SOIL SURVEY

Nance County Nebraska

UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service
In cooperation with the
UNIVERSITY OF NEBRASKA
Conservation and Survey Division

Series 1955, No. 9

Issued July 1960

HOW TO USE THE SOIL SURVEY REPORT

THIS SOIL SURVEY of Nance County will help farmers and livestock men in planning the kind of management that will protect their soils and provide good yields. It describes the soils, shows their location on a map, and tells what they will do under different kinds of management.

In making this survey, soil scientists walked over the fields and grazing lands. They dug holes and examined surface soils and subsoils; noticed differences in growth of crops, weeds, and grasses; and, in fact, recorded all the things that they thought might affect the suitability of the soils for farming, engineering, livestock production, and related uses.

The scientists plotted the boundaries of the soils on aerial photographs. From the photographs, cartographers prepared the detailed soil maps in the back of this report on which fields, roads, streams, and many other landmarks are shown.

Locating the soils

Use the index to map sheets to locate areas on the large map. The numbered rectangles on the index map show the parts of the county covered by each of the soil maps. Select the sheet showing that part of the county on which your farm is located. The boundaries of the soils are outlined in red, and there is a symbol for each soil. All areas marked with the same symbol are the same kind of soil, wherever they appear on the map. Suppose, for example, an area located on the map has a symbol HaB. The legend for the detailed map shows that this symbol identifies Hall silt loam, 3 to 7 percent slopes. This soil and all the others mapped in the county are described in the section Descriptions of the Soils.

Information on the soils

Special sections of this report will interest different groups of readers. The parts that discuss the settlement, industries, population, climate, and other facts about the county will be of interest to those not familiar with the area.

Farmers and those who work with farmers can learn about the soils in the section Descriptions of the Soils. After the soils were mapped and studied, each soil was listed in a land capability unit; that is, in groups of soils that need similar management and respond in about the same way. For example, Hall silt loam, 3 to 7 percent slopes, is placed in capability unit IIe–1. The management this soil needs, therefore, will be stated under the heading Capability unit IIe–1, in the section Use and Management of Soils. The farmer who has Hall silt loam, 3 to 7 percent slopes, on his farm will want to study the table on yields in this same section. This table tells what crops can be produced on this soil under two levels of management.

Livestock men can learn about the grazing capacity of their range in the section Range Management. Suitable trees for woodland sites are listed in the section Woodland Management.

Soil scientists will find information about how the soils were formed and how they are classified in the section Genesis, Morphology, and Classification of Soils.

The Guide to Mapping Units and Capability Units at the end of the report will simplify the use of the map and the report. The guide gives the map symbol for each soil, the name of the soil, the page on which the soil is described, the capability unit in which the soil has been placed, and the page where the capability unit is described.

If you find that you need help in farm planning, consult the county agricultural agent or the local representative of the Soil Conservation Service. Supervisors of the Nance County Soil Conservation District will arrange for you to receive technical help on a farm conservation plan. Members of the staff of your State agricultural experiment station will also be glad to help you.

Fieldwork for this survey was completed in 1954. Unless otherwise indicated, statements in this report refer to conditions in the county at that time.

***Cover picture.*—A landscape in Nance County. (Photograph furnished by the Boardman Studio, Fullerton, Nebr.)**

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UNITED STATES DEPARTMENT OF AGRICULTURE IN COOPERATION WITH THE UNIVERSITY OF NEBRASKA, CONSERVATION AND SURVEY DIVISION

NANCE COUNTY, located near the center of the eastern half of Nebraska, has an area of 438 square miles. Agriculture is the main industry. The air mileage from Omaha, Lincoln, Hastings, and other towns in Nebraska is shown in figure 1.

General Soil Areas of Nance County

One can get a "bird's-eye view" of nearly every part of Nance County from one of several high bluffs just west of Fullerton, the county seat. A prominent landmark called Lover's Leap (fig. 2) is used as a reference or observation point. This observation point is about 2 miles south of the geographic center of the county. Since Nance County is only 30 miles long and 15 miles wide, nearly all parts of the county can be viewed from this point (marked by a bird in figure 3).

There are three main soil areas in Nance County, each of which has a distinctive topography and pattern of soils. These general soil areas are shown in figure 3.

Rolling Loess Uplands (Belfore-Moody-Nora-Crofton)

This soil area is marked by nearly level to gently sloping divides that break to rolling to steeply rolling hills. Several small rivers and large creeks cut through these loess uplands. Small drainageways to the creeks and rivers begin on the narrow, nearly level upland divides and wind through the rolling hills. This area occurs west, northwest, north, and northeast of Lover's Leap, the observation, or reference point, near Fullerton. (See fig. 3.)

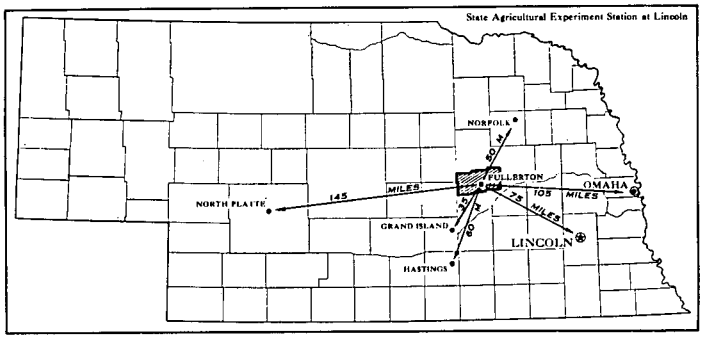

Figure 1.—Location of Nance County in Nebraska.

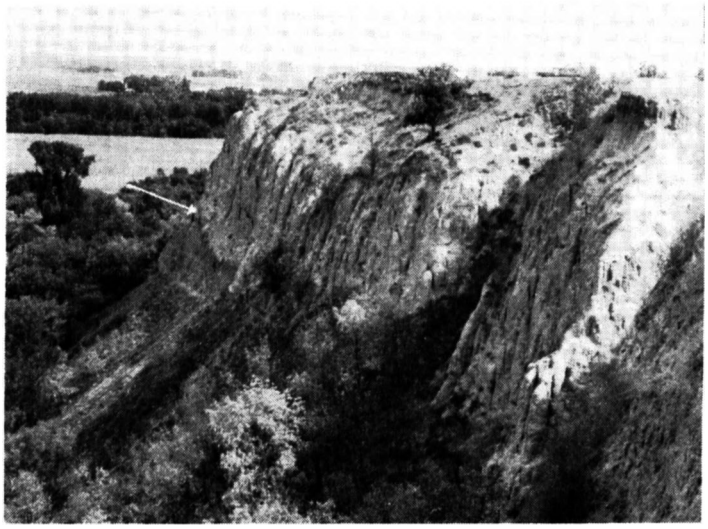

Figure 2.—Lover's Leap, a high bluff near Fullerton, is an observation point for locating general soil areas. The arrow points to where the Peorian loess above changes to the Loveland loess below.

The main streams that flow through these uplands are the Cedar River and Beaver, Plum, Timber, Skedee, Horse, and Cottonwood Creeks, and numerous smaller drainageways.

This area is composed of upland soils that have developed mainly in Peorian loess and, to a minor extent, in Loveland loess (fig. 4). The Peorian loess is a limy windblown soil material that ranges in color from a light yellowish brown to a light olive brown. The Loveland loess is under the Peorian loess. Where the Loveland loess is exposed on some lower slopes, the color

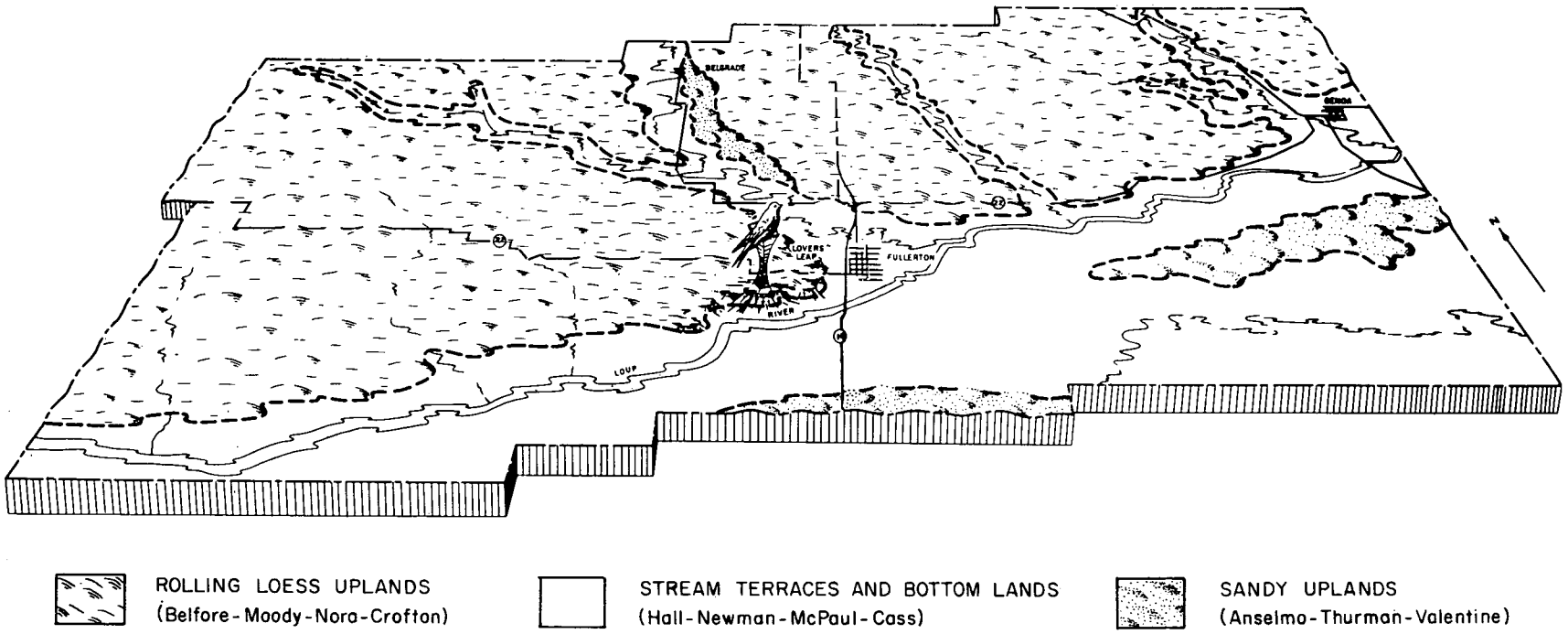

Figure 3.—General soil areas of Nance County from a "bird's-eye view."

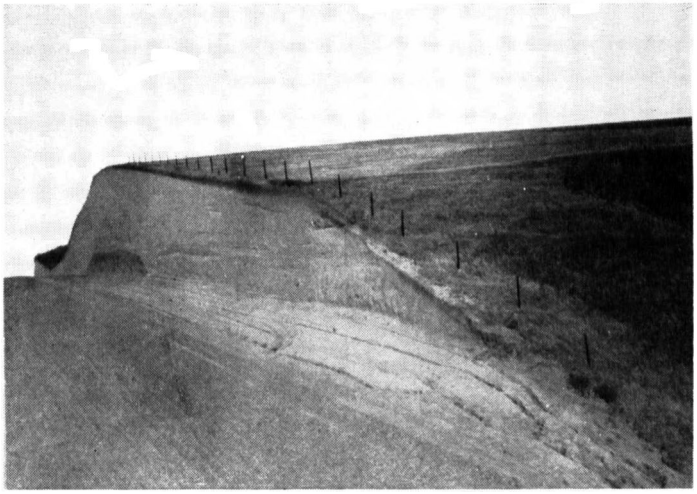

Figure 4.—**A road cut through Peorian loess. Buried Loveland loess shows as a dark spot in the bank. Peorian loess soils break rather sharply from nearly level and gently sloping ridges to rolling and steeply rolling areas.**

ranges from buff to reddish brown. The areas of Loveland loess are few and very small.

The soil pattern on the rolling loess uplands (Belfore-Moody-Nora-Crofton) is as follows:

Belfore soils are on the nearly flat uplands, and the Fillmore soils are in the small depressions. The Moody-Nora complex or Nora soils are on the gently sloping to rolling hills and have deep surface soil. The Crofton soils are on the rolling to very steep slopes and have thin surface soil, and the Nora-Crofton complex are on the rolling to very steep slopes and have mixed thick and thin surface soil. Loess hills and bluffs are on rough broken slopes and in canyonlike areas.

The Loveland loess is exposed on some of the slopes below the Peorian loess deposits. Soils of the Nuckolls series have developed in the Loveland loess.

At the base of some slopes, deep, dark soil material from the adjoining uplands has accumulated. The Judson soils have developed in this accumulation.

The soils of this area are used for general farming. The main crops are corn, oats, wheat, sorghums, alfalfa, and sweetclover. Practices for control of erosion are needed on the sloping croplands. These practices include construction of terraces and stabilized waterways and use of contour cultivation, of crop residues, and of cropping systems that include grass and legumes.

Steeper areas of Crofton soils and the Loess hills and bluffs are used for pasture and woodland. A good grass cover maintained by proper grazing control will help prevent erosion on these steeper areas.

Stream Terraces and Bottom Lands (Hall-Newman-McPaul-Cass)

The stream terraces and bottom lands occur along the Loup River and other streams in the county. In the southeastern part of the county, there is a gradual transition from the stream terraces to the bottom land along Prairie Creek. Since the slope is so gradual, it is difficult to tell where the terraces end and the bottom land begins. The streams and rivers through the rolling loess uplands also have some large areas of terraces and bottom lands.

The terrace soils can most easily be distinguished by the kind of subsoil they have. The soils with clay subsoil are Rokeby. The soils with silty clay loam subsoil are Hall. (Hall soils that contain saline-alkali spots are mapped as a Hall-Exline complex.) Soils that have silt loam or very fine sandy loam subsoil are Hord. The soils with fine sandy loam subsoil are Ortello, and those with loamy fine sand subsoil are Newman.

There are areas in the Newman, Hord, and Ortello soils that are moderately wet at times because of a high water table. Such areas are imperfectly drained phases of these three soils.

Small areas of terrace soils have gravelly substrata. The O'Neill soils are underlain with gravel at depths ranging from 20 to 36 inches. The Meadin soils have gravel at depths ranging from 10 to 20 inches.

The bottom lands or flood plains have the widest variety of soils. The drainage and degree of wetness, the kind of surface soil and subsoil, and the extent of flooding are important in classifying these soils.

The well-drained soils on the bottom lands are the Sarpy, Cass, and McPaul soils. The Sarpy soils have a loamy fine sand subsoil, the Cass soils have a subsoil that is fine sandy loam, and the McPaul soils have a silt loam subsoil.

The moderately wet soils on the bottom lands that normally have a depth to the water table ranging from 2 to 5 feet are the Lamoure, Leshara, and Wann soils. The Lamoure soils have a silty clay loam subsoil, the Leshara, a silt loam subsoil, and the Wann, a fine sandy loam subsoil.

The very wet, poorly drained soils on the bottom lands that have a high water table are the Loup and the Rauville soils. The Loup soils have a dominantly loamy fine sand subsoil. The Rauville soils have a subsoil ranging from silt loam to silty clay loam in texture.

The bottom lands that are very frequently flooded are classified as miscellaneous land types. Three of these are Sandy alluvial land, Silty alluvial land, and Very sandy alluvial land. The names indicate the dominant texture of each. Another miscellaneous land type, called Riverwash, is composed of sandbars and other nonagricultural land near major streams.

Soils of the terraces and bottom lands that are deep and well drained or only moderately wet are used for general farming. The main crops are corn, oats, wheat, sorghums, alfalfa, and sweetclover. Drainage is a problem on the moderately wet soils during years of excessive rainfall.

Soils that are wet, poorly drained, or frequently flooded are mostly in native grass, which is used for pasture or hay. Yields are high because of the abundant moisture. Surface drainage, where practical, will help make these areas more accessible for grazing or mowing. Trees, shrubs, and grass occur on some of the sandbars and Riverwash, but they are of little agricultural value.

Sandy Uplands (Anselmo-Thurman-Valentine)

There are three areas of sandy uplands in Nance County. Two are south of the Loup River and one is east of the Cedar River.

One area south of the Loup River occurs south of Fullerton and for about 5 miles continues along the middle of the southern boundary of the county. It is about ½ to 1 mile wide in the county and is part of the low, dunelike sandy upland that joins the terrace land south of the river.

Another sandy upland area south of the Loup River starts about 6 miles east of Fullerton (see fig. 3) and extends eastward beyond the county line. This area is rolling and hummocky and about 2 miles wide. It occurs between the valley of the Loup River and the nearly level bench land along Prairie Creek.

A narrow band of sandy uplands occurs east of the Cedar River, south of Belgrade.

The sandy uplands (Anselmo-Thurman-Valentine) are composed of the following soils: The Anselmo soils, which are fine sandy loams; the Thurman soils, which have a loamy fine sand surface soil and subsoil; and the Valentine soils, which are deep sands.

The sandy uplands (Anselmo-Thurman-Valentine) are used for general farming. The main crops grown are corn, rye, wheat, sorghums, vetch, alfalfa, sweetclover, and native grass.

Practices to control erosion by wind and water are necessary. Such practices should include the use of stubble mulch tillage, of wind stripcropping, and of field shelterbelts. Terraces, grassed waterways, and gully control structures should be used where needed and practical. The very sandy soils are best suited to grass, but they require careful range management because they are unstable.

Use and Management of Soils

This section has five parts. The first part explains the system of land capability grouping. In the second part, all the soils of the county are placed in capability units, and management suggestions for the soils in each unit are given. In the third part, estimated yields of principal crops are given for each soil under two levels of management. The fourth and fifth parts give suggestions for management of range and farm woodland.

Capability Groups

Capability grouping is a system of classification used to show the relative suitability of soils for crops, grazing, forestry, and wildlife. It is a practical grouping based on the needs and limitations of the soils, the risks of damage to them, and also their response to management. There are three levels above the soil mapping unit in this grouping. They are the capability unit, subclass, and class.

The capability unit, which can also be called a management group of soils, is the lowest level of capability grouping. A capability unit is made up of soils similar in kind of management they need, in risk of damage, and in general suitability for use.

The next broader grouping, the subclass, is used to indicate the dominant kind of limitation. The letter symbol "e" indicates that susceptibility to erosion is the dominant problem or hazard. The symbol "w" indicates that excess water, either in or on the soil, is the dominant hazard or limitation. Subclass "s" indicates that a root-zone limitation, such as shallowness or very slow permeability, is present in the soil. In some parts of the country, subclass "c" is used to indicate that climate is a limitation in the use of the soils.

The broadest grouping, the land capability class, is identified by Roman numerals. All the soils in one class have limitations and management problems of about the same degree, but of different kinds, as shown by the subclass. All the land classes except class I may have one or more subclasses.

In classes I, II, and III are soils that are suitable for annual or periodic cultivation of annual or short-lived crops.

Class I soils are those that have the widest range of use and the least risk of damage. They are level, or nearly level, productive, well drained, and easy to work. They can be cultivated with almost no risk of erosion and will remain productive if managed with normal care.

Class II soils can be cultivated regularly, but they do not have quite so wide a range of suitability as class I soils. Some class II soils are gently sloping; consequently, they need moderate care to prevent erosion. Other soils in class II may be slightly droughty or slightly wet, or somewhat limited in depth.

Class III soils can be cropped regularly but have a narrower range of use. These need even more careful management.

In class IV are soils that have greater natural limitations than those in class III, but they can be cultivated for some crops under very careful management.

In classes V, VI, and VII are soils that normally should not be cultivated for annual or short-lived crops, but they can be used for pasture or range, for woodland, or for wildlife.

Class V soils are nearly level and gently sloping but are droughty, wet, low in fertility, or otherwise unsuitable for cultivation.

Class VI soils are not suitable for crops because they are steep or droughty or otherwise limited, but they give fair yields of forage or forest products. Some soils in class VI can, without damage, be cultivated enough so that fruit trees or forest trees can be set out or pasture crops seeded.

Class VII soils provide only poor to fair yields of forage or forest products and have characteristics that limit them severely for these uses.

In class VIII are soils that have practically no agricultural use. Some of them have value as wildlife habitats or for scenery.

Classes, subclasses, and units in Nance County

The soils of Nance County are grouped into classes, subclasses, and units. The descriptive names in the following list apply to most, but not necessarily all, of the soils in each capability unit.

Class I.—Nearly level, productive soils that have few permanent limitations; suitable for tilled crops, pasture, and trees.

Unit I–1: Level or nearly level, well-drained soils that are easy to work.

Class II.—Soils that have some limitations if tilled; suitable for crops, pasture, and trees.
- Subclass IIe: Level to gently sloping soils; subject to erosion if cover is not maintained.
  - Unit IIe–1: Gently sloping silty soils.
  - Unit IIe–2: Nearly level claypan soils.
  - Unit IIe–3: Nearly level to gently sloping, moderately sandy soils.
- Subclass IIw: Moderately wet soils.
  - Unit IIw–4: Soils on terraces and flood plains that are subject to a fluctuating water table and to occasional flooding.

Class III.—Soils that have severe limitations and require careful management if tilled; suitable for crops, pasture, and trees.
- Subclass IIIe: Nearly level sandy soils and sloping, silty and sandy soils that have high risk of erosion when tilled.
  - Unit IIIe–1: Gently sloping or sloping, silty soils.
  - Unit IIIe–3: Gently sloping or sloping, moderately sandy and silty soils.
  - Unit IIIe–5: Nearly level or gently sloping, deep, sandy soils.
- Subclass IIIw: Soils that are limited mainly by excess water.
  - Unit IIIw–1: Moderately wet, clayey soils on flood plains.
  - Unit IIIw–2: Claypan soils in depressions that flood occasionally.
  - Unit IIIw–5: Moderately wet, sandy soils on flood plains.
  - Unit IIIw–6: Moderately wet, moderately sandy soils on uplands, terraces, and flood plains.
- Subclass IIIs: Nearly level soils limited mainly by moderate salinity or alkalinity.
  - Unit IIIs–1: Moderately saline or alkaline soils.

Class IV.—Soils that have very severe limitations if tilled; suitable for only limited or occasional cultivation but suited to pasture or trees.
- Subclass IVe: Soils subject to severe erosion if cover is not maintained.
  - Unit IVe–1: Sloping and strongly sloping, eroded and severely eroded soils.

Class V.—Soils that have few limitations for pasture or trees; not suited to tilled crops.
- Subclass Vw: Wet soils not suited to cultivation.
  - Unit Vw–1: Very wet lowlands.

Class VI.—Soils that have severe limitations for pasture or trees; not suited to tilled crops.
- Subclass VIe: Strongly sloping and steep soils limited for pasture or trees by risk of erosion if cover is not maintained.
  - Unit VIe–1: Steep, silty soils.
  - Unit VIe–3: Strongly sloping moderately sandy soils.
- Subclass VIw: Soils limited by excess water.
  - Unit VIw–3: Very frequently flooded soils or soils cut by deep drainageways.

Class VII.—Soils that have severe limitations for pasture and trees; not suited for tilled crops.
- Subclass VIIe: Soils limited by risk of erosion if cover is not maintained.
  - Unit VIIe–1: Thin silty soils on rough, broken slopes or in canyonlike areas.
  - Unit VIIe–5: Nearly level to strongly sloping sandy soils.
- Subclass VIIs: Soils that are severely limited by shallow root zone.
  - Unit VIIs–4: Shallow soils over gravel.

Class VIII.—Soils that are not suitable for producing commercial vegetation; suitable only for recreation or wildlife areas.
- Subclass VIIIs: Soils that are too unstable to grow useful plants.
  - Unit VIIIs–1: Riverwash and sandbars.

Management by Capability Units

Capability unit I–1

This unit consists of deep, level or nearly level soils that are easily worked. The moisture relations are good for plant growth. In this unit are the medium-textured, well-drained soils on the uplands, terraces, and bottom lands. Erosion is a minor problem and yields are high. The soils of this unit are:

Belfore silt loam, 0 to 1 percent slopes.
Cass silt loam.
Hall silt loam, 0 to 1 percent slopes.
Hord very fine sandy loam, 0 to 1 percent slopes.
McPaul silt loam.
Ortello very fine sandy loam, 1 to 3 percent slopes.

These soils are suitable for corn, oats, wheat, sorghum, soybeans, alfalfa, sweetclover, and grass. Row crops should not be grown for more than 3 consecutive years in the cropping system. Alfalfa and bromegrass, seeded about every 16 to 20 years and left for 2 to 4 years will help maintain fertility and tilth. Other sod-building grasses can be used in place of bromegrass. The principal management problem on these soils is the maintenance of fertility. The soils of this unit are generally low in lime. Lime needs should be determined by soil tests.

The soils of this unit are among the best in the county for irrigation, since they are nearly level and absorb and give up water readily.

Capability unit IIe–1

This unit consists of deep, gently sloping, silty soils that are easily worked. The moisture relations are good for plant growth. These medium-textured soils occur on uplands and terraces. The slopes range from 1 to 7 percent, and the erosion is slight to moderate. Water erosion, however, is the main problem on the cultivated soils. The soils of this unit are:

Belfore silt loam, 1 to 3 percent slopes.
Belfore silt loam, 1 to 3 percent slopes, eroded.
Hall silt loam, 1 to 3 percent slopes.
Hall silt loam, 3 to 7 percent slopes.
Hall silt loam, 3 to 7 percent slopes, eroded.
Hord very fine sandy loam, 1 to 3 percent slopes.
Hord very fine sandy loam, 3 to 7 percent slopes.
Judson silt loam, 1 to 3 percent slopes.
Judson silt loam, 3 to 7 percent slopes.
Moody-Nora silt loams, 3 to 7 percent slopes.
Moody-Nora silt loams, 3 to 7 percent slopes, eroded.

These soils are suitable for corn, oats, wheat, sorghum, soybeans, alfalfa, sweetclover, and grass. Terraces, contour tillage, grassed waterways, and mulch tillage will

help control erosion. Grass and legumes, seeded every 12 to 16 years and left about 4 years, will help maintain tilth and fertility. Although lime and phosphate generally are not required, soil tests may indicate their need on some fields. The soils of this unit are very good for irrigation, if proper methods are used for control of water erosion.

Capability unit IIe-2

Only one soil is in this unit in Nance County. It is a deep, nearly level soil. Because of the clay subsoil, water movement through this soil is moderately slow to slow. The surface soil and parent material have medium texture. Although this soil is highly productive, water is supplied slowly to plants because of the tight subsoil, and crops are subject to drought damage. The soil in this unit is:

Rokeby silt loam, 0 to 1 percent slopes.

This soil is suitable for wheat, corn, oats, sorghum, soybeans, alfalfa, sweetclover, and grass. Wheat and oats are particularly well suited because they mature before the hot, dry summer. The use of crop residues and grass and legume crops will help to maintain a more open and porous soil that will absorb water. This soil requires lime, since it is normally acid.

Irrigation will make continuous high yields possible, if the soil is properly fertilized and managed.

Capability unit IIe-3

This unit consists of deep and moderately deep, nearly level to gently sloping soils that are moderately sandy. They occur on uplands, terraces, and bottom lands. The slopes range from 0 to 7 percent. Production is moderately high to high. These soils are subject to both water and wind erosion. The soils in this unit are:

Cass fine sandy loam.
Hord fine sandy loam, 0 to 1 percent slopes.
Hord fine sandy loam, 1 to 3 percent slopes.
Hord fine sandy loam, 3 to 7 percent slopes.
Moody-Anselmo complex, 1 to 3 percent slopes.
Moody-Anselmo complex, 3 to 7 percent slopes.
O'Neill fine sandy loam, 1 to 3 percent slopes.
Ortello fine sandy loam, 1 to 3 percent slopes.
Ortello fine sandy loam, 1 to 3 percent slopes, eroded.
Sarpy fine sandy loam.
Thurman-Anselmo fine sandy loams, 1 to 3 percent slopes.
Thurman-Anselmo fine sandy loams, 1 to 3 percent slopes, eroded.

These soils are suitable for corn, wheat, rye, oats, sorghum, soybeans, sweetclover, alfalfa, and grass. Practices for the control of wind and water erosion are necessary. Such practices include the use of cover crops, wind stripcropping, shelterbelts, terraces, grassed waterways, and mulch tillage. The terraces, grassed waterways, and mulch tillage are needed only on the sloping land. The amounts of lime and phosphorus are generally low in these soils. These amendments, however, should be applied only according to needs determined by soil tests.

The soils of this unit are suitable for irrigation if erosion is controlled by proper methods.

Capability unit IIw-4

This unit consists of soils that are imperfectly drained and subject to occasional flooding. These medium-textured soils occur on terraces and bottom lands in nearly level areas. The water table is generally at depths of 2 to 5 feet. These soils are highly productive, but the water table is occasionally high enough to reduce the yields. It is generally beneficial to crops, however, because the subirrigation helps produce good yields in dry years. The soils in this unit are:

Hord very fine sandy loam, imperfectly drained, 0 to 1 percent slopes.
Leshara silt loam.
Ortello very fine sandy loam, imperfectly drained, 0 to 1 percent slopes.
Wann silt loam.

These soils are suitable for corn, oats, wheat, sorghum, soybeans, alfalfa, sweetclover, and grass. The main problem is the wetness in some seasons, and surface or tile drainage is necessary to remove this risk. These soils are generally high in lime. Grass and legume mixtures used 2 to 4 years every 16 to 20 years in the cropping system will help maintain fertility. If alfalfa dies out in the wet soils, as sometimes happens, nitrogen fertilizer may have to be used to obtain good yields of other crops.

The soils of this unit are fairly well suited to irrigation. In some years, however, subirrigation supplies enough moisture for good yields, especially for alfalfa and other deep-rooted crops.

Capability unit IIIe-1

This unit consists of gently sloping or sloping, silty soils with slight to severe erosion. Moisture is readily absorbed and is readily available to plants. The surface soils and subsoils are mostly silt loam. Slopes range from 3 to 12 percent. These soils are subject to severe water erosion. Yields are fairly high under good management. The soils of this unit are:

Crofton silt loam, 7 to 12 percent slopes.
Moody-Nora silt loams, 3 to 7 percent slopes, severely eroded.
Nora silt loam, 7 to 12 percent slopes.
Nora silt loam, 7 to 12 percent slopes, eroded.
Nora silt loam, 7 to 12 percent slopes, severely eroded.

These soils are suitable for corn, oats, wheat, sorghums, sweetclover, alfalfa, and grass. The main risk for the cultivated soils is water erosion (fig. 5). Practices for

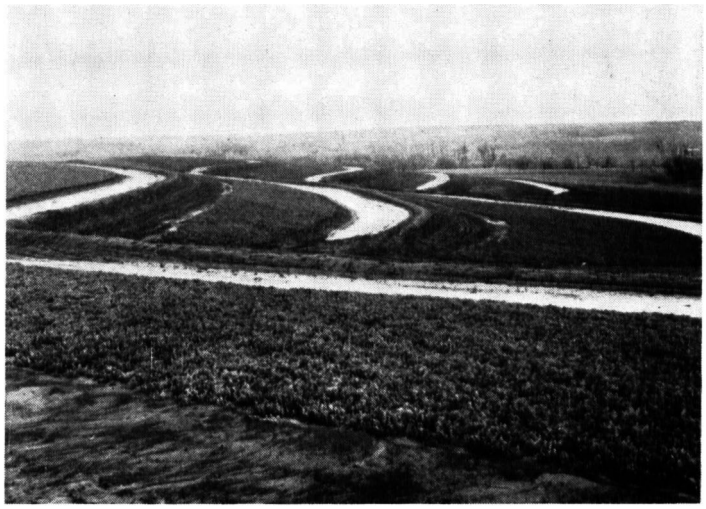

Figure 5.—**Nora silt loam, 7 to 12 percent slopes. Water erosion is the main problem on this soil.**

control of erosion are the use of contour tillage, terraces, grassed waterways, crop residues, and cropping systems that help maintain tilth. Grass and alfalfa, used in the rotation every 8 to 12 years and left about 4 years, will help maintain fertility and good soil structure.

The less sloping areas can be used for irrigation if practices to control water erosion are used.

Capability unit IIIe-3

This unit consists of gently sloping or sloping moderately sandy and silty soils on the uplands. The surface soils are mainly fine sandy loams, but the subsoils and underlying strata are variable. The slopes range from 3 to 12 percent, and the erosion ranges from slight to severe. Some areas are on low hummocky to dunelike slopes. The productivity is fairly high. The soils in this unit are:

Nora-Anselmo complex, 7 to 12 percent slopes, eroded.
Nora-Anselmo complex, 7 to 12 percent slopes, severely eroded.
Ortello fine sandy loam, 3 to 7 percent slopes.
Ortello fine sandy loam, 3 to 7 percent slopes, eroded.
Thurman-Anselmo fine sandy loams, 3 to 7 percent slopes, eroded.
Thurman-Anselmo fine sandy loams, 7 to 12 percent slopes, eroded.

These soils are suitable for corn, wheat, rye, oats, sorghum, alfalfa, vetch, sweetclover, and grass. Practices to control water and wind erosion are necessary to keep the soil productive. These practices include use of terraces, contour tillage, grassed waterways, structures for gully control, stripcropping, field shelterbelts, and mulch tillage. The cropping system should include about 4 years of grass and legumes every 8 to 12 years to maintain soil structure and fertility.

Lime, phosphorus, and nitrogen are generally low, especially in the more sandy soils.

Capability unit IIIe-5

This unit consists of nearly level or gently sloping, deep, sandy soils on bottom lands, terraces, and uplands. The surface soils are loamy fine sand, and the subsoils are loamy sand or sand. The slopes range from nearly level to 7 percent. The topography on the terraces and uplands ranges from nearly level to that of low hummocks or low dunes. The productivity of these soils is fairly good. Although they absorb water rapidly, they have a lower capacity to hold water that plants can use than the silty or clayey soils. The soils in this unit are:

Newman loamy fine sand, 1 to 3 percent slopes.
Newman loamy fine sand, 1 to 3 percent slopes, eroded.
Newman loamy fine sand, 3 to 7 percent slopes, eroded.
Sarpy loamy fine sand.
Thurman loamy fine sand, 1 to 3 percent slopes.
Thurman loamy fine sand, 1 to 3 percent slopes, eroded.
Thurman loamy fine sand, 3 to 7 percent slopes.
Thurman loamy fine sand, 3 to 7 percent slopes, eroded.
Thurman loamy fine sand, 3 to 7 percent slopes, severely eroded.

These soils are best suited to corn, rye, vetch, sorghum, alfalfa, and grass. If properly fertilized, they are also fairly well suited to wheat and sweetclover. These soils are generally low in lime, phosphorus, and nitrogen. Suitable cropping systems and amendments are needed to correct these deficiencies. Vetch, which appears to be well suited to these sandy soils, will supply much nitrogen. Alfalfa and sweetclover will grow readily if the soils are limed to correct the acidity.

Since these soils are subject to severe wind erosion, they need field shelterbelts, wind stripcropping, cover crops, and mulch tillage (fig. 6). Long slopes that are subject to water erosion need terraces, contour tillage, and grassed waterways.

These soils can be irrigated. However, since the sandy texture gives the soils a low capacity to hold water that plants can use, water must be applied frequently. Gravity irrigation is difficult because of the loamy sand texture, and is impossible in most places because of the irregular topography.

Capability unit IIIw-1

Only one soil is in the unit in the county—a deep, moderately wet soil on imperfectly drained bottom lands of the flood plains. The surface soil and subsoil are moderately heavy. Intake of water is moderately slow, and so is the release of water in the soil to plants. Generally, the depth to the water table is less than 5 feet. A few small, scattered alkali spots may occur in this soil. This soil has a high potential fertility and is very productive. The soil in this unit is:

Lamoure silty clay loam.

This soil is suitable for corn, oats, wheat, soybeans, sorghum, alfalfa, sweetclover, and grass. Crop yields are generally high, but may be reduced in wet seasons because of the high water table. Drainage would help prevent this reduction in yields.

Fertility and tilth can be improved if about 3 years of alfalfa are grown after 16 to 20 years of tilled crops. Flooding occurs at times, but the damage is generally minor.

This soil is suitable for irrigation during the dry years when the water table is low.

Capability unit IIIw-2

Only one soil is in the unit—a deep claypan soil in upland depressions that flood occasionally. This soil has a medium-textured surface soil and a clay subsoil

Figure 6.—**The mulch cover in the foreground protects Newman loamy fine sand, 1 to 3 percent slopes, from wind erosion. Valentine fine sand, 3 to 17 percent slopes, in the background, is suitable only for range.**

that causes slow permeability. This soil is too wet for cultivation in some years because of poor surface drainage. When moisture is favorable, however, productivity is high. The soil in this unit is:

Fillmore silt loam, 0 to 1 percent slopes.

This soil is suitable for all local crops, but it is rarely used for alfalfa. The water generally stands in the low places for at least a short time each year, and crops are subject to drowning. In some years high yields are produced because of the extra moisture draining into these depressions. In other years excess water in the depressions causes loss of crops. Surface drainage, if feasible, and good cropping systems are the principal management needs. This soil generally does not have enough lime and phosphorus for maximum yields.

Capability unit IIIw–5

This unit consists of moderately wet, sandy soils on flood plains. These soils are on imperfectly drained areas of the terraces and bottom lands. The surface soils are loamy fine sands, and the subsoils and substrata range from loamy to coarse sands. The water table is fairly high; it is generally at depths that range from 2 to 5 feet below the surface. Water enters the soil rapidly and also is given up readily for plants. The soils are fairly productive, but potential fertility is low. The soils in this unit are:

Newman loamy fine sand, imperfectly drained, 0 to 1 percent slopes.
Sarpy loamy fine sand, imperfectly drained.

Wind erosion is one of the chief hazards on these soils. It can be controlled by wind stripcropping, field shelterbelts, and cover crops. Another hazard is extreme wetness caused by the water table. This can be corrected by drainage. Such drainage should be well managed, since subirrigation from the water table may be desirable in dry years.

These soils have lime in the surface soil but are generally deficient in phosphorus. Suitable crops are corn, rye, vetch, sorghum, wheat, sweetclover, alfalfa, and grass. A grass-legume crop grown for about 3 years after 8 to 12 years of tilled crops will help maintain fertility. Vetch is well suited to these soils. Alfalfa does well when the depth to the water table remains at 3 feet or more.

Capability unit IIIw–6

This unit consists of moderately wet, moderately sandy soils on uplands, terraces, and flood plains. They are deep to moderately deep and imperfectly drained. The surface soils are fine sandy loams, and the subsoils range from silt loams to loamy sands. The imperfect drainage is caused by a high water table or by slow surface drainage in depressions. Productivity is fairly high on these soils in the drier years. The soils of this unit are:

Moody-Anselmo complex, depressions.
Ortello fine sandy loam, imperfectly drained, 0 to 1 percent slopes.
Sarpy fine sandy loam, imperfectly drained.
Wann fine sandy loam.

These soils are best suited to corn, oats, rye, wheat, sorghum, alfalfa, sweetclover, and grass. Occasionally, crops are lost because of excessive wetness. Drainage will help reduce the wetness. Cover crops, wind stripcropping, field shelterbelts, and mulch tillage will help prevent wind erosion. Crop yields are fairly high in most years because of extra moisture supplied by the high water table or by water that collects in depressions.

Capability unit IIIs–1

This unit consists of moderately saline or alkaline soils that are deep to moderately deep and occur on terraces and bottom lands. Saline or alkaline spots cover about 10 to 35 percent of the total area. The salts are brought to the surface by a high water table and capillary water, and this moisture evaporates at the surface, leaving accumulated salts. Some of the salts break down soil structure. Areas where this occurs are commonly called slick-spots, or alkali areas. Most of the areas of this unit are nonalkaline and are deep to moderately deep. Their texture is medium to moderately heavy. The water table in the soils of this unit generally ranges from 2 to 5 feet deep.

The soils in this unit are:

Hall-Exline silt loams, 0 to 1 percent slopes.
Lamoure silt loam, moderately saline.
Leshara silt loam, moderately saline.
Wann silt loam, moderately saline.

The areas not affected by alkali, which make up the major acreage, generally produce high yields. Yields are reduced on these areas in years when the water table is too high. The yields on the alkali areas range from fair to poor, according to the effects of the salts and moisture conditions.

Suitable crops are corn, wheat, oats, sorghum, soybeans, alfalfa, sweetclover, and grass. Since wheat, alfalfa, and some grasses are more tolerant of alkaline conditions, they may be more desirable on the more severely affected areas. Grass-and-legume mixtures used about 3 in every 10 to 12 years will help to maintain structure, tilth, and fertility. Simple drainage practices and chemical treatment of the alkali-saline areas may be desirable and practical on some of these soils.

These soils are suitable for irrigation if adequate subsurface drainage is established. If properly done, irrigation will help to leach out the excess salts and remove the alkali-saline condition.

Capability unit IVe–1

This unit consists of sloping and strongly sloping, eroded and severely eroded soils. They are deep upland soils and have slopes that range from 7 to 17 percent. If cultivated the soils of this unit are subject to severe erosion (fig. 7). They are deficient in available nitrogen and phosphorus and, consequently, have low productivity. Lime occurs at or near the surface. The soils of this unit are:

Crofton silt loam, 7 to 12 percent slopes, severely eroded.
Crofton silt loam, 12 to 17 percent slopes.
Crofton silt loam, 12 to 17 percent slopes, severely eroded.
Nora-Crofton silt loams, 12 to 17 percent slopes.
Nora-Crofton silt loams, 12 to 17 percent slopes, eroded.
Nora-Crofton silt loams, 12 to 17 percent slopes, severely eroded.
Nuckolls silty clay loam, 7 to 12 percent slopes, severely eroded.
Nuckolls silty clay loam, 12 to 17 percent slopes, severely eroded.

Figure 7.—**Crofton silt loam, 12 to 17 percent slopes, severely eroded. A complete conservation program that includes grass in the cropping system is needed to control erosion.**

These soils are suited to corn, oats, wheat, sorghum, alfalfa, sweetclover, and grass. Because of the severe risk of erosion, grass and legumes should be grown at least one-half of the time. A clean-tilled or row crop should not be grown for 2 consecutive years. Terraces, grassed waterways, contour cultivation, mulch tillage, and control of gullies are needed. These soils are generally low in phosphorus and nitrogen. Fertilizer should be applied according to needs indicated by soil tests. These soils are well suited to native pasture. The slopes are too steep for irrigation.

Capability unit Vw–1

This unit consists of very wet, deep and moderately deep soils on the lowlands or bottom lands. The soils cannot be cultivated because the water table is at or near the surface of the soil most of the time. Their use and management are therefore restricted. The textures of the surface soils and subsoils range from sand to silty clay. The soils of this unit are:

Loup fine sandy loam.
Loup silt loam.
Rauville soils.

Most of the acreage is covered with grass and scattered trees. No special practices are required for pasture or hay except good grazing control. In some wet seasons, grazing may have to be limited. Fertilizer has some value, but it should be applied only according to needs indicated by soil tests.

Capability unit VIe–1

This unit consists of steep, silty soils on loess. The surface soils are severely eroded or very thin. Although water enters the soil readily, runoff is high because of the steep slopes that range from 17 to 30 percent. Sheet and gully erosion may be severe. The fertility is fair on the uneroded areas and poor on the severely eroded areas. Some rough, broken, and deeply gullied areas are included in this unit. The soils in this unit are:

Crofton silt loam, 17 to 30 percent slopes.
Crofton silt loam, 17 to 30 percent slopes, severely eroded.

These soils are best suited to grass or trees (fig. 8). Cultivated areas should be reseeded to a mixture of native grass and legumes or planted to suitable trees. Management practices needed for pasture grass are proper stocking, deferred grazing, and rotation grazing. Terraces, structures for control of gullies, and grassed waterways are needed where water erosion has been severe. There are good dam sites on these soils for recreational areas or livestock water.

Capability unit VIe–3

This unit consists of strongly sloping, moderately sandy soils. The soils in this unit are severely eroded and, as a result, runoff is high. The surface soils are fine sandy loams, and the subsoils have mixed sandy and silty textures. The fertility is low because of erosion. The soils in this unit are:

Nora-Anselmo complex, 12 to 17 percent slopes, severely eroded.

This unit is not suitable for cultivation. It is best suited to native grasses. Terraces, gully-control structures, and grassed waterways are needed where water erosion has been severe. Areas in grass require careful management that includes proper stocking, rotation grazing, and occasional deferred grazing to allow grass to seed.

Capability unit VIw–3

This unit consists of land types that are very frequently flooded or are cut by deep drainageways. These silty or sandy soils occur on the bottom lands. They are not suitable for crops, because of frequent flooding. Some small areas with poor drainage are included. The average production of forage is only fair because of the frequent flood deposits on many areas. The land types in this unit are:

Sandy alluvial land.
Silty alluvial land.

Very little native timber of economic value occurs in these land types. Some of the areas on streambanks and bluffs are best suited to shrubs and trees. The smooth slopes are best suited to grass. Range management practices needed for maximum yields are proper

Figure 8.—**Crofton silt loam, 17 to 30 percent slopes, on a silty upland range site. A good grass cover will prevent erosion.**

stocking, rotation grazing, and deferred grazing. Flooded areas may need occasional reseeding of grass and legumes.

Capability unit VIIe–1

This unit consists of thin, silty soils on rough, broken slopes or in canyonlike areas. The soil material in these bluffs and breaks is mostly deep, silty loess. About half of this land type consists of smoothly rolling to steeply rolling areas between the breaks and gullies. The surface soil is generally very thin, and the fertility is fairly low. The land type in this unit is:

Loess hills and bluffs.

This land type is suitable only for trees, shrubs, and grass. Trees and shrubs are best suited to the areas of rough, gullied land and bluffs. Areas in grass need careful pasture management and grazing control to maintain a plant cover. This cover will help check sheet and gully erosion.

Dams or structures to control gullies are also needed to check erosion. Because of the rough relief, some areas of this land type are used to impound water for livestock or as sites for recreation.

Capability unit VIIe–5

This unit consists of nearly level to strongly sloping sandy soils. They are deep and moderately deep and occur on uplands and bottom lands. The bottom-land areas, subject to frequent flooding, consist mostly of sand that was deposited by water. The upland areas consist of windblown sand that is mostly stabilized, although there are some small, severely eroded spots and blowouts. These soils take in water very rapidly, but their capacity to hold water that plants can use is low. Fertility is fairly low in the uneroded areas and very low on the eroded ones. The soils in this unit are:

Sarpy fine sand.
Valentine fine sand, 3 to 17 percent slopes.
Valentine fine sand, 3 to 17 percent slopes, eroded.
Valentine loamy fine sand, 3 to 17 percent slopes.
Very sandy alluvial land.

These soils are best suited to grass. They require careful management that includes proper stocking, deferred grazing, rotation grazing, and fencing and reseeding of blowouts and other severely eroded places. Mixed tall grass and grasses suitable for stabilizing sandy land are needed for reseeding. Vetch and other legumes suitable for sandy land may be seeded with the grass.

Capability unit VIIs–4

Only one soil is in the unit in the county. It is a shallow soil over gravel. The depth over gravel ranges from 10 to 20 inches. The texture of the surface soil is loamy fine sand, and that of the subsoil ranges from loamy sand to sand. Water enters the soil rapidly, but the gravelly subsoil has very little capacity to hold water that plants can use. Consequently, the soil is very droughty and also low in fertility. The soil is:

Meadin loamy fine sand, 0 to 1 percent slopes.

This soil is best suited to grass but requires careful management. If overgrazed, it blows readily and undesirable grass and weeds increase rapidly. Good management includes proper stocking, deferred grazing, and rotation grazing.

Capability unit VIIIs–1

This unit consists of riverwash and sandbars. Only one land type is in the unit in the county. It consists of sandbars and willow-covered areas along the rivers. It is composed of recent deposits of coarse and fine sands and some silts. The land type in this unit is:

Riverwash.

This land type is useful only for wildlife, hunting, and fishing. Hunting and fishing in the area can be improved by good wildlife management.

Estimated Yields

The estimated average acre yields of principal crops under ordinary and improved management are given in table 1. The grazing capacity for tame pastures under two levels of management is also shown.

The estimated yields in columns A are for crops grown under prevailing management. Under such management, cropping systems are lacking or poor, manure or fertilizers are not applied or are used very little, and legumes and grass are seldom grown. No conservation practices are used. Under prevailing management the tame pastures are not properly stocked and are generally overgrazed. Fertilizer is not used, and the pasture is kept in only fair to poor condition.

Yields under more careful and intensive management are given in columns B. This type of management is discussed in the section Management by Capability Units. Such management includes (1) the use of cropping systems and conservation practices as needed, (2) the use of fertilizer as needed, (3) the return of crop residues, except forage, to the soil, and (4) the use of grass and legumes to maintain tilth, organic matter, and fertility. For the tame pastures, this management also includes the use of fertilizer on grass and legumes and keeping pastures in good condition through proper stocking, deferred grazing, and rotation grazing.

Note that yields of a crop on soils in the same capability unit may differ. Thus, the potential production of some soils may vary, even though the use and management may be the same.

In table 1 are the best current estimates that could be made under dryland farming. They are based primarily on information from representative farmers in all parts of the county, the county agricultural agent, and SCS personnel serving the Nance County Soil Conservation District. These estimates may change in the future because of weather conditions, use of new crop varieties, and other factors. Since irrigation is just being established on many farms, the results are too new and variable to be evaluated in terms of yield.

TABLE 1.—*Estimated average acre yields of the principal crops under (A) ordinary management and (B) improved management*

[If no yield is given, the soil is not suited to crop specified. See table 2 for suggested stocking rates when soils are used for range]

Map symbol	Soil	Corn		Wheat		Oats		Rye		Alfalfa		Tame pasture (bromegrass and alfalfa)	
		A	B	A	B	A	B	A	B	A	B	A	B
		Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Acres per cow*[1]	*Acres per cow*[1]
Be	Belfore silt loam, 0 to 1 percent slopes	30	50	15	30	15	40			2.0	3.5	8.0	3.0
BeA	Belfore silt loam, 1 to 3 percent slopes	25	45	12	25	15	35			2.0	3.5	8.0	3.0
BeA2	Belfore silt loam, 1 to 3 percent slopes, eroded	25	45	12	25	15	35			2.0	3.5	8.0	3.0
Ca	Cass silt loam	40	60	15	25	20	40			2.5	4.0	7.0	2.5
Cs	Cass fine sandy loam	40	60	12	20	15	35	10	20	2.5	3.5	10.0	3.0
CfC	Crofton silt loam, 7 to 12 percent slopes	20	35	12	20	15	25			2.0	3.0	10.0	4.0
CfC3	Crofton silt loam, 7 to 12 percent slopes, severely eroded	15	30	5	15	8	20			2.0	3.0	12.0	5.0
CfD	Crofton silt loam, 12 to 17 percent slopes	10	30	5	15	8	20			1.5	2.5	10.0	4.0
CfD3	Crofton silt loam, 12 to 17 percent slopes, severely eroded	8	25	5	15	8	20			1.5	2.5	12.0	5.0
CfE	Crofton silt loam, 17 to 30 percent slopes												
CfE3	Crofton silt loam, 17 to 30 percent slopes, severely eroded												
Fm	Fillmore silt loam, 0 to 1 percent slopes	20	50	5	30	10	25						
Ha	Hall silt loam, 0 to 1 percent slopes	30	50	15	30	15	40			2.0	3.5	8.0	3.0
HaA	Hall silt loam, 1 to 3 percent slopes	25	45	12	25	15	35			2.0	3.5	8.0	3.0
HaB	Hall silt loam, 3 to 7 percent slopes	25	45	12	25	15	35			2.0	3.5	8.0	3.0
HaB2	Hall silt loam, 3 to 7 percent slopes, eroded	20	40	10	20	15	35			2.0	3.5	8.0	3.0
HE	Hall-Exline silt loams, 0 to 1 percent slopes	25	45	15	25	15	40			2.0	3.5	9.0	3.0
Hr	Hord fine sandy loam, 0 to 1 percent slopes	25	45	15	30	15	35	15	30	2.0	3.5	10.0	3.0
HrA	Hord fine sandy loam, 1 to 3 percent slopes	25	45	15	30	15	35	15	30	2.0	3.5	10.0	3.0
HrB	Hord fine sandy loam, 3 to 7 percent slopes	20	40	10	25	10	30	12	25	1.5	3.0	10.0	3.0
Hy	Hord very fine sandy loam, 0 to 1 percent slopes	35	50	15	30	15	40			2.5	4.0	8.0	3.0
HyA	Hord very fine sandy loam, 1 to 3 percent slopes	30	45	12	25	12	35			2.5	4.0	8.0	3.0
HyB	Hord very fine sandy loam, 3 to 7 percent slopes	30	45	12	25	12	35			2.5	4.0	8.0	3.0
2Hy	Hord very fine sandy loam, imperfectly drained, 0 to 1 percent slopes	35	65	15	30	20	40	15	30	2.5	4.0	5.0	2.0
JuA	Judson silt loam, 1 to 3 percent slopes	35	60	15	30	20	40			2.5	4.0	8.0	3.0
JuB	Judson silt loam, 3 to 7 percent slopes	30	55	10	25	15	35			2.0	3.5	8.0	3.0
2La	Lamoure silt loam, moderately saline	25	50	12	25	15	35			2.5	4.0	9.0	3.5
Lb	Lamoure silty clay loam	35	60	20	30	20	40			3.0	4.5	5.0	2.0
Le	Leshara silt loam	35	55	15	25	20	40			3.0	4.5	5.0	2.0
2Le	Leshara silt loam, moderately saline	30	50	12	20	18	35			2.5	4.0	9.0	3.5
Lh	Loess hills and bluffs												
Lo	Loup fine sandy loam												
Lp	Loup silt loam												
Mc	McPaul silt loam	50	65							2.5	4.0	7.0	2.5
Me	Meadin loamy fine sand, 0 to 1 percent slopes												
2MA	Moody-Anselmo complex, depressions	25	45	12	20	20	35	10	20	2.5	3.5		
MAA	Moody-Anselmo complex, 1 to 3 percent slopes	25	45	15	30	15	35	15	30	2.0	3.5	10.0	3.0
MAB	Moody-Anselmo complex, 3 to 7 percent slopes	20	40	10	25	10	30	12	25	1.5	3.0	10.0	3.0
MNB	Moody-Nora silt loams, 3 to 7 percent slopes	35	50	15	30	15	35			2.5	3.5	8.0	3.0
MNB2	Moody-Nora silt loams, 3 to 7 percent slopes, eroded	35	50	15	30	15	35			2.5	3.5	8.0	3.0
MNB3	Moody-Nora silt loams, 3 to 7 percent slopes, severely eroded	30	45	12	28	12	30			2.0	3.0	10.0	4.0
NAC2	Nora-Anselmo complex, 7 to 12 percent slopes, eroded	20	40	10	25	10	30	12	25	1.5	3.0	12.0	4.0
NAC3	Nora-Anselmo complex, 7 to 12 percent slopes, severely eroded	15	35	10	20	10	25	10	20	1.5	2.5	12.0	4.0
NAD3	Nora-Anselmo complex, 12 to 17 percent slopes, severely eroded												
NCD	Nora-Crofton silt loams, 12 to 17 percent slopes	20	30	10	20	12	30			1.5	2.5	10.0	4.0
NCD2	Nora-Crofton silt loams, 12 to 17 percent slopes, eroded	20	30	10	20	12	30			1.5	2.5	10.0	4.0
NCD3	Nora-Crofton silt loams, 12 to 17 percent slopes, severely eroded	10	30	8	18	10	20			2.0	3.0	10.0	4.0
2Ne	Newman loamy fine sand, imperfectly drained, 0 to 1 percent slopes	20	40	10	20			12	25	2.0	3.5	6.0	2.5
NeA	Newman loamy fine sand, 1 to 3 percent slopes	15	40	10	20			12	25	1.5	2.5	14.0	4.5
NeA2	Newman loamy fine sand, 1 to 3 percent slopes, eroded	12	35	10	20			10	20	1.5	2.0	14.0	4.5

See footnote at end of table.

TABLE 1.—*Estimated average acre yields of the principal crops under (A) ordinary management and (B) improved management*—Continued

[If no yield is given, the soil is not suited to crop specified. See table 2 for suggested stocking rates when soils are used for range]

Map symbol	Soil	Corn		Wheat		Oats		Rye		Alfalfa		Tame pasture (bromegrass and alfalfa)	
		A	B	A	B	A	B	A	B	A	B	A	B
		Bu.	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Tons*	*Tons*	*Acres per cow* [1]	*Acres per cow* [1]
NeB2	Newman loamy fine sand, 3 to 7 percent slopes, eroded	12	35	8	18	----	----	10	20	1. 5	2. 0	14. 0	5. 5
NoC	Nora silt loam, 7 to 12 percent slopes	30	45	12	28	15	35	----	----	2. 0	3. 0	10. 0	4. 0
NoC2	Nora silt loam, 7 to 12 percent slopes, eroded	25	40	12	25	15	35	----	----	2. 0	3. 0	10. 0	4. 0
NoC3	Nora silt loam, 7 to 12 percent slopes, severely eroded	25	35	10	22	12	30	----	----	2. 0	3. 0	10. 0	4. 0
NuC3	Nuckolls silty clay loam, 7 to 12 percent slopes, severely eroded	20	30	8	20	10	25	----	----	1. 5	2. 5	12. 0	5. 0
NuD3	Nuckolls silty clay loam, 12 to 17 percent slopes, severely eroded	15	25	5	15	8	20	----	----	1. 5	2. 5	12. 0	5. 0
OnA	O'Neill fine sandy loam, 1 to 3 percent slopes	15	35	10	18	----	----	10	20	1. 0	2. 0	10. 0	3. 0
2Or	Ortello fine sandy loam, imperfectly drained, 0 to 1 percent slopes	25	50	15	25	20	40	15	30	2. 5	3. 5	5. 5	2. 0
OrA	Ortello fine sandy loam, 1 to 3 percent slopes	25	45	15	30	15	35	12	25	2. 0	2. 5	10. 0	3. 0
OrA2	Ortello fine sandy loam, 1 to 3 percent slopes, eroded	20	40	10	20	12	30	10	20	2. 0	2. 5	10. 0	3. 0
OrB	Ortello fine sandy loam, 3 to 7 percent slopes	18	35	10	18	10	25	10	20	1. 5	2. 0	12. 0	4. 0
OrB2	Ortello fine sandy loam, 3 to 7 percent slopes, eroded	18	35	10	18	10	25	10	20	1. 5	2. 0	12. 0	4. 0
20s	Ortello very fine sandy loam, imperfectly drained, 0 to 1 percent slopes	35	55	15	30	20	40	15	30	2. 5	4. 0	5. 0	2. 0
OsA	Ortello very fine sandy loam, 1 to 3 percent slopes	25	45	12	25	15	35	15	30	2. 5	3. 5	8. 0	3. 0
Ra	Rauville soils	----	----	----	----	----	----	----	----	----	----	----	----
Ro	Rokeby silt loam, 0 to 1 percent slopes	30	50	18	30	25	45	----	----	2. 5	4. 0	8. 0	3. 0
Rw	Riverwash	----	----	----	----	----	----	----	----	----	----	----	----
Sa	Sarpy fine sand	----	----	----	----	----	----	----	----	----	----	----	----
Sf	Sarpy fine sandy loam	25	45	12	20	----	----	10	20	2. 5	3. 5	10. 0	3. 0
2Sf	Sarpy fine sandy loam, imperfectly drained	25	50	15	25	20	40	15	30	2. 5	3. 5	6. 0	2. 5
Sg	Sarpy loamy fine sand	20	35	10	20	----	----	10	20	2. 0	3. 0	14. 0	4. 5
2Sg	Sarpy loamy fine sand, imperfectly drained	20	40	10	20	15	20	15	30	2. 0	3. 0	6. 0	2. 5
Sx	Sandy alluvial land	----	----	----	----	----	----	----	----	----	----	----	----
Sy	Silty alluvial land	----	----	----	----	----	----	----	----	----	----	----	----
TAA	Thurman-Anselmo fine sandy loams, 1 to 3 percent slopes	20	40	12	25	12	30	12	25	2. 0	2. 5	10. 0	3. 0
TAA2	Thurman-Anselmo fine sandy loams, 1 to 3 percent slopes, eroded	20	40	12	25	12	30	12	25	2. 0	2. 5	10. 0	3. 0
TAB2	Thurman-Anselmo fine sandy loams, 3 to 7 percent slopes, eroded	15	35	10	20	10	25	10	20	2. 0	2. 5	12. 0	4. 0
TAC2	Thurman-Anselmo fine sandy loams, 7 to 12 percent slopes, eroded	15	35	10	20	10	25	10	20	2. 0	2. 5	12. 0	4. 0
ThA	Thurman loamy fine sand, 1 to 3 percent slopes	15	40	10	20	----	----	12	25	1. 5	2. 5	14. 0	4. 5
ThA2	Thurman loamy fine sand, 1 to 3 percent slopes, eroded	12	35	10	20	----	----	10	20	1. 5	2. 0	14. 0	4. 5
ThB	Thurman loamy fine sand, 3 to 7 percent slopes	12	35	10	20	----	----	10	20	1. 5	2. 0	14. 0	5. 0
ThB2	Thurman loamy fine sand, 3 to 7 percent slopes, eroded	12	35	8	18	----	----	10	20	1. 5	2. 0	14. 0	5. 5
ThB3	Thurman loamy fine sand, 3 to 7 percent slopes, severely eroded	10	30	5	15	----	----	8	15	1. 0	2. 0	15. 0	5. 5
VaC	Valentine fine sand, 3 to 17 percent slopes	----	----	----	----	----	----	----	----	----	----	----	----
VaC2	Valentine fine sand, 3 to 17 percent slopes, eroded	----	----	----	----	----	----	----	----	----	----	----	----
VbC	Valentine loamy fine sand, 3 to 17 percent slopes	----	----	----	----	----	----	----	----	----	----	----	----
Vs	Very sandy alluvial land	----	----	----	----	----	----	----	----	----	----	----	----
Wb	Wann fine sandy loam	25	50	15	25	20	40	15	30	2. 5	3. 5	5. 5	2. 0
Wn	Wann silt loam	30	55	15	25	20	40	----	----	2. 5	4. 0	5. 0	2. 0
2Wn	Wann silt loam, moderately saline	30	50	15	25	20	35	----	----	3. 0	4. 0	9. 0	3. 5

[1] Average number of acres required for mature cow for 6 months of grazing without injury to pasture.

Range Management

Soil areas in native grass are grouped into range sites for management purposes. Range sites are areas of different kinds of grassland. They differ in the kind and amount of original vegetation they can produce (fig. 9). For example, sandy land has a different grass cover than silty upland. The amount of forage produced also varies on the different range sites; for example, on wet bottom land, sand, or thin loess.

Range condition is determined by comparing the kind and amount of present vegetation with the original. The present condition of the range is indicated by the range condition classes—excellent, good, fair, and poor. A range in excellent condition is one where use and management have maintained or restored the most desirable and productive kinds of grass. A range in poor condition has been overgrazed over the years and the best grass is gone. Ranges in good or fair condition are intermediate and are rated on the amount of good grass left.

Table 2 lists the range sites, the soils and the dominant native grasses in those sites, and the suggested stocking rates according to range condition. Stocking rates in the table are suggestions only; the rate for each pasture should be determined from time to time for the range site and condition.

Usually three or four kinds of native grass are dominant in the original vegetation of a range site. For example, the silty range site in excellent condition will have big bluestem, little bluestem, side-oats grama, and western wheatgrass (table 2). Many other kinds of grass may be present, but these four produce most of the forage on this site. If the silty site is grazed so that these four kinds of grass remain dominant, it is probably producing near the maximum amount of forage. This holds true for the other sites; they produce the most over a long period when the kinds of grass are as nearly like the original cover as possible.

To determine the stocking rate from table 2, first locate the soils on your range or pasture on the soil map. Then find these soils in the range sites in table 2. The guide to mapping units at the back of the report will help you in doing this. Next, examine the range and compare the kinds of grass there with those shown in the table for a range in excellent condition. The range condition can be estimated from the kind and vigor of grasses present and the number of weeds. A person employed by the Soil Conservation Service or the county agricultural agent will help in checking the range.

The grazing value of your range depends on improving and maintaining desirable grass by using good management. All range, regardless of condition, requires the following range management practices: (1) Stocking the proper number and kinds of livestock; (2) proper distribution of grazing; and (3) proper season of use.

Woodland Management

The farm woodlands in the county consist chiefly of windbreaks or shelterbelts for farmsteads, fields, and livestock, as well as trees and shrubs for wildlife cover (fig. 10).

The soils are grouped into woodland sites for planting purposes. The same kinds of trees and shrubs can be successfully grown within each site, and the same type of ground preparation and cultivation can be used. Very different methods of ground preparation and maintenance, however, are required for the silty to clayey soils than for the very sandy soils. The silty soils are also suitable for a greater variety of trees and shrubs than the very sandy soils.

The woodland sites, the capability units in each site, and the suitable kinds of trees and shrubs for windbreaks and wildlife are given in table 3. An employee of the Soil Conservation Service or the county agricultural agent can assist in planning the management of woodland.

Descriptions of the Soils

The scientist who makes a soil survey examines the soils in the field. He classifies them according to the facts that he observes, maps their boundaries on an aerial photograph or other map, and describes them in his report.

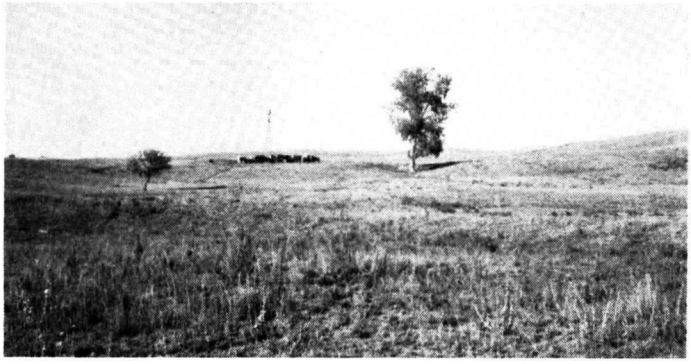

Figure 9.—An overgrazed range site on sands. The cover is poor and forage production is low.

Figure 10.—A field shelterbelt planting that is also an excellent wildlife habitat.

TABLE 2.—*Range sites, dominant grasses, and suggested stocking rates by range condition classes*

Range site and soil	Dominant grasses on site when range is in excellent condition class	Suggested stocking rates by range condition classes			
		Excellent	Good	Fair	Poor
		Acres per animal unit [1]	*Acres per animal unit* [1]	*Acres per animal unit* [1]	*Acres per animal unit* [1]
Silty (silt loams and very fine sandy loams)	Big bluestem, little bluestem, side-oats grama, and western wheatgrass.	6	8	12	24
Belfore silt loam, 0 to 1 percent slopes.					
Belfore silt loam, 1 to 3 percent slopes.					
Belfore silt loam, 1 to 3 percent slopes, eroded.					
Cass silt loam.					
Crofton silt loam, 7 to 12 percent slopes.					
Crofton silt loam, 7 to 12 percent slopes, severely eroded.					
Crofton silt loam, 12 to 17 percent slopes.					
Crofton silt loam, 12 to 17 percent slopes, severely eroded.					
Crofton silt loam, 17 to 30 percent slopes.					
Crofton silt loam, 17 to 30 percent slopes, severely eroded.					
Hall silt loam, 0 to 1 percent slopes.					
Hall silt loam, 1 to 3 percent slopes.					
Hall silt loam, 3 to 7 percent slopes.					
Hall silt loam, 3 to 7 percent slopes, eroded.					
Hord very fine sandy loam, 0 to 1 percent slopes.					
Hord very fine sandy loam, 1 to 3 percent slopes.					
Hord very fine sandy loam, 3 to 7 percent slopes.					
Judson silt loam, 1 to 3 percent slopes.					
Judson silt loam, 3 to 7 percent slopes.					
McPaul silt loam.					
Moody-Nora silt loams, 3 to 7 percent slopes.					
Moody-Nora silt loams, 3 to 7 percent slopes, eroded.					
Moody-Nora silt loams, 3 to 7 percent slopes, severely eroded.					
Nora silt loam, 7 to 12 percent slopes.					
Nora silt loam, 7 to 12 percent slopes, eroded.					
Nora silt loam, 7 to 12 percent slopes, severely eroded.					
Nora-Crofton silt loams, 12 to 17 percent slopes.					
Nora-Crofton silt loams, 12 to 17 percent slopes, eroded.					
Nora-Crofton silt loams, 12 to 17 percent slopes, severely eroded.					
Ortello very fine sandy loam, 1 to 3 percent slopes.					
Rokeby silt loam, 0 to 1 percent slopes.					
Sandy (fine sandy loams)	Prairie sandreed, sand bluestem, switchgrass, and little bluestem.	6	8	12	24
Cass fine sandy loam.					
Hord fine sandy loam, 0 to 1 percent slopes.					
Hord fine sandy loam, 1 to 3 percent slopes.					
Hord fine sandy loam, 3 to 7 percent slopes.					
Moody-Anselmo complex, 1 to 3 percent slopes.					
Moody-Anselmo complex, 3 to 7 percent slopes.					
Nora-Anselmo complex, 7 to 12 percent slopes, eroded.					
Nora-Anselmo complex, 7 to 12 percent slopes, severely eroded.					
Nora-Anselmo complex, 12 to 17 percent slopes, severely eroded.					
O'Neill fine sandy loam, 1 to 3 percent slopes.					
Ortello fine sandy loam, 1 to 3 percent slopes.					
Ortello fine sandy loam, 1 to 3 percent slopes, eroded.					
Ortello fine sandy loam, 3 to 7 percent slopes.					
Ortello fine sandy loam, 3 to 7 percent slopes, eroded.					
Sarpy fine sandy loam.					
Thurman-Anselmo fine sandy loams, 1 to 3 percent slopes.					
Thurman-Anselmo fine sandy loams, 1 to 3 percent slopes, eroded.					
Thurman-Anselmo fine sandy loams, 3 to 7 percent slopes, eroded.					
Thurman-Anselmo fine sandy loams, 7 to 12 percent slopes, eroded.					

See footnote at end of table.

TABLE 2.—*Range sites, dominant grasses, and suggested stocking rates by range condition classes*—Continued

Range site and soil	Dominant grasses on site when range is in excellent condition class	Suggested stocking rates by range condition classes			
		Excellent	Good	Fair	Poor
		Acres per animal unit [1]	*Acres per animal unit* [1]	*Acres per animal unit* [1]	*Acres per animal unit* [1]
Sands (deep, loose, coarse-textured soils; dominantly sands; level to gentle slopes). Newman loamy fine sand, 1 to 3 percent slopes. Newman loamy fine sand, 1 to 3 percent slopes, eroded. Newman loamy fine sand, 3 to 7 percent slopes, eroded. Sarpy fine sand. Sarpy loamy fine sand. Thurman loamy fine sand, 1 to 3 percent slopes. Thurman loamy fine sand, 1 to 3 percent slopes, eroded. Thurman loamy fine sand, 3 to 7 percent slopes. Thurman loamy fine sand, 3 to 7 percent slopes, eroded. Thurman loamy fine sand, 3 to 7 percent slopes, severely eroded. Valentine fine sand, 3 to 17 percent slopes. Valentine fine sand, 3 to 17 percent slopes, eroded. Valentine loamy fine sand, 3 to 17 percent slopes.	Sand bluestem, switchgrass, prairie sandreed, and little bluestem.	6	8	12	24
Subirrigated (water table is rarely over the surface of the soil, but soil is subirrigated most of the season). Hord very fine sandy loam, imperfectly drained, 0 to 1 percent slopes. Lamoure silty clay loam. Leshara silt loam. Newman loamy fine sand, imperfectly drained, 0 to 1 percent slopes. Ortello fine sandy loam, imperfectly drained, 0 to 1 percent slopes. Ortello very fine sandy loam, imperfectly drained, 0 to 1 percent slopes. Sarpy fine sandy loam, imperfectly drained. Sarpy loamy fine sand, imperfectly drained. Wann fine sandy loam. Wann silt loam.	Big bluestem, Indiangrass, and switchgrass.	3	3.5	6	12
Overflow (sometimes flooded by streams or runoff from higher areas). Fillmore silt loam, 0 to 1 percent slopes. Moody-Anselmo complex, depressions. Sandy alluvial land. Silty alluvial land. Very sandy alluvial land.	Big bluestem, switchgrass, and western wheatgrass.	5	6.5	10	20
Wet land (water table is over surface part of year and soil is subirrigated). Loup fine sandy loam. Loup silt loam. Rauville soils.	Prairie cordgrass, northern reedgrass, and bluejoint reedgrass.	2	2.5	4	7
Saline lowland (bottom land and subirrigated land where salt affects vegetation). Hall-Exline silt loams, 0 to 1 percent slopes. Lamoure silt loam, moderately saline. Leshara silt loam, moderately saline. Wann silt loam, moderately saline.	Switchgrass, western wheatgrass, and saltgrass.	5.5	7.5	11	22
Shallow (gravel at depth of 10 to 20 inches) Meadin loamy fine sand, 0 to 1 percent slopes.	Needle-and-thread, little bluestem, and prairie sandreed.	6.5	9	13	27
Clayey (moderately heavy clays and clay loams) Nuckolls silty clay loam, 7 to 12 percent slopes, severely eroded. Nuckolls silty clay loam, 12 to 17 percent slopes, severely eroded.	Little bluestem, side-oats grama, western wheatgrass, and bluestem.	6	8	12	24
Thin loess (shallow thin loess soils; slopes of 30 percent or more). Loess hills and bluffs.	Little bluestem, side-oats grama, big bluestem, and western wheatgrass.	8	11	16	32

[1] Stocking rates are for a 6-month (or equivalent) grazing period in normal years; rates for good, fair, and poor conditions will permit range to regain excellent condition.

TABLE 3.—*Woodland sites and suitable plantings for windbreaks and wildlife*

Woodland site and capability units	Use and suitable plantings			
	Windbreak plantings for farmsteads, fields, and livestock		Plantings for wildlife	
Silty to clayey sites All deep, well-drained, silty, clayey, or claypan soils (except saline-alkali); capability units I–1, IIe–1, IIe–2, IIIe–1, IVe–1, VIe–1, and VIIe–1.	Plum. Lilac. Cotoneaster. Honeysuckle. Chokecherry. Multiflora rose. Mulberry. Russian-olive. Bur oak. Rocky Mountain juniper.	American elm. Hackberry. Honeylocust. Chinese elm.[1] Hybrid elm. Austrian pine. Ponderosa pine. Redcedar. Green ash.	Plum. Cotoneaster. Honeysuckle. Chokecherry. Three-leaved sumac. Ninebark. Lilac. Nanking cherry. Mongolian cherry.	Sandcherry. Buffaloberry. Russian-olive. Redcedar. Multiflora rose. Hawthorn. Siberian crab. Golden currant.
Sandy sites Slightly sandy and nearly level very sandy soils; capability units IIe–3, IIIe–3, IIIe–5, and VIe–3.	Plum. Lilac. Cotoneaster. Honeysuckle. Three-leaved sumac. Chokecherry. Sandcherry. Boxelder. Mulberry. Russian-olive. Green ash.	American elm. Hackberry. Honeylocust. Chinese elm. Hybrid elm. Cottonwood. Austrian pine. Ponderosa pine. Redcedar. Rocky Mountain juniper.	Plum. Lilac. Cotoneaster. Honeysuckle. Three-leaved sumac. Chokecherry. Nanking cherry.	Sandcherry. Russian-olive. Boxelder. Golden currant. Siberian crab. Mongolian cherry.
Very sandy sites Very sandy and loose sandy soils that cannot be safely cultivated; capability unit VIIe–5.	Redcedar. Rocky Mountain juniper.	Austrian pine. Ponderosa pine.	Redcedar.	
Moderately wet sites Bottom lands, benches, or upland depressions that are occasionally wet because of high water table or flooding; capability units IIw–4, IIIw–1, IIIw–5, IIIw–6, VIw–3.	Plum. Buffaloberry. Lilac. Purple willow. Dogwood. Honeysuckle. Chokecherry. Multiflora rose. Boxelder. Diamond willow. Russian-olive. Golden willow.	Green ash. American elm. Hackberry. Honeylocust. Chinese elm. Hybrid elm. Cottonwood. White willow. Black walnut. Redcedar. Austrian pine.[2]	Plum. Buffaloberry. Lilac. Red-osier dogwood. Honeysuckle. Chokecherry. Multiflora rose.	Ninebark. Nanking cherry. Korean cherry. Wild black cherry. Juneberry. Redcedar. Golden currant.
Wet sites All bottom lands, benches, and upland depressions, with extreme water conditions caused by flooding, high water table, or poor drainage; capability units IIIw–1 and Vw–1.	Buffaloberry. Purple willow. Dogwood. Boxelder. Diamond willow.	Chinese elm. Hybrid elm. Cottonwood. White willow. Russian-olive.	Buffaloberry. Red-osier dogwood.	Russian-olive.
Moderately saline or alkali sites All moderately saline or alkali soils; capability unit IIIs–1.	Buffaloberry. Purple willow. Dogwood. Boxelder. Diamond willow.	Russian-olive. Green ash. Cottonwood. White willow.	Redcedar. Red-osier dogwood.	Buffaloberry.
Shallow sites Shallow to very shallow over bedrock, shale or gravel; capability unit VIIs–4.	Redcedar.		Redcedar.	
Nonplantable sites Areas not suitable for planting trees; capability unit VIIIs–1.	None.		None.	

[1] Siberian elm but erroneously called Chinese elm in the Midwest.
[2] Use only on drier sites.

The soil scientist digs many holes to observe the soil characteristics. The holes are not dug at regular intervals but are spaced as indicated by variations in topography and other features that suggest differences in the soil. Some of these variations are illustrated in figure 11, which shows the principal soils of Nance County.

Each hole reveals layers within the soil, which are called horizons. These horizons generally differ in one or more of the following characteristics: Thickness, color, texture, structure, and consistence. Collectively, these horizons are known as the soil profile. Each soil has a particular organization of horizons and soil characteristics that is not the same as that of another soil.

The surface layer, called the A horizon, is one from which soluble minerals and clay have been removed by percolating water. It is generally the darkest layer in the profile and contains the most organic matter. The A horizon is often divided into parts called A_1, A_2, or A_3. The depth of the horizon is measured from the surface of the soil downward.

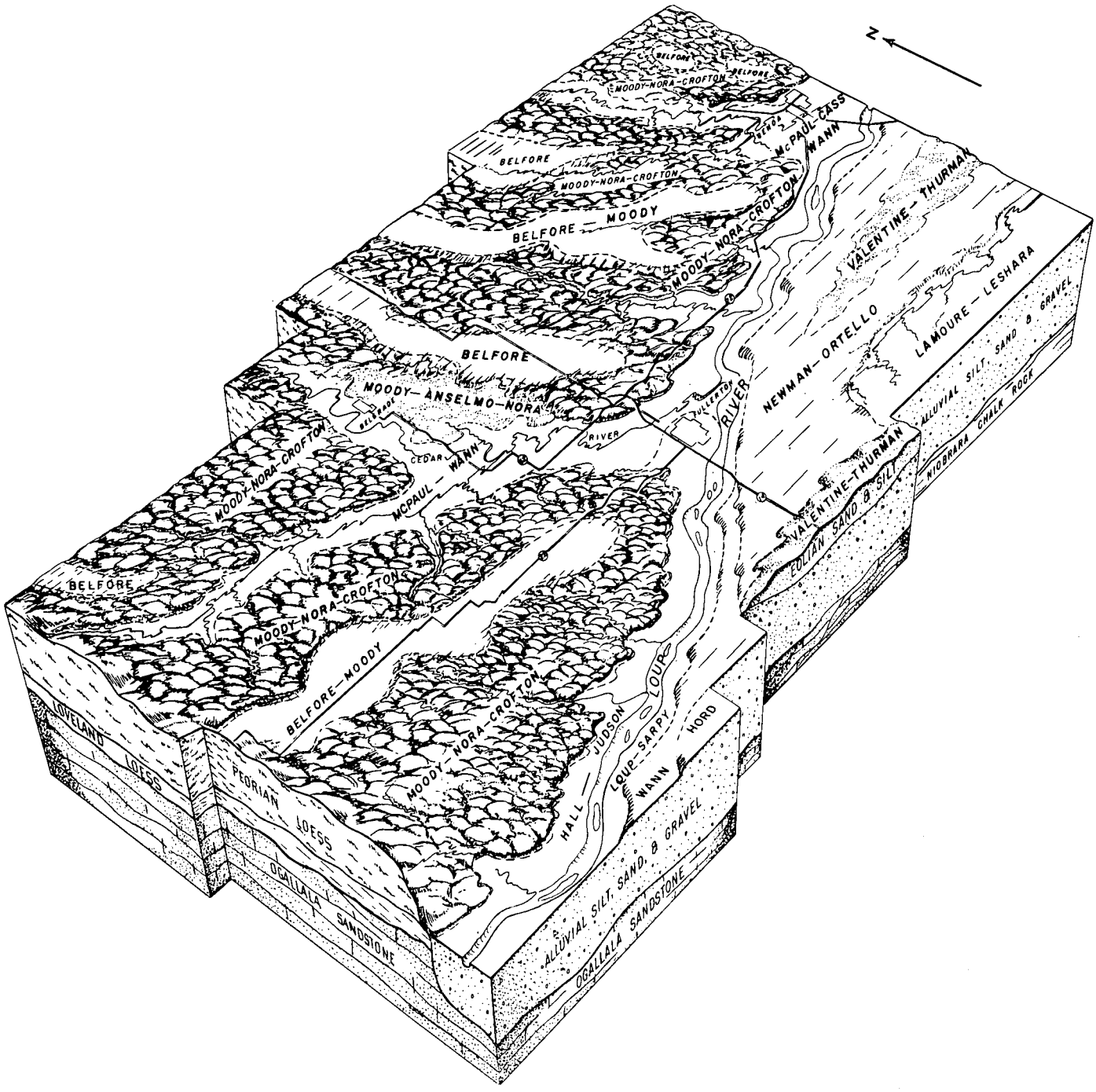

Figure 11.—Principal soils of Nance County.

The B horizon, or subsoil, is one in which clay and other materials have accumulated. It has developed a distinctive color and structure. The B horizon is a master horizon of altered material characterized by (1) an accumulation of clay, iron, or aluminum, with accessory organic material; or (2) more or less blocky or prismatic structure together with other characteristics, such as stronger colors, unlike those of the A or the underlying horizons of nearly unchanged material; or (3) characteristics of both these categories. Commonly, the lower limit of the B horizon corresponds with the lower limit of the solum.

The material below the B horizon, if it appears to be like the material from which the soil developed, is called the C horizon. The C horizon is a layer of unconsolidated material relatively little affected by the influence of organisms and presumed to be similar in chemical, physical, and mineralogical composition to the material from which at least a part of the overlying solum has formed.

Among the characteristics that set these horizons apart are color, texture, structure, and consistence. These and many other terms used in the report are defined in the Glossary.

Some soil conditions are shown by special symbols on the soil map. There are special symbols for small severely eroded areas, depressions, Loveland loess outcrops, rock outcrops, salt or alkali spots, and gravelly areas. The symbols are explained in the legend on the soil map. They show special conditions in areas that cover less than 5 acres.

Each of the soils mapped in Nance County is described in detail in the following pages. A list of the mapping units and the map symbol and capability unit of each are given in the back of the report. The approximate acreage and proportionate extent of each soil are given in table 4. The location and distribution of the soils are shown on the soil map in the back of this report.

TABLE 4.—*Acreage and proportionate extent of the soils mapped*

Soil	Acres	Percent	Soil	Acres	Percent
Belfore silt loam, 0 to 1 percent slopes	4,373	1.6	Moody-Nora silt loams, 3 to 7 percent slopes	443	0.2
Belfore silt loam, 1 to 3 percent slopes	24,346	8.7	Moody-Nora silt loams, 3 to 7 percent slopes, eroded	3,525	1.3
Belfore silt loam, 1 to 3 percent slopes, eroded	414	.1	Moody-Nora silt loams, 3 to 7 percent slopes, severely eroded	525	.2
Cass silt loam	3,735	1.3	Nora-Anselmo complex, 7 to 12 percent slopes, eroded	276	.1
Cass fine sandy loam	4,472	1.6	Nora-Anselmo complex, 7 to 12 percent slopes, severely eroded	314	.1
Crofton silt loam, 7 to 12 percent slopes	488	.2	Nora-Anselmo complex, 12 to 17 percent slopes, severely eroded	239	.1
Crofton silt loam, 7 to 12 percent slopes, severely eroded	502	.2	Nora-Crofton silt loams, 12 to 17 percent slopes	399	.1
Crofton silt loam, 12 to 17 percent slopes	454	.2	Nora-Crofton silt loams, 12 to 17 percent slopes, eroded	354	.1
Crofton silt loam, 12 to 17 percent slopes, severely eroded	4,935	1.8	Nora-Crofton silt loams, 12 to 17 percent slopes, severely eroded	5,750	2.0
Crofton silt loam, 17 to 30 percent slopes	28,542	10.2	Newman loamy fine sand, imperfectly drained, 0 to 1 percent slopes	682	.2
Crofton silt loam, 17 to 30 percent slopes, severely eroded	19,094	6.8	Newman loamy fine sand, 1 to 3 percent slopes	2,732	1.0
Fillmore silt loam, 0 to 1 percent slopes	426	.1	Newman loamy fine sand, 1 to 3 percent slopes, eroded	1,462	.5
Hall silt loam, 0 to 1 percent slopes	20,989	7.5	Newman loamy fine sand, 3 to 7 percent slopes, eroded	164	.1
Hall silt loam, 1 to 3 percent slopes	4,847	1.7	Nora silt loam, 7 to 12 percent slopes	4,098	1.5
Hall silt loam, 3 to 7 percent slopes	278	.1	Nora silt loam, 7 to 12 percent slopes, eroded	15,617	5.6
Hall silt loam, 3 to 7 percent slopes, eroded	482	.2	Nora silt loam, 7 to 12 percent slopes, severely eroded	37,294	13.3
Hall-Exline silt loams, 0 to 1 percent slopes	691	.2	Nuckolls silty clay loam, 7 to 12 percent slopes, severely eroded	277	.1
Hord fine sandy loam, 0 to 1 percent slopes	1,569	.6	Nuckolls silty clay loam, 12 to 17 percent slopes, severely eroded	322	.1
Hord fine sandy loam, 1 to 3 percent slopes	239	.1	O'Neill fine sandy loam, 1 to 3 percent slopes	281	.1
Hord fine sandy loam, 3 to 7 percent slopes	27	(1)	Ortello fine sandy loam, imperfectly drained, 0 to 1 percent slopes	1,616	.6
Hord very fine sandy loam, 0 to 1 percent slopes	4,091	1.5	Ortello fine sandy loam, 1 to 3 percent slopes	7,774	2.8
Hord very fine sandy loam, 1 to 3 percent slopes	190	.1	Ortello fine sandy loam, 1 to 3 percent slopes, eroded	632	.2
Hord very fine sandy loam, 3 to 7 percent slopes	22	(1)	Ortello fine sandy loam, 3 to 7 percent slopes	115	(1)
Hord very fine sandy loam, imperfectly drained, 0 to 1 percent slopes	1,604	.6	Ortello fine sandy loam, 3 to 7 percent slopes, eroded	268	.1
Judson silt loam, 1 to 3 percent slopes	1,766	.6	Ortello very fine sandy loam, imperfectly drained, 0 to 1 percent slopes	1,575	.6
Judson silt loam, 3 to 7 percent slopes	372	.1	Ortello very fine sandy loam, 1 to 3 percent slopes	2,606	.9
Lamoure silt loam, moderately saline	7,143	2.5			
Lamoure silty clay loam	1,297	.5			
Leshara silt loam	1,898	.7			
Leshara silt loam, moderately saline	390	.1			
Loess hills and bluffs	533	.2			
Loup fine sandy loam	671	.2			
Loup silt loam	1,154	.4			
Moody-Anselmo complex, depressions	254	.1			
Moody-Anselmo complex, 1 to 3 percent slopes	1,177	.4			
Moody-Anselmo complex, 3 to 7 percent slopes	909	.3			
McPaul silt loam	7,764	2.8			
Meadin loamy fine sand, 0 to 1 percent slopes	301	.1			

TABLE 4.—*Acreage and proportionate extent of the soils mapped*—Continued

Soil	Acres	Percent	Soil	Acres	Percent
Rauville soils	499	0. 2	Thurman loamy fine sand, 1 to 3 percent slopes, eroded	739	0. 3
Rokeby silt loam, 0 to 1 percent slopes	686	. 2	Thurman loamy fine sand, 3 to 7 percent slopes	539	. 2
Riverwash	2, 558	. 9	Thurman loamy fine sand, 3 to 7 percent slopes, eroded	1, 269	. 5
Sarpy fine sand	2, 660	. 9	Thurman loamy fine sand, 3 to 7 percent slopes, severely eroded	218	. 1
Sarpy fine sandy loam	569	. 2	Valentine fine sand, 3 to 17 percent slopes	2, 104	. 7
Sarpy fine sandy loam, imperfectly drained	1, 241	. 4	Valentine fine sand, 3 to 17 percent slopes, eroded	510	. 2
Sarpy loamy fine sand	2, 182	. 8	Valentine loamy fine sand, 3 to 17 percent slopes	1, 409	. 5
Sarpy loamy fine sand, imperfectly drained	404	. 1	Very sandy alluvial land	4, 200	1. 5
Sandy alluvial land	192	. 1	Wann fine sandy loam	2, 554	. 9
Silty alluvial land	6, 396	2. 3	Wann silt loam	3, 057	1. 1
Thurman-Anselmo fine sandy loams, 1 to 3 percent slopes	875	. 3	Wann silt loam, moderately saline	249	. 1
Thurman-Anselmo fine sandy loams, 1 to 3 percent slopes, eroded	275	. 1	Water; ponds; etc	707	. 2
Thurman-Anselmo fine sandy loams, 3 to 7 percent slopes, eroded	1, 490	. 5	Total	280, 320	100. 0
Thurman-Anselmo fine sandy loams, 7 to 12 percent slopes, eroded	208	. 1			
Thurman loamy fine sand, 1 to 3 percent slopes	751	. 3			

[1] Less than 0.1 percent.

Belfore Series

The deep soils of the Belfore series occur on nearly level upland in the northern part of the county. They are well drained and have a medium-textured surface soil and a moderately fine textured subsoil that has developed from Peorian loess (fig. 12).

The Belfore soils are associated with the Fillmore soils, which occur on upland depressions, and the Moody-Nora silt loams, which occur on gentle slopes.

Typical profile (cultivated Belfore silt loam, 1 to 3 percent slopes, 50 feet north and 75 feet east of SW corner, sec. 36, T. 18 N., R. 4 W.):

A_{1p} 0 to 7 inches, dark-gray (10YR 4/1, dry) and very dark brown (10YR 2/2, moist) silt loam; weak, very fine, crumb structure; slightly hard when dry and friable when moist; abrupt, smooth lower boundary.

A_{12} 7 to 11 inches, dark grayish-brown (10YR 4/2, dry) and very dark grayish-brown (10YR 3/2) silty clay loam; moderate, fine and very fine, granular structure; slightly hard when dry and friable when moist; clear, wavy lower boundary.

B_{21} 11 to 22 inches, dark grayish-brown (10YR 4/2, dry) and dark-brown (10YR 3/3, moist) silty clay loam; strong, very fine, subangular blocky structure; hard when dry and firm when moist; clear, wavy lower boundary.

B_{22} 22 to 30 inches, brown (10YR 5/3, dry) and dark-brown (10YR 4/3, moist) silty clay loam; strong, fine, prismatic structure to a strong, coarse, and medium blocky structure; very hard when dry and firm when moist; few, fine, faint, brown mottlings; clear, wavy lower boundary.

B_{23} 30 to 38 inches, brown (10YR 5/3, dry) and dark-brown (10YR 4/3, moist) silty clay loam; strong, medium, prismatic structure to strong, coarse, angular blocky structure; very hard when dry and firm when moist; common, fine, faint, brown mottlings; clear, wavy lower boundary.

B_3 38 to 50 inches, light olive-brown (2.5Y 5/4, dry) and olive-brown (2.5Y 4/4, moist) silty clay loam; moderate, coarse, prismatic structure to a weak, coarse, blocky structure; slightly hard when dry and friable when moist; common, fine, faint, yellowish-brown mottlings; clear, wavy lower boundary.

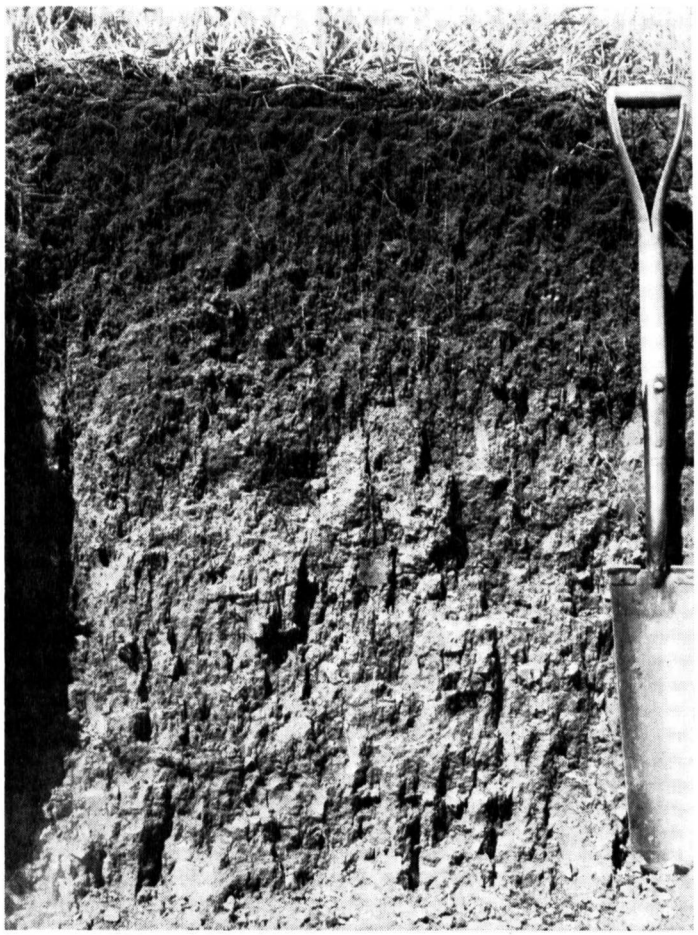

Figure 12.—**Profile of Belfore silt loam, showing a dark surface soil, about 14 inches thick, over a moderately to strongly developed subsoil that extends to the bottom of the spade. Peorian loess parent material occurs at 50 inches.**

C 50 to 60 inches, pale-yellow (2.5Y 7/4, dry) and light olive-brown (2.5Y 5/4, moist) silt loam; weak; coarse, prismatic to massive structure; many, medium, prominent, yellowish-brown mottlings; some brown iron stains and soft iron concretions.

The productivity of the Belfore soils is high. They are suitable for all the crops commonly grown in the area, and they are well suited to irrigation where water is available.

Belfore silt loam, 0 to 1 percent slopes (Be), has a profile similar to the one described. It occurs on nearly level slopes and is in capability unit I–1 and in the silty range site.

Belfore silt loam, 1 to 3 percent slopes (BeA), has the profile described for the Belfore series. It is in capability unit IIe–1 and in the silty range site.

Belfore silt loam, 1 to 3 percent slopes, eroded (BeA2), has a profile similar to the one described. The surface soil is 6 to 8 inches thick. This soil absorbs water more slowly than the uneroded Belfore soils because it has less organic matter and poorer surface structure. This soil is in capability unit IIe–1 and in the silty range site.

Cass Series

The Cass series consists of deep and moderately deep alluvial soils with moderately sandy subsoils. They occur on nearly level flood plains along streams flowing from the sandy uplands. The Cass soils differ from the Wann soils in being better drained and noncalcareous. In addition, the water table normally is not high enough to be a problem.

Typical profile (cultivated Cass fine sandy loam, 0.15 mile south and 80 feet east of center of sec. 24, T. 17 N., R. 4 W.):

A_{1p} 0 to 7 inches, dark-gray (10YR 4.5/1, dry) and very dark gray (10YR 3/1, moist) fine sandy loam; weak, very fine, crumb to single grain structure; slightly hard when dry and very friable when moist; abrupt, smooth lower boundary.

A_{12} 7 to 10 inches, dark-gray (10YR 4/1, dry) and very dark gray (10YR 3/1, moist) fine sandy loam; weak, very fine, crumb to single grain structure; soft when dry and very friable when moist; clear, smooth lower boundary.

AC 10 to 14 inches, gray (10YR 5/1, dry) and dark grayish-brown (10YR 4/2, moist) light fine sandy loam; single grain structure; soft when dry and loose when moist; clear, smooth lower boundary.

C_1 14 to 20 inches, gray (10YR 6/1, dry) and gray (10YR 5/1, moist) loamy sand; single grain structure; loose; clear, wavy lower boundary.

C_2 20 to 36 inches, light-gray (10YR 7/1, dry) and light brownish-gray (10YR 6/2, moist) sand; single grain structure; loose; clear, wavy lower boundary.

C_3 36 to 50 inches, white (10YR 8/2, dry) and light-gray (10YR 7/2, moist) fine to coarse sand; single grain structure; loose.

This profile is noncalcareous, which is typical of the series. There is a gradual transition with depth to a lighter color and texture.

The principal variation in these soils is that they are stratified in places with slightly heavier materials.

The Cass soils are subject to occasional flooding, but overflow damage is usually minor. Floodwater is beneficial to the crops in dry years. These soils are well suited to surface irrigation, but occasional flooding is a hazard.

Most areas of these soils are farmed. All the local crops are suited and produce moderately high yields. The native vegetation is cottonwood, willow, ash, and American elm, along with a mixture of tall, coarse grass. Forage yields are high when these soils are cleared of trees.

Cass fine sandy loam (Cs) has the profile described for the Cass series. This soil is in capability unit IIe–3 and in the sandy range site.

Cass silt loam (Ca) is similar to Cass fine sandy loam but has a silt loam surface soil ranging from 6 to 15 inches in thickness. This soil is in capability unit I–1 and in the silty range site.

Crofton Series

The Crofton are thinly developed silty soils over calcareous, silty Peorian loess (fig. 13). They occur on narrow, rounded ridgetops and the steeper side slopes.

Figure 13.—**Profile of Crofton silt loam. The thin surface soil occurs directly over the Peorian loess parent material.**

The surface soil is dark in uneroded areas and lighter colored in eroded areas. These soils have a weakly developed subsoil that is highly calcareous. Slopes are rolling to very steep and range from 7 to 30 percent.

Typical profile (Crofton silt loam, 12 to 17 percent slopes):

A_1 0 to 5 inches, grayish-brown (10YR 5/2, dry) and very dark grayish-brown (10YR 3/2, moist) silt loam; weak, fine and very fine, crumb structure; slightly hard when dry and very friable when moist; slight effervescence; clear, wavy lower boundary.

AC 5 to 20 inches, light brownish-gray (10YR 6/2, dry) and dark grayish-brown (10YR 4/2, moist) silt loam; weak, coarse, prismatic to massive structure; slightly hard when dry and very friable when moist; strong effervescence; gradual, irregular lower boundary.

C 20 to 60 inches, light yellowish-brown (2.5Y 5.5/3, dry) and olive-brown (2.5Y 4/3, moist) silt loam; soft when dry and very friable when moist; strong effervescence.

Corn, oats, sorghum, wheat, and alfalfa are the most suitable crops. Because of the high lime content of these soils, the availability of soil phosphorus is low. Phosphate fertilizers are needed for best crop yields.

The Crofton soils on slopes of more than 17 percent are suitable only for grass. The native grass cover is mixed bluestem and grama. Forage production is fairly good under proper management.

Crofton silt loam, 7 to 12 percent slopes (CfC), has a profile similar to the one described. The slopes are less. This soil is in capability unit IIIe–1 and in the silty range site.

Crofton silt loam, 7 to 12 percent slopes, severely eroded (CfC3), has a profile similar to the one described. The surface soil, however, has been removed by erosion. Limy subsoil materials and lime concretions are on the surface of the soil. Light-colored areas occur where parent loess is exposed (fig. 14). This soil is in capability unit IVe–1 and in the silty range site.

Crofton silt loam, 12 to 17 percent slopes (CfD), has the profile described for the Crofton series. This soil is in capability unit IVe–1 and in the silty range site.

Figure 14.—**The light-colored areas are Crofton silt loam, 7 to 12 percent slopes, severely eroded. Erosion has removed the surface soil and exposed the parent material.**

Crofton silt loam, 12 to 17 percent slopes, severely eroded (CfD3), has a profile similar to the one described. The original surface soil has been removed by erosion, and the calcareous subsoil and lime concretions are exposed. This soil is in capability unit IVe–1 and in the silty range site.

Crofton silt loam, 17 to 30 percent slopes (CfE), has a profile similar to the one described, but it occurs on steeper slopes, and the soil horizons are not quite so thick. Most of this soil consists of rough and uneven slopes and breaks along drainageways. It is in native vegetation. This soil is in capability unit VIe–1 and in the silty range site.

Crofton silt loam, 17 to 30 percent slopes, severely eroded (CfE3), is similar to Crofton silt loam, 17 to 30 percent slopes. The original surface soil, however, has been lost through erosion. Most of this soil has been cultivated. It is in capability unit VIe–1 and in the silty range site.

Fillmore Series

The Fillmore series consists of deep, dark soils with a clay subsoil that are on nearly level uplands. They have developed in Peorian loess in the poorly drained upland depressions. They remain wet for some time after rains. The Fillmore soils are associated with those of the Belfore series, which occur around the depressional areas. Only one soil of the Fillmore series is mapped in the county.

Typical profile (Fillmore silt loam, 0 to 1 percent slopes, 2,400 feet north and 60 feet west of SE corner, sec. 14, T. 16 N., R. 7 W.):

A_{1p} 0 to 7 inches, gray (10YR 5/1, dry) and very dark gray (10YR 3/1, moist) silt loam; weak, coarse, granular structure breaking to a fine and very fine, granular structure; slightly hard when dry and friable when moist; abrupt, smooth lower boundary.

A_{12} 7 to 10 inches, gray (80 percent is 10YR 5/1 and 20 percent is 10YR 6/1, dry) and very dark gray (80 percent is 10YR 3/1 and 20 percent is 10YR 5/1, moist) silt loam; weak, very thick, platy structure to weak, very fine, crumb structure; slightly hard when dry and friable when moist; abrupt, smooth lower boundary.

A_2 10 to 14 inches, light-gray (10YR 6/1, dry) and gray (10YR 5/1, moist) silt loam; weak, very fine, crumb to massive structure; soft when dry and very friable when moist; abrupt, smooth lower boundary.

B_{21} 14 to 28 inches, dark-gray (10YR 3.5/1, dry) and very dark gray (10YR 3/1, moist) clay; strong, coarse and medium, blocky structure breaking to a strong, fine, blocky structure; very hard when dry and extremely firm when moist; clear, wavy lower boundary.

B_{22} 28 to 36 inches, grayish-brown (10YR 5/2, dry) and very dark grayish-brown (10YR 3/2, moist) clay; moderately strong, coarse and medium, blocky structure breaking to a strong, fine, blocky structure; very hard when dry and extremely firm when moist; clear, wavy lower boundary.

B_{23} 36 to 54 inches, gray or light-gray (10YR 6/1, dry) and grayish-brown (10YR 5/2, moist) clay or clay loam; weak, coarse and medium, blocky structure; very hard when dry and firm when moist; various shades of light gray are visible in this horizon; gradual, wavy lower boundary.

C 54 to 60 inches, light-gray (10YR 7/2, dry) and light brownish-gray (10YR 6/2, moist) silty clay loam; massive structure; hard when dry and firm when moist; distinct yellowish-brown and grayish mottlings are common.

Fillmore silt loam, 0 to 1 percent slopes (Fm), is the soil described. The gray layer, or A_2 horizon, is at various depths ranging from 10 to 24 inches. This is the chief variation in this soil and results from the variable depths of silt washed from the surrounding uplands and deposited in these depressions.

This soil is suitable for all local crops. Since it is in depressions, however, the crops are lost occasionally because of the water from higher areas that collects in these low places. Unless the areas have been drained by ditch or tile, they are not planted to alfalfa or small grain. This soil is used mostly for corn or sorghum when it is dry enough to farm. The Fillmore soil is somewhat droughty because of the claypan subsoil, which does not give up moisture readily to crops. This soil is in capability unit IIIw–2 and in the overflow range site.

Hall Series

The Hall series consists of deep, well-drained soils on terraces just north of the Loup River and along the drainageways in the northern part of the county. They are on nearly level to gently sloping relief. A few small areas have slopes as steep as 6 percent.

The Hall soils have a moderately heavy subsoil and have developed over very deep silty parent material. In contrast, the Hord soils near the Loup River have a more friable silt loam or very fine sandy loam subsoil and moderately sandy to sandy underlying material that begins at depths of 40 to 60 inches.

The Hall soils occur on silty loess-covered terraces, whereas the Hord soils are primarily over stratified alluvium. Old buried soils are noted in the Hall as well as in the Hord series. The Hall soils are similar to the Belfore soils of the nearly level upland.

Typical profile (Hall silt loam, 0 to 1 percent slopes, 0.3 mile east and 80 feet north of center of sec. 20, T. 17 N., R. 7 W.):

A_{1p} 0 to 6 inches, gray (10YR 5/1, dry) and very dark gray (10YR 3/1, moist) silt loam; weak, fine and very fine, crumb structure; slightly hard when dry and friable when moist; abrupt, smooth lower boundary.

A_{12} 6 to 16 inches, dark-gray (10YR 4/1, dry) and black (10YR 2/1, moist) silt loam; weak, coarse, blocky structure to weak, fine and very fine, crumb structure; slightly hard when dry and friable when moist; clear, smooth lower boundary.

B_1 16 to 20 inches, dark-gray (10YR 4/1, dry) and very dark grayish-brown (10YR 3/2, moist) silty clay loam; moderate, fine, blocky structure to moderate, fine, granular structure; hard when dry and friable when moist; clear, wavy lower boundary.

B_{21} 20 to 28 inches, light brownish-gray (10YR 6/2, dry) and dark grayish-brown (10YR 4/2, moist) silty clay loam; moderate, medium, prismatic structure to moderate, fine, blocky structure; hard when dry and firm when moist; clear, wavy lower boundary.

B_{22} 28 to 36 inches, light brownish-gray (10YR 6/2, dry) and olive-brown (2.5Y 4/4, moist) silty clay loam; strong, coarse to fine, blocky structure; very hard when dry and firm when moist; film of colloidal clay makes structure surfaces of blocks shiny; clear, wavy lower boundary.

B_{23} 36 to 54 inches, light-gray (10YR 7/2, dry) and light olive-brown (2.5Y 5/4, moist) silt loam; weak, coarse, prismatic structure; slightly hard when dry and very friable when moist; clear, wavy lower boundary.

C_1 54 to 60 inches, pale-yellow (2.5Y 7/4, dry) and light yellowish-brown (2.5Y 6/4, moist) silt loam; massive structure; soft when dry and very friable when moist.

Most areas of Hall soils are cultivated, and they are suited to all the local crops. They are well suited to irrigation.

Hall silt loam, 0 to 1 percent slopes (HcI), has the profile described for the Hall series. It is in capability class I–1 and in the silty range site.

Hall silt loam, 1 to 3 percent slopes (HcA), has a profile similar to the one described, but the surface soil is about 2 inches thinner. It is in capability unit IIe–1 and in the silty range site.

Hall silt loam, 3 to 7 percent slopes (HcB), has a profile similar to the one described. The slopes are steeper, and the surface soil is only about 12 inches thick. This soil is in capability unit IIe–1 and in the silty range site.

Hall silt loam, 3 to 7 percent slopes, eroded (HcB2), has a profile similar to the one described. The surface soil is only 6 to 10 inches thick, however, because of erosion losses. The lighter colored subsoil is brought to the surface when the soil is plowed. Water is absorbed more slowly than on uneroded areas. This soil is in capability unit IIe–1 and in the silty range site.

Hall-Exline Complex

Hall-Exline silt loams, 0 to 1 percent slopes (HE), is composed of areas of Hall silt loam that contain spots of Exline silt loams. Alkaline-saline soil covers from 10 to 35 percent of the total area of the complex. An old buried soil is sometimes present below this soil.

The Hall silt loam in this complex is similar to Hall silt loam, 0 to 1 percent slopes, described under the Hall series. A description of Exline silt loam follows.

Typical profile (cultivated Exline silt loam, 0 to 1 percent slopes, 60 feet north and 350 feet west of SE corner, sec. 19, T. 16 N., R. 5 W.):

A_{1p} 0 to 5 inches, gray (10YR 5/1, dry) and very dark gray (10YR 3/1, moist) silt loam; weak, very fine and fine, crumb structure; few gray (10YR 5/1, moist) streaks and splotches; abrupt boundary.

B_{21} 5 to 11 inches, dark-gray (10YR 4/1, dry) and black (10YR 2/1, moist) clay loam; strong, medium and coarse, prismatic structure to strong, coarse, blocky structure; very firm when moist and very hard when dry; clear, smooth boundary.

B_{22} 11 to 16 inches, gray (10YR 5/1, dry) and very dark gray (10YR 3/1, moist) silty clay loam; strong, coarse, prismatic structure to strong, coarse and medium, blocky structure; firm when moist and hard when dry; clear, smooth boundary.

B_{23} 16 to 22 inches, grayish-brown (10YR 5/2, dry) and very dark grayish-brown (10YR 3/2, moist) clay loam; strong, coarse and medium, blocky structure; firm when moist and hard when dry; some crystalline salts in streaks and old root channels; clear, wavy boundary.

B_{3ca} 22 to 30 inches, gray (10YR 6/1, dry) and dark-gray (10YR 4/1.5, moist) silty clay loam; moderate, medium, prismatic structure to moderate, coarse and medium, subangular blocky structure; firm when moist and hard when dry; few, fine, faint, gray and yellowish-brown mottlings; some soft lime concretions; effervescent only around concretions; clear, wavy boundary.

C_{ca} 30 to 42 inches, light-gray (10YR 7/2, dry) and grayish-brown (10YR 5/2, moist) silty clay loam; several strata of very fine sandy loam; weak, coarse, subangular blocky structure to weak, fine and very fine, subangular blocky structure; friable when moist and slightly hard when dry; few, fine, faint, brown mottlings; scattered soft lime concretions in effervescent matrix; abrupt boundary.

A_{1bca} 42 to 56 inches, gray (10YR 5/1, dry) and very dark gray (10YR 3/1, moist) thin strata of clay, silty clay, and silty clay loam (top layer of a buried soil); massive structure; many soft lime concretions; entire matrix is strongly effervescent; clear, smooth boundary.

C_{bca} 56 to 60 inches, light-gray (10YR 7/1, dry) and gray (10YR 5/1, moist) silty clay loam; massive structure; friable when moist and slightly hard when dry; common, medium, distinct gray and brown mottlings; abundant lime concretions; violent effervescence.

These areas are nearly level and drainage is fair. They contain a few small, poorly drained, low places or depressions.

Crop production is affected by the extent of the alkali areas. About 65 percent or more of this complex is nonalkali and produces very good crops. Some production is obtained from the alkali areas during the more favorable growing seasons.

The Hall-Exline complex is suitable for all the crops produced in the county. As a whole, this complex is fairly productive. It is suitable for irrigation. It is in capability class IIIs–1 and in the saline lowland range site.

Hord Series

The Hord series consists of deep medium-textured soils on terraces that are mostly south of the Loup River. They are easily worked and are on nearly level areas and gentle slopes that reach a maximum of 6 percent.

The Hord soils differ from the Hall soils principally in having a weakly developed medium-textured subsoil. In contrast, the Hall soils have a well-developed, silty clay loam subsoil. The Hord soils have developed from old stratified sandy and silty alluvium, and the Hall soils, from silty parent material.

Typical profile (cultivated Hord very fine sandy loam, 0 to 1 percent slopes, 0.42 mile east and 100 feet north of SW corner, sec. 32, T. 16 N., R. 6 W.):

A_{1p} 0 to 7 inches, gray (10YR 5/1, dry) and very dark gray (10YR 3/1.5, moist) very fine sandy loam; weak, medium and fine, angular blocky structure to a weak, very fine, crumb structure; soft when dry and very friable when moist; abrupt, smooth lower boundary.

A_{12} 7 to 14 inches, dark-gray (10YR 4/1, dry) and very dark brown (10YR 2/1.5, moist) very fine sandy loam; weak, medium, angular blocky structure breaking to a fine and very fine, crumb structure; slightly hard when dry and very friable when moist; worm casts and small open channels are numerous; clear, wavy lower boundary.

B_{21} 14 to 28 inches, gray (10YR 5/1, dry) and very dark grayish-brown (10YR 3/1.5, moist) very fine sandy loam or silt loam; weak, coarse and medium, subangular blocky to weak, crumb structure; slightly hard when dry and very friable when moist; worm casts and fine openings throughout; gradual, wavy lower boundary.

B_{22} 28 to 38 inches, brown (10YR 5/2.5, dry) and dark grayish-brown (10YR 4/2, moist) very fine sandy loam; weak, coarse, angular blocky to a weak, fine and very fine, crumb structure; slightly hard when dry and very friable when moist; many worm casts and many minute channels or openings are visible; clear, wavy lower boundary.

B_{23ca} 38 to 50 inches, light brownish-gray (10YR 6/2.5, dry) and grayish-brown (10YR 5/2, moist) loam; weak, medium and fine, subangular blocky to a weak, fine and very fine, crumb structure; slightly hard when dry and friable when moist; violent effervescence; many small and medium-sized soft calcium carbonate concretions; clear, wavy lower boundary.

C_1 50 to 60 inches, light-gray (10YR 7/2.5, dry) and light brownish-gray (10YR 6/2, moist) very fine sandy loam; weak, fine and very fine, crumb to massive structure; soft when dry and very friable when moist; violent effervescence; few soft calcium carbonate concretions; gradual, wavy lower boundary.

C_2 60 to 70 inches, light-gray (10YR 7/2, dry) and light brownish-gray (10YR 6/2, moist) very fine sandy loam; weak, crumb to massive structure; soft when dry and very friable when moist; violent effervescence but no calcium carbonate concretions.

The entire profile is very friable and open. It has very small openings or channels that become fewer with depth.

The Hord soils are suitable for all local crops. They are among the most productive soils because of their deep silty profile. The level of fertility is high, but tests have shown a need for lime and for phosphate fertilizer in some areas. These soils are well suited to irrigation.

Hord fine sandy loam, 0 to 1 percent slopes (Hr), has a profile similar to the one described. The surface soil, however, is a fine sandy loam. This soil is in capability unit IIe–3 and in the sandy range site.

Hord fine sandy loam, 1 to 3 percent slopes (HrA), has a profile similar to the one described. The surface soil is slightly thinner and has a fine sandy loam texture. Slopes average about 2 percent. This soil is in capability unit IIe–3 and in the sandy range site.

Hord fine sandy loam, 3 to 7 percent slopes (HrB), has a profile similar to the one described. This soil, however, is on steeper slopes and has a fine sandy loam surface soil 10 to 12 inches thick. It is in capability unit IIe–3 and in the sandy range site.

Hord very fine sandy loam, 0 to 1 percent slopes (Hy), has the profile described for the Hord series. It is in capability class I–1 and in the silty range site.

Hord very fine sandy loam, 1 to 3 percent slopes (HyA), has a profile similar to the one described. The surface soil is slightly thinner and the slopes average about 2 percent. This soil is in capability unit IIe–1 and in the silty range site.

Hord very fine sandy loam, 3 to 7 percent slopes (HyB), has a profile similar to the one described. The slopes are steeper, and the surface soil is 10 to 12 inches thick. Some erosion has occurred. This soil is in capability unit IIe–1 and in the silty range site.

Hord very fine sandy loam, imperfectly drained, 0 to 1 percent slopes (2Hy), has a profile similar to the one described. It is limy throughout the profile. The water table is from 2 to 5 feet below the surface and subirrigates this soil. This soil is in capability unit IIw–4 and in the subirrigated range site.

Judson Series

The Judson series consists of deep silty soils at the base of slopes or on the lower ends of long slopes. Many areas are on colluvial slopes between the terraces and the rolling uplands. The Judson soils developed from dark colluvial materials from adjoining uplands. A buried soil under the profile is typical of Judson soils in this county.

Typical profile (cultivated Judson silt loam, 1 to 3 percent slopes, 0.25 mile west and 100 feet south of the center of sec. 5, T. 16 N., R. 5 W.):

A_{1p} 0 to 7 inches, dark grayish-brown (10YR 4/2, dry) and black (10YR 2/1, moist) silt loam; weak, fine and very fine, crumb structure; slightly hard when dry and very friable when moist; abrupt, smooth lower boundary.

A_{12} 7 to 12 inches, dark-gray (10YR 4/1, dry) and very dark brown (10YR 2/1.5, moist) silt loam; weak, coarse, prismatic structure breaking to weak, fine, angular blocky structure; slightly hard when dry and very friable when moist; gradual, wavy lower boundary.

B_{21} 12 to 24 inches, very dark grayish-brown (10YR 3/2, dry) and very dark brown (10YR 2/2, moist) silt loam; weak, moderately coarse, prismatic structure breaking to moderate, medium and fine, subangular blocky structure; slightly hard when dry and friable when moist; gradual, wavy lower boundary.

B_{22} 24 to 32 inches, dark-brown (10YR 3/3, dry) and very dark brown (10YR 2/2, moist) heavy silt loam; weak, moderately coarse, prismatic structure breaking to moderate, medium and fine, subangular blocky structure; hard when dry and firm when moist; clear, wavy lower boundary.

C_1 32 to 50 inches, brown (10YR 5/3, dry) and dark grayish-brown (10YR 4/2, moist) silt loam; weak, fine, prismatic structure breaking to weak, medium, blocky structure; slightly hard when dry and very friable when moist; clear, wavy lower boundary.

A_{1b} 50 to 60 inches, very dark grayish-brown (10YR 3/2, dry) and black (10YR 2/1, moist) silt loam; moderately fine, granular structure; slightly hard when dry and very friable when moist. This is a buried soil.

Worm casts occur through all horizons.

These soils are very productive and are suitable for all the crops grown in the county. They are well suited to irrigation if erosion is properly controlled.

Judson silt loam, 1 to 3 percent slopes (JuA), has the profile described for the Judson series. It is in capability unit IIe–1 and in the silty range site.

Judson silt loam, 3 to 7 percent slopes (JuB), has a profile similar to the one described. It has steeper slopes and is not so dark below 24 inches. It is in capability unit IIe–1 and in the silty range site.

Lamoure Series

The Lamoure series consists of deep and moderately deep bottom-land soils with a silty clay loam or silty clay subsoil. These soils are imperfectly drained and normally have a water table that is from 2 to 5 feet below the surface. They have developed from moderately fine textured calcareous clayey alluvium.

These soils are subirrigated by the moderately high water table. Excess sodium or other salts have accumulated in the moderately saline phase of Lamoure silt loam.

Typical profile (cultivated Lamoure silty clay loam):

A_{1p} 0 to 7 inches, dark-gray (10YR 4/1, dry) and black (10YR 2/1, moist) silty clay loam; weak, medium and fine, granular structure to fine and very fine, crumb structure; hard when dry and firm when moist; abrupt, smooth lower boundary.

A_{12} 7 to 16 inches, very dark gray (10YR 3/1, dry) and black (10YR 2/1, moist) silty clay loam; moderate, medium and fine, granular structure to a moderately fine and very fine, crumb structure; hard when dry and firm when moist; clear, smooth lower boundary.

B_1 16 to 20 inches, dark-gray (10YR 3.5/1, dry) and very dark gray (10YR 3/1, moist) silty clay loam; weak, medium and fine, blocky structure to weak, medium and fine, granular structure; hard when dry and firm when moist; clear, wavy lower boundary.

B_{21} 20 to 30 inches, grayish-brown (10YR 5/2, dry) and very dark grayish-brown (10YR 3/2, moist) silty clay loam; strong, medium, prismatic to moderately strong, medium and coarse, blocky structure; very hard when dry and very firm when moist; common, fine, distinct, yellowish-brown mottlings; some dark manganese stains are scattered throughout the horizon; clear, wavy lower boundary.

B_{22} 30 to 38 inches, light brownish-gray (10YR 6/2, dry) and dark-gray (10YR 4/1, moist) silty clay loam; weak, medium, prismatic to weak, medium and fine, blocky structure; very hard when dry and very firm when moist; common, fine, distinct, yellowish-brown mottlings and scattered manganese stains; clear, wavy lower boundary.

C 38 to 50 inches +, light-gray (10YR 7/2, dry) and pale-brown (10YR 6/3, moist) fine sandy loam; single grain structure; slightly hard when dry and friable when moist; no mottlings.

The Lamoure soils are highly productive. Occasionally they are too wet for high yields; in normal and dry years, however, subirrigation improves yields. Flooding is a hazard in some seasons, but many times floodwater is beneficial, especially in dry seasons. These soils are suitable for irrigation if drainage is adequate.

Lamoure silty clay loam (lb) has the profile described. A few small scattered alkali spots occur. This soil is in capability unit IIIw–1 and in the subirrigated range site.

Lamoure silt loam, moderately saline (2la), has a profile similar to the one described. The surface soil is silt loam in texture. Alkali or slick spots cover about 10 to 30 percent of the areas mapped. This soil is in capability unit IIIs–1 and in the saline lowland range site.

Leshara Series

The Leshara series consists of deep, imperfectly drained, medium-textured soils on flood plains along streams. They are associated with the Wann and Lamoure soils. All three are imperfectly drained bottomland soils. They differ principally in the texture of the subsoil. The Leshara subsoil is silty or medium textured, the Wann is moderately sandy, and the Lamoure is clayey.

Typical profile (cultivated Leshara silt loam, 0.25 mile south and 60 feet west of NE corner, sec. 30, T. 17 N., R. 6 W.):

A_{1p} 0 to 6 inches, dark-gray (10YR 4/1, dry) and black (10YR 2/1, moist) silt loam; weak, very fine, granular to crumb structure; slightly hard when dry and friable when moist; slightly effervescent in spots; clear, smooth lower boundary.

A_{12} 6 to 10 inches, gray (10YR 5/1, dry) and very dark gray (10YR 3/1, moist) silt loam; moderate, very fine, subangular blocky structure breaking to moderate, very fine, granular structure; hard when dry and friable when moist; effervescence is strong but lime is not visible; worm casts and small channels or openings throughout; clear, wavy lower boundary.

B_1 10 to 14 inches, gray (10YR 6/1, dry) and dark-gray (10YR 4/1, moist) silt loam; weak, coarse and medium, blocky to weak, very fine, granular structure; slightly hard when dry and very friable when moist; violent effervescence; worm casts are abun-

dant; the surface of the blocks is stained dark gray, and the matrix is mottled with dark gray in places; clear, wavy lower boundary.

B_{21} 14 to 20 inches, light-gray (10YR 6/1, dry) and gray (10YR 5/1, moist) silt loam; weak, coarse, angular blocky to weak, very fine crumb structure; slightly hard when dry and very friable when moist; violent effervescence; scattered soft lime concretions; numerous worm casts; dark organic stainings on the blocky surfaces in some places; clear, wavy lower boundary.

B_{22} 20 to 28 inches, gray (10YR 5/1, dry) and dark-gray (10YR 4/1, moist) heavy silt loam; weak, coarse, blocky breaking to a moderate, coarse, medium and fine granular structure; hard when dry and friable when moist; effervescence is violent, and small, soft lime concretions are numerous; brown, medium, faint mottlings are common; clear, wavy lower boundary.

B_{23} 28 to 34 inches, light-gray (10YR 6/1, dry) and gray (10YR 5/1, moist) silt loam; weak, coarse, blocky to weak, medium and fine, granular structure; hard when dry and friable when moist; effervescence is violent and disseminated lime is visible throughout this layer; faint, fine, light-brown mottlings are common; clear, wavy lower boundary.

C_1 34 to 40 inches, light brownish-gray (2.5Y 6/2, dry) and grayish-brown (2.5Y 5/2, moist) silt loam or very fine sandy loam; massive structure; hard when dry and friable when moist; strong effervescence; faint, medium, light-brown mottlings are common; clear, wavy lower boundary.

C_2 40 to 48 inches, light-gray (2.5Y 7/2, dry) and grayish-brown (2.5Y 5/2, moist) very fine sandy loam; massive structure; hard when dry and very friable when moist; strong effervescence; yellowish-brown mottlings are common, distinct, and medium; clear, wavy lower boundary.

C_3 48 to 60 inches, white (10YR 8/1, dry) and light-gray (10YR 7/1, moist) loamy fine sand or fine sand; single grain structure; hard when dry and very friable when moist; wet.

The Leshara soils are very productive and are suitable for all the local crops. The high water table causes excessive wetness in some years, but normally it improves yields by subirrigation. These soils are suitable for irrigation, but flooding and imperfect drainage are problems.

Leshara silt loam (le) is the soil described. This soil is in capability unit IIw–4 and in the subirrigated range site.

Leshara silt loam, moderately saline (2le), has a profile similar to the one described. From 10 to 35 percent of the mapped areas have saline and alkali spots. The alkali spots are generally small. In places they are depressed and water stands in them after rains. When dry, the surface of the alkali spots is very light gray. It tends to crust, and stands of crops are therefore difficult to establish. This soil is in capability unit IIIs–1 and in the saline lowland range site.

Loess Hills and Bluffs

Loess hills and bluffs (lh) make up a land type that consists mostly of very steep, rough, broken topography on Peorian loess soil material. About half of the areas have canyons and bluffs as well as large gullies or deep drainageways. The remaining areas have smoother rolling to steeply rolling slopes. Areas of mixed Moody-Nora, Nora, and Crofton soils occur on these slopes, but they are too small or scattered to be mapped separately.

Soil slipping is common on the steeper slopes. This slipping causes short vertical steps, commonly called catsteps, (fig. 15) which are on practically all of the very steep slopes.

Trees cover some of the steeper slopes and the bluff and canyon areas. The smoother areas of Moody-Nora, Nora, and Crofton soils among the bluffs and canyons have mixtures of tall and short grasses.

This land type is suitable only for grazing. The carrying capacity will vary according to the topography, grass, and rainfall. This land type is in capability unit VIIe–1 and in the thin loess range site.

Loup Series

The Loup series consists of soils on very wet and low flood plains. They have a sandy to very sandy subsoil and substrata. They are fairly common along the major streams that originate in the sandy uplands.

The water table is generally less than 24 inches below the surface of these soils, and at times it is at or near the surface. Although the Loup soils are not suitable for cultivation, they provide some of the better pasture and meadow in the county because of their high water table. Grass is generally green during the summer because of subirrigation.

Willow trees, cottonwood trees, meadow grass, and sedge are the natural vegetation. Two Loup soils are mapped.

Loup fine sandy loam (lo) has the following profile (near the SE corner, sec. 33, T. 17 N., R. 4 W.):

A_{11} 0 to 6 inches, black (10YR 2/1, moist) fine sandy loam; weak, fine, crumb to single grain structure; slightly hard when dry and very friable when moist; violent effervescence; clear, wavy lower boundary.

A_{12} 6 to 12 inches, black (10YR 2/1, moist) fine sandy loam; weak, fine, crumb to single grain structure; slightly hard when dry and very friable when moist; strong effervescence; few, fine, faint, brown mottlings; clear, wavy lower boundary.

AC 12 to 15 inches, very dark gray (10YR 2.5/1, moist), light fine sandy loam or loamy fine sand; slightly hard when dry and very friable when moist; strong effervescence; many, medium, distinct brown mottlings; clear, wavy lower boundary.

C 15 to 48 inches, light-gray (10YR 7/2, moist) sand; single grain structure; loose; many, medium, distinct yellowish-brown mottlings; no effervescence; moist sand at 34 inches and water table at 40 inches.

The dark surface soil ranges from 5 to 12 inches in thickness but averages about 7 inches. Fine, or mixed fine and medium sand, substrata occur at 12 to 20 inches.

Figure 15.—**Loess hills and bluffs, a severely eroded land type. "Catsteps" on the slopes were probably caused by cowpaths.**

The soil horizons over the sand substrata are generally calcareous and mottled.

This soil is too wet for tillage, but it is very productive of pasture and hay. It is in capability unit Vw–1 and in the wet land range site.

Loup silt loam (Lp) has the following profile:

A_{1p} 0 to 6 inches, gray (10YR 5/1, dry) and black (10YR 2/1, moist) silt loam; fine and very fine, subangular blocky to massive structure; slightly hard when dry and friable when moist; strong effervescence; few, fine, faint, brown and yellowish-brown mottlings; abrupt, smooth lower boundary.

A_{12} 6 to 15 inches, dark-gray (10YR 4/1, dry) and black (10YR 2/1, moist) very fine sandy loam; weak, fine and very fine, crumb structure; slight effervescence; few, fine, faint, dark-brown mottlings; slightly hard when dry and very friable when moist; clear, wavy lower boundary.

AC 15 to 18 inches, light fine sandy loam; when dry, 50 percent is dark gray (10YR 4/1) and 50 percent is gray (10YR 6/1); when moist, 50 percent is black (10YR 2/1) and 50 percent is very dark gray (10YR 3/1); weak, fine, crumb to single grain structure; soft when dry and friable when moist; strong effervescence; few, fine, faint, yellowish-brown mottlings; clear, wavy lower boundary.

C 18 to 48 inches, white (10YR 8/2, dry) and very pale brown (10YR 7/3, moist) fine sand; single grain structure; loose; no effervescence or mottling; water table at 30 inches.

The water table is normally above 24 inches. It is near the surface during wet years or wet seasons. The vegetation is bluegrass, sedge, whiteclover, and scattered willow trees. This soil produces some of the better pasture in the county because it is subirrigated. It is in capability unit Vw–1 and in the wet land range site.

McPaul Series

This series consists of deep, silty, bottom-land soils that are sometimes flooded. They occur chiefly along the smaller drainageways that flow from the loessal uplands of the county.

The soils are composed of recent deposits of moderately dark, silty alluvium that comes from the eroding uplands. They are highly stratified with the deposited layers, which vary in thickness. The soil material is dominantly gray or grayish brown because of the loss of organic matter in floodwater. The color depends on the upland source and whether it is eroded surface soil or subsoil. Dark, nearly black, buried soils occur in the profile at various depths that range from 2 feet to generally more than 3 feet.

Only one soil of the McPaul series is mapped in the county.

Typical profile (cultivated McPaul silt loam 0.4 mile south of center of sec. 6, T. 17 N., R. 4 W.):

A_{1p} 0 to 7 inches, dark grayish-brown (10YR 4/2, dry) and very dark grayish-brown (10YR 3/2, moist) silt loam; weak, fine and very fine, crumb to massive structure; slightly hard when dry, very friable when moist.

A_{12} 7 to 24 inches, silt loam of mixed color; when dry, 70 percent is grayish brown (10YR 5/2) and 30 percent light brownish gray (10YR 6/2); when moist, 70 percent very dark gray (10YR 3/1) and 30 percent grayish brown (10YR 5/2) (the lighter colored material is blotched because it is mixed and stratified); weak, medium, subangular blocky to massive structure; slightly hard when dry, friable when moist; clear, wavy lower boundary.

C 24 to 36 inches, silt loam that when dry is mixed dark grayish brown (10YR 4/2) and light brownish gray (10YR 6/2), and when moist is mixed very dark grayish brown (10YR 3/2, and dark brownish gray (10YR 4/2); weak, subangular blocky to massive structure; slightly hard when dry and friable when moist; clear, smooth lower boundary.

D 36 to 60 inches, dark-gray (10YR 4/1, dry) and very dark gray (10YR 3/1, moist) silt loam; weak, fine, granular structure breaking to a weak, fine and very fine, crumb structure. This appears to be a buried soil.

No horizons effervesce with dilute hydrochloric acid. The mixed color in the A_{12} and C horizons was probably caused by cultivation after floods. The freshly deposited silt was probably plowed and mixed with the buried surface soil that was darker and older. Repeated plowing after each flood caused a blotched color of dark and light shades down to the original buried profile.

McPaul silt loam (Mc) has the profile described. It comprises some of the most productive areas in the county and is suitable for all local crops. Small grain is grown very little, however, because of the occasional spring floods. This soil is subject to floods but is otherwise well suited to irrigation. This soil is in capability unit I–1 and in the silty range site.

Meadin Series

The soils of the Meadin series are shallow terrace soils that are 10 to 20 inches deep over gravel. They have a loam to coarse sand subsoil. They are not extensive in the county and occur on nearly level stream terraces. Only one soil of the series is mapped.

Typical profile (Meadin loamy fine sand 0.2 mile east of NW corner, sec. 24, T. 16 N., R. 4 W.):

A_1 0 to 5 inches, dark-gray (10YR 4/1, dry) and very dark brown (10YR 2/2, moist) loamy fine sand; single grain structure; loose; clear, wavy lower boundary.

C_1 5 to 18 inches, pale-brown (10YR 6/3, dry) and brown (10YR 5/3, moist) sand; single grain structure; loose; gradual, irregular lower boundary.

C_2 18 to 60 inches, light yellowish-brown (10YR 6/4, dry) and brown (10YR 5/3, moist) mixed coarse sand and very fine and fine gravel.

Meadin loamy fine sand, 0 to 1 percent slopes (Me), has the profile described. It has a shallow root zone and a very low capacity to hold moisture that plants can use. It is too droughty for crops and is best suited to hay and pasture. This soil is in capability unit VIIs–4 and in the shallow range site.

Moody-Anselmo Complex

The Moody-Anselmo complex consists of two soils so intricately associated that it was not practical to map them separately. The complex occurs in depressional areas and on nearly level to gentle slopes that reach a maximum of 7 percent.

The Anselmo soil has developed in sandy material. This material has enough silt and clay to give it a moderate coherence. The surface soil is about 18 inches thick, and it is composed of gray to grayish-brown loamy materials. Loose, grayish-brown to pale-brown fine sandy loam grading to loamy fine sand underlies the surface soil to a depth of about 36 inches. Beneath this loamy fine sand is loose sand.

The Moody soil has developed in calcareous loessal material. A slight amount of fine sandy material has been blown over the surface soil. The sandy surface soil has a grayish color and a thickness of about 12 inches. The silty clay loam subsoil has a brownish color, a blocky structure, and a depth of about 36 inches. The parent material is a moderately clayey, yellowish-brown loess.

Typical profile of Anselmo soil (Anselmo fine sandy loam, 2,400 feet west and 100 feet north of SE corner, sec. 5, T. 15 N., R. 6 W.):

A_{1p} 0 to 6 inches, grayish-brown (10YR 5/2, dry) and very dark grayish-brown (10YR 3/2, moist) fine sandy loam; weak, very fine crumb to single grain structure; slightly hard when dry and very friable when moist; abrupt, smooth lower boundary.

A_{12} 6 to 17 inches, very dark gray (10YR 3/1, dry) and black (10YR 2/1, moist) fine sandy loam; very weak, coarse, blocky to single grain structure; slightly hard when dry and very friable when moist; clear, wavy lower boundary.

AC 17 to 20 inches, loamy fine sand; when dry, 80 percent is grayish brown (10YR 5/2) and 20 percent is very dark gray (10YR 3/1); when moist, 80 percent is dark grayish brown (10YR 4/2) and 20 percent is black (10YR 2/1); single grain structure; loose; clear, wavy lower boundary.

C_1 20 to 34 inches, very pale brown (10YR 7/3, dry) and pale-brown (10YR 6/3, moist) loamy fine sand; single grain structure; loose; gradual, wavy lower boundary.

C_2 34 to 48 inches, light-gray (10YR 7/2, dry) and light yellowish-brown (10YR 6/4, moist) sand; single grain structure; loose; gradual, wavy lower boundary.

C_3 48 to 60 inches, very pale brown (10YR 7/3, dry) and light yellowish-brown (10YR 6/4, moist) sand; single grain structure; loose; contains a few, faint, medium brown mottlings.

The entire profile is noncalcareous.

Typical profile of Moody soil (Moody fine sandy loam on a slope of 3 percent, 2,500 feet west and 100 feet south of NE corner of sec. 18, T. 17 N., R. 6 W.):

A_{1p} 0 to 6 inches, grayish-brown (10YR 5/2, dry) and very dark grayish-brown (10YR 3/2, moist) fine sandy loam; weak, fine, crumb structure; loose when dry and very friable when moist; smooth, abrupt lower boundary.

A_{12} 6 to 13 inches, very dark grayish-brown (10YR 3/2, dry) and black (10YR 2/1, moist) fine sandy loam; weak, medium and fine, subangular blocky to weak, fine and very fine, crumb structure; very friable when moist and slightly hard when dry; gradual, wavy lower boundary.

AB 13 to 20 inches, very dark grayish-brown (10YR 3/2, dry) and very dark brown (10YR 2/2, moist) fine sandy loam; moderate, medium, subangular blocky to moderate, fine and very fine, subangular blocky structure; very friable when moist and slightly hard when dry; clear, wavy lower boundary.

B_{21} 20 to 28 inches, brown (10YR 5/3, dry) and dark yellowish-brown (10YR 4/4, moist) silty clay loam; moderate, medium, blocky to weak, fine, subangular blocky structure; friable when moist and hard when dry; gradual, wavy lower boundary.

B_{22} 28 to 36 inches, light yellowish-brown (10YR 6/4, dry) and dark-brown (10YR 4/3, moist) silty clay loam; moderate, coarse, prismatic to weak, coarse and medium, subangular blocky structure; friable when moist and hard when dry; gradual, wavy lower boundary.

C 36 to 60 inches, yellowish-brown (10YR 5/4, dry) and dark yellowish-brown (10YR 4/4, moist) silty clay loam; weak, coarse, prismatic to massive structure; friable when moist and slightly hard when dry; strong effervescence.

The fine sandy loam surface material varies in thickness. The silty loess is normally less than 24 inches below the surface.

Moody-Anselmo complex, 1 to 3 percent slopes (MAA), is nearly level. Some small areas with slightly siltier or sandier surface soil than typical are included in this mapping unit. In a few spots the subsoil is more clayey than typical. This complex is in capability unit IIe–3 and in the sandy range site.

Moody-Anselmo complex, 3 to 7 percent slopes (MAB), is gently sloping. The surface soil is about 8 inches thick. This complex is in capability unit IIe–3 and in the sandy range site.

Moody-Anselmo complex, depressions (2MA), occurs in imperfectly drained flat and depressional areas. Parts of some areas may be covered with water during wet seasons. In places the surface soil is as much as 18 inches thick.

The soils of this mapping unit are highly productive when dry enough to farm. Runoff from surrounding uplands helps produce good yields in dry years. All crops can be grown, but alfalfa stands may be drowned out. This complex is suitable for irrigation if surface drainage is provided. It is in capability unit IIIw–6 and in the overflow range site.

Moody-Nora Complex

The soils of the Moody-Nora complex occur on the gently sloping uplands in the northern part of the county. The complex is composed of the deep Moody soil and the moderately deep Nora soil. These soils occur in such an intricate pattern that it was not practical to map them separately.

The Moody soil is similar to the one described under the Moody-Anselmo complex, but the surface soil has a silt loam texture. The Nora soil is described under the Nora series.

The Moody-Nora complex is highly productive if it is not too severely eroded. It is subject to moderately severe erosion by water. It can be successfully irrigated if proper irrigation methods are followed and erosion is controlled.

Moody-Nora silt loams, 3 to 7 percent slopes (MNB), is in capability unit IIe–1 and in the silty range site.

Moody-Nora silt loams, 3 to 7 percent slopes, eroded (MNB2), has lost about half of the surface soil through erosion. This complex is in capability unit IIe–1 and in the silty range site.

Moody-Nora silt loams, 3 to 7 percent slopes, severely eroded (MNB3), has lost most of the surface soil through erosion. Because the subsoil is exposed, this mapping unit is lighter colored than the uneroded units. This complex is in capability unit IIIe–1 and in the silty range site.

Newman Series

The Newman series consists of deep, sandy soils. They occur on terraces along the Loup River. They have developed on alluvial sands that have been partly reworked by wind. Most areas are nearly level, although some hummocky areas have slopes ranging up to 7 percent.

Typical profile (cultivated Newman loamy fine sand, 1 to 3 percent slopes):

A_{1p} 0 to 6 inches, dark-gray (10YR 4/1, dry) and very dark gray (10YR 3/1, moist) loamy fine sand; weak, cloddy to single grain structure; slightly hard when dry and very friable when moist; abrupt, smooth lower boundary.

A_{12} 6 to 12 inches, dark-gray (10YR 4/1, dry) and very dark gray (10YR 3/1, moist) loamy fine sand; cloddy to single grain structure; slightly hard when dry and friable when moist; clear, wavy lower boundary.

A_3 12 to 18 inches, dark-gray (10YR 4/1, dry) and very dark grayish-brown (10YR 3/2, moist) loamy fine sand; single grain structure; loose; clear, wavy lower boundary.

C_1 18 to 22 inches, dark-gray (10YR 4/1, dry) and dark-brown (10YR 3/3, moist) loamy sand; single grain structure; loose when dry or moist; clear, wavy lower boundary.

C_2 22 to 30 inches, light brownish-gray (10YR 6/2, dry) and grayish-brown (10YR 5/2.5, moist) sand; single grain structure; loose; clear, wavy lower boundary.

C_3 30 to 60 inches, white (10YR 8/2, dry) and very pale brown (10YR 8/3, moist) sand; single grain structure; loose.

The depth of the surface soil ranges from 8 to 18 inches, and the color ranges from very dark gray to very dark grayish brown. The lower horizons of this soil are lighter in texture and brighter in color. Some coarse sand and very fine gravel is in the underlying strata in places. The entire profile is noncalcareous.

In places the water table is high enough during some seasons to reduce the yields of cultivated crops. Crops are subirrigated when the water table is at a favorable level. Such a water table occurs in the imperfectly drained phase of Newman loamy fine sand, a moderately wet sandy soil on terraces.

The Newman soils are generally low in lime and phosphorus; crop yields improve when these amendments are added. Rye, corn, sorghum, and vetch are the most suitable crops. These soils will blow readily if left without a cover, and practices are needed for the control of wind erosion.

Newman loamy fine sand, 1 to 3 percent slopes (NeA), has the profile described. It is in capability unit IIIe–5 and in the sands range site.

Newman loamy fine sand, 1 to 3 percent slopes, eroded (NeA2), has a profile similar to the one described. The surface soil is only about 8 inches thick. The main problem is wind erosion. This soil is in capability unit IIIe–5 and in the sands range site.

Newman loamy fine sand, 3 to 7 percent slopes, eroded (NeB2), has a profile similar to the one described. The surface soil is about 8 inches thick, and slopes may be hummocky in places. This soil is in capability unit IIIe–5 and in the sands range site.

Newman loamy fine sand, imperfectly drained, 0 to 1 percent slopes (2Ne), is similar to the well-drained Newman loamy fine sands. However, a water table, from 2 to 5 feet below the surface, makes this soil moderately wet at times. The profile is somewhat mottled because of improper drainage. This soil is in capability unit IIIw–5 and in the subirrigated range site.

Nora Series

The Nora series consists of moderately deep soils on rolling slopes. The depth to lime ranges from about 10 inches on severely eroded slopes to 20 inches in uneroded areas.

The thickness of the surface soil ranges from less than 6 inches in the severely eroded areas to about 10 inches in the uneroded areas. The subsoil ranges in texture from heavy silt loam to silty clay loam. It extends to depths of 15 to 30 inches, where the C horizon begins.

The Nora soils are associated with the Crofton soils, which are on the steeper or more eroded slopes and are calcareous to, or nearly to, the surface. Small tracts of Crofton soils occur in some of the Nora soil areas. The Nora soils are also associated with the more deeply developed Moody soils, which are on gentle slopes and have a deeper lime zone.

Typical profile (cultivated Nora silt loam, 7 to 12 percent slopes, eroded):

A_{1p} 0 to 6 inches, grayish-brown (10YR 5.5/2, dry) and very dark grayish-brown (10YR 3/2, moist) silt loam; weak, fine and very fine, crumb structure; hard when dry and friable when moist; abrupt, smooth lower boundary.

B_{21} 6 to 12 inches, grayish-brown (2.5Y 5/2, dry) and dark-brown (10YR 4/3, moist) silty clay loam; moderate, medium, granular to a weak, fine and very fine, crumb structure; hard when dry and firm when moist; clear, smooth lower boundary.

B_{22ca} 12 to 20 inches, light brownish-gray (2.5Y 6/2, dry) and brown (10YR 5/3, moist) heavy silt loam; weak, coarse, prismatic structure breaking to a weak, fine and very fine, subangular blocky structure; hard when dry and friable when moist; strong effervescence; a few scattered calcium carbonate concretions; clear, wavy lower boundary.

B_{3ca} 20 to 30 inches, light brownish-gray (2.5Y 6/2, dry) and light olive-brown (2.5Y 5/4, moist) silt loam; weak, coarse, blocky structure; hard when dry and friable when moist; violent effervescence; calcium carbonate concretions numerous; clear, wavy lower boundary.

C_{ca} 30 to 60 inches, pale-yellow (2.5Y 7/4, dry) and light yellowish-brown (2.5Y 6/4, moist) silt loam; massive structure; soft when dry and very friable when moist; violent effervescence; concretions are fewer than in B_{3ca} horizon; fine, distinct, yellowish-brown mottlings are common.

The Nora soils produce high to moderately high yields, depending upon the severity of erosion. The soils are subject to severe erosion by water because of their position on the more rolling slopes. These soils can be irrigated if intensive practices for control of water erosion are used.

Nora silt loam, 7 to 12 percent slopes (NoC) (fig. 16), has a profile similar to the one described. The surface soil is 8 to 10 inches thick in most places. This soil is in capability unit IIIe–1 and in the silty range site.

Nora silt loam, 7 to 12 percent slopes, eroded (NoC2), has the profile described for the Nora series. This soil is in capability unit IIIe–1 and in the silty range site.

Nora silt loam, 7 to 12 percent slopes, severely eroded (NoC3), has a profile similar to the one described. Erosion has removed most of the surface soil. The plow layer is grayish brown because the surface soil and subsoil have been mixed by tillage. Limy materials occur in places at a depth of 12 inches, but they are generally deeper. This soil is in capability unit IIIe–1 and in the silty range site.

Figure 16.—**Nora silt loam, 7 to 12 percent slopes. Erosion is the principal problem if this soil is cultivated.**

Nora-Anselmo Complex

The silty to moderately sandy soils of the Nora-Anselmo complex occur on rolling slopes of 7 to 17 percent. In some areas they developed on mixed silt and sand deposited by wind, but in most areas they consist of silty loess mantled with sand. The sand mantle in most places ranges from 6 to about 20 inches in thickness. The depth to the lime zone ranges from 12 to 30 inches but is deeper in the more sandy profiles.

In places where the sand mantle is absent or very thin, the soil is of the Nora series. In places where the entire profile is moderately sandy, the soil is of the Anselmo series. A typical profile for the Nora soils is described under the Nora series. A typical profile for the Anselmo soils is described under the Moody-Anselmo complex.

Nora-Anselmo complex, 7 to 12 percent slopes, eroded (NAC2), has a fine sandy loam surface soil over most of the area. The thickness of the surface soil ranges from 6 to 12 inches but averages about 8 inches. This soil is in capability unit IIIe–3 and in the sandy range site.

Nora-Anselmo complex, 7 to 12 percent slopes, severely eroded (NAC3), is similar to the eroded phase of the complex. The surface soil has a similar texture but is thinner and browner. The average thickness is less than 6 inches. The brown color is the result of exposure of the subsoil over most of the area by erosion and tillage. Nora-Anselmo complex, 7 to 12 percent slopes, severely eroded, is in capability unit IIIe–3 and in the sandy range site.

Nora-Anselmo complex, 12 to 17 percent slopes, severely eroded (NAD3), is similar to Nora-Anselmo complex, 7 to 12 percent slopes, severely eroded, but it has steeper and more erodible slopes. The average slope is about 14 percent. The surface soil is very thin, and the subsoil is exposed in most of the area. Small areas of calcareous subsoil show in many places. This complex is in capability unit VIe–3 and in the sandy range site.

Nora-Crofton Complex

The soils of the Nora-Crofton complex (fig. 17) occur on moderately steep slopes of 12 to 17 percent. They have developed a thin to moderately deep profile over calcareous loess. The two soils in the complex are so intricately associated that it is not practical to map them separately. A typical profile for each soil is given under the series description.

Nora-Crofton silt loams, 12 to 17 percent slopes (NCD), consists of soils with profiles similar to those described under the Nora and Crofton series. The surface soil ranges from 8 to 10 inches in thickness except in the smaller areas of Crofton soil. This complex is in capability unit IVe–1 and in the silty range site.

Nora-Crofton silt loams, 12 to 17 percent slopes, eroded (NCD2), is similar to Nora-Crofton silt loams, 12 to 17 percent slopes. However, the surface soil of the Nora silt loam in this complex is thinner; it ranges from 5 to 8 inches in thickness. The brown subsoil is exposed in many places because cultivation reaches the subsoil. Areas of Nora silt loam with the lime zone below 12 inches are more extensive than those of Crofton silt loam in this mapping unit. This complex is in capability unit IVe–1 and in the silty range site.

Nora-Crofton silt loams, 12 to 17 percent slopes, severely eroded (NCD3) is similar to Nora-Crofton silt loams, 12 to 17 percent slopes, eroded. The subsoil, however, is exposed over a greater area because of erosion and tillage. The thin Crofton soils with lime at or near the surface cover from 25 to 50 percent of the total acreage of this complex. This complex is in capability class IVe–1 and in the silty range site.

Nuckolls Series

The Nuckolls soils have developed from Loveland loess, which is exposed on some of the lower slopes between the Peorian loess uplands and the terraces north of the Loup River. They have a clayey surface soil and sub-

Figure 17.—**Nora-Crofton silt loams; the light areas are Crofton soils and the dark areas are Nora soils. The eroded surface soil has been deposited in the drainageway in the foreground.**

soil. The Loveland loess parent material appears to be mostly silty clay loam in this county.

Typical profile (Nuckolls silty clay loam, 7 to 12 percent slopes, severely eroded, 2,500 feet west and 100 feet north of SE corner, sec. 19, T. 16 N., R. 6 W.):

A_{1p} 0 to 5 inches, light brownish-gray (10YR 6/2, dry) and dark grayish-brown (10YR 4/2, moist) silty clay loam; weak, fine and very fine, granular structure; hard when dry and firm when moist; abrupt, smooth lower boundary.

B_1 5 to 10 inches, dark grayish-brown (10YR 4/2, dry) and dark-brown (10YR 4/3, moist) silty clay loam; weak, coarse, blocky breaking to a weak, fine, subangular blocky structure; hard when dry and firm when moist; clear, wavy lower boundary.

B_{21} 10 to 17 inches, brown (10YR 5/3, dry) and dark-brown (10YR 4/3, moist) silty clay loam; weak, medium, blocky breaking to a weak, fine and very fine, blocky structure; hard when dry and firm when moist; clear, wavy lower boundary.

B_{22} 17 to 26 inches, brown (10YR 5/3, dry) and dark grayish-brown (10YR 4/2, moist) silty clay loam; strong, medium, blocky structure breaking to a strong, fine, blocky structure; very hard when dry and very firm when moist; clear, wavy lower boundary.

B_{23ca} 26 to 34 inches, pale-brown (10YR 6/3, dry) and brown (10YR 5/3, moist) silty clay; strong, coarse, and medium blocky breaking to a strong, fine, blocky structure; very hard when dry and very firm when moist; numerous concretions; effervescence only around the concretions and not on the soil material; clear, wavy lower boundary.

C_{1ca} 34 to 48 inches, light-brown (7.5YR 6/4, dry) and brown (7.5YR 5/4, moist) silty clay; few widely spaced vertical cracks, otherwise massive structure; very hard when dry and very firm when moist; strong effervescence and numerous calcium carbonate concretions; clear, wavy lower boundary.

C_{2ca} 48 to 60 inches, light-brown (7.5YR 6/4, dry) and brown (7.5YR 5/4, moist) silty clay loam; massive structure; hard when dry and firm when moist; violent effervescence and many calcium carbonate concretions; more friable and slightly lighter in texture than the horizon above.

The Nuckolls soils have fairly low crop yields because of low fertility. Consequently, much of the area of these soils has been seeded to grass, although all local crops are suitable. The soils of the Nuckolls series are highly erodible because of their moderately heavy texture, low infiltration rate, low amount of organic matter, and topographic position. They receive excessive runoff water from the uplands above.

Nuckolls silty clay loam, 7 to 12 percent slopes, severely eroded (NuC3), has the profile described for the Nuckolls series. Uneroded areas of Nuckolls silty clay loam are included with this soil because of their small extent. This soil is in capability unit IVe–1 and in the clayey range site.

Nuckolls silty clay loam, 12 to 17 percent slopes, severely eroded (NuD3), has a profile similar to the one described. It is on steeper slopes. The erosion has exposed the subsoil over a larger part of the area than on the lesser slopes. This soil is in capability unit IVe–1 and in the clayey range site.

O'Neill Series

The O'Neill series consists of moderately deep soils on the stream terraces. They have a fine sandy loam subsoil and gravelly substrata. The depth to gravel ranges from 20 to 36 inches. Only one soil of the series is mapped in the county.

Typical profile (cultivated O'Neill fine sandy loam, 1 to 3 percent slopes, 0.1 mile south and 60 feet west of NE corner, sec. 35, T. 16 N., R. 6 W.):

A_{1p} 0 to 6 inches, dark-gray (10YR 4/1, dry) and very dark gray (10YR 3/1, moist) fine sandy loam; single grain structure; loose when dry or moist; abrupt, smooth lower boundary.

A_{12} 6 to 12 inches, dark-gray (10YR 4/1, dry) and very dark brown (10YR 2/2, moist) fine sandy loam; weak, coarse, prismatic to fine, crumb structure; loose when dry or moist; clear, smooth lower boundary.

B_1 12 to 22 inches, gray (10YR 5/1, dry) and very dark grayish-brown (10YR 3/2, moist) fine sandy loam; weak, coarse, prismatic to single grain structure; loose; gradual, wavy lower boundary.

B_3 22 to 30 inches, light brownish-gray (10YR 6/2, dry) and dark grayish-brown (10YR 4/2, moist) loamy sand; single grain structure; loose; gradual, wavy lower boundary.

C 30 to 50 inches, very pale brown (10YR 8/3, dry) and light brownish-gray (10YR 6/2, moist) coarse sand and gravel; contains a few pieces of gravel more than one-quarter inch in diameter.

The texture becomes coarser, and there is a gradual color transition with depth. However, the horizons are distinct.

These soils are fairly well suited to all the common crops, but the gravelly subsoil makes them droughty. They are generally deficient in lime and phosphorus. Consequently, alfalfa and sweetclover require these amendments for good yields. Practices for control of wind erosion are needed on these soils.

O'Neill fine sandy loam, 1 to 3 percent slopes (OnA), is the soil described. This soil is in capability unit IIe–3 and in the sandy range site.

Ortello Series

The deep, moderately sandy soils of the Ortello series occur mainly on high terraces south of the Loup River. Most areas are nearly level, although some have slopes ranging up to 7 percent. The Ortello soils have developed from old sandy alluvium that was probably reworked by wind.

Typical profile (cultivated Ortello fine sandy loam, 1 to 3 percent slopes, 0.15 mile north and 100 feet east of SW corner, sec. 13, T. 16 N., R. 5 W.):

A_{1p} 0 to 5 inches, gray (10YR 5/1, dry) and very dark gray (10YR 3/1, moist) fine sandy loam; weak, cloddy to single grain structure; slightly hard when dry and friable when moist; abrupt, smooth lower boundary.

A_{12} 5 to 12 inches, dark-gray (10YR 4/1, dry) and very dark gray (10YR 3/1, moist) fine sandy loam; weak, very fine, crumb to massive structure; slightly hard when dry and friable when moist; clear, wavy lower boundary.

B_2 12 to 20 inches, dark-gray (10YR 4/1, dry) and very dark gray (10YR 3/1, moist) fine sandy loam; weak, coarse, prismatic structure; slightly hard when dry and friable when moist; clear, wavy lower boundary.

B_3 20 to 30 inches, grayish-brown (10YR 5/2, dry) and very dark grayish-brown (10YR 3/2, moist) fine sandy loam; weak, coarse, prismatic structure; slightly hard when dry and very friable when moist; gradual, wavy lower boundary.

C_1 30 to 48 inches, light-gray (10YR 7/2, dry) and light brownish-gray (10YR 6/2, moist) loamy fine sand; single grain structure; loose; gradual, wavy lower boundary.

C_2 48 to 60 inches, white (10YR 8/2, dry) and light-gray (10YR 7/2, moist) fine sand; single grain structure; loose.

The Ortello soils are suitable for all the crops generally grown in the county. Although they have a moderately high capacity to produce, they have lime and phosphorus deficiencies in most places. There is some wind erosion on all areas. On the gentle slopes, water erosion is also a hazard. Practices to control both water and wind erosion are needed on cultivated sloping areas.

The water table is high enough during some seasons to affect tillage and crop production in some areas of the imperfectly drained phases of Ortello soils. Subirrigation, however, benefits crop production during some seasons on these phases.

Ortello fine sandy loam, 1 to 3 percent slopes (OrA), has the profile described for the Ortello series. This soil is in capability unit IIe–3 and in the sandy range site.

Ortello fine sandy loam, 1 to 3 percent slopes, eroded (OrA2), has a profile similar to that of the soil described, but the surface soil is only about 8 inches thick. This soil is in capability unit IIe–3 and in the sandy range site.

Ortello fine sandy loam, 3 to 7 percent slopes (OrB), has a profile similar to the one described. The sand substratum occurs at a depth of about 30 inches. This soil is in capability unit IIIe–3 and in the sandy range site.

Ortello fine sandy loam, 3 to 7 percent slopes, eroded (OrB2), has a profile similar to the one described. The surface soil is 6 to 8 inches thick. This soil is in capability unit IIIe–3 and in the sandy range site.

Ortello fine sandy loam, imperfectly drained, 0 to 1 percent slopes (2Or), has a profile similar to the one described. The depth to the water table ranges from 2 to 5 feet below the surface. This soil is in capability unit IIIw–6 and in the subirrigated range site.

Ortello very fine sandy loam, 1 to 3 percent slopes (OsA), has a profile similar to the one described except for texture of the surface soil. This soil is in capability class I–1 and in the silty range site.

Ortello very fine sandy loam, imperfectly drained, 0 to 1 percent slopes (2Os), has a profile similar to the one described. The texture of the surface soil is very fine sandy loam and the water table is moderately high, normally 2 to 5 feet below the surface. The subsoil is more mottled than that of the soil described because of this high water table. This soil is in capability unit IIw–4 and in the subirrigated range site.

Rauville Series

The Rauville series consists of poorly drained silty clay loam and silt loam soils of the bottom lands. They have a water table that is at or near the surface part of the time. They are too wet for cultivation, but subirrigation by the water table produces some of the most dependable grazing land in the county. These soils are of alluvial origin and have developed from silt and silty clay deposited by floods. The soils of the Rauville series in Nance County are mapped as Rauville soils.

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Typical profile (Rauville silty clay loam in wet pastureland):

A_{11} 0 to 4 inches, dark-gray (10YR 4/1, moist) silty clay loam; moderate, medium and fine, granular structure; sticky when wet; slightly effervescent; contains many, medium, prominent brown mottles and stains; clear, wavy lower boundary; recent alluvium.

A_{12} 4 to 18 inches, dark-gray (10YR 4/1, moist) silty clay loam; weak, medium to fine, granular structure; plastic when wet; contains many, medium, prominent brown mottles; clear, smooth lower boundary; no effervescence; fairly recent alluvium as indicated by color lighter than that of horizon below.

B_{21} 18 to 24 inches, black (10YR 2/1, wet) silt loam; weak, fine, granular structure; plastic when wet; prominent, fine, brown mottles are common; clear, wavy lower boundary; darker color indicates that this horizon was probably once the surface soil.

B_{22} 24 to 32 inches, black (10YR 2/1, moist) very fine sandy loam; weak, very fine, granular to massive structure; plastic when wet; brown, fine, distinct mottles are common; clear, wavy lower boundary.

C_1 32 to 44 inches, very dark gray (10YR 3/1, moist) very fine sandy loam; massive structure; very plastic when wet; faint, brown and gray, medium mottles are common; clear, wavy lower boundary; waterlogged.

C_2 44 to 60 inches, gray (10YR 5/1, wet) fine sandy loam; single grain structure; very plastic when wet; brown and gray mottles are common, distinct, and medium; waterlogged.

Free water is normally on or near the surface part of the time.

The native vegetation is bluegrass, sedges, scattered willows, water-tolerant grass, and weeds.

Under good management these soils are very productive of meadow and pasture. Excessive wetness may defer grazing in some seasons. Because of subirrigation, these soils produce forage during dry years.

Rauville soils (Ra) are in capability unit Vw–1 and in the wet land range site.

Riverwash

Riverwash (Rw) occurs along the Loup and Cedar Rivers and consists primarily of sandbars, which are often flooded and unstable. It is the first to be covered by water when the streams overflow.

Some of the areas have a sparse plant cover. Other island or shoreline areas have a dense growth of small and large willows and a few small clumps of grasses. Close-growing vegetation is constantly covered by sandy or silty flood deposits.

All of the areas of this land type are a habitat for wildlife and provide good hunting and fishing. Ducks, geese, and other water birds use the sandbars. Deer and other game animals use the more vegetated areas for grazing and cover.

Riverwash is about the only land in the county that is not being taken away from wildlife and used for agriculture. However, many areas are now fenced with adjoining pastureland. This land type is in capability unit VIIIs–1.

Rokeby Series

The Rokeby series consists of deep soils on nearly level stream terraces. In this county they have a silt loam surface soil and a clay subsoil, and they have

developed in deep silty soil material. Although these soils are not extensive, there are some areas along every major drainageway.

The Rokeby soils are associated with the Hall soils. They are generally level, whereas the Hall soils are nearly level to gently sloping. Only one soil of the Rokeby series is mapped in the county.

Typical profile (cultivated Rokeby silt loam, 0 to 1 percent slopes, 200 feet east and 60 feet north of the SW corner, sec. 34, T. 17 N., R. 5 W.):

- A_{1p} 0 to 6 inches, dark-gray (10YR 4/1, dry) and very dark gray (10YR 3/1, moist) silt loam; weak, fine and very fine, crumb structure; dry when hard and friable when moist; abrupt, smooth lower boundary.
- A_{12} 6 to 12 inches, very dark gray (10YR 3/1, dry) and black (10YR 2/1, moist) silty clay loam; weak, very coarse, blocky structure that breaks to moderate, medium and fine, granular structure; hard when dry and friable when moist.
- A_2 12 to 14 inches, very dark gray (10YR 3/1, dry) and black (10YR 2/1, moist) silty clay loam; structure is weak, medium, and platy and strong, medium, fine and very fine, granular; hard when dry and firm when moist; abrupt, smooth lower boundary; this horizon is leached and has a light-gray cast in places.
- B_{21} 14 to 24 inches, dark-gray (10YR 4/1, dry) and very dark gray (10YR 2.5/1, moist) clay; strong, coarse and medium, prismatic structure that breaks to a strong, fine, angular blocky structure; very hard when dry and very firm when moist; clear, wavy lower boundary.
- B_{22} 24 to 30 inches, dark-gray (10YR 4/1, dry) and very dark gray (10YR 3/1, moist) clay; moderate, coarse and medium, prismatic structure breaking to a strong, medium, angular blocky structure; very hard when dry and very firm when moist; clear, wavy lower boundary.
- B_{23} 30 to 36 inches, grayish-brown (10YR 5/2, dry) and very dark grayish-brown (10YR 3/2, moist) clay; weak, medium, prismatic structure crumbling to a weak, very fine, subangular blocky structure; very hard when dry and very firm when moist; clear, wavy lower boundary.
- B_3 36 to 44 inches, light brownish-gray (10YR 6/2, dry) and grayish-brown (10YR 5/2, moist) silty clay loam; weak, coarse and medium, blocky structure; hard when dry and firm when moist; contains a few calcium carbonate concretions; slight effervescence only around the concretions; clear, irregular lower boundary.
- C 44 to 60 inches, light brownish-gray (2.5Y 6/2, dry) and gray (10YR 6/1, moist) silt loam; massive structure; slightly hard when dry and very friable when moist; slight effervescence; contains a few, fine, faint, yellowish-brown mottlings.

The Rokeby soils are suitable for all the common crops, but the tight clay subsoil makes them droughty. They are highly productive if they receive enough rain or are irrigated. Most areas require lime and phosphate fertilizer to produce maximum yields.

Rokeby silt loam, 0 to 1 percent slopes (Ro), is the only Rokeby soil mapped in Nance County. This soil is in capability unit IIe–2 and in the silty range site.

Sandy Alluvial Land

Sandy alluvial land (Sx) occurs along streams that frequently flood. Most profiles of this unit consist of highly stratified deposits laid down by streams. The material consists of sand in which there are thin layers of silty or clayey deposits.

This land type is adjacent to river and stream channels and in places occurs along swales and deeply entrenched creek channels. These areas cannot be cultivated, because of frequent flooding and poor drainage or wetness in places.

The vegetation is a mixture of grass and trees. Trees generally cover the rougher areas around streambanks or the more deeply cut channels. Such areas are generally used for pasture. The nearly level, more poorly drained areas are sometimes used for hay but mainly for pasture. Small areas where the risk of flooding is not too great are sometimes cleared and cropped.

This land type is in capability unit VIw–3 and in the overflow range site.

Sarpy Series

The Sarpy series consists of sandy to very sandy alluvial soils that range from well drained to imperfectly drained. They flood occasionally. These soils are developing in fairly recent flood deposits. They generally receive some additional sand deposits from current flooding. This is especially true of Sarpy fine sand.

Typical profile (cultivated Sarpy loamy fine sand, 2,600 feet east and 200 feet south of NW corner, sec. 25, T. 17 N., R. 4 W., about a quarter mile north of Loup River bridge):

- A_{1p} 0 to 5 inches, gray (10YR 5.5/1, dry) and dark-gray (10YR 4.5/1, moist) loamy fine sand; single grain structure; loose; abrupt, smooth lower boundary.
- A_{12} 5 to 12 inches, gray (10YR 5/1, dry) and very dark gray (10YR 3.5/1, moist) loamy fine sand; very weak, medium and fine, subangular blocky to single grain structure; slightly hard when dry and very friable when moist; clear, smooth lower boundary.
- AC 12 to 16 inches, light brownish-gray (10YR 6/2, dry) and gray (10YR 5/1, moist) loamy sand; single grain structure; loose; clear, wavy lower boundary.
- C_1 16 to 34 inches, white (10YR 8/2, dry) and light-gray (10YR 7/2, moist) fine sand; single grain structure; loose; clear, wavy lower boundary.
- C_2 34 to 60 inches, white (10YR 8/1, dry) and very pale brown (10YR 8/3, moist) coarse sand; single grain structure; loose.

In some places the horizons are slightly darker or finer textured than those described. In some areas the soil material below 20 inches contains some coarse sand and very fine gravel; in a few small areas it is fine gravel at 30 inches. The well-drained Sarpy soils are noncalcareous, but the imperfectly drained soils are calcareous in the surface horizon.

The water table is below 5 feet in the well-drained Sarpy soils but is at 2 to 5 feet in the imperfectly drained soils. Crops are sometimes affected by the high water table. In dry seasons, however, the crops benefit by subirrigation.

Sarpy fine sand is not tillable but is stabilized with a cover of mixed tall grass and trees. It is used mostly for pasture. The Sarpy loamy fine sands and fine sandy loams are fairly productive of crops, pasture, or meadow. They are suitable for all the crops grown in the area. Practices to control wind erosion are required, however, to keep these soils from blowing.

Sarpy fine sand (Sa) has a profile similar to the one described. The surface soil is fine sand, but coarse sand may occur at any depth below 20 inches. This soil is in capability unit VIIe–5 and in the sands range site.

Sarpy fine sandy loam (Sf) has a profile similar to the one described. The surface soil is a fine sandy loam ranging from 6 to 10 inches in thickness. This soil is in capability unit IIe–3 and in the sandy range site.

Sarpy fine sandy loam, imperfectly drained (2Sf), has a profile similar to the one described. The surface soil is a fine sandy loam and is generally limy. The depth to the water table ranges from 2 to 5 feet. This soil is in capability unit IIIw–6 and in the subirrigated range site.

Sarpy loamy fine sand (Sg) has the profile described for the Sarpy series. It is in capability unit IIIe–5 and in the sands range site.

Sarpy loamy fine sand, imperfectly drained (2Sg), has a profile similar to the one described. The surface soil is limy. The water table is 2 to 5 feet below the surface, and the soil, therefore, is moderately wet. It is in capability unit IIIw–5 and in the subirrigated range site.

Silty Alluvial Land

Silty alluvial land (Sy) consists of frequently flooded silty soils along stream channels that are deeply entrenched in places. The texture of these soils is dominantly silt loam or very fine sandy loam. The colors of the horizons are dark gray, gray, and light gray. Included are small areas along the larger flood plains that have moderately sandy surface soils. Areas with moderately sandy strata occur locally.

A large part of Silty alluvial land, as much as 50 percent in places, consists of deeply cut creek channels and adjoining streambanks and breaks. These areas are usually covered with trees. The rest of this land type consists of smoother cleared land in native tall and short grasses or bromegrass. This land will produce high yields of forage.

At times small tillable areas are formed by floods and are cleared for farming, only to be ruined by other floods. Because of this risk, this land type is best suited to pasture. It is in capability unit VIw–3 and in the overflow range site.

Thurman Series

The soils of the Thurman series are deep upland soils that have a loamy fine sand surface soil over a sand subsoil. Many of the areas of Thurman soil have a wavelike or low dune topography. The parent material is fine sand that was deposited by wind.

The Thurman soils are associated with the very sandy Valentine soils. They are also associated with the Anselmo soils, which are dominantly of fine sandy loam texture. The Thurman soils contain enough silt and clay to make them suitable for tillage.

Typical profile (cultivated Thurman loamy fine sand, 3 to 7 percent slopes, sec. 2, T. 15 N., R. 6 W.):

A_{1p} 0 to 4 inches, dark grayish-brown (10YR 4/2, dry) and very dark grayish-brown (10YR 3/2, moist) loamy fine sand; single grain structure; loose; abrupt, smooth lower boundary.

A_{12} 4 to 12 inches, dark-gray (10YR 4/1, dry) and very dark gray (10YR 3/1, moist) loamy fine sand; single grain structure; slightly hard when dry and loose when moist; clear, smooth lower boundary.

AC 12 to 18 inches, gray (10YR 5/1, dry) and very dark grayish-brown (10YR 3/2, moist) loamy fine sand; single grain structure; loose; clear, wavy lower boundary.

C_1 18 to 24 inches, grayish-brown (10YR 5/2, dry) and dark grayish-brown (10YR 4/2, moist) loamy sand; single grain structure; loose; clear, wavy lower boundary.

C_2 24 to 48 inches, pale-brown (10YR 6/3, dry) and brown (10YR 5/3, moist) sand or fine sand; single grain structure; loose.

The entire profile is noncalcareous. There is a gradual transition to lighter colors and textures of the horizons with depth.

The Thurman soils are suitable for all the local crops. They are better suited to rye than other small grain. They are generally deficient in lime and phosphorus, which are required for maximum yields. Thurman soils will blow easily and need protection from wind erosion.

Thurman loamy fine sand, 1 to 3 percent slopes (ThA), has a profile similar to the one described. This soil is in capability unit IIIe–5 and in the sands range site.

Thurman loamy fine sand, 1 to 3 percent slopes, eroded (ThA2), has a profile similar to the one described. It differs mainly in slope gradient and in thickness of the surface soil. The surface soil is 8 inches thick. This soil is in capability unit IIIe–5 and in the sands range site.

Thurman loamy fine sand, 3 to 7 percent slopes (ThB), has the profile described as typical of the Thurman series. It is in capability unit IIIe–5 and in the sands range site.

Thurman loamy fine sand, 3 to 7 percent slopes, eroded (ThB2), has a profile similar to the one described. The surface soil is only 6 to 7 inches thick. This soil is in capability unit IIIe–5 and in the sands range site.

Thurman loamy fine sand, 3 to 7 percent slopes, severely eroded (ThB3), has a profile similar to the one described. The surface soil, however, is very thin because of severe wind erosion. This soil is in capability unit IIIe–5 and in the sands range site.

Thurman-Anselmo Complex

The Thurman-Anselmo complex consists of intermixed sandy and moderately sandy soils on the uplands. It occurs on nearly level to gently rolling low hummocky or low dunelike areas. These soils have developed from sandy and moderately sandy eolian material. The profiles range from fine sandy loams to loamy fine sands.

A typical profile of the Thurman soils of this complex is described under the Thurman series. A typical profile of the Anselmo soils is described under the Moody-Anselmo complex.

Although the Thurman-Anselmo soils are productive, they are generally low in lime and phosphorus. They are suitable for all local crops.

Thurman-Anselmo fine sandy loams, 1 to 3 percent slopes (TAA), occurs on nearly flat to slightly hummocky topography. This complex is in capability unit IIe–3 and in the sandy range site.

Thurman-Anselmo fine sandy loams, 1 to 3 percent slopes, eroded (TAA2), is similar to the uneroded phase. The surface soils are only 7 to 8 inches thick. This complex is in capability unit IIe–3 and in the sandy range site.

Thurman-Anselmo fine sandy loams, 3 to 7 percent slopes, eroded (TAB2), is, in some places, somewhat hummocky or has low dunes. This complex is in capability unit IIIe–3 and in the sandy range site.

Thurman-Anselmo fine sandy loams, 7 to 12 percent slopes, eroded (TAC2), occurs on slopes that average about 8 percent and tend to be dunelike. The thickness of the surface soil averages 6 to 7 inches. This complex is in capability unit IIIe–3 and in the sandy range site.

Valentine Series

The Valentine series consists of soils on deep upland sands that have little or no profile development. They are wind-deposited sands that are stabilized by a mixed grass cover, but some blowouts and eroded areas are included. Areas have low hummocks or dunes.

Typical profile (Valentine fine sand, 3 to 17 percent slopes, 0.2 mile west and 50 feet north of SE corner, sec. 3, T. 16 N., R. 4 W.):

- A_1 0 to 4 inches, dark-gray (10YR 4/1, dry) and very dark brown (10YR 2/2, moist) fine sand; single grain structure; loose; clear, wavy lower boundary.
- C_1 4 to 10 inches, dark-brown (10YR 4/3, dry) and dark-brown (10YR 3/3, moist) fine sand; single grain structure; loose; clear, wavy lower boundary.
- C_2 10 to 36 inches, brown (10YR 5/3, dry) and dark yellowish-brown (10YR 3/4, moist) fine sand; single grain structure; loose.

The Valentine soils are suitable only for range. Careful range management is required to prevent erosion and to obtain maximum production.

Valentine fine sand, 3 to 17 percent slopes (VaC), has the profile described as typical of the Valentine series. It is mainly on the steeper dunelike areas, and the grass cover is not so dense as on the areas of Valentine loamy fine sand, 3 to 17 percent slopes. It is in capability unit VIIe–5 and in the sands range site.

Valentine fine sand, 3 to 17 percent slopes, eroded (VaC2), has a profile similar to the one described. This soil occurs in similar areas and has a similar cover, but it differs from Valentine fine sand, 3 to 17 percent slopes, in having many blowouts and small dunes caused by severe wind erosion. It is in capability unit VIIe–5 and in the sands range site.

Valentine loamy fine sand, 3 to 17 percent slopes (VbC), has a profile similar to that described for the Valentine series. The surface soil, however, is loamy fine sand that ranges from 2 to 5 inches in thickness. This soil is mainly on the more gentle slopes and hummocks. A good, dense cover of mixed tall grass covers these areas. This soil is in capability unit VIIe–5 and in the sands range site.

Very Sandy Alluvial Land

Very sandy alluvial land (Vs) occurs on low flood plains along the Loup and Cedar Rivers and Prairie Creek. It is in overflow areas where mixed loamy fine sand and very sandy material have been deposited by floods. The deposits are loose and highly stratified. This land type is on undulating areas that have numerous small swales and small remnants of former stream channels. Much of this land is subirrigated, as the water table is within the root zone of plants.

A mixture of grass and trees cover the area. The trees dominate, but their density varies. About a third of the areas are dominated by grass and have only scattered trees. Another third of the areas have both grass and trees, and the rest have a dense tree cover and only scattered grass.

This land type is generally not suitable for farming and is nearly all used for pasture. Small areas of the better soils are cleared for farming. The detailed pattern of this land type changes frequently because of the deposits left by floods. This land type is in capability unit VIIe–5 and in the overflow range site.

Wann Series

The Wann series consists of soils on the flood plains that have a moderately sandy subsoil and a moderately high water table. The water table ranges from 2 to 5 feet below the surface of the soil. In some seasons the wetness limits crop production. In normal or drier seasons, the water table provides beneficial subirrigation.

Typical profile (cultivated Wann fine sandy loam, 2,550 feet north and 80 feet east of SW corner, sec. 22, T. 16 N., R. 4 W.):

- A_{1p} 0 to 6 inches, dark-gray (10YR 4/1, dry) and very dark grayish-brown (10YR 3/2, moist) fine sandy loam; weak, very fine, crumb structure; slightly hard when dry and very friable when moist; abrupt, smooth lower boundary.
- A_{12} 6 to 11 inches, dark-gray (10YR 4/1, dry) and nearly black (10YR 2.5/1, moist) fine sandy loam; weak, very fine, blocky structure to weak, very fine, crumb structure; slightly hard when dry and very friable when moist; clear, wavy lower boundary.
- AC 11 to 18 inches, gray (10YR 5/1, dry) and very dark grayish-brown (10YR 3/2, moist) loamy fine sand; single grain structure; loose; clear, wavy lower boundary.
- C_1 18 to 24 inches, light brownish-gray (10YR 6/2, dry) and dark grayish-brown (10YR 4/2, moist) loamy fine sand; single grain structure; loose; clear, wavy lower boundary.
- C_{2ca} 24 to 32 inches, light olive-brown (2.5Y 5/4, dry) and olive-brown (2.5Y 4/4, moist) sandy clay loam or loam; hard when dry and firm when moist; clear, wavy lower boundary; a few small calcium carbonate concretions are visible; effervescence slight except on concretions.
- C_3 32 to 38 inches, light-gray (2.5Y 7/2, dry) and light brownish-gray (2.5Y 6/2, moist) fine sandy loam; loose when dry and very friable when moist; clear, wavy lower boundary; some very fine gravel.
- C_4 38 to 50 inches, light-gray (10YR 6/1, dry) and gray (10YR 5/1, moist) fine sandy loam; single grain structure; loose when dry and very friable when moist.

The depth to the water table ranges from 30 to 36 inches in this profile.

All of the Wann soils in the county are tillable and suitable for the local crops. Yields are limited by alkali on the saline phase and depend on the type of crop, the degree and extent of the alkali, and moisture conditions.

Wann fine sandy loam (Wb) has the profile described for the Wann series. It is in capability unit IIIw–6 and in the subirrigated range site.

Wann silt loam (Wn) has a profile similar to the one described. The surface soil is silt loam or loam. This soil is in capability unit IIw–4 and in the subirrigated range site.

Wann silt loam, moderately saline (2Wn), has a profile

similar to the one described. The surface soil has a silt loam or loam texture. Saline-alkali conditions affect from 10 to 35 percent of the acreage. The affected areas have a very light gray to whitish surface soil when dry. Some salts can be seen near the surface where the concentration of alkali is severe. This soil is in capability unit IIIs–1 and in the saline lowland range site.

Genesis, Morphology, and Classification of Soils

Factors of Soil Formation

Soil is formed by complex processes that include physical and chemical weathering, and the formation and decay of organic matter. Soil-forming processes are influenced by (1) the type of parent material, (2) climate, (3) plant and animal life, (4) relief and drainage, and (5) time. The degree and nature of soil development at any place depend upon the influence these five factors have had.

All of these five factors are important in the genesis of every soil; but some have more influence than others in different kinds of situations or locations. The interaction of all of the factors of soil formation is complex in its effect. The five factors of soil formation are briefly discussed in this section as they relate to the soils of Nance County.

Parent material

The soils of Nance County have developed from three kinds of parent material: Loess, alluvium, and eolian sands. The relationship of the soils to the parent material is shown in figure 18.

The upland soils have developed on silt or sand deposited by wind. The terrace, or bench, soils have developed on silt or sand deposited by water and modified or shifted by wind action in some areas. The bottom-land soils have no significant development but are stratified deposits of silt and sand; some material of clayey texture occurs in most of the parent material. In both terrace and bottom-land soils, there are a few small areas of gravelly alluvium in the subsoil.

The parent material of the silty upland consists mostly of Peorian loess, a silty, floury, limy material of yellowish-brown to olive-brown color.

Thin and patchy deposits of Bignell loess are believed to occur in places near the Loup River and some distance from it. Bignell loess cannot be distinguished lithologically from Peorian loess. Its distribution has not been determined.

Small areas of Loveland loess outcrop on some slopes, since this material occurs under the Peorian loess on the uplands. Loveland loess is slightly finer textured than Peorian loess and is pinkish buff to reddish brown.

The deep, sandy upland soils have developed on eolian sands blown from the stream valleys. These pale-brown fine sands blow easily if they are not covered with vegetation.

The high terrace, or high bench, soils have developed on silty alluvium. This alluvium is similar to loess and is stratified or mixed with loess. One or more buried dark soils are common below depths of 2 to 3 feet.

The soils of the lower terraces apparently have developed almost entirely in alluvium of stratified silty to sandy texture that is gravelly in places. Much of this material has been modified to various degrees by wind sorting and by sand that drifted into the lower places of the dunelike topography on parts of the terraces.

In the bottom lands, the parent material is mostly loamy sand and sand that was washed from the sandhills north and west of Nance County. Loess was also washed from the bordering uplands and deposited along the Cedar River and Beaver Creek. The medium-textured alluvium along the small tributary streams and drainageways comes mostly from the loess-mantled uplands.

Several small outcrops of bedrock occur a few miles northwest of Fullerton on the south side of the Cedar River. These outcrops are interbedded sandstone and silt of the Ogallala formation. They are too small to be mapped, and they are shown on the soil map by symbols.

Climate

This county has a subhumid climate marked by extremes of summer and winter temperatures. The average annual precipitation is 26.08 inches and the average annual temperature is 49.6°F. This climate and rainfall help to produce medium to tall prairie grass. The rainfall has not been heavy enough to leach the soils deeply. This climatic environment is probably the most significant reason that the well-developed soils in Nance County are the Chernozem soils. Their dark, granular surface soil and calcareous subsoil are due mainly to the influence of two factors on their development—the native grass cover and the rainfall.

Plant and animal life

Trees, shrubs, grass and other herbaceous plants, micro-organisms, and various other forms of plant and animal life on and in the soil are active agencies in soil development. The changes brought about by plants and animals depend on the kinds of life and the life processes peculiar to each.

The kinds of plants and animals that live on and in the soil are determined by such factors of environment as climate, parent material, relief, age of the soil, and the associated organisms. The general type of vegetation is controlled by climate to a great extent. In this way climate exerts an indirect influence on soil development.

A well-developed soil is largely the result of the effects of climate and living organisms on the parent material.

Grass has had more influence than other vegetation on the soils of Nance County. It has supplied the abundant organic matter that has given the surface soil its dark color.

Much organic matter has been added to the soil by dead leaves, roots, and entire plants. Most of this organic matter has been added to the A horizon. There it has been acted upon by micro-organisms, earthworms and other animal life, and by direct chemical reactions. Although little is known of the micro-organisms, earth-

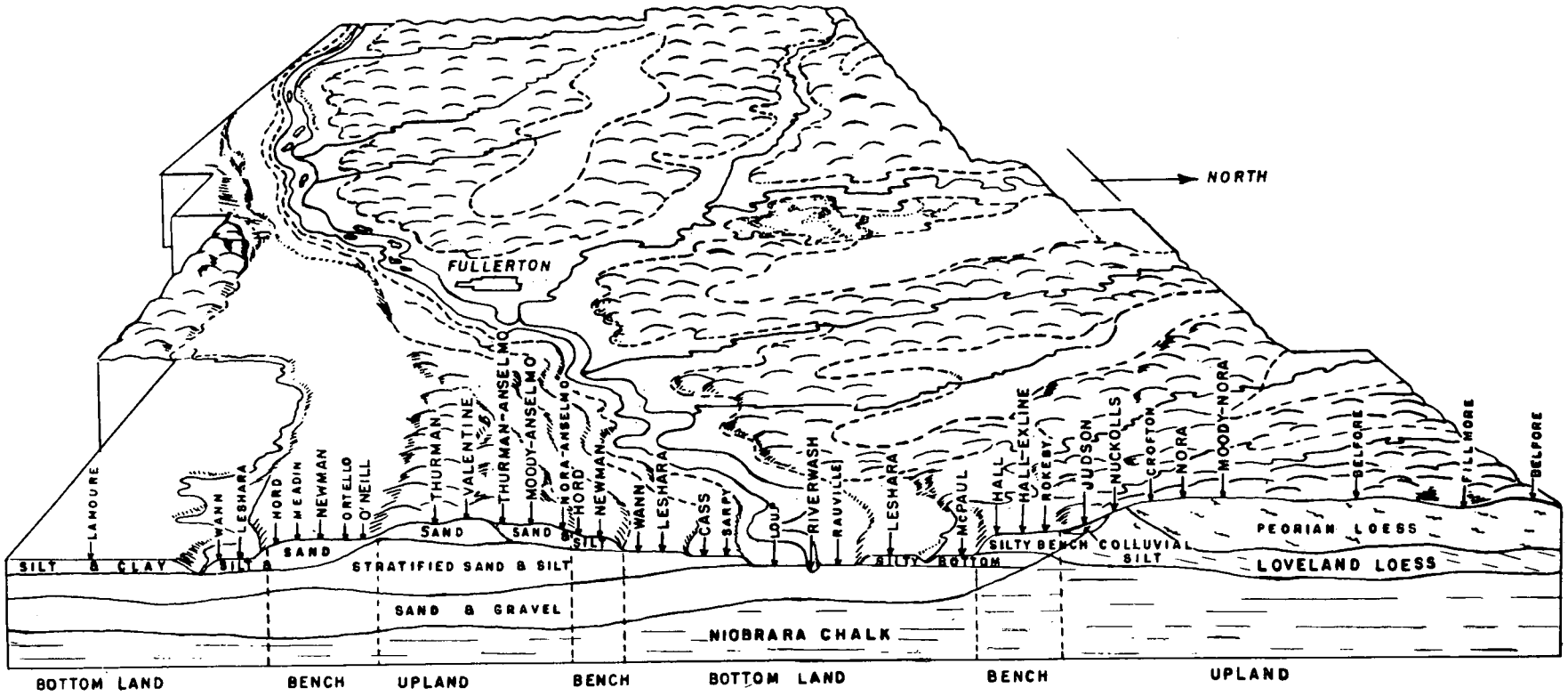


Figure 18.—A cross section along the eastern side of Nance County showing the relationship of the soils to the geological materials.

worms, and other population of the soils of the county, their importance in soil formation is probably equal to that of vegetation.

Relief and drainage

The nearly level, well-drained, upland and terrace (or bench) areas of Nance County have the most deeply developed soils. More rain was absorbed than in the sloping soils. This helped produce more vegetation that, in turn, produced more organic matter. The extra water caused more leaching. Clay and soluble minerals were carried to greater depths than they were in the more sloping soils. Thus, deep soil profiles were formed on the gentle slopes.

Generally, the steeper the slope, the shallower the profile development because of higher runoff and greater erosion. On steep slopes the lime zones are at or near the surface because of less leaching and slower soil development.

The relief or lay of the land of poorly drained or wet areas is important to soil development. Poorly drained depressions may have a claypan because of the more severe leaching of colloidal clay into the subsoil.

The decay of organic materials is slow or incomplete on the very wet spots of the poorly drained areas that have a high water table. Saline or alkaline areas are formed in some places where the water table brings up salt solutions in the soil profile, a process of upward leaching.

Time

The soils vary from young to old. A young soil has no genetic horizons; the older soils have pronounced development, or strong profiles.

An example of a young soil is the Valentine series. The sand dunes on which they are developing shift readily, and the sand has been stabilized for only a short time. The vegetation is thinner and sparser than on some soils, and development proceeds at a much slower rate.

Recent alluvial soils are young. The soil material is still being deposited, and no profile has had time to develop. Loess hills and bluffs and Crofton soils are young in development. Although these steep, silty soils have had time for some development, erosion has not permitted weathered soil material to accumulate.

The most mature soils in the county are the deeply developed, nearly level, upland and terrace (bench) soils. They have distinct horizons in the profile. Some horizons have moderate to strong structure. This is particularly true of the Belfore, Hall, and Rokeby soils.

The more sloping soils or sandy soils are less mature in development, and the horizons and structure are less distinct.

Most of the soils in the county are young and immature in development. The alluvium and sand have been deposited too recently for soil-forming processes to be significant. On the sloping uplands, soils have only moderately to weakly developed profiles because of runoff and erosion.

Since all of the parent materials are deep and unconsolidated, the depth and degree of soil development has little direct relation to agricultural use. Soils that are developing from recently deposited parent material may have a higher potential fertility than older soils. The reason is that the essential soil minerals have not yet leached out of the root zone. Most soils in the county are fairly high to high in potential fertility because they are fairly young and immature.

Classification by Great Soil Groups

The soil series of Nance County are classified by great soil groups as shown in table 5, and the principal characteristics are given for each series.

Chernozems

Nance County is about midway, from east to west, in the Chernozem soil belt in Nebraska. The soils have developed under dominantly mid and tall prairie grasses. Most of the upland and terrace soils of the county are Chernozems (fig. 19).

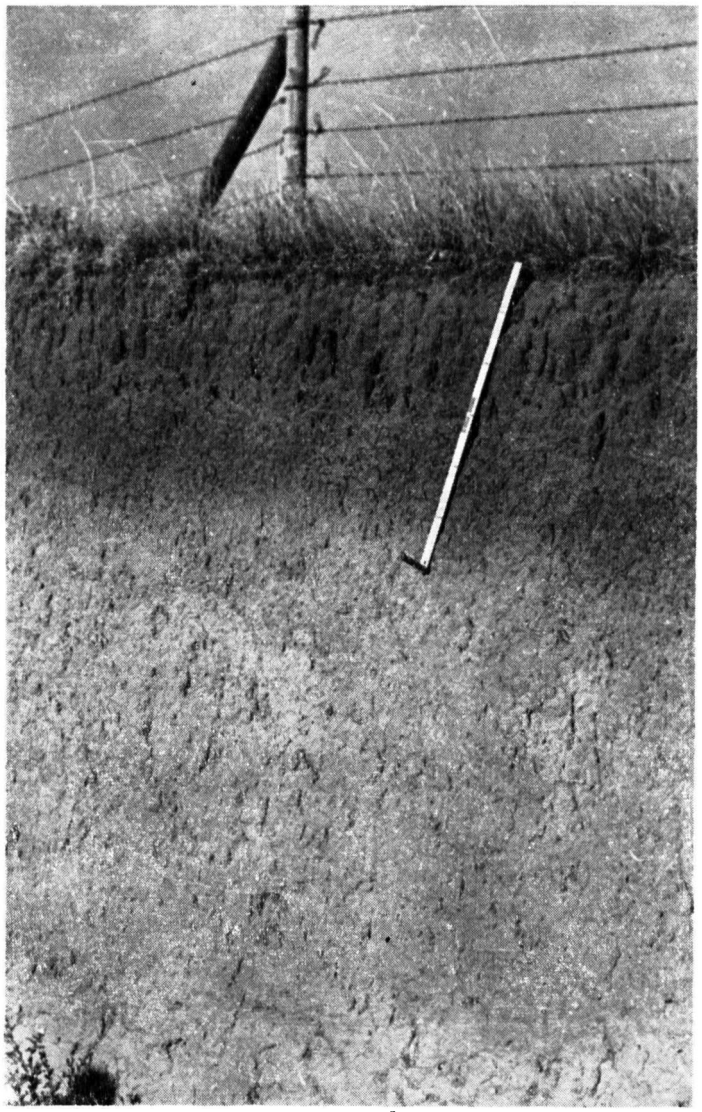


Figure 19.—**Belfore silt loam is a Chernozem soil that has developed in Peorian loess. It has a thick granular surface soil and a medium-textured subsoil. The calcareous parent material occurs at a depth of about 48 inches.**

TABLE 5.—*Classification and*

Soil series	Great soil group	Physiographic position	Parent material
Anselmo	Chernozem	Rolling upland	Eolian sands
Belfore	Chernozem	Nearly level upland	Peorian loess
Cass	Alluvial soils	Bottom land	Sandy alluvium
Crofton	Regosol	Rolling upland	Peorian loess
Exline	Solonetz (solodized)	Alluvial terrace	Loess and silty alluvium
Fillmore	Planosol	Upland depressions	Peorian loess
Hall	Chernozem	Alluvial terrace	Loess and silty alluvium
Hord	Chernozem	Alluvial terrace	Sandy and silty alluvium
Judson	Alluvial soils (colluvial)	Colluvial slope	Silty colluvium
Lamoure	Humic Gley soils	Bottom land	Clayey alluvium
Leshara	Humic Gley soils	Bottom land	Silty alluvium
Loup	Alluvial soils	Bottom land	Sandy alluvium
McPaul	Alluvial soils	Bottom land	Silty alluvium
Meadin	Regosol (Chernozemic)	Alluvial terrace	Gravelly alluvium
Moody	Chernozem	Rolling upland	Peorian loess
Newman	Regosol (Chernozemic)	Alluvial terrace	Old sandy alluvium
Nora	Chernozem	Rolling upland	Peorian loess
Nuckolls	Chernozem	Rolling upland	Loveland loess
O'Neill	Chernozem	Alluvial terrace	Gravelly alluvium
Ortello	Chernozem	Alluvial terrace	Old sandy alluvium
Rauville	Humic Gley soils	Bottom land	Silty clay alluvium
Rokeby	Planosol	Alluvial terrace	Loess and silty alluvium
Sarpy	Alluvial soils	Bottom land	Sandy alluvium
Thurman	Regosol (Chernozemic)	Hummocky uplands	Eolian sands
Valentine	Regosol	Dune uplands	Eolian sands
Wann	Alluvial soils	Bottom land	Sandy alluvium

[1] Main limitation on use.

The Chernozems have a dark surface soil and an accumulation of calcium carbonate in the subsoil. They have developed in areas where the rainfall is not heavy enough to leach the calcium carbonate from the profile. If the soils have not been eroded, the structure of the surface soil is granular.

The Chernozem soils in this county are of the Anselmo, Belfore, Hall, Hord, Moody, Nora, Nuckolls, O'Neill, and Ortello series.

Regosols

The upland soils with little or no development are classed as Regosols. They have a thin surface soil that occurs directly over silty or sandy parent material. The Crofton and Valentine soils are Regosols. Several soils in this area are beginning to take on the features of Chernozems, although they are not sufficiently developed to be called Chernozems. These are the Meadin, Newman, and Thurman soils.

Planosols

There are two soils in the county classed as Planosols. Their distinguishing feature is a compact clay subsoil. The Planosols in the county are of the Fillmore and Rokeby series. The Fillmore soils are on the upland depressions, and the Rokeby soils are on the nearly level terraces. The Planosols cover a very small part of the county.

Alluvial soils

The Alluvial soils are primarily recent bottom-land or colluvial soils. The processes of soil development have not taken place to any significant degree in these soils. The soils in this group are of the Cass, Judson, Loup, McPaul, Sarpy, and Wann series.

Humic Gley soils

The Humic Gley soils are bottom-land soils that were developed in areas that had imperfect to poor drainage. The soils in this group are of the Lamoure, Leshara, and Rauville series.

Solonetz (solodized)

The Exline series of soils, located on the terraces, consists of spots of an alkaline claypan soil, classified as Solonetz (solodized). The spots are surrounded by Hall soils of the Chernozem group. Exline soils make up from 10 to 35 percent of the mapping unit that is called Hall–Exline silt loams, 0 to 1 percent slopes. This complex occupies only a few small areas in the county.

Facts About Nance County

Location and Extent

Nance County is near the center of the eastern half of Nebraska. It is rectangular and averages about 15 miles wide from north to south and 30 miles long from east to west. It has an area of about 280,320 acres.

The average elevation is about 1,780 feet above sea level. The lowest elevation (about 1,540 feet) is where the Loup River crosses the eastern boundary. The highest point is about 2,020 feet and occurs along the western boundary. The elevations of the principal towns are: Fullerton, 1,630 feet; Belgrade, 1,707 feet; and Genoa, 1,580 feet. The county slopes mostly to the southeast.

principal characteristics of soil series

Dominant subsoil texture	Drainage class	Natural Fertility	Principal problem or hazard [1]
Fine sandy loam	Well drained	Medium	Water and wind erosion.
Silty clay loam	Well drained	High	Erosion.
Fine sandy loam	Well drained	High	Occasional flooding.
Silt loam	Excessively drained	Medium	Erosion.
Clay loam	Well drained	Medium	Alkali and salts.
Clay	Poorly drained	Medium	Occasional flooding.
Silty clay loam	Well drained	High	Erosion.
Very fine sandy loam	Well drained	High	Erosion.
Silt loam	Well drained	High	Erosion.
Silty clay loam	Imperfectly drained	High	Moderately wet.
Silt loam	Imperfectly drained	High	Moderately wet.
Loamy fine sand	Very poorly drained	Medium	Very wet.
Silt loam	Well drained	High	Occasional flooding.
Sand	Well drained	Low	Very droughty
Silty clay loam	Well drained	High	Erosion.
Loamy fine sand	Well drained	Medium	Wind erosion.
Silt loam	Well drained	Medium	Erosion.
Silty clay loam	Excessively drained	Low	Erosion.
Fine sandy loam	Well drained	Medium	Erosion and droughtiness.
Fine sandy loam	Well drained	Medium	Wind erosion.
Silty clay loam	Very poorly drained	Medium	Very wet.
Clay	Moderately well drained	High	Slow permeability.
Loamy fine sand	Well drained to imperfectly drained	Medium	Occasional flooding.
Loamy fine sand	Well drained	Medium	Wind erosion.
Fine sand	Excessively drained	Very low	Wind erosion.
Fine sandy loam	Imperfectly drained	High	Moderately wet.

Settlement and Development

Nance County was unorganized territory until 1857. During that year it was ceded to the Pawnee Indians for a reserve. In 1875 the Government moved the Indians to other territory, and settlers began arriving the following year. All the land was sold for $2.50 to $5.00 an acre and the proceeds were given to the Indians.

When the first settlers arrived, Nance County was mostly prairie, except where trees were dominant along the streams and waterways. The same native cover still grows in some small areas.

The native grass was big bluestem, switchgrass, western wheatgrass, Indiangrass, prairie cordgrass, northern reedgrass, bluejoint reedgrass, and, on the bottom lands, saltgrass. The native grass on the silty uplands was mostly big bluestem, little bluestem, side-oats grama, and western wheatgrass. The sandy uplands were mostly in sand bluestem, switchgrass, prairie sandreed, and little bluestem.

Trees on the uplands were the bur oak, American wild plum, eastern redcedar, hackberry, green ash, and boxelder. All of these trees, except the bur oak, also grew on the bottom lands along with sandbar willow, almondleaf willow, black willow, cottonwood, American elm, and red elm.

The early settlers raised corn and vegetables for home use; pork and game were also part of the food supply.

In the early years, the farmers needed to produce only enough for home and local use. After marketing facilities were developed, about 1900, the farmers raised corn, oats, wheat, barley, sorghum, alfalfa, and wild hay and produced cattle, hogs, and chickens on nearly every farm. This is largely the type of farming still carried on. Sweetclover, tame grass, and vetch have been added in the last 20 years for forage and soil-building purposes.

Significant changes are taking place in farming operations. Many farms are now primarily grain farms and produce no livestock to use the grain and forage. The 1954 Federal census lists 233 cash grain farms in the county. Other farmers are specializing in feeding cattle and hogs and buy much feed and hay. Buying and finishing feeder cattle is fairly common.

The most significant change is the development of irrigation on many farms.

Commercial fertilizers have become important in recent years, especially on irrigated farms. Their use on nonirrigated areas has not been significant, especially in dry years, but it is becoming more important. In 1954 there were 1,657 tons of commercial fertilizer used on 28,606 acres.

The farmers and ranchers of the county formed the Nance County Soil Conservation District on July 17, 1941. This district includes all the agricultural land in the county. The Soil Conservation Service gives technical help in planning proper land use and in establishing conservation practices. The county agricultural agent provides the latest research information on better farming methods.

Towns and Industries

Fullerton, the county seat, is the largest town in the county. In 1950 it had a population of 1,520. The other towns and their 1950 population are Genoa, 1,026 and Belgrade, 284.

Nance County has no large industry except agriculture. The towns are principally trading centers. Fullerton has a large cooperative creamery that produces butter and dried buttermilk and processes eggs.

The Loup River Public Power District has a diversion dam in the Loup River about 4 miles southwest of Genoa. There, the water is diverted into a canal that runs to two power plants in Platte County to the east.

The farm of the University of Nebraska Foundation Seed Division is located near Genoa. This farm has two 320-acre units. It is used to raise foundation seed and for seed increase plots for new and experimental varieties of crops and grass.

A hydroelectric plant, located on the Cedar River at Fullerton, belongs to the Consumers Public Power District.

There are several gravel pits along the Loup River that furnish gravel for roads, for building, and for packing of some irrigation wells.

Some farmers are commercial seed growers. They produce mainly alfalfa, sweetclover, and bromegrass seed. Several commercial honey producers are in the county.

Population

The Federal census showed a population of 8,718 in 1930, 7,653 in 1940, and 6,512 in 1950.

The population decline has been mostly on the smaller farms and poorer land. There has been an increase in the size of farms, partly because of mechanization.

Climate

There is considerable variation in the weather from year to year. The total rainfall has varied from a maximum of 40.17 inches in 1900 to 11.44 inches in 1936. The average annual precipitation at Genoa from 1876 to 1955 is 26.08 inches.

July is the warmest month and has an average temperature of 76.2°F. January is the coldest month and has an average temperature of 21.6° F. Temperature extremes have ranged from 116°F. to 32° below zero.

The average frost-free period at Genoa is from April 30 to October 6—an average frost-free growing season of 159 days. The latest frost recorded in spring was May 25, and the earliest in autumn was September 12.

The prevailing winds in the growing season are from the southwest. During the rest of the year the prevailing winds are from the northwest.

Crop production is limited mainly by lack of enough moisture in some seasons. There have been several drought years with almost total crop failures. Good crop yields are produced most of the time if good management, including moisture-conserving practices, is used.

Monthly, seasonal, and annual temperature and precipitation, compiled from reports of the United States Weather Bureau station at Genoa, are given in table 6.

TABLE 6.—*Temperature and precipitation at Genoa Station, Nance County, Nebraska*

[Elevation, 1,595 feet]

Month	Temperature [1]			Precipitation [2]			
	Average	Absolute maximum	Absolute minimum	Average	Driest year (1936)	Wettest year (1900)	Average snowfall
	°F.	°F.	°F.	*Inches*	*Inches*	*Inches*	*Inches*
December	25.6	79	−28	0.82	1.00	0.28	6.4
January	21.6	69	−31	.64	1.25	.04	6.7
February	25.1	73	−32	.76	1.31	.58	6.2
Winter	24.1	79	−32	2.22	3.56	.90	19.3
March	36.4	89	−17	1.15	.18	.58	5.1
April	50.4	98	1	2.59	.64	5.87	.5
May	60.7	101	20	3.94	2.44	3.18	[3]
Spring	49.2	101	−17	7.68	3.26	9.63	5.6
June	70.4	108	36	4.49	1.76	1.95	[3]
July	76.2	116	43	3.43	.42	5.32	[3]
August	74.2	110	38	2.83	1.20	6.94	[3]
Summer	73.6	116	36	10.75	3.38	14.21	[3]
September	65.5	106	25	2.95	1.23	10.45	0
October	51.8	96	2	1.59	.01	4.76	[3]
November	37.2	84	−8	.89	[3]	.22	2.6
Fall	51.5	106	−8	5.43	1.24	15.43	2.6
Year	49.6	116	−32	26.08	11.44	40.17	27.5

[1] Average temperature based on a 77-year record, through 1955; highest temperature on a 60-year record and lowest on a 61-year record, through 1952.

[2] Average precipitation based on a 79-year record, through 1955; wettest and driest years based on an 80-year record, in the period 1876–1955; snowfall based on a 15-year record, through 1952.

[3] Trace.

Crops and Livestock

During the last 20 years, the trend in Nance County has been toward a decrease in the number of farms and an increase in the size of farms. The Federal census in 1954 showed 890 farms averaging 302.5 acres per farm, as compared with 1,216 farms in 1935 averaging 231.8 acres per farm.

The acreage of the principal crops in Nance County in stated years is given in table 7.

Sweet clover, red clover, and vetch are used for soil improvement and forage production. Tame grasses are becoming common in the cropping systems and pasture programs. Varieties of grass used for reseeding are bromegrass, intermediate wheatgrass, tall wheatgrass, crested wheatgrass, sand lovegrass, reed canarygrass, and many of the native grasses. Bromegrass is the most common tame grass now used. Native hay is produced mostly on the wet sloughs or bottom lands. The native pastures are primarily on the rougher, steeper uplands, which are not suitable for cultivation.

The number of livestock in Nance County in stated years is given in table 8.

Irrigation

According to the 1954 Federal census, there were 45 farms with 2,352 irrigated acres. The 1949 census

TABLE 7.—*Acreage of principal crops in stated years*

Crop	1939	1949	1954
	Acres	*Acres*	*Acres*
Corn:			
For all purposes	60, 389	89, 793	81, 024
For grain	35, 493	88, 761	77, 018
For silage	4, 792	301	3, 394
Small grains, threshed:			
Mixed	1, 345	806	434
Oats	14, 017	21, 751	25, 005
Barley	11, 234	1, 297	1, 680
Rye	3, 112	1, 214	1, 450
Wheat	15, 693	25, 705	15, 835
Soybeans, all purposes			781
Bromegrass seed harvested		386	464
Hay:			
All hay crops (except soybeans and sorghum)	14, 368	20, 411	26, 692
Alfalfa and alfalfa mixtures	5, 190	14, 388	20, 279
Wild hay	7, 241	4, 794	4, 661
All other hay	1, 937	1, 229	1, 752
Sorghums:			
All purposes (except for syrup)	19, 872	168	2, 541
Silage	13, 768	20	655
	Number [1]	*Number* [1]	*Number*
Trees of bearing age:			
Apple	1, 386	279	151
Peach	298	255	100
Pear	27	44	28
Cherry	353	146	112

[1] One year later than the crop year given at the head of column.

showed 27 farms with 1,395 irrigated acres. More irrigation systems are being established, but a suitable water supply is not available in all places. Estimates show that at least a fourth of the county would be well suited to irrigation if there were a source of water.

Most of the soils are suitable for irrigation if they are not too steep, sandy, or wet. Gravity irrigation is the most common, although many farmers are using sprinkler systems on the irregular slopes and sandy soils. Much of the land can be leveled for gravity irrigation if the surfaces are not too irregular and the cost is not prohibitive. The soils are almost all deep enough for leveling if they are not too sandy. For information on the soils suitable for irrigation, refer to the section Use and Management of Soils.

Transportation

One or more State highways pass through every town in the county. County roads are along most of the section lines except in the river valleys. Only three bridges cross the Loup River. They are in the eastern, central, and western parts of the county.

Many of the rural roads have been improved and gravelled, and road improvement is continuing. Gravelled roads are near many of the farmsteads, especially along the mail routes.

Fullerton, Genoa, and Belgrade are served by branch lines of the Union Pacific Railroad. Much of the freight is now carried by trucks. Bus lines serve Fullerton and Genoa.

TABLE 8.—*Number of livestock on farms in stated years*

[Livestock of all ages unless otherwise indicated]

Livestock	1940	1950	1954
Cattle and calves	[1] 16, 096	23, 099	35, 330
Cows, including heifers that have calved	([2])	9, 332	13, 942
Milk cows	5, 085	4, 586	4, 632
Horses and mules	[1] 4, 799	2, 109	708
Hogs and pigs	[3] 8, 261	21, 918	26, 665
Sheep and lambs	[4] 2, 147	712	1, 492
Poultry:			
Chickens 4 months old and over	72, 357	98, 020	111, 282
Turkeys raised	[5] 2, 531	[5] 4, 752	9, 139
Ducks raised	[5] 1, 955	[5] 1, 379	1, 659

[1] Over 3 months old.
[2] Not reported.
[3] Over 4 months old.
[4] Over 6 months old.
[5] One year earlier than date given at head of column.

Wildlife

There is a variety of wildlife along the rivers and creeks in the county. Deer run along the main streams, where they find brushy, woody cover. Migratory waterfowl are normally abundant in the spring and fall because of the many miles of streams.

Pheasant and quail are the principal upland game birds. Their population varies in different seasons, but it is generally ample for fairly good to good hunting.

Fishing waters are reached in fairly short distances from any point within the county. All of the streams and the canal of the Loup River Public Power District are fished. Several old gravel pits and some farm ponds are stocked with fish. The streams contain principally catfish, and the ponds have bullheads, bass, bluegill, and carp.

Glossary

Aggregate, soil. Many primary soil particles held together in a single mass or cluster such as a prism, crumb, or granule.

Alluvial soil. A soil developing from transported and relatively recently deposited material (alluvium) characterized by a weak modification (or none) of the original material by soil-forming processes.

Association, soil. An area of land composed of one or more soil types that occur in a characteristic pattern. The association may consist of soils that are similar or that differ widely in important characteristics. Each soil association, however, has a certain repeating pattern of the same important soil type, or types, and other features that give it a characteristic landscape.

Bottom lands. The normal flood plains of a stream, part of which may be flooded only at infrequent intervals.

Boundaries, horizon. The width of the horizon boundaries is described as abrupt, if less than 1 inch wide; clear, if about 1 to 2½ inches wide; gradual, if 2½ to 5 inches wide; and diffuse, if more than 5 inches wide. Their distinctness is described as smooth, if the boundary is nearly a plane; wavy or undulating, if pockets are wider than their depth; irregular, if irregular pockets are deeper than their width; and broken, if parts of the horizon are unconnected with other parts.

Calcareous soil. Soil that contains enough calcium carbonate to effervesce (fizz) when treated with dilute hydrochloric acid. A soil that is alkaline in reaction because of the presence of calcium carbonate.

Chernozem soils. A group of soils having deep, dark to nearly black surface horizons and rich in organic matter, which grade to lighter colored soil below. At 1.5 to 4 feet, these soils have layers of accumulated calcium carbonate. They develop under tall and mixed grasses in a temperate to cool subhumid climate.

Colluvium. Mixed deposits of soil material and rock fragments near the base of rather steep slopes. The deposits have accumulated through soil creep, slides, and local wash.

Color. Colors are given for each horizon by descriptive names, as brown or dark brown, or by Munsell notations, as 10YR 5/3 and 10YR 4/3. *See* Munsell color notation.

Complex, soil. An intricate mixture of different kinds of soil that are too small to be indicated separately on maps of the scale used. They are, therefore, mapped as a unit.

Consistence. A soil term expressing cohesion and the resistance to forces tending to deform or rupture the aggregate. Terms commonly used to describe consistence are as follows:

Firm. When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Friable. When moist, crushes easily under gentle to moderate pressure between thumb and forefinger and coheres when pressed together.

Hard. When dry, moderately resistant to pressure; barely breakable between thumb and forefinger.

Loose. Noncoherent.

Plastic. When wet, a wire is formable; soil mass is readily deformed by moderate pressure, but cohesive.

Sticky. When wet, adheres to other material; generally very cohesive when dry.

Flood plain. The nearly flat lands along streams that overflow during floods.

Great soil group (soil classification). A broad group of soils having common internal soil characteristics.

Horizon, soil. A layer of soil, approximately parallel to the soil surface, that has more or less well-defined characteristics. Horizons are identified by letters as follows:

Horizon A. The horizon at the surface. From this horizon the soluble minerals and clay have been removed by percolating water. The major A horizon may be subdivided into A_1, the part that is dark colored because of organic matter, and A_2, the part that is leached and light colored.

Horizon B. The horizon in which clay or other material has been added by percolating waters. It may be subdivided into B_1, B_2, or B_3 horizons.

Horizon C. A layer of unconsolidated rock material presumed to be similar in chemical, physical, and mineral composition to the material from which at least a part of the overlying solum developed.

Humic Gley soils. An intrazonal group of poorly to very poorly drained hydromorphic soils that have dark-colored, organic-mineral horizons of moderate thickness, underlain by mineral gley horizons. The Humic Gley soils have developed under either swamp-forest or herbaceous marsh vegetation, mostly in humid or subhumid climates.

Inclusions. Areas of soil mapped with a different soil because they were too small to be mapped separately on a map of the scale used.

Loess. Geological deposit of relatively uniform, fine material, mostly silt, presumably transported by wind.

Mapping unit, soil. An area of soil enclosed by a boundary and identified by a symbol on the soil map.

Mottling, soil. Contrasting color patches that vary in number and size. Descriptive terms are as follows: Contrast—*faint, distinct,* and *prominent;* abundance—*few, common,* and *many;* and size—*fine, medium,* and *coarse.*

Munsell color notation. A method of designating soil color by a combination of letters and numbers, such as 10YR 3/4. The Munsell notation is used to supplement the color names whenever greater precision is needed. It consists of separate notations for hue, value, and chroma.

Permeability. That quality of the soil that enables water or air to move through it.

Phase, soil. A subdivision of a soil type based on minor variations; a mapping unit.

Planosol. A group of soils with eluviated surface horizons underlain by claypans or fragipans, developed on nearly flat or gently sloping uplands in humid or subhumid climates.

Profile, soil. A vertical section of the soil from the surface into the parent material.

Range sites. Different kinds of grassland, which vary from each other in the kind and amount of original vegetation they can produce.

Range condition. The present state of the vegetation in relation to the original condition for the site.

Reaction, soil. The degree of acidity or alkalinity of the soil mass, expressed in pH values or in words as follows:

	pH
Extremely acid	Below 4.5
Very strongly acid	4.5–5.0
Strongly acid	5.1–5.5
Medium acid	5.6–6.0
Slightly acid	6.1–6.5
Neutral	6.6–7.3
Milky alkaline	7.4–7.8
Moderately alkaline	7.9–8.4
Strongly alkaline	8.5–9.0
Very strongly alkaline	9.1 and higher

Regosol. A group of soils without definite genetic horizons, which are developing from deep, unconsolidated or soft, rocky deposits.

Runoff. The amount of water removed by flow over the surface of the soil.

Series, soil. A group of soils that have soil horizons similar in their differentiating characteristics and arrangement in the soil profile, except for the texture of the surface soil, and have developed from a particular type of parent material. A series may include two or more soil types that differ from one another in the texture of the surface soils.

Soil. The natural medium for the growth of land plants on the surface of the earth; composed of organic and mineral materials.

Solum. The upper part of the soil profile above the parent material. In this part of the profile, the processes of soil formation take place.

Structure, soil. The arrangement of the soil particles into lumps, granules, or other aggregates. Soil structure is classified according to grade, class, and type.

Grade. Distinctness and durability of the soil aggregates; expresses the differential between cohesion within aggregates and adhesion between aggregates. Terms: *Structureless* (single grain or massive), *weak, moderate,* and *strong.*

Class. Size of soil aggregates. Terms: *Very fine* or *very thin, fine* or *thin, medium, coarse* or *thick,* and *very coarse* or *very thick.*

Type. Shape and arrangement of soil aggregates. Terms: *Blocky, subangular blocky, columnar, crumb, granular, platy,* and *prismatic.*

Texture, soil. The relative proportions of the various size groups of individual soil grains in a mass of soil. Specifically the proportions of sand, silt, and clay. A coarse-textured soil is one high in sand; a fine-textured soil has a large proportion of clay.

Clay. Small mineral soil grains, less than 0.002 millimeter (0.000079 in.) in diameter; soil material that contains 40 percent or more of clay, less than 45 percent of sand, and less than 40 percent of silt.

Silt. Small mineral soil grains ranging from 0.002 millimeter (0.000079 in.) to 0.05 millimeter (0.002 in.) in diameter; soil material that contains 80 percent or more silt and less than 12 percent clay.

Sand. Small rock or mineral fragments that have diameters ranging from 0.05 millimeter (0.002 in.) to 2.0 millimeters 0.079 in.). The term sand is also applied to soils that contain 85 percent or more of sand.

Type, soil. A group of soils that have genetic horizons similar as to differentiating characteristics, including texture and arrangement in the soil profile, and developed from a particular kind of parent material.

Wind stripcropping. Growing crops in strips extending crosswise to the general direction of prevailing winds without regard to the contour of the land. Usually strips of wind-resistant crops are alternated with other crops or fallow to prevent surface movement of soil over broad areas.

Woodland site. A group of soils that produce the same kinds and amounts of forest products and need similar management.

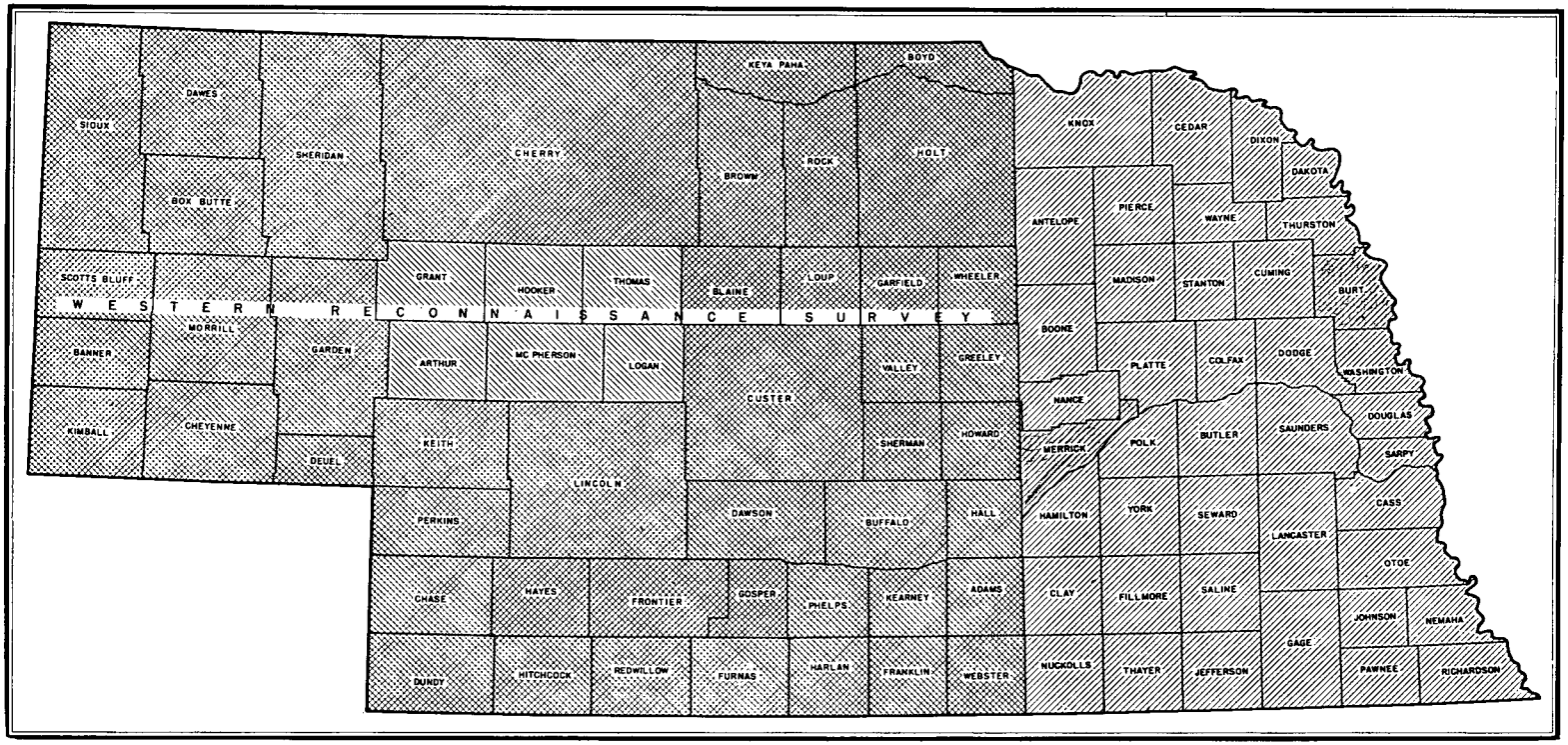
GUIDE TO MAPPING UNITS AND CAPABILITY UNITS

[See table 1, p. 11, for estimated crop yields, and table 4, p. 18, for the acreage and the proportionate extent of the soils. See table 2, p. 14, for range management and table 3, p. 16, for woodland management. Where percent slope is not shown for a mapping unit, the soils are level or nearly level]

Mapping symbol	Soil	Page	Capability unit	Page
Be	Belfore silt loam, 0 to 1 percent slopes	20	I–1	5
BeA	Belfore silt loam, 1 to 3 percent slopes	20	IIe–1	5
BeA2	Belfore silt loam, 1 to 3 percent slopes, eroded	20	IIe–1	5
Cs	Cass fine sandy loam	20	IIe–3	6
Ca	Cass silt loam	20	I–1	5
CfC	Crofton silt loam, 7 to 12 percent slopes	21	IIIe–1	6
CfC3	Crofton silt loam, 7 to 12 percent slopes, severely eroded	21	IVe–1	8
CfD	Crofton silt loam, 12 to 17 percent slopes	21	IVe–1	8
CfD3	Crofton silt loam, 12 to 17 percent slopes, severely eroded	21	IVe–1	8
CfE	Crofton silt loam, 17 to 30 percent slopes	21	VIe–1	9
CfE3	Crofton silt loam, 17 to 30 percent slopes, severely eroded	21	VIe–1	9
Fm	Fillmore silt loam, 0 to 1 percent slopes	22	IIIw–2	7
Ha	Hall silt loam, 0 to 1 percent slopes	22	I–1	5
HaA	Hall silt loam, 1 to 3 percent slopes	22	IIe–1	5
HaB	Hall silt loam, 3 to 7 percent slopes	22	IIe–1	5
HaB2	Hall silt loam, 3 to 7 percent slopes, eroded	22	IIe–1	5
HE	Hall-Exline silt loams, 0 to 1 percent slopes	22	IIIs–1	8
Hr	Hord fine sandy loam, 0 to 1 percent slopes	23	IIe–3	6
HrA	Hord fine sandy loam, 1 to 3 percent slopes	23	IIe–3	6
HrB	Hord fine sandy loam, 3 to 7 percent slopes	23	IIe–3	6
Hy	Hord very fine sandy loam, 0 to 1 percent slopes	23	I–1	5
HyA	Hord very fine sandy loam, 1 to 3 percent slopes	23	IIe–1	5
HyB	Hord very fine sandy loam, 3 to 7 percent slopes	23	IIe–1	5
2Hy	Hord very fine sandy loam, imperfectly drained, 0 to 1 percent slopes	23	IIw–4	6
JuA	Judson silt loam, 1 to 3 percent slopes	24	IIe–1	5
JuB	Judson silt loam, 3 to 7 percent slopes	24	IIe–1	5
Lb	Lamoure silty clay loam	24	IIIw–1	7
2La	Lamoure silt loam, moderately saline	24	IIIs–1	8
Le	Leshara silt loam		IIw–4	6
2Le	Leshara silt loam, moderately saline	25	IIIs–1	8
Lh	Loess hills and bluffs	25	VIIe–1	10
Lo	Loup fine sandy loam	25	Vw–1	9
Lp	Loup silt loam	25	Vw–1	9
Mc	McPaul silt loam	26	I–1	5
Me	Meadin loamy fine sand, 0 to 1 percent slopes	26	VIIs–4	10
MAA	Moody-Anselmo complex, 1 to 3 percent slopes	27	IIe–3	6
MAB	Moody-Anselmo complex, 3 to 7 percent slopes	27	IIe–3	6
2MA	Moody-Anselmo complex, depressions	27	IIIw–6	8
MNB	Moody-Nora silt loams, 3 to 7 percent slopes	27	IIe–1	5
MNB2	Moody-Nora silt loams, 3 to 7 percent slopes, eroded	27	IIe–1	5
MNB3	Moody-Nora silt loams, 3 to 7 percent slopes, severely eroded	27	IIIe–1	6
NeA	Newman loamy fine sand, 1 to 3 percent slopes	28	IIIe–5	7
NeA2	Newman loamy fine sand, 1 to 3 percent slopes, eroded	28	IIIe–5	7
NeB2	Newman loamy fine sand, 3 to 7 percent slopes, eroded	28	IIIe–5	7
2Ne	Newman loamy fine sand, imperfectly drained, 0 to 1 percent slopes	28	IIIw–5	8
NoC	Nora silt loam, 7 to 12 percent slopes	28	IIIe–1	6
NoC2	Nora silt loam, 7 to 12 percent slopes, eroded	28	IIIe–1	6
NoC3	Nora silt loam, 7 to 12 percent slopes, severely eroded	28	IIIe–1	6
NAC2	Nora-Anselmo complex, 7 to 12 percent slopes, eroded	29	IIIe–3	7
NAC3	Nora-Anselmo complex, 7 to 12 percent slopes, severely eroded	29	IIIe–3	7
NAD3	Nora-Anselmo complex, 12 to 17 percent slopes, severely eroded	29	VIe–3	9
NCD	Nora-Crofton silt loams, 12 to 17 percent slopes	29	IVe–1	8
NCD2	Nora-Crofton silt loams, 12 to 17 percent slopes, eroded	29	IVe–1	8
NCD3	Nora-Crofton silt loams, 12 to 17 percent slopes, severely eroded	29	IVe–1	8
NuC3	Nuckolls silty clay loam, 7 to 12 percent slopes, severely eroded	30	IVe–1	8
NuD3	Nuckolls silty clay loam, 12 to 17 percent slopes, severely eroded	30	IVe–1	8
OnA	O'Neill fine sandy loam, 1 to 3 percent slopes	30	IIe–3	6
OrA	Ortello fine sandy loam, 1 to 3 percent slopes	31	IIe–3	6
OrA2	Ortello fine sandy loam, 1 to 3 percent slopes, eroded	31	IIe–3	6
OrB	Ortello fine sandy loam, 3 to 7 percent slopes	31	IIIe–3	7
OrB2	Ortello fine sandy loam, 3 to 7 percent slopes, eroded	31	IIIe–3	7
2Or	Ortello fine sandy loam, imperfectly drained, 0 to 1 percent slopes	31	IIIw–6	8
OsA	Ortello very fine sandy loam, 1 to 3 percent slopes	31	I–1	5
2Os	Ortello very fine sandy loam, imperfectly drained, 0 to 1 percent slopes	31	IIw–4	6
Ra	Rauville soils	31	Vw–1	9
Rw	Riverwash	31	VIIIs–1	10
Ro	Rokeby silt loam, 0 to 1 percent slopes	32	IIe–2	6
Sx	Sandy alluvial land	32	VIw–3	9
Sa	Sarpy fine sand	32	VIIe–5	10
Sf	Sarpy fine sandy loam	33	IIe–3	6

GUIDE TO MAPPING UNITS AND CAPABILITY UNITS—Continued

Mapping symbol	Soil	Page	Capability unit	Page
2Sf	Sarpy fine sandy loam, imperfectly drained	33	IIIw–6	8
Sg	Sarpy loamy fine sand	33	IIIe–5	7
2Sg	Sarpy loamy fine sand, imperfectly drained	33	IIIw–5	8
Sy	Silty alluvial land	33	VIw–3	9
ThA	Thurman loamy fine sand, 1 to 3 percent slopes	33	IIIe–5	7
ThA2	Thurman loamy fine sand, 1 to 3 percent slopes, eroded	33	IIIe–5	7
ThB	Thurman loamy fine sand, 3 to 7 percent slopes	33	IIIe–5	7
ThB2	Thurman loamy fine sand, 3 to 7 percent slopes, eroded	33	IIIe–5	7
ThB3	Thurman loamy fine sand, 3 to 7 percent slopes, severely eroded	33	IIIe–5	7
TAA	Thurman-Anselmo fine sandy loams, 1 to 3 percent slopes	33	IIe–3	6
TAA2	Thurman-Anselmo fine sandy loams, 1 to 3 percent slopes, eroded	33	IIe–3	6
TAB2	Thurman-Anselmo fine sandy loams, 3 to 7 percent slopes, eroded	34	IIIe–3	7
TAC2	Thurman-Anselmo fine sandy loams, 7 to 12 percent slopes, eroded	34	IIIe–3	7
VaC	Valentine fine sand, 3 to 17 percent slopes	34	VIIe–5	10
VaC2	Valentine fine sand, 3 to 17 percent slopes, eroded	34	VIIe–5	10
VbC	Valentine loamy fine sand, 3 to 17 percent slopes	34	VIIe–5	10
Vs	Very sandy alluvial land	34	VIIe–5	10
Wb	Wann fine sandy loam	34	IIIw–6	8
Wn	Wann silt loam	34	IIw–4	6
2Wn	Wann silt loam, moderately saline	34	IIIs–1	8



Areas surveyed in Nebraska shown by shading. Detailed surveys shown by northeast-southwest hatching; reconnaissance surveys shown by northwest-southeast hatching; crosshatching indicates areas covered by both detailed and reconnaissance surveys.

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