 14C3	C	None	---	---	2.0-4.0	Perched	Mar-Jun	>60	---	High.
Darwin: 71, 71+, F71, W71	D	Frequent	Long	Jan-Jun	0-2.0	Apparent	Jan-Jun	>60	---	Moderate.
Okaw: 84	D	Occasional	Brief	Apr-Jun	0-2.0	Apparent	Mar-Jun	>60	---	High.
Jacob: 85, W85	D	Frequent	Long	Mar-Jul	0-1.0	Perched	Feb-Jul	>60	---	Moderate.
Bonnie: 108	C/D	Frequent	Long	Mar-Jun	0-3.0	Apparent	Mar-Jun	>60	---	High.
Racoon: 109	C/D	Occasional	Brief	Mar-May	0-2.0	Apparent	Mar-Jun	>60	---	High.
Coln:										

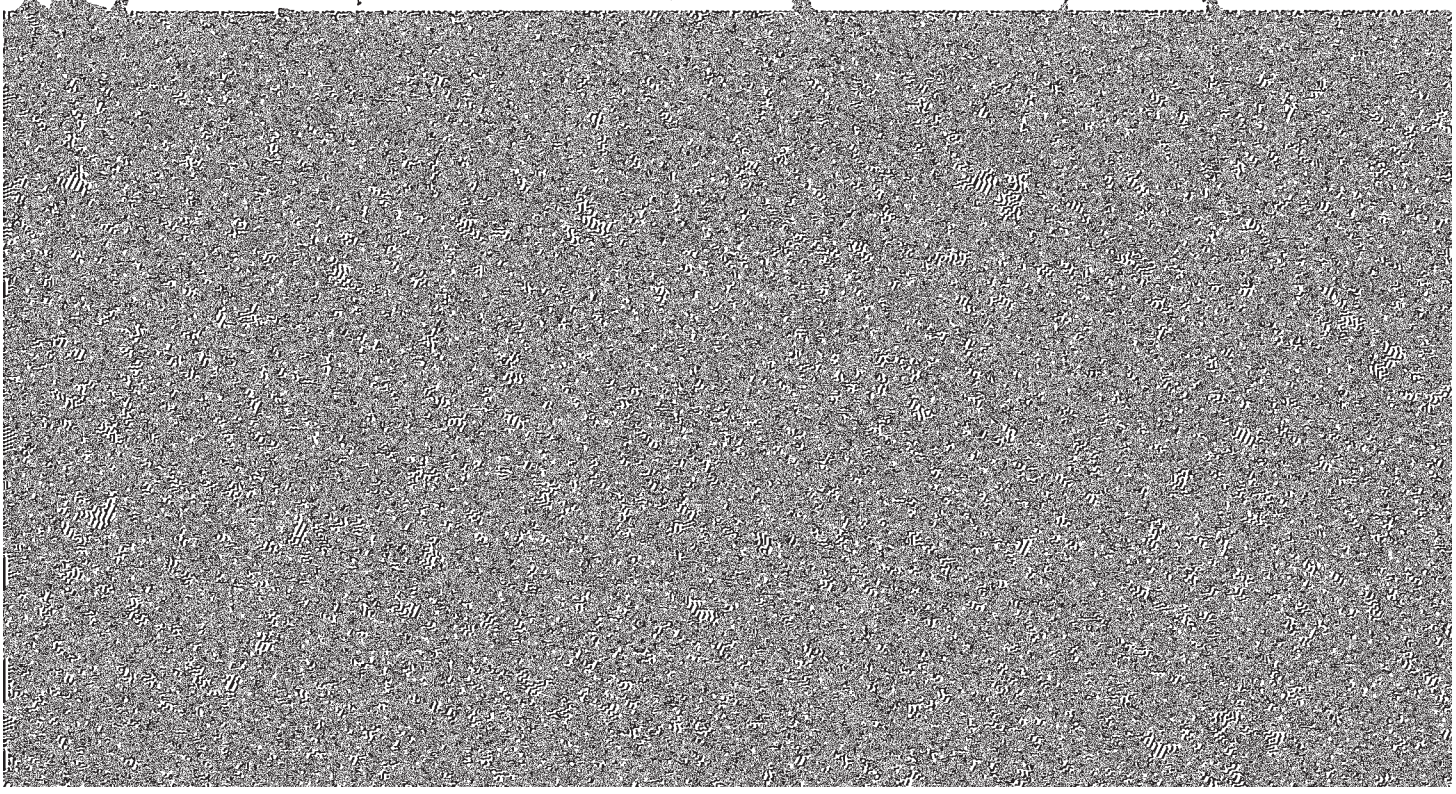


TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	
					Ft			In		
St. Charles: 243B	B	None	---	---	>6.0	---	---	>60	---	High.
Alford: 308B2, 308C2, 308C3, 308D2, 308D3, 308E, 308E3, 308G	B	None	---	---	>6.0	---	---	>60	---	High.
Haymond: 331	B	Frequent	Brief	Jan-May	>6.0	---	---	>60	---	High.
Wakeland: 333	B/D	Frequent	Brief	Jan-May	1.0-3.0	Apparent	Jan-Apr	>60	---	High.
Birds: 334	C/D	Frequent	Long	Mar-Jun	0-3.0	Apparent	Mar-Jun	>60	---	High.
Hurst: 338A, 338B2	D	Rare	---	---	1.0-3.0	Apparent	Feb-Apr	>60	---	Moderate.
Belknap: 382	C	Common	Long	Mar-Jun	0-3.0	Apparent	Mar-Jun	>60	---	High.
Piopolis: 420, W420	C/D	Frequent	Long	Mar-Jun	0-3.0	Apparent	Mar-Jun	>60	---	High.
Karnak: 426	D	Frequent	Long	Mar-May	0-3.0	Apparent	Apr-Jun	>60	---	High.
Burnside: 427	B	Occasional	Brief	Mar-Jun	3.0-5.0	Apparent	Feb-Jun	29-65	Hard	Moderate.
Coffeen: 428	B	Frequent	Brief	Mar-May	1.0-3.0	Apparent	Jan-May	>60	---	High.
Raddle: 430A	B	Rare	---	---	>6.0	---	---	>60	---	High.
Ware: 456, F456	B	Common	Brief	Apr-Jun	4.0-6.0	Apparent	Apr-Jun	>60	---	Moderate.
Booker: 457, W457	D	Common	Brief to	Apr-Jul	0-1.0	Perched	Nov-May	>60	---	Moderate.

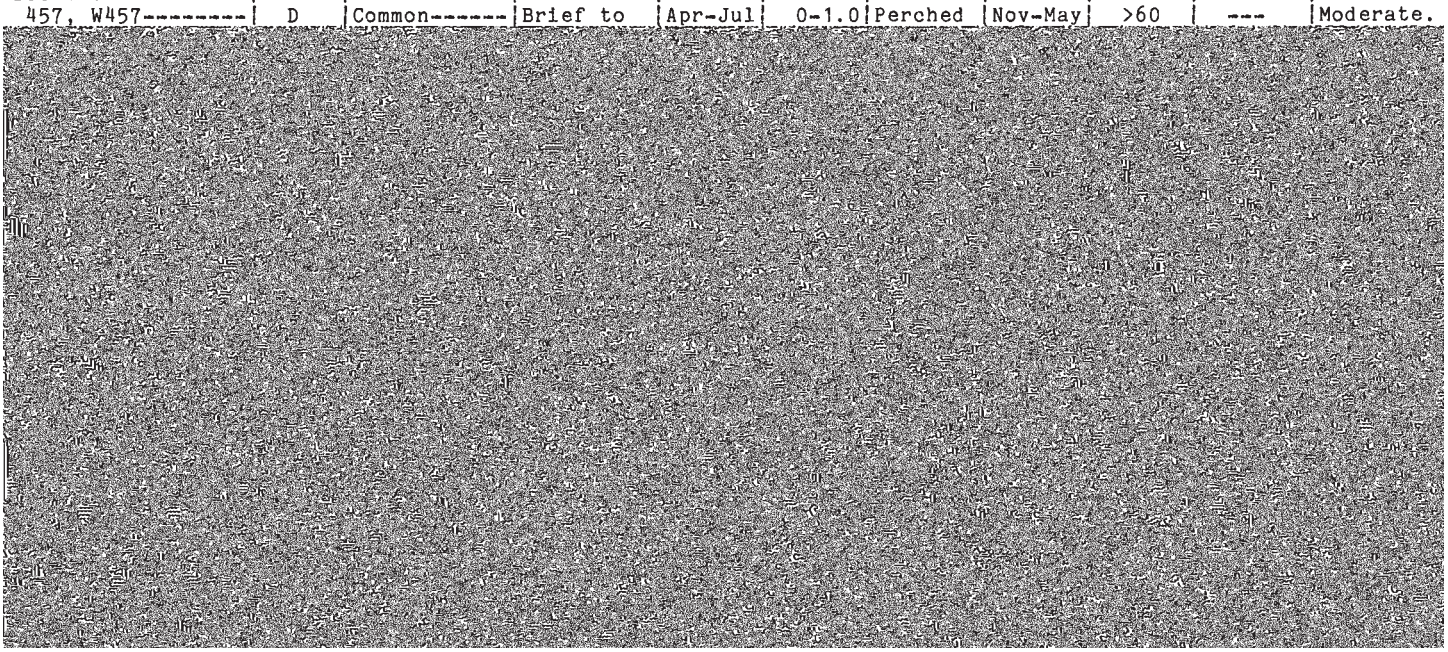


TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	
					Ft			In		
Hosmer:										
[1]850D:										
Hosmer part----	C	None----------	---	---	3.0-6.0	Perched	Mar-Apr	>60	---	High.
Hickory part---	C	None----------	---	---	>6.0	---	---	>60	---	Moderate.
[1]850D3:										
Hosmer part----	C	None----------	---	---	3.0-6.0	Perched	Mar-Apr	>60	---	High.
Hickory part---	C	None----------	---	---	>6.0	---	---	>60	---	Moderate.
Hickory:										
[1]850E:										
Hickory part---	C	None----------	---	---	>6.0	---	---	>60	---	Moderate.
Hosmer part----	C	None----------	---	---	3.0-6.0	Perched	Mar-Apr	>60	---	High.
[1]850E3:										
Hickory part---	C	None----------	---	---	>6.0	---	---	>60	---	Moderate.
Hosmer part----	C	None----------	---	---	3.0-6.0	Perched	Mar-Apr	>60	---	High.
Alford:										
[1]852E:										
Alford part----	B	None----------	---	---	>6.0	---	---	>60	---	High.
Wellston part--	B	None----------	---	---	>3.0	Apparent	Mar-May	>40	Hard	High.
[1]852G:										
Alford part----	B	None----------	---	---	>6.0	---	---	>60	---	High.
Wellston part--	B	None----------	---	---	>3.0	Apparent	Mar-May	>40	Hard	High.

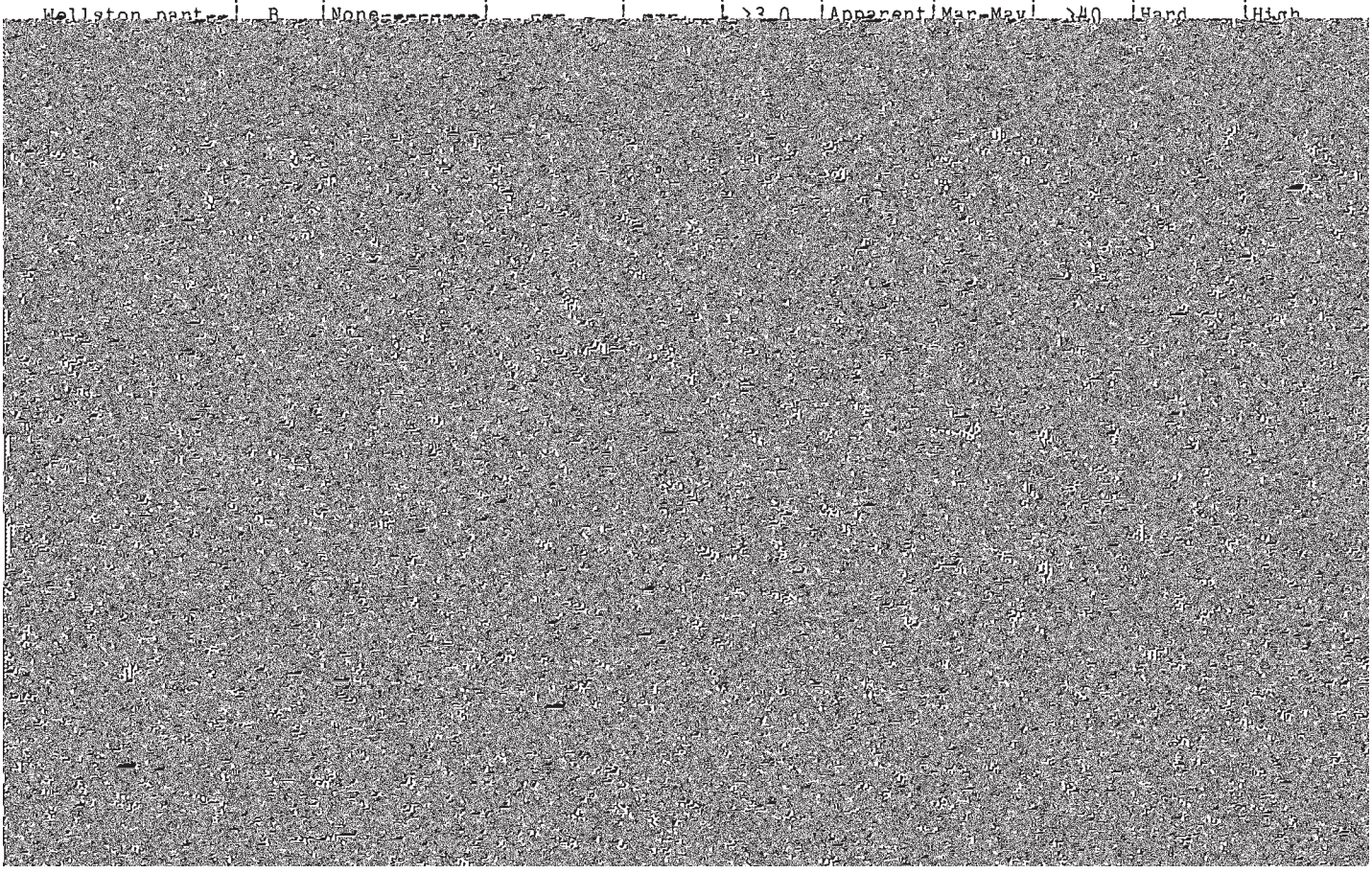


TABLE 15.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table			Bedrock		Potential frost action
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hardness	
					Ft			In		
Alford: [1]999D3:										
Alford part----	B	None----------	---	---	>6.0	---	---	>60	---	High.
Hickory part---	C	None----------	---	---	>6.0	---	---	>60	---	Moderate.
Hickory: [1]999E:										
Hickory part---	C	None----------	---	---	>6.0	---	---	>60	---	Moderate.
Alford part----	B	None----------	---	---	>6.0	---	---	>60	---	High.
[1]999E3:										
Hickory part---	C	None----------	---	---	>6.0	---	---	>60	---	Moderate.
Alford part----	B	None----------	---	---	>6.0	---	---	>60	---	High.
Mine dump: M.D.										
Quarry: Qu.										

[1]This mapping unit is made up of two or more dominant kinds of soil. See mapping unit description for the composition and behavior characteristics of the mapping unit.
[2]Rock outcrop part not evaluated.

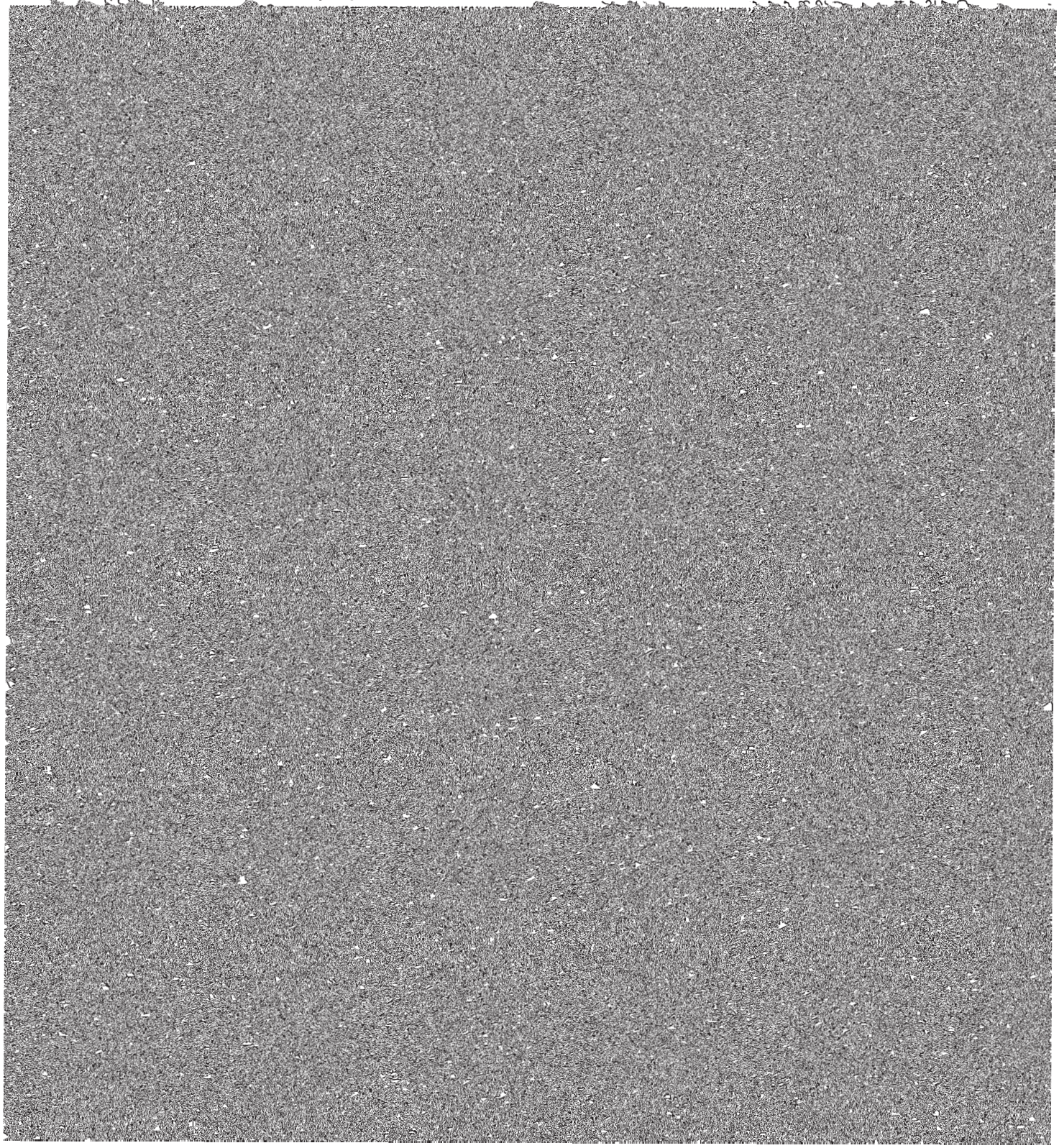


TABLE 16.--ENGINEERING TEST DATA--Continued

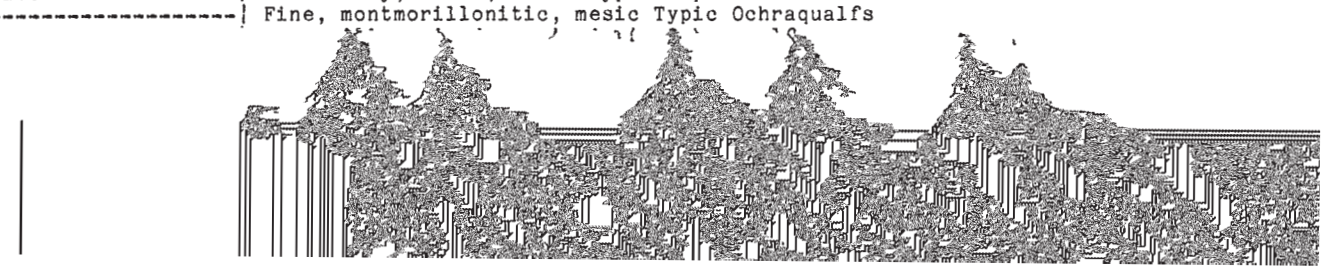
Parent material	Illinois report number S74-	Depth	Moisture density[1]		Percentage passing sieve--[2]			Percentage smaller than--[2]				Liquid limit	Plasticity index	Classification	
			Maximum	Optimum	No. 10	No. 40	No. 200	0.05 mm	0.02 mm	0.005 mm	0.002 mm			AASHTO[3]	Unified[4]
		In	lb/cu ft	Pct								Pct			
Clayey alluvium.	39-5-1	4-16	83.7	32.4	100.0	99.2	98.0	91.7	92.2	84.6	75.0	85.8	50.2	A-7-5 (60)	CH
Thin loess over clayey lacustrine deposits.	39-6-1	7-11	107.3	17.0	100.0	96.1	93.3	84.6	63.8	27.0	17.4	30.8	9.7	A-4(9)	CL
	39-6-2	15-31	88.5	28.2	100.0	99.8	99.1	92.7	77.5	51.0	44.5	60.0	32.3	A-7-6 (38)	CH
	39-6-3	54-63	95.8	23.6	100.0	98.9	96.3	91.5	80.2	56.2	47.8	54.4	42.4	A-7-6 (46)	CH
Loess over silty lacustrine deposits.	39-3-1	13-19	99.3	16.7	100.0	99.7	98.5	91.4	71.0	42.2	32.9	49.4	25.5	A-7-6 (29)	CL
	39-3-2	26-35	100.7	21.7	100.0	99.3	98.2	85.9	61.4	40.2	33.9	55.1	33.3	A-7-6 (36)	CH
	39-3-3	55-67	96.4	24.1	100.0	99.8	98.2	92.6	71.8	50.6	41.2	61.4	35.5	A-7-6 (41)	CH
Loess over glacial drift.	39-4-1	5-10	105.4	19.0	100.0	99.0	98.1	95.0	73.5	30.6	21.6	31.4	9.6	A-4(10)	CL
	39-4-2	19-32	98.6	21.5	100.0	99.7	99.2	92.7	73.4	48.6	41.3	48.6	27.0	A-7-6 (30)	CL
	39-4-3	58-80	102.8	20.4	100.0	98.6	96.2	89.0	57.2	30.2	24.9	45.4	25.9	A-7-6 (27)	CL

O Designation T99-57, Method A (1).
lysis according to AASHTO Designation T88-57 (1). Results by this procedure frequently differ somewhat
uld have been obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO
material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the
erial including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine
by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of
. The mechanical analyses used in this table are not suitable for use in naming textural classes for soils.
O Designation M145-49 (1).
nified Soil Classification System (8).
c.

TABLE 17.--CLASSIFICATION OF THE SOILS

[An asterisk in the first column indicates a taxadjunct to the series. See text for a description of those characteristics of this taxadjunct that are outside the range of the series]

Soil name	Family or higher taxonomic class
Alford	Fine-silty, mixed, mesic Typic Hapludalfs
Alvin	Coarse-loamy, mixed, mesic Typic Hapludalfs
Ava	Fine-silty, mixed, mesic Typic Fragiudalfs
Banlic	Coarse-silty, mixed, nonacid, mesic Aeric Haplaquepts
Belknap	Coarse-silty, mixed, acid, mesic Aeric Fluvaquents
Birds	Fine-silty, mixed, nonacid, mesic Typic Fluvaquents
Bluford	Fine, montmorillonitic, mesic Aquic Hapludalfs
Bonnie	Fine-silty, mixed, acid, mesic Typic Fluvaquents
Booker	Very-fine, montmorillonitic, mesic Vertic Haplaquolls
Bowdre	Clayey over loamy, montmorillonitic, thermic Fluvaquentic Hapludolls
Burnside	Loamy-skeletal, mixed, acid, mesic Typic Udifluvents
*Cairo	Clayey over sandy or sandy-skeletal, montmorillonitic, thermic Vertic Haplaquolls
Camden	Fine-silty, mixed, mesic Typic Hapludalfs
Coffeen	Coarse-silty, mixed, mesic Fluvaquentic Hapludolls
Colp	Fine, montmorillonitic, mesic Aquic Hapludalfs
Darwin	Fine, montmorillonitic, mesic Vertic Haplaquolls
Dupo	Coarse-silty over clayey, mixed, nonacid, mesic Aquic Udifluvents
Gorham	Fine-silty, mixed, mesic Fluvaquentic Haplaquolls
Goss	Clayey-skeletal, mixed, mesic Typic Paleudalfs
Haymond	Coarse-silty, mixed, nonacid, mesic Typic Udifluvents
Hickory	Fine-loamy, mixed, mesic Typic Hapludalfs
Hosmer	Fine-silty, mixed, mesic Typic Fragiudalfs
Hoyleton	Fine, montmorillonitic, mesic Aquollic Hapludalfs
Hurst	Fine, montmorillonitic, mesic Aeric Ochraqualfs
Jacob	Very fine, montmorillonitic, acid, mesic Vertic Haplaquepts
Karnak	Fine, montmorillonitic, nonacid, mesic Vertic Haplaquepts
Medway	Fine-loamy, mixed, mesic Fluvaquentic Hapludolls
Neotoma	Loamy-skeletal, mixed, mesic Ultic Hapludalfs
Okaw	Fine, montmorillonitic, mesic Typic Albaqualfs
Orthents, silty	Fine-silty, mixed, mesic Udorthents
Orthents, loamy	Fine-loamy, mixed, mesic Udorthents
Orthents, clayey	Clayey, montmorillonitic, mesic Udorthents
Piopolis	Fine-silty, mixed, acid, mesic Typic Fluvaquents
Racoon	Fine-silty, mixed, mesic Typic Ochraqualfs
Raddle	Fine-silty, mixed, mesic Typic Hapludolls
*St. Charles	Fine-silty, mixed, mesic Typic Hapludalfs
Sexton	Fine, montmorillonitic, mesic Typic Ochraqualfs



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