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E.C. 18-86-2



LAND

JUDGING.....

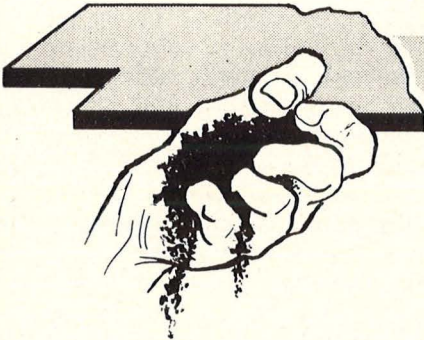
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Land Judging in Nebraska

Harold H. Gilman
Extension Conservationist

INTRODUCTION

Land judging enables each participant to learn how to recognize the physical features of the soil, to classify the soil and to treat it according to its capabilities.

There is considerable interest in land judging in Nebraska among students of vocational agriculture and boys and girls in 4-H Club work. This is due in part to the great interest of Nebraskans in the conservation of our two most valuable natural resources—soil and water.

Nebraska was the first state west of the Mississippi to vote all agricultural land within its boundaries into a soil and water conservation district. Through the efforts of all its citizens Nebraska farmers and ranchers in 1956 constructed 11,507 miles of terraces, or 19.3% of all terraces built in the entire United States. Again in 1957, 9,998 miles of terraces were constructed in Nebraska while only 41,997 miles were built in the rest of the nation. Terracing is only one phase of a complete farm conservation plan. Other conservation practices have been established in similar proportions.

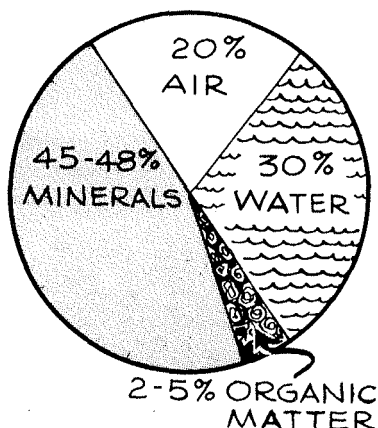
By teaching the youth of our state the fundamentals of soil and water conservation we shall keep Nebraska first in conservation.

SOIL

What is Soil?

Soil is the thin, outer skin of the earth derived from weathered rock fragments and decayed plant and animal remains. When it contains the proper proportions of air, water, minerals and organic matter needed by plants, it furnishes support and food for growing plants.

Soils vary in the percentages of ingredients according to their textures. For example, a silt loam surface soil in best condition for plant growth contains four things in the proportions illustrated in the chart.



Importance of Surface Soil

Surface soil is important because it: (a) contains most of the organic matter supply, the storehouse of plant food, (b) it absorbs the most moisture during rains, (c) it is farmed more easily, and (d) it doesn't wash away as fast as subsoil.

The subsoil lies just beneath the surface soil. It is usually lighter in color, contains less plant food, is harder to farm and washes away more easily.

The parent material lies below the subsoil. It is the material from which both subsoil and surface soil were formed.

When farming started in the United States, there was an average of nine inches of surface soil over our cultivated acres. Today there is an average of six inches. We have lost one-third of our surface soil.

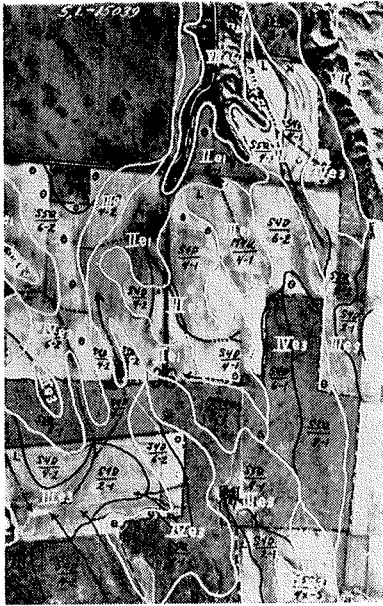
HOW LAND USE IS DETERMINED

Each tract of land is different. The kind of soil, the slope, the degree of erosion, the fertility and the physical conditions vary from place to place. Any of these factors, as well as others, may limit the possible use of land.

In order to find out the facts, a soil survey and land capability map is made. The land capability map shows the degree of hazards or limitations common to a group of soils. It shows the essential physical soil information needed for the proper preparation of farm conservation plans. One can see from these maps the areas on a farm where simple erosion control is needed, areas that need intensive treatment, areas on which intertilled crops can be grown only occasionally and areas that should be seeded to grass.



A soil surveyor examines the characteristics of the soil.



A land capability map. This is the completed soil survey map. Now the problem is to farm the land according to the capabilities of the soils.

Making the Soil Survey

The soil surveyor makes a land capability map (a soils map) on an aerial photograph large enough to show every road, ditch, fence, building and field.

The tools he uses are a spade, soil auger, soil probe and hand level. His frequent borings into the soil (usually 3 to 4 feet deep) enable him to determine the depth of the surface soil and subsoil, to estimate the amount of soil that has been lost through erosion, and to determine the texture and permeability of the soil. The hand level enables him to measure the per cent of slope. He puts these facts on the aerial photograph by code and draws boundary lines to show how far each particular soil condition extends. He also maps the present land use by designating the cropland, pastureland, woods, etc.

Many vocational agriculture and 4-H Club teams receive valuable assistance in land judging from soil scientists of the Soil Conservation Service. Therefore, the land judging score card has been developed to fit very closely with Soil Conservation Service Standards. All soils in Nebraska are mapped in accordance with the National Scheme of Soil Classification.

THE NATIONAL SCHEME OF SOIL CLASSIFICATION

This is a system of classifying soils according to their depth, color, texture, thickness, parent material, etc. A numbering system is used in Nebraska to code the most significant soil facts. By knowing the legend, one can read a soils symbol on a map from any part of the state and interpret many of the characteristics of that soil.

Interpreting a Soil Symbol

The order of the letters and numbers in the soil symbol in the state coding system are as follows:

First number is Effective Depth (This is omitted in Nebraska unless there is an inhibiting layer).

First letter is texture of surface soil.

Next number is permeability of subsoil and substratum (If perme-

ability of subsoil and substratum are the same only one number is in the symbol; if they are different, two numbers appear).

Next letter is type of underlying material.

In addition to the above factors, there are other associated land features shown in the symbols. They will apply to wetness or water table, frequency of overflow, salinity or alkalinity, textures, and excess lime. All of these numbers and letters are described so that you can better understand the soil symbols as shown in the various capability charts. When the major soil characteristics are learned, most of the soils can be described from the mapping symbol.

EXPLANATION OF MAPPING SYMBOLS

Standard Mapping Symbol

Example: 3L67T1s2 (See explanation below)

3 —Effective depth of soil to inhibiting layer (3 depth is 20-36 in.)

L —Texture of topsoil (L is light textured, usually loamy fine sand)

6 —Permeability of subsoil (6 is rapid)

7 —Permeability of underlying material (7 is very rapid-coarse sand & gravel)

T1—Type of underlying material or position (T1 is terrace position)

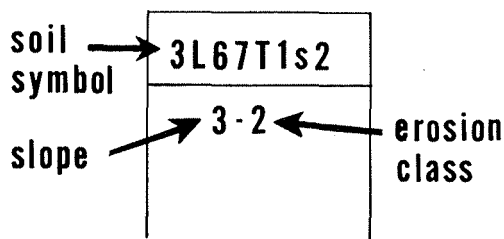
s2 —Moderately saline or alkali—crops moderately affected

Effective Depth

1. Very deep (60 in. plus)
 2. Deep (36-60 inches)
 3. Moderately deep (20-36 inches)
 4. Shallow (10-20 inches)
 5. Very shallow (0-10 in.)
- Depth is not shown on soils more than 36 inches deep. The 1 and 2 depths are omitted from the mapping symbols.

Texture of Topsoil

- H—Heavy (fine textured)
 F—Moderately heavy (moderately fine textured)
 M—Medium textured
 S—Moderately light (moderately sandy)
 L—Light (Coarse textured very sandy)
 C—Very light (Very coarse sands)
 X—Undifferentiated
 r—Very gravelly



Permeability of Subsoil and Substratum

- 2—Slow
- 3—Moderately slow
- 4—Moderate
- 5—Moderately rapid
- 6—Rapid
- 7—Very rapid

The above numbers are shown only once in composite symbol where subsoil and substratum are the same.

Type of Underlying Material

- D —Peorian Loess

- D1—Loveland Loess
 F —Sandstone F₁ Siltstone (Brule)
 G —Glacial Drift
 K —Shale (Pierre) K₁ Shale (Chadron)
 L —Limestone
 Q —Sand QU—Reworked Sandy Colluvium
 T1 or T—Terrace
 U —Colluvium
 X —Bottomland
 Z —Gravel
 R —Caliche and Tertiary outwash
 S —Silt
 Y —Clay

Special Land Features

- a1—Thin or severely eroded topsoil
- f1—Occasional overflow land
- f3—Frequent overflow or rough broken bottomlands
- w2—Moderately wet, crops sometimes affected
- w3—Very wet, too wet for cultivation
- s2—Moderately saline or alkali; crops moderately affected
- s3—Vary saline or alkali, crops severely affected

Erosion Problems

- e1—Silty or moderately heavy soils
- e2—Claypan soils
- e3—Moderately sandy soils
- e4—Heavy clay soils
- e5—Very sandy soils
- e6—Silty or moderately heavy soils—steep slopes
- e7—Limy loess soils

Soil Problems

- s1—Saline or alkali conditions
- s2—Heavy clay or claypan
- s3—Very shallow soils
- s4—Shallow soils

- w3—Silty or moderately heavy bottomlands
- w4—Silty or moderately heavy soils
- w5—Very sandy soils
- w6—Moderately sandy soils

Water Problems

- w—Textures are variable—can be overflow
- w1—Heavy wet bottomlands
- w2—Claypan or depression Claypans

Climatic Problem

- c1—Limited rainfall

Thickness of Topsoil

- a1—Thin—0-6 inches
- a2—Moderately thick 6-12
- a3—Over 12 inches

Erosion Classes

- 1—None slight (0-25% topsoil lost)
- 2—Moderate (26-75% of topsoil lost)
- 3—Severe water erosion (76% of topsoil to 25% of subsoil lost)
- S—Severe wind erosion.
- T—Very severe water or wind erosion.

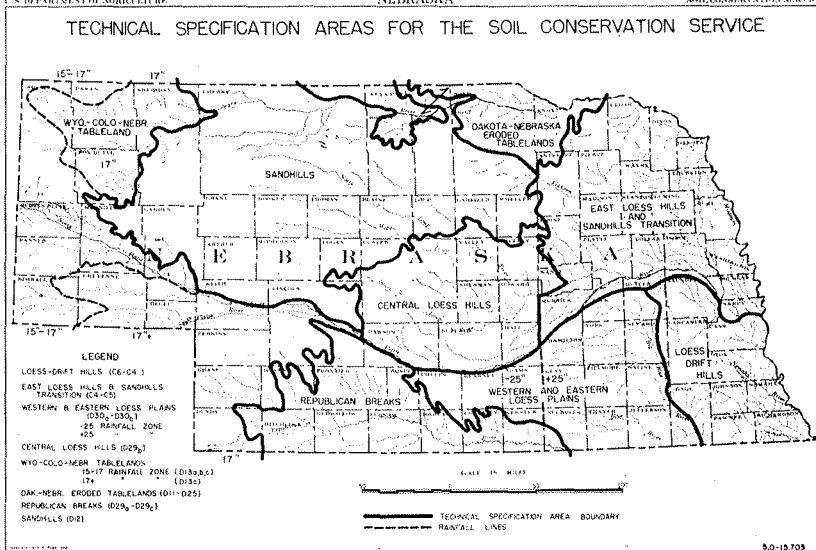
Why Should You Know the State Coding System

You will be allowed to use a Land Capability chart in land judging contests. The soils in your area are mapped by this system. By knowing the meaning of the various letters and numbers, you will understand the description of the soil in the capability chart and it should assist you in the determination of the land class.

What Are Capability Charts?

Nebraska has a wide variety of soils, topography, rainfall and erosion. In order to treat each acre according to its needs and treat it according to its capability, the soils have been grouped into eight areas. (See map on page 8).

In each area, the soils have a general correlation with each other, and the rainfall and the general topography of the land is comparable. So a capability chart for each of the eight areas has been prepared and is available at the County Agent's office. This chart lists all soils in



your area with all slopes and degrees of erosion of each soil. They are also grouped into eight land classes. Because of the details of the classification of soils each contestant in land judging will be allowed to use the capability charts **while judging**.

The eight areas are:

- (1) Loess Drift Hills
- (2) East Loess Hills and Sandhills Transition
- (3) Western and Eastern Loess Plains
- (4) Central Loess Plains
- (5) Wyoming, Colorado, Nebraska Tablelands
- (6) Dakota-Nebraska Eroded Tableland
- (7) Republican Breaks
- (8) Sandhills

What Do the Symbols Mean Following the Land Capability Class Designation?

These are subclasses and land capability units that further describe the land. For example, Class III e4 indicates a soil that has Class III limitations or hazards and a heavy clay soil. Following are the capability units shown with the land class designation to further describe the soil:

Erosion Problems

- e1—erosion problems on silty or moderately heavy soils.
- e2—claypan soils
- e3—moderately sandy soils
- e4—heavy clay soils

- e5—very sandy soils
- e6—silty or moderately heavy soils—steep slopes
- e7—limy loess soils

Soil Problems

- s1—saline or alkali conditions.
- s2—heavy clay or claypan (where erosion is not dominant).
- s3—very shallow soils.
- s4—shallow soils.

Water Problems

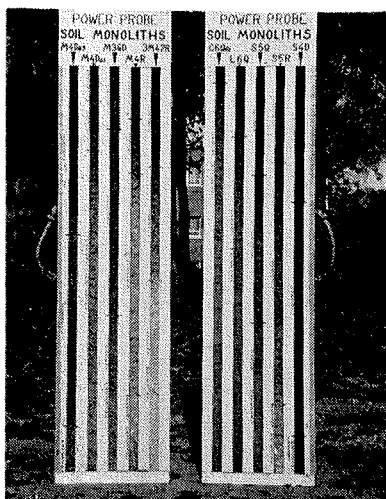
- w—textures are variable—can be overflow (“f”) or watertable (“w”) an overall grouping on range land where textures are not shown.
- w1—heavy wet bottomlands.
- w2—claypan soils (w₂ watertable) or depression claypans (“f₁).
- w3—silty or moderately heavy bottomlands, occasionally overflowed.
- w4—silty or moderately heavy soils (usually bottomlands) watertable.
- w5—very sandy soils (usually bottomlands) w₂ watertable.
- w6—moderately sandy soils (usually bottomlands-w₂ watertable).

Climatic Problem

- c1—limited rainfall.

HOW TO PREPARE FOR A LAND JUDGING CONTEST

1. Study this bulletin.
2. Take a conducted tour through your Soil Conservation District. Become familiar with the soil problems and how they are treated.
3. Study and become familiar with conservation terms listed on pages 36 to 39 of this bulletin.



One inch soil monoliths collected with a power probe. Most Soil Conservation offices have a set of these monoliths of your area. It would be a good project for your class or club to prepare a set for your own use.

4. Your soil conservation district probably has soil monoliths of the soils of your county. Have them explained to you.

5. Study and learn the explanation of mapping symbols as listed on pages 6 and 7.

6. Have your instructor or leader teach you how to recognize:

Depth favorable to root development.

Surface texture.

Permeability of subsoil.

How to estimate per cent of slope.

How to read a capability chart.

How to determine and recognize the land capability classes.

The land treatments for each class of land.

7. In preparing yourself for a land judging contest you may expect certain information to be given you at the contest. You will also assume and consider certain other facts.

What The Instructors Should Tell You

1. The boundaries of the field to be judged.

2. The depth of the original surface soil.

3. The direction to estimate the percent of slope.

4. The percent of slope under each subdivision under "slope."
(These figures will vary from one area to another.)

You Should Assume

Even though the field staked out to be judged is probably less than one acre in size, you should assume that it represents an average practical size field of 30 to 50 acres.

You Do Not Consider

1. Land treatment now on the field.

2. Any vegetation or crop that has been growing or is now growing on the field.

Part I

THE NEBRASKA LAND JUDGING SCORE CARD

On the following two pages is a sample of the Nebraska Land Judging Score Card as it is used in contests throughout the state. Each section will be discussed in detail.

NEBRASKA LAND JUDGING SCORE CARD

Contestant No. _____

Field No. _____

PART I—PHYSICAL FEATURES OF THE SOIL(Indicate your answer by an X in the square)
Possible score—60 points**DEPTH FAVORABLE TO ROOT DEVELOPMENT**

Deep
 Moderately deep
 Shallow
 Very shallow

SURFACE TEXTURE

Heavy (H)
 Moderately heavy (F)
 Medium (M)
 Moderately light (S)
 Light (L)
 Very light (C)

PERMEABILITY OF SUBSOIL

Slow (2)
 Moderately slow (3)
 Medium (4)
 Moderately rapid (5)
 Rapid (6)
 Very rapid (7)

THICKNESS OF SURFACE SOIL

Thick
 Moderately thick
 Thin

WETNESS OR OVERFLOW

Well drained
 Moderately wet
 Very wet

SLOPE

Nearly level (.....%)
 Gently sloping (.....%)
 Moderately sloping (.....%)
 Strongly sloping (.....%)
 Steep (.....%)
 Very steep (.....%)

EROSION—WATER AND WIND

None to slight
 Moderate
 Severe
 Very severe

ORGANIC MATTER

High
 Medium
 Low

PART I—SCORE**PART II—LAND CAPABILITY CLASS**

I, II, III, IV, V, VI, VII, VIII.

(Circle one of the above)

Possible score — 10 points

SCORE

Form 1-10M-4/59-Ag.

PART III**RECOMMENDED LAND TREATMENT**(Circle numbers that apply)
Possible score — 30 points

| | |
|-----|--|
| 1. | |
| 2. | |
| 3. | |
| 4. | |
| 5. | |
| 6. | |
| 7. | |
| 8. | |
| 9. | |
| 10. | |
| 11. | |
| 12. | |
| 13. | |
| 14. | |
| 15. | |
| 16. | |
| 17. | |
| 18. | |
| 19. | |
| 20. | |
| 21. | |
| 22. | |
| 23. | |
| 24. | |
| 25. | |
| 26. | |
| 27. | |
| 28. | |
| 29. | |
| 30. | |
| 31. | |
| 32. | |
| 33. | |
| 34. | |
| 35. | |
| 36. | |

Part III Score

OFFICIAL TABULATION

Score—Part I _____

Score—Part II _____

Score—Part III _____

TOTAL SCORE _____

PART III

(Possible Score—30 points)

Select from the list below, the proper conservation practices needed to conserve both soil and water and to maintain or improve the productivity of the land. CIRCLE the corresponding numbers on the opposite side of this card under PART III that should be applied to this field.

1. Continuous cultivation—wheat fallow.
2. Continuous cultivation including a row crop $\frac{3}{4}$ time (9 out of 12 years) close growing crops to include grasses and legumes.
3. Continuous cultivation including a row crop $\frac{1}{2}$ time (6 out of 12 years) close growing crops to include grasses and legumes.
4. Continuous cultivation including a row crop $\frac{1}{3}$ time (4 out of 12 years) close growing crops to include grasses and legumes.
5. Occasional cultivation including a row crop $\frac{1}{4}$ time (3 out of 12 years) close growing crops to include grasses and legumes.
6. Permanent vegetation; few restrictions in use.
7. Permanent vegetation; moderate restrictions in use.
8. Permanent vegetation; severe restrictions in use.
9. Wildlife.
10. Seed turn rows and fence lines to permanent grass.
11. Plow under grasses and deep rooted legumes for green manure.
12. Practice crop residue management—no burning.
13. Practice a stubble mulch farming system.
14. Practice field strip cropping or contour strip cropping.
15. Establish and maintain grassed waterways.
16. Plant a field windbreak for wind erosion control.
17. Establish terraces and farm on the contour.
18. Establish diversion terrace with an adequate outlet.
19. Farm on the contour.
20. Establish drainage system (open drains, tile drains).
21. Maintain terraces.
22. Lime and fertilize according to tests.
23. Mow or spray for weed control.
24. Construct pasture furrows, grooves, pitting, etc.
25. Seed or reseed to recommended grasses or grass-legume mixture.
26. Gully control—construct erosion control structures or shape, fertilize, and seed to grass.
27. Terrace prior to establishing permanent hay and/or pasture.
28. Defer grazing until cover is adequate.
29. Mulch and cover is adequate—continue grazing at the proper rate.
30. Graze to utilize up to one-half of each year's growth.
31. Control rodents, prairie dogs, gophers.
32. Plant to legumes, grass, trees, and/or shrubs suitable for wildlife.
33. Fence for wildlife protection.
34. _____
35. _____
36. _____

NEBRASKA LAND JUDGING SCORE CARD

Contestant No. _____

Field No. _____

In every contest you will have **four** score cards, one for each field to be judged. Upon registering for a contest, you will be assigned a number and this same number appears **on all** of your score cards. This number appears in the space Contestant No.

One card is used for each field and the field number will appear in the upper right hand corner of the card where it says Field No. Be sure to hand in the right card for the right field.

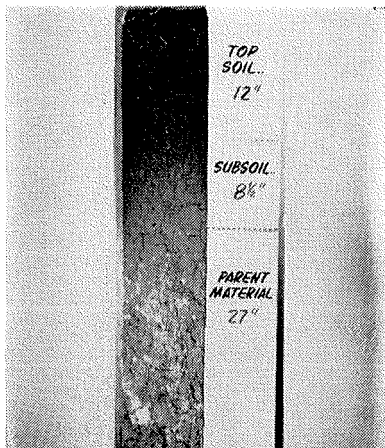
DEPTH FAVORABLE TO ROOT DEVELOPMENT

Deep
Moderately deep
Shallow
Very shallow

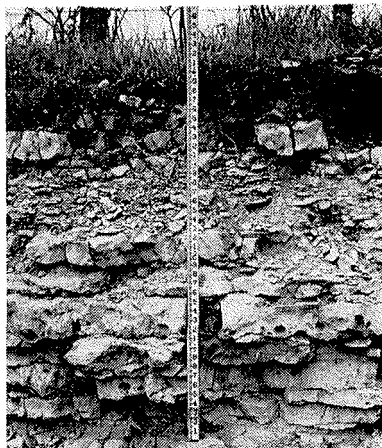
| | |
|--|--|
| | |
| | |
| | |
| | |

A large majority of Nebraska soils are deep or very deep (36 inches plus). To shorten the symbol, the depth figure is omitted for them. However, where the soils are moderately deep, shallow or very shallow, the depth number is always shown as follows:

- | | | |
|--------------------|---------------------|--|
| 3. Moderately deep | 20-36 inches | shown in symbol if there is a zone that restricts root development |
| 4. Shallow | 10-20 inches | |
| 5. Very shallow | less than 10 inches | |



If the soil profile was like this, no number would appear in the soil symbol.



Less than 10 inches. The number "5" would be the first digit of the soil symbol, if the profile was like this.

Meaning of Effective Depth

Effective depth refers to the depth of soil material plant roots can penetrate in search of water and nutrients. In judging effective depth of soil, we are concerned with the way soil functions as a zone for growth of roots and for reception, transmission and storage of water.

Limiting layers or conditions that affect effective depth are:

1. Solid bedrock.
2. Shattered bedrock containing less than 15% of fine sand, silt, and clay, and less than 5% of silt plus clay.
3. Medium sized or larger gravel containing less than 15% fine sand, silt and clay, and not more than 5% of silt plus clay.
4. Fine gravel, coarse sand, medium sand or mixtures of these materials containing less than 5% of silt plus clay.
5. A definite indurated layer such as iron pan, cemented gravel, hard caliche or other hard pan.

A limiting layer as described above **must be present in every soil that is described as moderately deep, shallow, or very shallow.** Otherwise you will consider it a **deep soil.**

SURFACE TEXTURE

| | |
|------------------------|-----------|
| Heavy | (H) |
| Moderately heavy | (F) |
| Medium | (M) |
| Moderately light | (S) |
| Light | (L) |
| Very light | (C) |

| | |
|--|--|
| | |
| | |
| | |
| | |
| | |
| | |

The letter representing surface soil texture is always shown and is the first digit of the soil mapping symbol on deep and very deep soils. (The second digit on moderately deep, shallow and very shallow soils.) Surface texture symbols are:

H—Heavy (clays)

F—Moderately heavy (silty clay loam)

M—Medium (silt and very fine sandy loam)

S—Moderately light (sandy loam)

L—Light (loamy sands)

C—Very light (sand, sand and gravel)

What Is Texture?

Texture refers to the coarseness or fineness of a soil. It is determined by the percentage of sand, silt and clays that make up the soil mass.

Sand or gravel particles are much larger than the others. Water will soak into that kind of a soil very fast but it will hold much less water than silt or clay soils.

At the other extreme, a clay particle is so small that it cannot be seen with the naked eye. Since clay particles fit so closely together water is absorbed very slowly. However, a clay soil holds more water than any other soil.

TEXTURE GROUPS

Nebr. Score Card Designation

| | | | | |
|----------------------|---|---|---|-------------------------|
| Clay | } | Clay - - - - - Fine texture | } | H — Heavy |
| Silty clay | | | | |
| Sandy clay | | | | |
| Silty clay loam | } | Clay - - - - - loam | } | F — Moderately heavy |
| Clay loam | | | | |
| Sandy clay loam | | | | |
| Silt | } | Loam - - - - - Medium texture | } | M — Medium |
| Silt loam | | | | |
| Loam | | | | |
| Very fine sandy loam | | | | |
| Fine sandy loam | } | Sandy - - - - - loam | } | S — Moderately light |
| Sandy loam | | | | |
| Coarse sandy loam | | | | |
| Loamy very fine sand | } | Loamy - - - - - sand Coarse texture | } | L — Light |
| Loamy fine sand | | | | |
| Loamy sand | | | | |
| Loamy coarse sand | | | | |
| Very fine sand | } | Sand - - - - - | } | C — Very light |
| Fine sand | | | | |
| Sand | | | | |
| Coarse sand | | | | |
| Gravel | } | Gravel | } | |

Importance Of Texture

Texture determines the rate at which water enters the soil and the amount of water a soil can retain. Water is held in a thin film or layer on the surface of each individual soil particle. Clay, having much more surface area around the individual soil particles, will hold more water than sand.

In fertility potential, plant nutrients such as nitrogen, phosphorus, and potassium are held on the surface area of the minute soil particles. Clays having more surface area will have a higher fertility potential than the sands.

Texture also gives us a clue as to the type of erosion to expect. On sandy soils you can expect more wind erosion than water erosion. Clay soils are usually more susceptible to water erosion.

Brief Description of Texture Groups

H. Heavy—Heavy textured soils form very hard clods when dry—are plastic and sticky when wet. When a sample of a moist, heavy textured soil is pressed between the thumb and fingers, it will form a long flexible ribbon.

F. Moderately heavy—Soils with in this group form hard clods when dry. When moist soil is pressed between thumb and fingers, it will form a thin ribbon which will break readily, barely sustaining its own weight.

M. Medium—Medium textured soils have moderate amounts of fine grades of sand and some clay. Over half of the particles are silt. When these soils are dry, lumps can be readily broken and when pulverized, the soil feels soft and floury. When wet, the soil will not ribbon but will have a broken appearance.

S. Moderately light—These soils contain a large amount of sand but have enough silt and clay to make them somewhat coherent. The individual sand grains can be readily seen. Dry soil will form a cast when squeezed but will fall apart readily. A moist soil will form a cast when squeezed but will have to be handled very carefully without breaking.

L. Light—Light textured soils consist of loamy sands. These soils are gritty and when pressed in the hand will form a cast but will fall apart when touched.

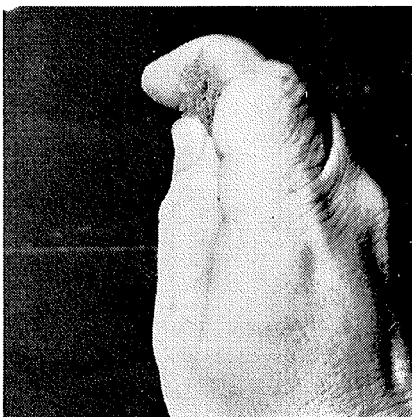
C. Very light—Sand and gravel are classified in this category. The very light soils do not hold enough water or contain enough plant nutrients for profitable plant growth.



Heavy



Medium



Light

PERMEABILITY OF SUBSOIL

| | |
|------------------------|-----------|
| Slow | (2) |
| Moderately slow | (3) |
| Medium | (4) |
| Moderately rapid | (5) |
| Rapid | (6) |
| Very rapid | (7) |

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Permeability of Subsoil—What Does It Mean?

Permeability means the ease in which air, water and roots move through the soil. Permeability is measured by the rate at which water or air will enter and pass through a column of soil.

Determining Permeability

Permeability is determined by the soil texture (size of soil particles) and the structure (arrangement of the soil particles). The correlation between texture and permeability is very close. Fine textured soils have slow permeability and coarse textured soils have rapid permeability.

Subsoil permeability is important because:

1. Rapid subsoil permeability will allow plant nutrients to pass below the root zone.
2. Slow permeability will not allow water and air to move freely. Slow air and water movement causes poor aeration. However, slowly permeable subsoils hold more water and food nutrients than rapidly permeable subsoils.

Very slow, (class 1) permeability is not mapped in Nebraska because there is not sufficient acreage to warrant using this classification. The following table shows the system of mapping used in Nebraska.

| No. | Description | Rate inches per hour | Probable characteristics | |
|-----|-----------------|-------------------------|--|------------------------------------|
| | | | Texture | Structure |
| 2. | Slow | .05 to .20 in. per hr. | Heavy to moderately heavy | Platy Fragmental |
| 3. | Moderately slow | .05 to .20 in. per hr. | Moderately heavy Medium | Fragmental Nut-like |
| 4. | Moderate | .80 to 2.50 | Moderately light Medium Moderately heavy | Granular Nut-like Fragmental |
| 5. | Moder. light | 2.50 to 5.00 | Moderately light Light | Crumb Granular Nut-like |
| 6. | Rapid | 5.00 to 10.0 | Light Very light | Single grain |
| 7. | Very rapid | over 10. | Very light Coarse sands and gravel | Single grain |

TEXTURAL CLASSES IN REGARD TO PERMEABILITY OF SUBSOIL
Nebraska Score Card Designation

| | | | | |
|----------------------|------------|-----------|----------------|-------------------------|
| Clay | Clay | - - - - - | Fine texture | Slow (2) |
| Silty clay | | | | |
| Sandy clay | | | | |
| Silty clay loam | Clay loam | - - - - - | | Moderately (3) slow |
| Clay loam | | | | |
| Sandy clay loam | | | | |
| Silt | Loam | - - - - - | Medium texture | Moderate (4) |
| Silt loam | | | | |
| Loam | | | | |
| Very fine sandy loam | Sandy loam | - - - - - | | Moderately rapid (5) |
| Fine sandy loam | | | | |
| Sandy loam | | | | |
| Coarse sandy loam | | | | |
| Loamy very fine sand | Loamy sand | - - - - - | | Rapid (6) |
| Loamy fine sand | | | | |
| Loamy sand | | | | |
| Loamy coarse sand | Sand | - - - - - | Coarse texture | |
| Very fine sand | | | | |
| Fine sand | | | | |
| Sand | Gravel | - - - - - | | Very rapid (7) |
| Coarse sand | | | | |
| Gravel | | | | |

THICKNESS OF SURFACE SOIL

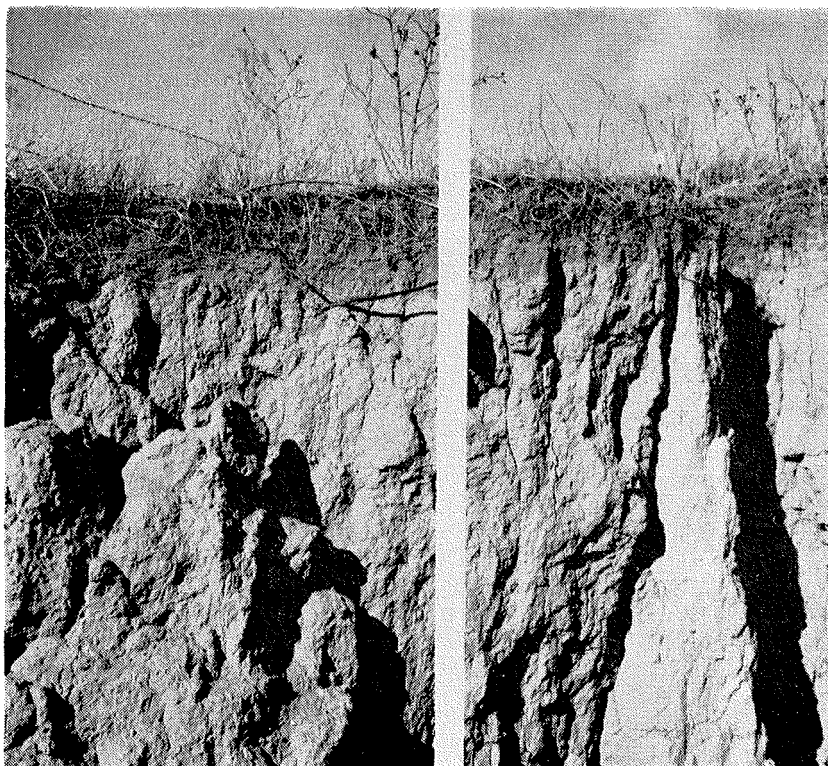
| | |
|------------------------|--|
| Thick | |
| Moderately thick | |
| Thin | |

On the Nebraska soil judging score card, thickness of surface soil has been divided into: thick—12 inches +; moderately thick—6 to 12 inches; thin—0 to 6 inches.

In Nebraska, the following system is used in mapping thickness of surface soil:

- a1—thin—0-6 inches
- a2—moderately thick—6 to 12 inches
- a3—thick—12 to 24 inches
- a4—very thick—24 to 36 inches

Very thick, and thick are usually combined and mapped as a 3. Thin soils are mapped as a 1. Only where it is thought to be significant is the a2 shown.



Thin surface soil. Profile of Crofton silt loam showing about 6 inches of surface soil directly over Peorian loess parent material. This physical feature would be indicated in the soil symbol as "A1".

WETNESS OR OVERFLOW

Well drained
 Moderately wet
 Very wet

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Wetness refers to water table conditions. Overflow refers to hazards applying to surface water conditions.

In interpreting the coding system in the capability charts, the following degrees of wetness are mapped:

W2—Moderately wet; crops moderately affected.

Planting and choice of crops affected (Lower 1 class)

W3—Very wet; crops seriously affected.

Cultivation impractical (Class V)

W4—Extremely wet; too wet for cultivation.

Swamp or marsh (Class VIII)

The overflow hazard appears in two degrees:

f1—Occasional or of short duration;

Crops occasionally damaged or planting dates somewhat delayed (Capability lowered one class)

f3—Very frequent or of long duration; growth of cultivated crops not feasible (Capability Class V or lower)

On the Nebraska Land Judging score card **Wetness** and **Overflow** are combined and listed under:

Well drained

Moderately wet—includes W2 or f1

Very wet—includes W3, W4, or f3

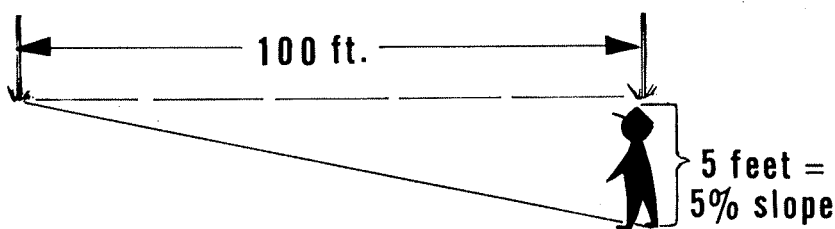
SLOPE

Nearly level(.....%)
 Gently sloping(.....%)
 Moderately sloping(.....%)
 Strongly sloping(.....%)
 Steep(.....%)
 Very steep(.....%)

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One of the most important physical features of land is the per cent of slope. It is important because it influences the speed at which water will flow. The faster water flows, the more soil washing will occur.

Judges will usually have two stakes, 100 feet apart driven into the ground. Estimate the number of feet of rise or fall between the stakes. This will be the per cent of slope.



Slope also influences cultivation. Very steep slopes should be in grass.

In each technical specification area in Nebraska, the limits for each subdivision under slope are different. Following are the percentages of slope in each division for each area:

Percentages of Slope

| | Nearly level | Very gentle | Gently sloping | Moderately sloping | Strongly sloping | Steep | Very steep | Canyons & bluffs |
|--------------------------------|--------------|-------------|----------------|--------------------|------------------|-------|------------|------------------|
| Loess Drift Hills | 0-1 | 2 | 3-6 | 7-11 | 12-16 | 17-20 | 21-30 | 31+ |
| East Loess Hills | 0-2 | | 3-6 | 7-11 | 12-16 | 17-20 | 21-30 | 31+ |
| Sandhill Transition | | | | | | | | |
| Eastern & Western Loess Plains | 0-1 | 2-3 | 4-5-6 | 7-8-9 | 10-30 | | | 31+ |

Percentages of Slope—(continued)

| | Nearly level | Very gentle | Gently sloping | Moderately sloping | Strongly sloping | Steep | Very steep | Canyons & bluffs |
|--------------------------------|--------------|-------------|----------------|--------------------|------------------|-------|------------|------------------|
| Central Nebraska Loess Hills | 0-1 | | 2-3-4-5 | 6-10 | 11-16 | 17-30 | | 31+ |
| Wyo-Col-Nebr Tableland | 0-1 | 1-3 | 3-5 | 5-9 sloping | 9-30 mod. steep | 30+ | | |
| Dakota-Nebr.-Eroded Tablelands | 0-1 | | 2-5 | 6-10 | 11-16 | 17-30 | | 31+ |
| Republican breaks | 0-1 | 2-3 | 4-6 | 7-9 | 10-30 | | | 31+ |
| Sandhills | 0-1 | | 2-5 | 6-10 | 11-16 | 17-30 | | 31+ |

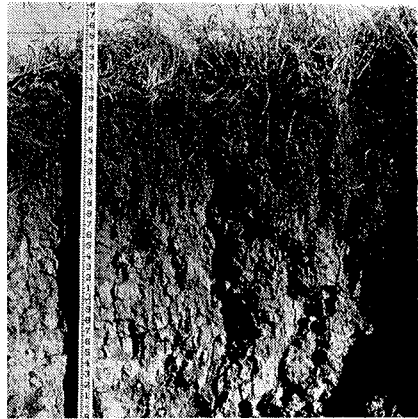
EROSION—WATER AND WIND

None to slight
 Moderate
 Severe
 Very severe

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Another important physical feature that has bearing in the classification of land is the amount of soil erosion. In this part of the contest you will be given the original depth of the topsoil when white man first came to Nebraska. You will then decide how much is left and what per cent of the surface has been lost.

None to slight—Erosion is not apparent or slight erosion has taken place. You will consider 0 to 25% of the surface soil lost in this category. In the capability chart this is indicated as the figure "1."



Soil profile showing upper 4 feet of Bur- chard clay loam. There is a very heavy lime zone in the lower third of the section. This soil profile would be "1" erosion.

Moderate—26 to 75% of the surface soil lost. It is indicated by the number "2."

Severe—76% of top soil lost to 25% of the sub soil lost. This is "3" erosion.

Very severe—Very severely gullied or land destroyed by gullies. Letter S denotes 76% of the topsoil and from 25% to all of the sub-soil lost.



Severe erosion. Field nearly destroyed by wind erosion. This field would be "S" or very severe on your score card.

ORGANIC MATTER

High

Medium

Low

| | |
|--|--|
| | |
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Although organic matter is not a factor in determining land capability, it is very important in conservation farming. Dark brown or black soils are usually high in organic matter

High organic matter content in soils is desirable because it means higher water holding capacity, better tilth and usually a higher level of fertility.

Medium organic matter in a soil is indicated by brown, grayish brown or gray soils.

Low organic matter in a soil is indicated by light gray, pale yellow or pale brown soils. Low organic matter is not desirable.

Part II

PART II—LAND CAPABILITY CLASS

I, II, III, IV, V, VI, VII, VIII

(Circle one of the above)

Possible score—10 points

All land is graded into eight classes, class I being the best and class VIII the poorest.

By evaluating the physical characteristics of the soil, all land can be placed in one of the eight classes. Each class is determined by the number and severity of the limitations placed on its use by physical characteristics.

DESCRIPTION

Land Suited for Cultivation (Classes I-IV)

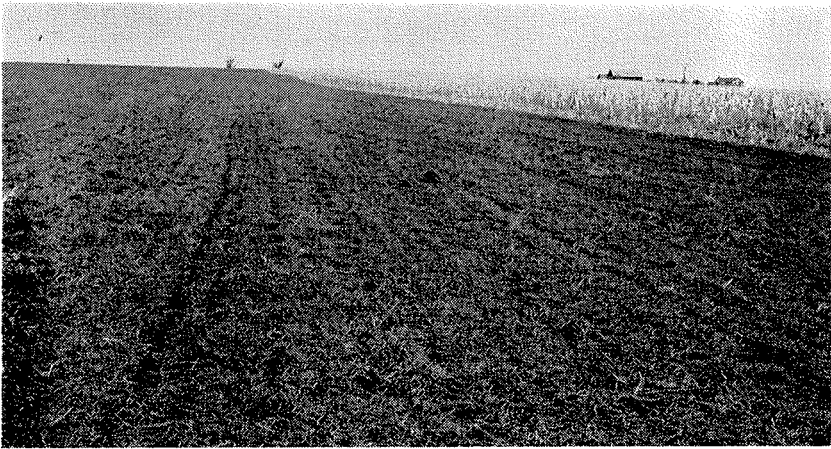
This class of land is found on well drained, nearly level land where wind or water erosion is very low. These soils can be farmed intensely under a sequence of adapted crops, using barnyard manure or commercial fertilizer, subsurface tillage, cover or green manure crops that will maintain or improve fertility and soil structure.

Class I soils are deep, easily worked, productive and suited for intensive cropping

Class I land.



Class II land.



Class II soils have a few limitations that reduce the choice of crops and require moderate conservation practices. Some of these include gentle slopes, moderate susceptibility to wind or water erosion, less than ideal soil depth, occasional damaging overflow, and somewhat unfavorable soil structure and workability.

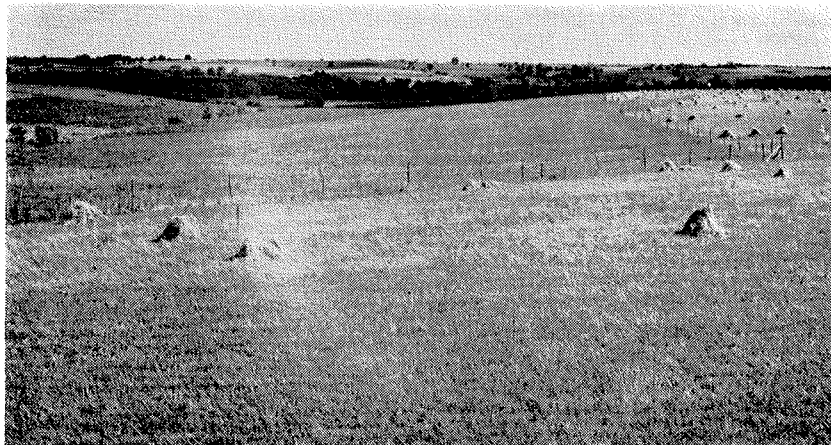
Production can be sustained at a high level by applying one or more good conservation practices. This would include planting crops in approved sequences, contour tillage, terraces, occasional diversion terraces, grassed waterways, cover or green manure crops, stubble mulching, and proper fertilization.

Class III soils have severe limitations that reduce the choice of plants and require special conservation practices. The amount of clean cultivation is restricted and the cultural practices are more intensive on this type of land.

Limitations placed on Class III land are the result of the effects of one or more of the following factors: moderately steep slopes, high susceptibility to water and wind erosion, frequent overflow, wetness, shallow depths of soil favorable to root development, low moisture holding capacity, low fertility potential, salinity or alkali problems and sometimes climatic conditions.

Conservation treatments on Class III land include: approved cropping sequence including grasses and legumes, grassed waterways, contour farming, terracing, cover and green manure crops, stubble mulching, wind strip cropping, and proper fertilization.

Class III land.



Class IV land.



Class IV soils have very severe limitations that restrict the choice of plants and require very careful management. Many of the soils in this class are suited only for occasional cultivation. This limitation is the result of the effects of one or more of the following: steep slopes, severe susceptibility to water and wind erosion, severe effects of past erosion, shallow soils, low moisture holding capacity, frequent overflows causing severe crop damage, excessive wetness, severe alkaline or saline conditions, and moderately adverse climate.

Conservation treatment practices for Class IV land include: occasional cultivation (not more than 25% of the time), grasses and legumes, terracing, contour farming, strip cropping, cover and green manure crops, stubble mulching.

Land Generally not Suited for Cultivation (Class V-VIII)

Class V soils have little or no erosion hazard, but have other factors that limit their use largely to pasture, range, woodland or wildlife food and cover. Class V soils are found on bottomlands subject to frequent overflow or are ponded areas where drainage for cultivated crops is not feasible.

Good grazing and hayland management practices are considered adequate conservation measures on Class V soil.

Class V land.



Class VI soils have severe limitations that make them generally unsuited for cultivation and limit their use to pasture or range, woodland, or wildlife food and cover. Limitations that cannot be corrected in these soils are: steep slopes, severe erosion hazard, effects of past erosion, stoniness, shallow rooting zone, excessive wetness, low moisture capacity, salinity or alkalinity.

Deterioration may occur unless the intensity of grazing is restricted and special conservation measures are applied. One or more of the following practices are usually required to maintain or improve Class VI land.

1. Seeding grass in drainageways and fencing where continuous grazing will prevent establishing grass stands.
2. Using contour furrows and grooves on some soil types.
3. Introduction of desirable grasses and legumes.
4. Arranging intensity of grazing and time of use to leave protective cover of grass at the end of the growing season.

5. Adjust grazing periods to permit natural reseeding of desirable species of grass and to allow plants to store food reserves.

6. Arrangement of water supply and location of salting stations to guarantee uniform grazing over entire pasture.

Class VI land.

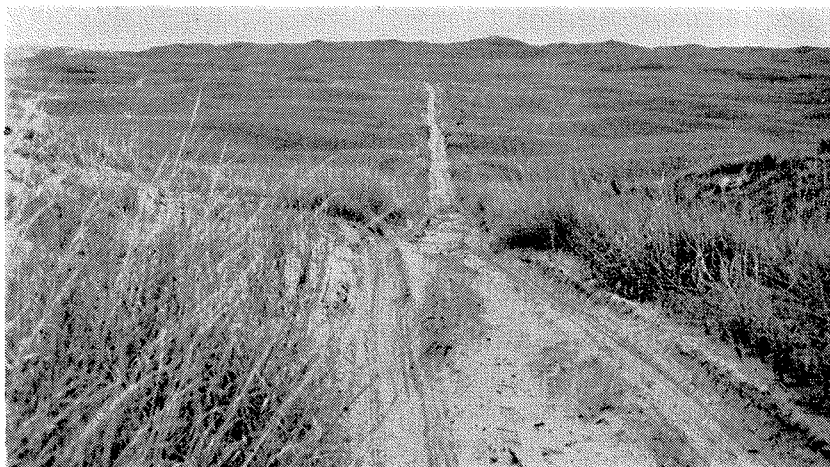


Class VII soils have very severe limitations that make them unsuited for cultivation and that restrict their use largely to grazing, woodland or wildlife.

The physical conditions or limitations of soils in Class VII consist of one or more of the following: very steep slopes, erosion, shallow soil, stones, salts or alkali.

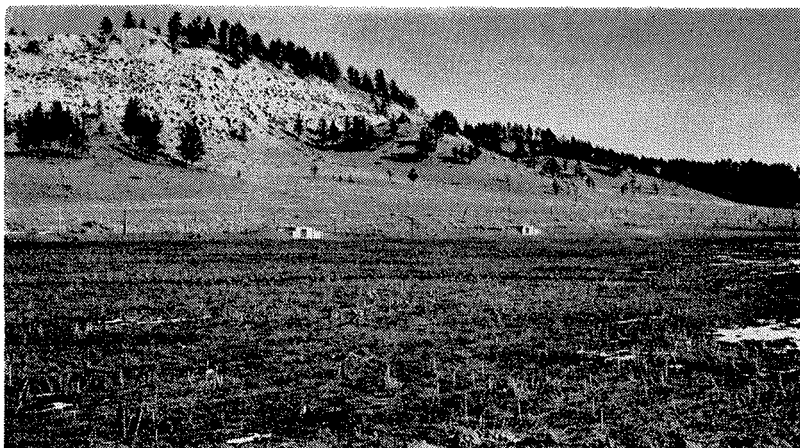
These soils usually have a sparse growth of vegetation and require very severe restrictions in use.

Class VII land.



Class VIII soils consist of those areas mainly used for recreation, wildlife or water supply. None of this land is suited for cultivation or grazing. Badlands, rock outcrops, sandy beaches, river wash and other nearly barren lands are included in Class VIII.

Class VIII land.



Part III

LAND TREATMENT

After examining and determining the physical features of the soil profile, you determine the class of land or land capability. The capability class indicates the most intensive use for which it is suited. Part III of your score card contains a few of the land treatments commonly used in Nebraska.

Nebraska has a wide variation in climate and soils. Therefore it is impracticable to have one set of rules as to recommended land treatment. Each area will have its own set of ground rules. The following general comments about each land treatment as listed on the score card are mentioned only as a guide.

General Comments

Practices 1 through 9—are cropping systems. Mark one of these for each field that you judge.

Practices 10 through 33—mark only those applicable to the field being judged.

Practices 32 through 33—will generally be used for Class VIII only.

Individual Practices

1. Continuous cultivation-wheat fallow

This practice is not applicable in areas I, II, III, IV, and VI. Use this practice on classes II, III, IV land in area VI and west of North Platte and McCook on land class II in area VII.

2. Continuous cultivation including a row crop $\frac{3}{4}$ time (9 out of 12 years)

Close growing crops to include grasses and legumes. Use this practice on land Class I in Areas I, II, III, IV, VI. Do not use this practice in Area VII. Use on Class I land in Area VIII.

3. Continuous cultivation including a row crop $\frac{1}{2}$ time (6 out of 12 years) Close growing crops to include grasses and legumes

Use this practice on land Class II in all areas except Areas VII and VIII. Do not use in Area VII and west of North Platte, and McCook in Area VIII.

4. Continuous cultivation including a row crop $\frac{1}{3}$ time (4 out of 12 years). Close growing crops to include grasses and legumes.

Use on Class III land in all areas except Area VII.

5. Occasional cultivation including a row crop $\frac{1}{4}$ time (3 out of 12 years). Close growing crops to include grasses and legumes.

Use on land Class IV in all areas except Area VII.

6. Permanent vegetation; few restrictions in use.

Use on land Class V in all areas.

7. Permanent vegetation; moderate restrictions in use.

Use on land Class VI in all areas.

8. Permanent vegetation; severe restrictions in use.

Use on land Class VII in all areas.

9. Wildlife.

Use on land Class VIII in all areas.

10. Seed turn rows and fence lines to permanent grass.

This is a good practice on land Classes I, II, III and IV except in Areas VII and VIII. Use only on S and L textures in Area VIII.

11. Plow under grasses and deep rooted legumes for green manure.

This is a good practice for land Classes I, II, III and IV in Areas I, II, III and IV. Do not consider this practice in Areas VI, VII and VIII.

12. Practice crop residue management. No burning.

Use this practice on all classes of land.

13. Practice a stubble mulch farming system.

Use on land Classes I through IV in all areas. However, used mainly on S, L, C textures in Areas I, II and III.

14. Practice field strip cropping or contour strip cropping.

Use on S, L, C textures on land Classes II, III and IV where ter-

racing is not feasible in Areas I, III, and IV. This practice is not applicable in Area II.

15. Establish and maintain grassed waterways.

Good for all classes of cultivated land: I, II, III, IV, except in Areas VII and VIII.

16. Plant a field windbreak for wind erosion control.

Good where applicable on land Classes I, II, III and IV.

17. Establish terraces and farm on the contour.

Definitely on land of suitable topography and texture for land classes II, III, IV.

18. Establish diversion terrace with an adequate outlet.

This practice is good on all classes where it is applicable. It is used to protect fields from flooding from a field above the one you are judging.

19. Farm on the contour.

Usually on Class I land where terraces are not needed (do not mark this practice if number 17 is marked).

20. Establish drainage system (open drains, tile drains).

This practice is sometimes used on Class V land. Use only when there is a drainage problem.

21. Maintain terraces.

Always mark this practice if number 17 is used.

22. Lime and fertilizer according to tests.

This is a recommended practice on land Classes I, II, III, IV. Do not use on Land Classes VII and VIII.

23. Mow or spray for weed control.

This is good for land Classes V, VI and VII if weeds are present.

24. Construct pasture furrows, grooves, pitting, etc.

Recommended for land Classes VI and VII in southwestern and western Nebraska. Not recommended for remainder of Nebraska.

25. Seed or reseed to recommended grasses or grass legume mixture.

For land Classes V, VI and VII, if seeding is necessary.

26. Gully control—construct erosion control structures or shape, fertilize and seed to grass.

Use on all classes of land if gully control is needed.

27. Terrace prior to establishing permanent hay and/or pasture.

This practice to be used on land Classes VI, VII if grasses have not been established and you think terraces would assist in getting a stand of grass.

28. Defer grazing until cover is adequate.

If pasture or range has been overgrazed use this practice on land Classes V, VI, and VII. Also use on all new seedlings of these classes.

29. Mulch and cover is adequate—continue grazing at the proper rate.

If the pasture or range is properly grazed at the present time, use this practice for land Classes V, VI and VII.

30. Graze to utilize up to one-half of each year's growth.

If pasture or range has not been grazed and an excellent cover is available, mark this practice. For land Classes V, VI and VII.

31. Control rodents, prairie dogs, gophers.

Use on all classes of land if applicable.

32. Plant to legumes, grass, trees, and/or shrubs suitable for wildlife life.

Use for Class VIII land.

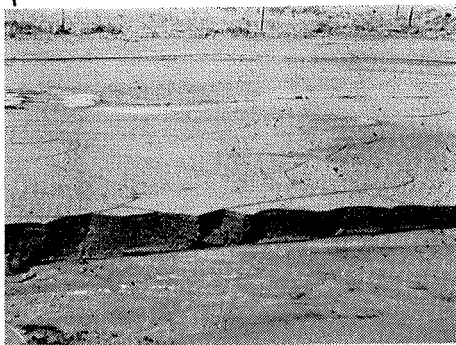
33. Fence for wildlife protection.

Use for Class VIII land

Problems and **A**nswers

PROBLEM

Soil washed from a 60-acre field and deposited at the bottom of the slope from one heavy rain.



ANSWER

Terraces, contour listings and farm road on the contour.



PROBLEM

Wind erosion along highway 26
in Nebraska.



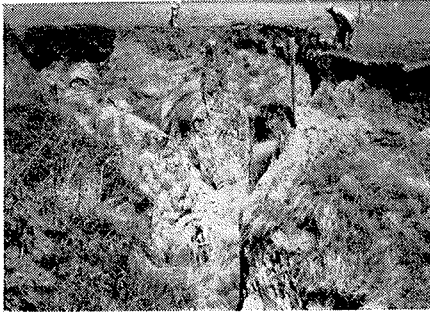
ANSWER

Close up of mulch in wheat field. Keep
crop residues on or near the surface.

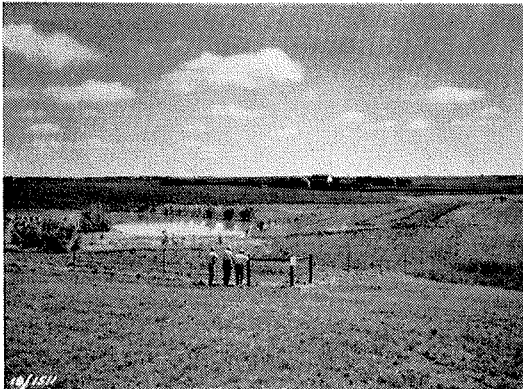
1. Prevents splash erosion.
2. Gets more water in the soil
3. Prevents blowing.
4. Prevents evaporation.

Windbreaks also will help answer the prob-
lem.

PROBLEM



Gullies



Build a good farm pond (erosion control dam).

1. Fence to keep livestock out.
2. Plant a wildlife habitat area around the area.

ANSWER

Keep as much water out of the gully as you can by:

1. Terraces and contour farming.
2. Grassed waterways.
3. Diversions.
4. Practice stubble mulch system of farming. Do not burn any crop residues.
5. Seed eroded land to grass and manage properly.
6. Use a good crop sequence to include grass and/or legumes.

PROBLEM



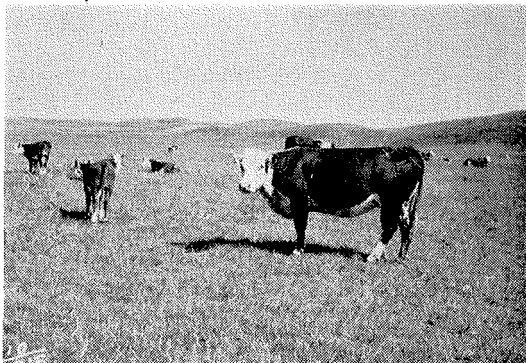
Poor range and pastures—

by poor management, overstocking, not grazing at the proper time.

ANSWER

A good range—

By proper stocking, proper grazing, use of other conservation practices.



Our Goal

A complete land treatment program on a 225 acre watershed above a grade control and detention structure. This is the purpose and goal of every good contestant in land judging to know when and where to apply the conservation practices which we have tried to explain in this circular.



GLOSSARY OF TERMS USED IN LAND JUDGING

Objective of Land Judging: To learn how to conserve and improve our most important resource, the soil. To gain an appreciation of the need to classify land according to its capability in order that each kind of land may be best treated and used to keep it permanently productive without damage.

CLAY—(1) Small mineral particles of the soil, less than 0.002 mm in diameter. (2) Soil material containing 40% or more clay, less than 45% sand, and less than 40 silt.

CLAYPAN—A horizon of accumulation or a stratum of dense compact and relatively impervious clay. Clay pan is not cemented, but is hard when dry, and plastic or stiff when wet. Its presence like that of a true hardpan may interfere with water movement or root development.

COARSE TEXTURED SOIL—A sandy soil.

CONTOUR—(1) An imaginary line on the surface of the earth connecting points of the same elevation. (2) A line on a map to show the location of points of the same elevation. A series of contour lines on a map show the topography of the land.

CONTOUR FARMING—Conducting field operations, such as plowing, planting, cultivating and harvesting on the contour or at right angles to the natural direction of slope.

CONTOUR STRIP CROPPING—The production of crops in comparatively narrow strips planted on the contour and at right angles to the natural direction of slope. Usually strips of grass or close growing crops are alternated with those in cultivated crops.

COVER CROP—A close-growing crop grown primarily for the purpose of protecting and improving soil between periods of regular crop production, or between trees and vines in orchards and vineyards.

CROPLAND—Land regularly used for the production of crops (except forest crops and permanent pasture). Rotation pasture, cultivated summer fallow, orchards, and land ordinarily used for crops but temporarily idle is included.

CROP RESIDUE—The portion of a plant, or crop, left in the field after harvest.

CROP ROTATION—The growing of different crops in recurring succession on the same land.

DEPTH, EFFECTIVE SOIL ROOT ZONE—The depth of soil material which plant roots can penetrate readily to obtain water and plant nutrients. It is the depth to a layer that differs from the overlying material in physical or chemical properties sufficiently to prevent or seriously retard the growth of roots.

DIVERSION—A diversion is a channel with a supporting ridge on the lower side constructed across the slope to intercept run-off and minimize erosion, or to prevent excess run-off from flowing onto lower lying areas. In some areas a series of diversions are constructed across the slope similar to terraces, but with greater horizontal and vertical spacing. Also known as *Diversion Terrace*.

DRAINAGE—(1) The removal of excess surface or ground water from land by means of surface or sub-surface drains.

EROSION—The detachment and movement of the solid material of the land surface by wind, moving water or ice, and by such processes as landslides and creep.

FERTILIZER—Any material which is added to the soil to supply one or more of the plant nutrients.

FIELD STRIP CROPPING—A system of strip cropping in which crops are grown in parallel strips laid out across the general slope but which do not follow the contour. Strips of grass or close growing crops are alternated with those in cultivated crops.

FINE TEXTURED SOIL—A soil predominately silt and clay.

GLACIAL SOIL MATERIAL—Material transported and deposited by glacial action from which soil may be developed.

- GRADE**—The slope of a road, channel, or natural ground.
- GRADED TERRACE**—A terrace having a constant or variable grade (slope in feet or inches per 100 feet of length) along its length.
- GRASSED WATERWAY**—A natural or constructed waterway, usually broad and shallow, covered with erosion-resistant grasses, used to conduct surface water from cropland.
- GREEN MANURE CROP**—Any crop grown for the purpose of being turned under while green, or soon after maturity, for soil improvement.
- GULLY**—A channel or miniature valley cut by running water, but through which water commonly flows only during and immediately after heavy rains or during the melting of snow.
- HARDPAN**—A cemented (indurated) or hardened soil horizon. This horizon which may have any texture is compacted or cemented by iron oxide, silica, organic matter or other substance. Contrast with *Claypan*.
- HUMUS**—(1) Organic matter that has reached a more or less stable advanced stage of decomposition.
- IMPERVIOUS SOIL**—A soil resistant to penetration by water and usually by air and roots.
- INFILTRATION**—The downward entry of water into soil or other material.
- LAND-CAPABILITY**—The suitability of land for use without damage. Land-capability as ordinarily used in the United States of America, is an expression of the effect of physical land conditions, including climate, on the total suitability for use without damage for crops that require regular tillage, for grazing, for woodland, and for wildlife. Land-capability involves consideration of (a) the risks of land damage from erosion or other causes, and (b) the difficulties in land use owing to physical land characteristics including climate.
- LAND-CAPABILITY CLASS**—One of the eight classes of land in the land-capability classification. These eight land-capability classes, distinguished according to the risk of land damage or the difficulty of land use.
- LEVEL TERRACE**—A terrace that follows the absolute contour, as contrasted with a graded terrace. Used only on permeable soils where conservation of moisture for crop use is particularly important or where outlet channels are impractical.
- LIMING**—The application of lime to land, primarily to reduce soil acidity and to supply calcium for plant growth.
- LOAM**—(1) Soil containing a relatively even mixture of sand and silt and a somewhat smaller proportion of clay, generally a desirable quality. May be subdivided into texture classes like sandy loam, silt loam, and clay loam. (2) Specifically, soil material containing 7 to 27 per cent clay, 28 to 50 per cent silt, and less than 52 per cent sand.
- LOESS**—Deposit of wind-transported fine-textured material uniform and unstratified, mostly silt, but may contain some fine sand and clay.
- ORGANIC MATTER**—A general term for plant and animal material in or on the soil, in all stages of decomposition.
- PARENT MATERIAL (SOILS)**—The horizon of weathered rock or partly weathered soil material from which the soil is formed. Horizon C of the soil profile.
- PASTURE**—(1) The food of livestock harvested by grazing. (2) An area devoted to the production of forage which will be harvested by grazing animals. Includes natural or native pastures, with native or naturally distributed forage plants or uncultivated land, and pastures seeded by man on cultivated land.
- PASTURE, NATIVE**—Uncultivated land occupied wholly or chiefly by native plants suitable for grazing.
- PASTURE IMPROVEMENT**—Any practice of grazing, mowing, fertilizing, liming, seeding, scattering droppings, contour furrowing, or other methods of management designed to improve the vegetation for grazing purposes.

PERMANENT PASTURE—Grazing land occupied by perennial pasture plants or by selfseeding annuals, usually both, which remains unplowed for many years. Contrast with *Rotation Pasture*.

PERMEABILITY, SOIL—The quality or state of a soil or of any horizon in the soil profile relating to the transmittal of water or air to all parts of the mass.

PROPER STOCKING (RANGE MANAGEMENT)—Rate at which livestock are placed in a pasture or other management unit to bring about use of range forage and other resources without injury to the range.

RANGE—(1) Land that produces primarily native forage suitable for grazing by livestock. Also, forest land producing forage. Usually relatively extensive areas of land suitable for grazing, but not suitable for cultivation, especially in arid, semiarid, or infested regions.

RANGE IMPROVEMENT—Any means employed to increase the utility and ease of management of the range such as development of water supply, fencing, revegetation, and control of noxious plants.

ROTATION GRAZING—Grazing two or more pastures, or parts of a range in regular order, with definite recovery periods between grazing periods. Where only two fields are involved, sometimes called *Alternate Grazing*. Contrast with *Continuous Grazing*.

ROTATION PASTURE—A cultivated area used as a pasture one or more years as a part of crop rotation. Contrast with *Permanent Pasture*.

ROW CROP—A crop planted in rows relatively far apart, usually 2 to 4 feet, to allow cultivation between rows during the growing season.

SAND—(1) Mineral soil grains 2.00 to 0.05 mm. in diameter according to U. S. Department of Agriculture standards; 2.00 to 0.02 mm. according to the International System. (2) Soil material containing 85% or more sand; percentage of silt, plus $1\frac{1}{2}$ times the percentage of clay, shall not exceed 15%.

SILT—(1) Small mineral soil grains intermediate between clay and sand; 0.05 to 0.002 mm. in diameter according to U. S. Department of Agriculture standards; 0.02 to 0.002 mm. in diameter according to the International System. (2) Waterborne sediment with diameters of individual grains approaching that of silt. (3) Soil material containing 80% or more silt and less than 12% clay.

SLOPE, LAND—The inclination of the land surface from the horizontal. Usually expressed in percent for soil conservation work. Can be expressed in degrees.

$$\text{Percent slope} = \frac{\text{Vertical distance}}{\text{Horizontal distance}} \times 100$$

SOIL—Soil is a natural body developed from weathered minerals and decaying organic matter, covering the earth in a thin layer. It is a natural medium on the surface of the earth in which plants may grow.

SOIL BUILDING—Increasing the productive capacity of soil by appropriate fertilization, growth of soil-building plants, and good management.

SOIL CLASSIFICATION—The systematic grouping of soils based on profile characteristics such as thickness, color, and structure of the different horizons, drainage, and parent material.

SOIL CONSERVATION SURVEY—A record on a map or aerial photograph of the physical land features that are significant in determining land capability and in recommending land use and soil conservation practices. The features include the kind of soil, steepness of slope, type and degree of soil erosion, and overflow hazards or salinity if they are present.

SOIL CONSERVING CROPS—Crops that prevent or retard erosion and maintain or replenish rather than deplete soil organic matter. Grasses and legumes that are cut for hay and produce considerable aftermath generally can be regarded as soil conserving crops.

SOIL EROSION—The detachment and movement of soil from the land surface by wind or running water, including normal soil erosion and accelerated erosion.

SOIL HORIZON—A layer of soil approximately parallel to the land surface with observable characteristics that have been produced through the operation of soil building processes. Each horizon differs in one or more characteristics from the one above or below. The letters A, B and C are used to designate soil horizons.

SOIL PROFILE—A vertical section of the soil from the surface through all its horizons into the parent material.

STRIP CROPPING—Growing crops in a systematic arrangement of strips or bands to serve as vegetative barriers to wind and water erosion.

STRUCTURE, SOIL—The arrangement of soil particles either single grain or in aggregates, that make up the soil mass. The structure may refer to the natural arrangement of the soil when in place and undisturbed or to the soil at any degree of disturbance. The principal types of soil structure (aggregates) are platy, prismatic, columnar, blocky, nuciform, granular and crumb. The aggregates in these structure types vary in size and degree of stability. Structure is one of the important characteristics which determines the erodibility of soils.

STUBBLE MULCH—A protective cover provided by leaving plant residues of any previous crop as a mulch on the soil surface when preparing for and planting the following crop.

SUBSOIL—Roughly, that part of the solum under the topsoil; in soils not having clearly differentiated layers, the soil under the topsoil to a depth of about five feet.

SUBSTRATUM—An indefinite term for the C horizon of a soil; the layer below the land surface.

SUBSURFACE TILLAGE—Tillage with specialized equipment which thoroughly loosens and prepares a seedbed but does not invert the surface residual mulch.

SURFACE SOIL—The upper part of a cultivated soil commonly stirred by the plow or other tillage implements; or an equivalent depth, 5 to 8 inches, in non-arable soils.

TERRACE—An embankment or ridge of earth constructed across a slope to control run-off and minimize soil erosion.

TEXTURE, SOIL—The relative proportions of various sized mineral particles, or soil separates, in the soil. Clay soils are said to be fine or heavy textured, loams are medium textured, and sandy or gravelly soils are coarse or light textured. In the laboratory, texture is determined by mechanical analysis. In the field, by the feel when the moist soil is rubbed between the thumb and fingers.

WATERWAY—A natural course for the flow of water.

WILDLIFE LAND—(1) Land, whether or not suitable for other uses, used for the main or sole purpose of producing or maintaining wildlife. (2) Land of such character that its only practical use is for wildlife habitat or production.

WINDBREAK—A barrier of trees and shrubs, usually with three or more rows, to reduce or check the force of the wind. Established for the protection of fields, orchards, feedlots and homesteads.

WIND EROSION—The detachment, transportation, and deposition of soil by the action of wind. The removal and redeposition may be in more or less uniform layers or as localized blowouts and dunes.

WIND STRIP CROPPING—The production of crops in long, relatively narrow strips, placed crosswise of the direction of the prevailing winds without regard to the contour of the land.

(Most of definitions used in this glossary were taken from the Soil Conservation Society of America glossary of terms.—1955)

Land Judging

IN NEBRASKA

