CIR 242

Land Judging and Homesite Evaluation in Florida [1]

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Note: Sections containing material that has been revised, updated, or clarified in 2007 are italicized.

Introduction

Soils have always been a basic resource. They will continue to be a most important resource affecting our individual and national economy.

Soils differ one from another. Because of these differences, land capabilities vary from place to place. A knowledge of soil characteristics will help to determine the capability of land, the proper use of land, and the conservation practices necessary.

These differences in soil characteristics can be described in rather definite terms. Once we have learned the proper terms, we can discuss soil differences with anyone else who speaks the same language.

First, we must know several things about our soils. From this knowledge, we can determine what our land is capable of and just how we will have to treat it. We will need to know about soil texture, organic matter, thickness of rooting zone, permeability, slope, erosion, and drainage. Soils with certain combinations of these characteristics can be grouped into soil types. Similar types of soil may be suited to similar agricultural uses. We arrange these groups into land capability classes. Understanding capability classification makes it easier to plan for conservation farming, ranching, or grove management. Similarly, soils with certain characteristics may be found to have predictable degrees of limitation for various urban uses, including homesites.

Land Judging

Definitions of Land Characteristics

The information contained in this section will help in filling out Part One of the Land Judging score card (see Figure 6).

Surface texture

Texture (Figure 1) is a soil property related to the proportion of sand, silt, and clay that a soil contains. The soil should be moist to determine its texture by sense of touch. When mineral soil is rubbed between the fingers (Figure 2), (a) sand is gritty, (b) silt is smooth and floury, and (c) clay is slick and sticky. Fourteen textural grades of mineral soil have been established but are grouped into three broad textural groups (Table 1) for land judging purposes.

Organic soils contain at least 15 percent non-mineral, organic materials and are dark colored, light in weight when dry, and smeary or greasy when moist. "Organic" is not a true textural name. Therefore, the word appears in parentheses on the Land Judging and Homesite Evaluation score cards.

Surface texture **only** is to be indicated on the score cards.

Some confusion may result from the fact that coarse sandy loam, fine sandy loam, and very fine sandy loam are listed in Table 1 but are not shown in the USDA textural triangle shown in Figure 1. All three "sub-textures" meet the criteria for sandy loam, but they have especially high contents of coarse sand-, fine sand-, and very fine sand-sized particles, respectively. All three are loamy for land judging purposes, but they may differ somewhat from each other in permeability or other behavior.

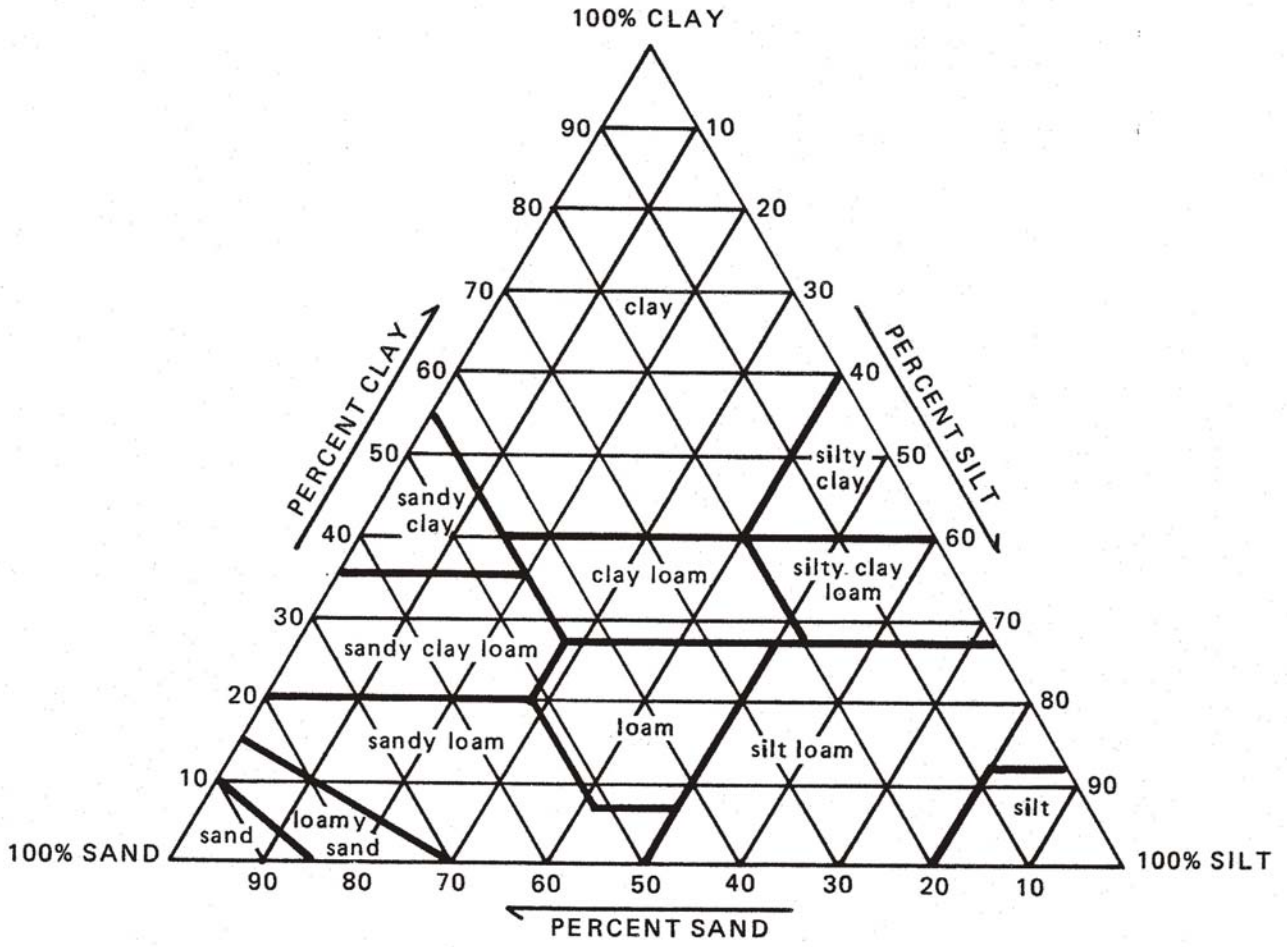

Figure 1. Textural triangle used to help determine soil texture.

Table 1. Soil texture determination.

Broad Textural Groups		**Textural Names from USDA Textural Triangle**
Sandy soils	Coarse-textured, very sandy soils	Sands Loamy sands
Loamy soils	Moderately coarse-textured soils	*Coarse sandy loam* Sandy loam Fine sandy loam
	Medium-textured soils	Very fine sandy loam Loam Silt loam Silt
	Moderately fine-textured soils	Clay loam Sandy clay loam Silty clay loam
Clayey soils	Fine-textured soils	Sandy clay Silty clay Clay

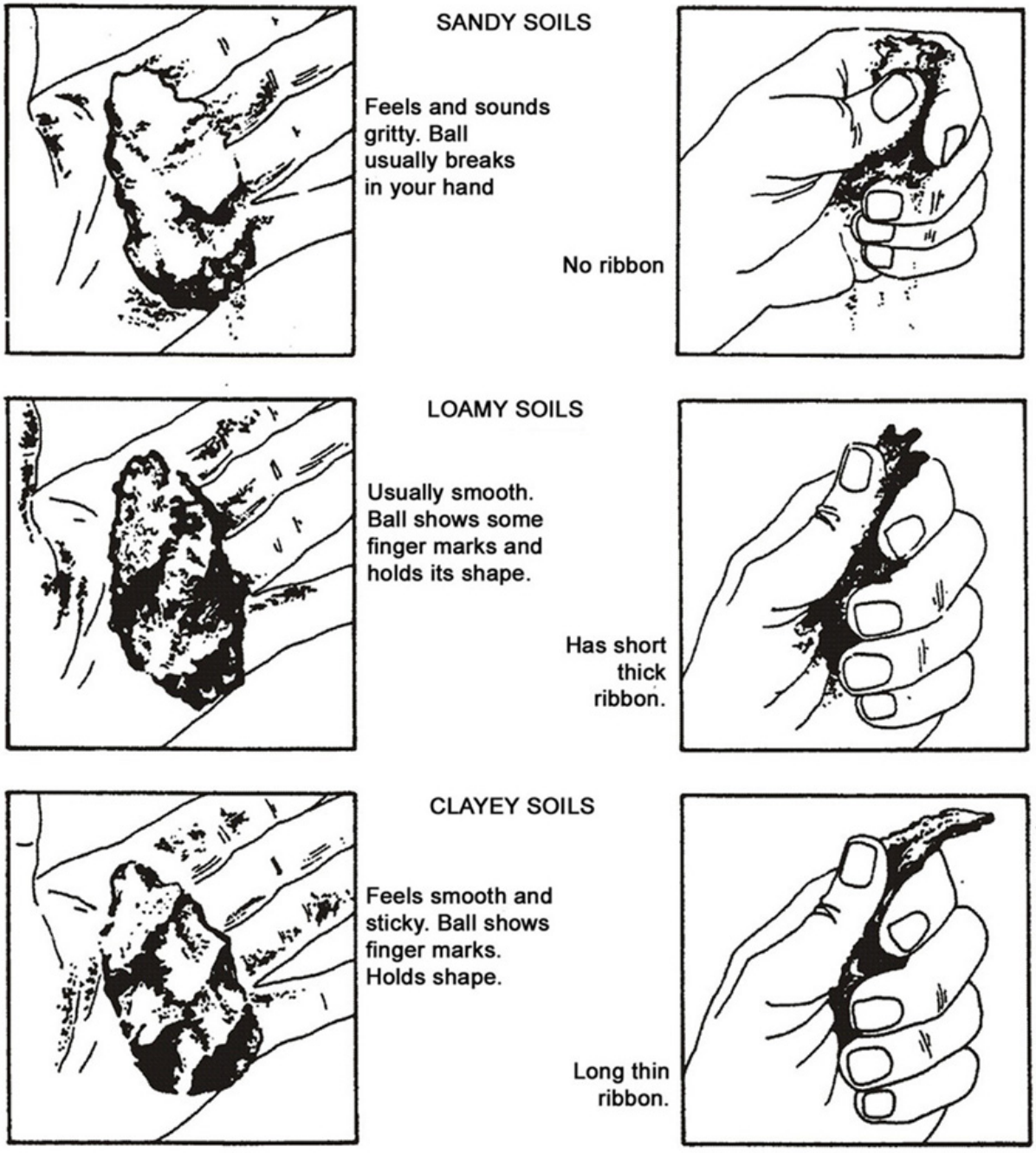

Figure 2. Ribbon method of determining soil texture.

Organic matter

Soil organic matter is the residue of plant and animal material in various stages of decomposition. It helps hold both water and nutrients in the plant root zone and, upon decomposition, becomes plant food. Organic matter of the surface soil (from the surface down to the first significant change in color) is estimated visually by examining the darkness of color of an ***air-dry*** sample. Usually the darker the color of the surface soil, the higher the organic matter content. It is generally agreed that, where the soil organic matter is

between 0 and 2 percent, it is low; between 2 and 5 percent, it is medium; and where it is over 5 percent, it is high.

Thickness of rooting zone

The total thickness of surface and subsoil layers readily penetrated by crop roots is considered to be the thickness of the rooting zone. Dense hardpan, clay pan, rock, a seasonally high water table (under natural conditions, i.e., without artificial drainage), or other unfavorable conditions may limit the rooting zone. Occurrence of roots at a given depth is not a good indicator, because there may be artificial drainage in place, and/or the roots may be those of weeds or other non-agronomic plants that are not the primary consideration in land judging. Rooting zone thickness is described in Table 2.

Table 2. Rooting zone thickness.

Thin	0 - 19.9 inches
Thick	20 - 39.9 inches
Very thick	40 inches or more

Permeability

Permeability refers to the rate of water or air movement through the most restrictive layer in the soil, including bedrock, if present. This may be considered as internal drainage. Permeability can be estimated from texture, compaction, and arrangement of soil particles (structure). Figure 3 illustrates the common ways particles may be arranged to form soil structure. This secondary grouping of particles may affect the soil's internal drainage by either providing a pathway for water to drain (such as around the outside of granules) or by retarding water movement (such as with platy structure or where structure is absent and the soil is massive).

Rapid. *Soils are generally not finer than sands to fine sandy loam throughout the profile, with little if any defined structure other than being structureless (i.e., single-grained) (very little restriction to movement of water and air). Organic soil material (e.g., muck or peat) is generally rapidly permeable, unless compaction or some other soil feature gives cause to think otherwise.*

Moderate. *These soils generally include medium-textured loamy soils, light silty clay loam (i.e., on the coarser-textured side of the silty clay loam category), light clay loam, or light sandy clay loam with prismatic to granular or blocky structure, and have no severely restrictive layers. Weakly cemented sandy material is also included.*

Slow. Soils generally would be on the fine side of the loamy group, such as heavy silty clay loam to heavy sandy clay loam. Such soils would be structureless (massive) or have platy structure, weakly expressed blocky structure, or weakly expressed prismatic structure. Strongly cemented sandy material is included here, as is impermeable or slowly permeable bedrock.

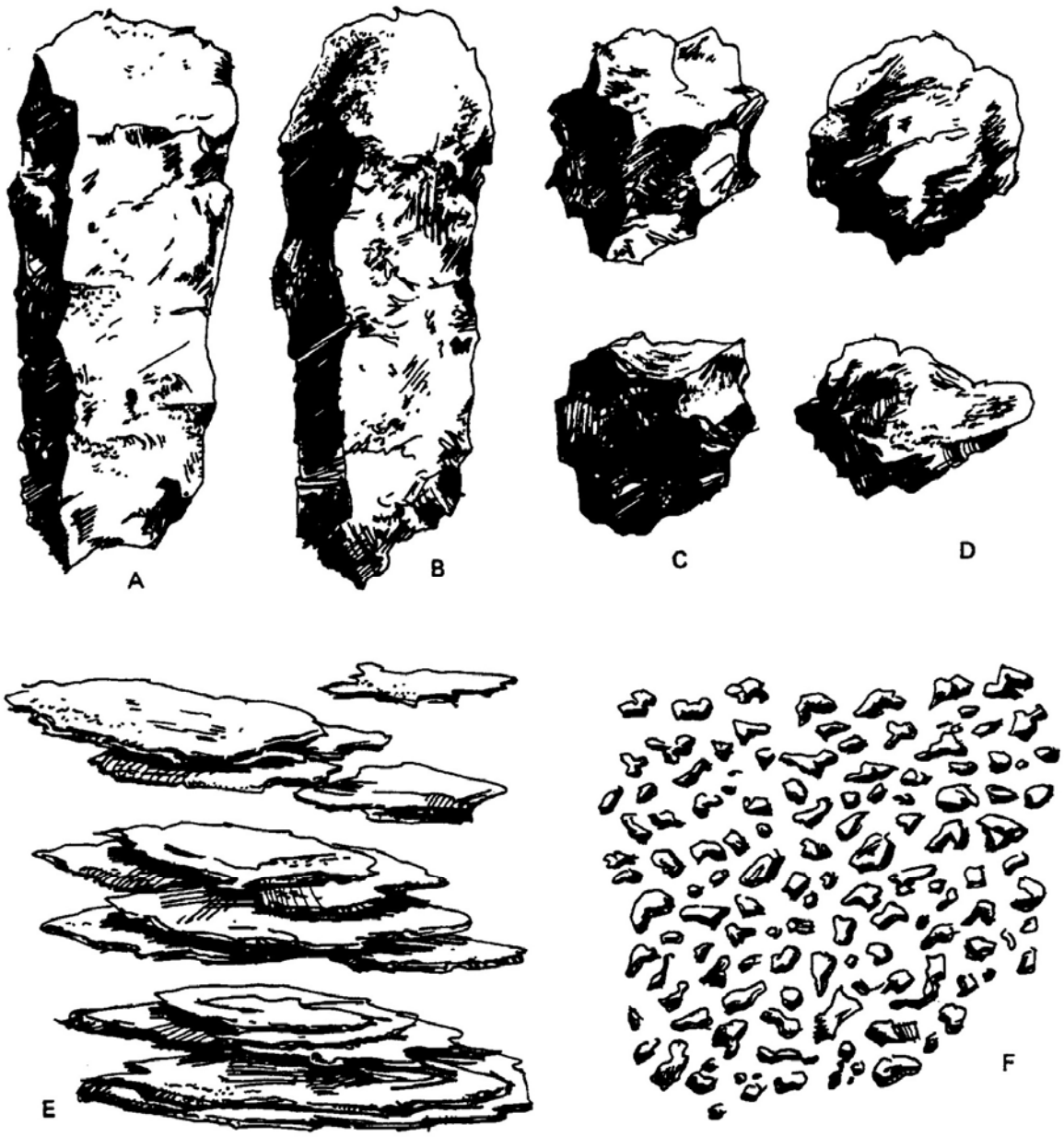

Figure 3. Drawings illustrating some of the types of soil structure: A, prismatic; B, columnar; C, angular blocky; D, subangular blocky; E, platy; and F, granular.

Slope

Slope is measured in feet of fall or rise per 100 feet of horizontal travel and is expressed in percent, as in Table 3.

Table 3. Slope classification.

A. Nearly level	0 - 1.99%
B. Gently sloping	2 - 4.99%
C. Moderately sloping	5 - 7.99%
D. Strongly sloping	8 - 11.99%
E. Steep	12 - 16.99%
F. Very steep	17% or more

Erosion -- wind and water

Erosion is the loss of soil by forces of water and wind. Proper soil management can greatly reduce erosion and maintain productivity and usefulness of the land. The degree to which erosion has occurred is described by the following terms:

None to slight. Less than 25 percent of the thickness of the surface soil removed. No gullies.

Moderate. 25 to 75 percent of the thickness of the surface soil removed, with or without gullies.

Severe. 75 percent or more of the thickness of the surface soil removed, with or without occasional uncrossable gullies.

Very severe. All of the surface soil removed, and up to 75 percent of the subsoil lost.

Drainage

Drainage can be regarded as an index of wetness of the natural soil. Drainage is associated with the rate at which water is removed from the soil profile under natural conditions. Wetness of a soil is influenced by many factors, including internal drainage, permeability, landscape position, and depth to the water table. Generally, internal drainage is a reflection of permeability. For example, a very slowly permeable soil exhibits poor to very poor internal drainage. The presence and depth of a water table is not necessarily a reflection of permeability. Establishing depth and permanency of the water table requires study during different seasons of the year. The terms used to describe soil drainage are discussed below.

Poor. Water drains so slowly that the soil remains wet for a large part of the time. The water table is commonly within 20 inches of the surface during a considerable part of the year. Poorly drained conditions are due to a high water table, to a slowly permeable layer within the profile, to seepage, or to some combination of these conditions. Poorly drained soils are usually characterized by uniform gray or mottled gray colors immediately below the surface soil. Mottling is normally associated with loamy or clayey subsoils. Some poorly drained sandy soils may be light gray or white from the surface downward, with or without mottles. *A spodic layer at depths of 10 to 40 inches is usually (but not always!) an indicator of poor drainage. Landscape position and other factors **may** cause a Spodosol to be somewhat poorly drained or even drier.*

Somewhat poor. Water is removed from the soil slowly enough to keep it wet for significant periods. The water table is at depths of 20 to 40 inches for a considerable part of the year. Somewhat poorly drained conditions are due to a moderately high water table, to a slowly permeable layer within the profile, to seepage, or to some combination of these conditions. Somewhat poorly drained soils are

usually characterized by uniform grayish, brownish, or yellowish colors in the upper profile and commonly have mottles between the 20 and 40-inch depths. Mottling is normally associated with loamy or clayey subsoils. Somewhat poorly drained sandy soils may be white or light gray from the surface downward with or without mottles.

Moderately well or well. Water is removed from the soil somewhat slowly so that the profile may be wet for short, but significant, periods of time. The water table is commonly below the 40-inch depth. Moderately well drained soils may have a slowly permeable layer within or immediately beneath the subsoil, a relatively high water table, additions of water through seepage, or some combination of these conditions. Moderately well drained and well-drained soils normally have uniform colors in surface soil and upper subsoil, but may be mottled in the lower subsoil (below 40 inches). *If the water table is below 72 inches and the soil is **not** sandy throughout the 0- to 72-inch depth (e.g., it is loamy in part or all of the profile), the soil is well drained.*

Excessive. *The soil is sandy throughout its depth.* Water is removed from the soil readily. The water table occurs at depths below 72 inches. The soil is free or nearly free of mottling throughout the profile. Dominant colors are pale brown, yellow, and red. Some excessively drained soils are white or light gray in color and lack evidence of wetness.

Land capability class

A Land Capability Class designation is a statement of a soil's suitability for use as cropland. The different classes are defined as follows, and safe land uses for each of the land classes are shown in Figure 4.

Class I. Soils in this class are suitable for cultivation over a long period of time. They are moderately well drained to well-drained, deep, productive, nearly level, not subject to more than slight erosion regardless of treatment, and are free from overflows that interfere with planting, growing, or harvesting of crops.

Class II. This class includes soils that are suitable for cultivation over a long period of time. However, they have some hazards and limitations such as gentle slopes, slight erosion, or moderate wetness. The following are some of the practices that may be needed to overcome the hazards and limitations of soils in this class: crop rotations that include soil-conserving and soil-improving crops at least one-half of the time, water control, contour farming, and diversion of water from upslope.

Class III. Soils in this class are good for cultivated crops, but they have severe limitations that reduce the variety of plants that can be grown, require special conservation practices, or both. The following are the treatments that may be needed: terracing and contour cultivation, strip cropping, and crop residue management. They also need intensive crop rotations, which include soil-conserving and soil-improving crops at least two years out of three. Diversion of upslope water or other water control measures may also be needed.

Class IV. Soils making up this class have very severe limitations that restrict the choice of plants, require very careful management, or both. Some of the limitations are steep slopes, excessive wetness, or poor soil characteristics. They should be managed in a rotation, which includes soil-conserving and soil-improving crops at least three-fourths of the time. When cultivated, sloping land should be broken in strips and will require practices such as terracing and contour farming. Wet lands will require water control. Both sloping and wet land will require conservation of organic residues. As a rule, these soils are best suited for pasture or hay.

Class V. Soils in this class are not suitable for cultivation but may be used for permanent vegetation. These soils are not more than slightly susceptible to erosion and, therefore, they require no special conservation practices or restrictions in use. These soils may be frequently flooded or poorly drained. Good grazing management is required if utilized for pasture or range, or good timber management if used for woodland. All areas should be protected from wildfire.

Class VI. Soils in Class VI have severe limitations that make them generally unsuitable for cultivation and limit their use largely to pasture or range, woodland, or wildlife food and cover. Restrictions commonly needed on pasture and range include deferred and rotational grazing to maintain a good soil cover at all times. Timberland should be protected from grazing. All areas should be protected from wildfire.

Class VII. Soils in Class VII have very severe limitations that make them unsuitable for cultivation and restrict their use to woodland or wildlife. Practices required are protection from grazing, protection from wildfire, and other practices to increase woodland production and wildlife population.

Class VIII. Soils in this class are not suitable for cultivation and are not suitable for useful permanent vegetation or woodland. It is land of little or no economic value agriculturally, except for wildlife or recreational purposes. Class VIII land needs protection from wildfire and restriction from grazing.

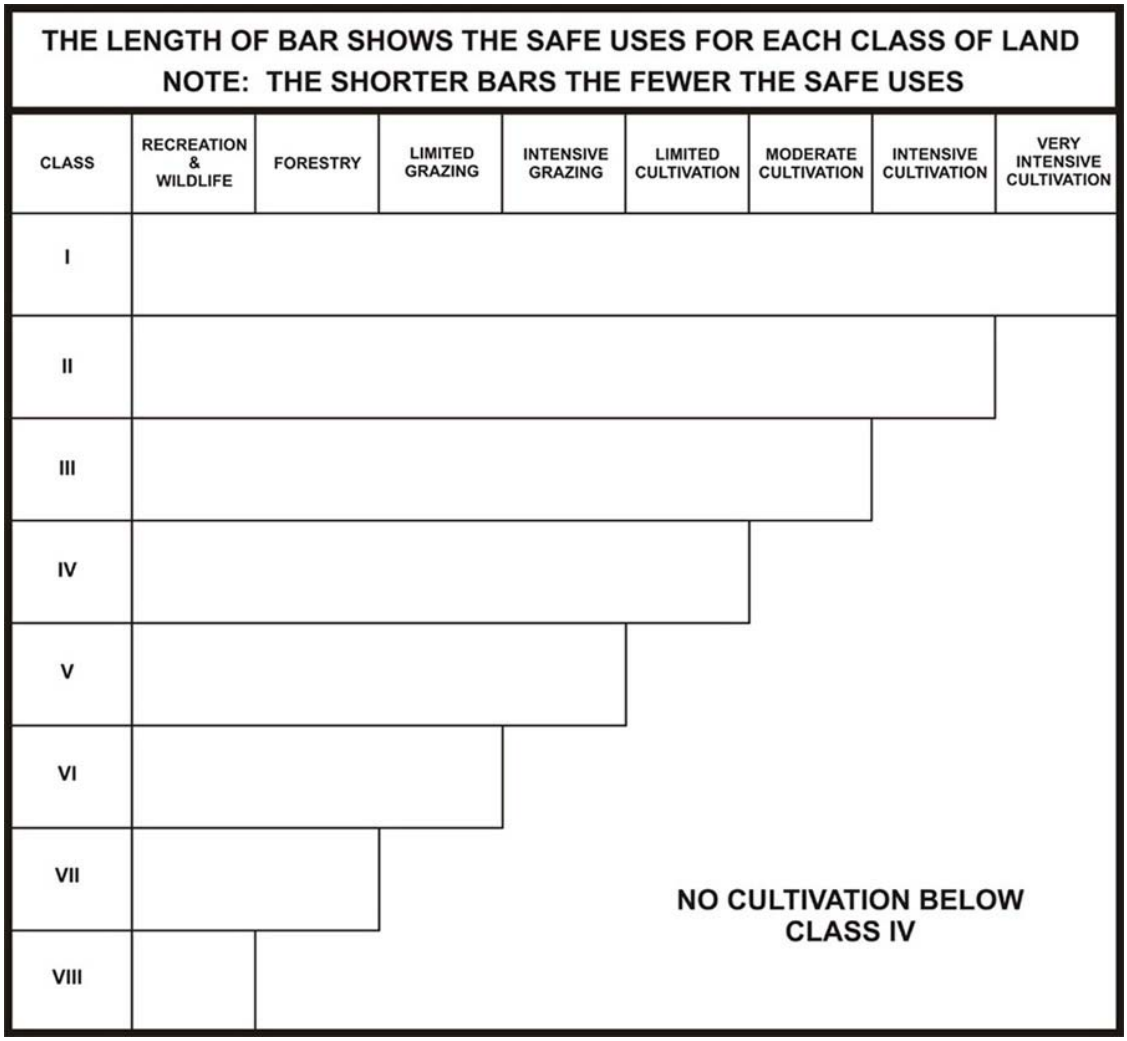

Figure 4. Safe uses for the various land classes.

Land Characteristics and Their Limitations on Capability Class

(Shown in Table 4)

Table 4. Land Characteristics and Their Limitations on Capability Class

Factor	Best Possible Land Class
Surface Texture	
Sandy	II
Loamy	I
Clayey	III
(Organic)	III
Organic Matter	
High	I
Medium	I
Low	I
Thickness of rooting zone	
Thin	III
Thick	II
Very thick	I
Permeability	
Rapid	II
Moderate	I
Slow	II
Slope	
A Nearly level	I
B Gently sloping	II
C Moderately sloping	III
D Strongly sloping	IV
E Steep	VI
F Very steep	VII
Erosion	
None to slight	I
Moderate	II
Severe	III
Very severe	IV
Drainage	
Poor	III
Somewhat poor	II
Moderately well and well	I
Excessive	IV

If only one factor keeps a site from being Class I, that factor determines land class. Where two or more factors are involved, the situation may be more complex. Capability class may be determined by the most limiting factor. A penalty, or downgrading of capability class, may be assessed under some circumstances, however, as in the examples given in Table 5.

Table 5. Examples of Land Capability Class determination.

Ex.	Surface Texture	Organic Matter	Thickness of Rooting Zone	Permeability	Slope	Erosion	Drainage	Class
1.	Sandy II	Low I	Thick II	Moderate I	B II	Moderate II	Well I	III
2.	Loamy I	Medium I	Thick II	Slow II	C III	Moderate II	Somewhat Poor II	IV
3.	Sandy II	Low I	Very Thick I	Rapid II	C III	Slight I	Excessive IV	VI
4.	Loamy I	Medium I	Very Thick I	Moderate I	C III	Moderate II	Well I	III
5.	Loamy I	Low I	Thin III	Slow II	E VI	Moderate II	Poor III	VII
6.	Sandy II	High I	Thick II	Rapid II	A I	None I	Poor III	IV
7.	Loamy I	Medium I	Thin III	Slow II	D IV	Moderate II	Somewhat Poor II	VII
8.	Loamy I	Low I	Very Thick I	Moderate I	C III	Severe III	Well I	IV
9.	Organic III	High I	Thin III	Rapid II	A I	None I	Poor III	VI
10.	Sandy II	Low I	Thin III	Slow II	B II	None I	Poor III	VI
11.	Sandy II	Low I	Thick II	Rapid II	B II	Moderate II	Well I	III
12.	Loamy I	Medium I	Thin III	Slow II	C III	Severe III	Moderately Well I	VI
13.	Loamy I	Low I	Thick II	Slow II	D IV	Moderate II	Well I	VI
14.	Loamy I	Medium I	Very Thick I	Moderate I	A I	None I	Well I	I
15.	Sandy II	Low I	Very Thick I	Moderate I	A I	None I	Moderately Well I	II
16.	Sandy II	Low I	Thin III	Moderate I	A I	None I	Somewhat Poor II	III
17.	*Sandy* *II*	*Low* *I*	*Thick* *II*	*Moderate* *I*	*B* *II*	*None* *I*	*Moderately Well* *I*	*II*
18.	*Sandy* *II*	*Medium* *I*	*Thick* *II*	*Rapid* *II*	*B* *II*	*Moderate* *II*	*Somewhat Poor* *II*	*III*

Ex.	Surface Texture	Organic Matter	Thickness of Rooting Zone	Permeability	Slope	Erosion	Drainage	Class
19.	*Sandy*	*Low*	*Thick*	*Moderate*	*D*	*Very Severe*	*Moderately Well*	*VI*
	II	*I*	*II*	*I*	*IV*	*IV*	*I*	
20.	*Sandy*	*Low*	*Very Thick*	*Rapid*	*D*	*Very Severe*	*Excessive*	*VII*
	II	*I*	*I*	*II*	*IV*	*IV*	*IV*	

Soil Taxonomy

Soil classification systems of various sorts have been used for hundreds of years. Many systems were based on one soil characteristic, such as color, elevation, moisture, fertility, or acidity-alkalinity. These systems of classification served a particular purpose for local conditions but were based on opinions that were difficult to reproduce; they therefore had very limited meaning. The Land Capability Classification System was an improvement over the older systems because it included the rating of several soil characteristics by observations and measurements which could be reproduced. The Capability Class system has helped many people recognize the importance of various soil characteristics; however, science and technology have expanded since it was first developed.

A new classification system was begun in 1951, and after several revisions the new system was adopted in 1965. This system, called Soil Taxonomy, is based on physical, chemical, and mineralogical properties and can be used anywhere in the United States. The taxonomic system recognizes six categories: Order, Suborder, Great Group, Subgroup, Family, and Series. Soil Order is the only category that is required in land judging contests. Dominant features of soil orders are described below (percent base saturation will be given in a contest), followed by a map (see Figure 5) of the soil orders in Florida.

Alfisols. Well-developed soils with a relatively fine-textured subsoil horizon that has a percent base saturation of 35 percent or more.

Aridisols. Dry soils that occur in arid or semi-arid regions.

Entisols. Soils with little or no horizon development.

Histosols. Soils composed of relatively thick (usually 16 inches or more) organic materials (mucks and peats).

Inceptisols. Soils of humid regions with profile development sufficient to exclude them from the Entisols, but insufficient to include them in Spodosols, Ultisols, or other well-developed soils. Soils that appear to be like Mollisols but have less than 50 percent base saturation may also be Inceptisols.

Mollisols. Soils with thick (usually 10 inches or more) , dark surfaces that have a base saturation of 50 percent or more in the surface soil.

Oxisols. Highly weathered soils of the tropics.

Spodosols. Soils with a spodic horizon (a dark-colored horizon or subhorizon with a mixture of organic matter and aluminum [Al], with or without iron [Fe]).

Ultisols. Well-developed soils with a relatively fine-textured subsoil horizon that has less than 35 percent base saturation.

Vertisols. Soils with more than 30 percent clay which appreciably expand upon wetting and contract upon drying.

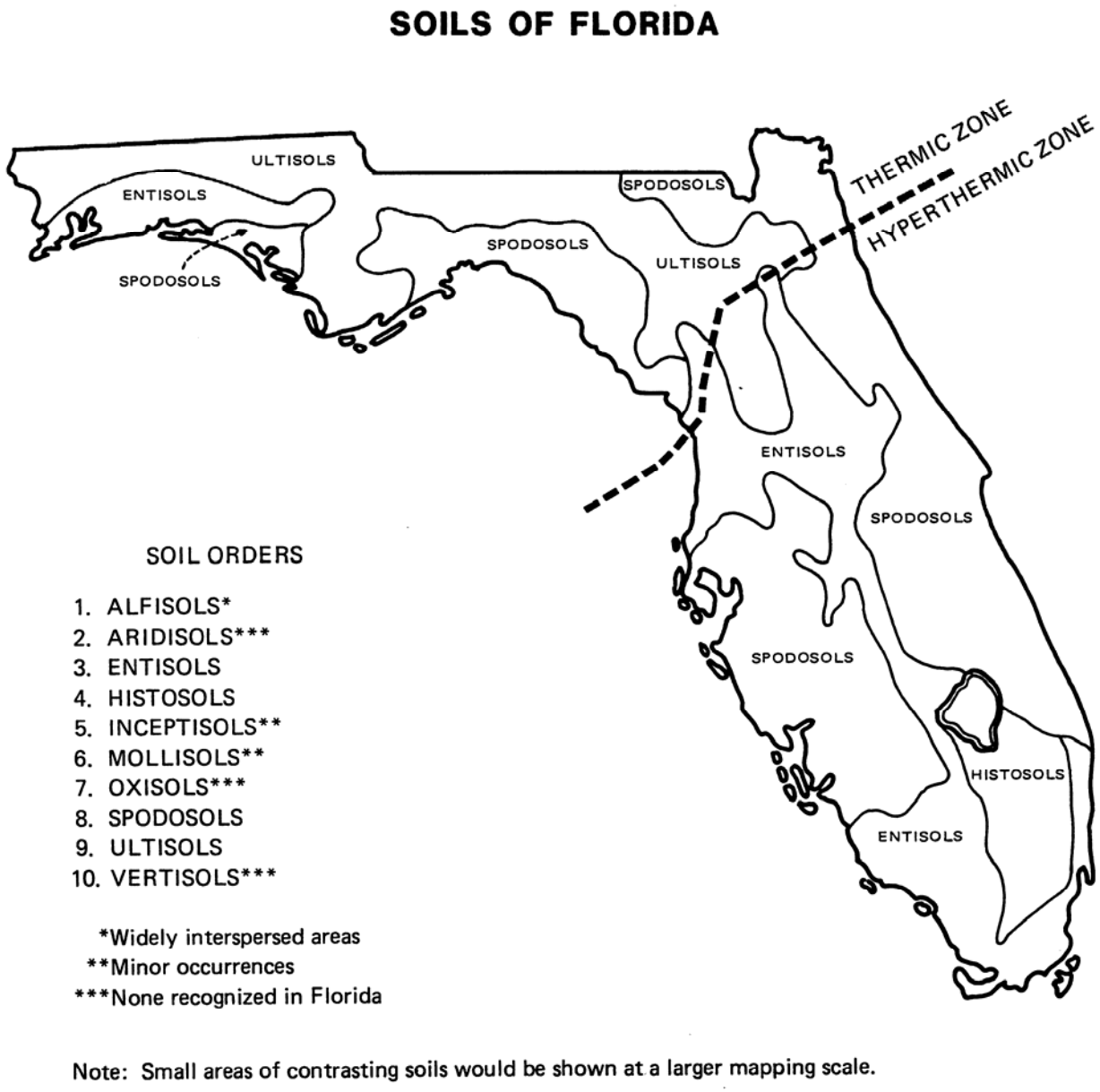

Figure 5. Soil orders in Florida.

While Florida's soil orders are shown alphabetically in the above listing, it should be understood that there is a protocol for determining the taxonomic classification of a soil. Using that protocol, soils should be keyed out in the following sequence:

- *Histosols*
- *Spodosols*
- *Oxisols*
- *Vertisols*
- *Aridisols*
- *Ultisols*
- *Mollisols*
- *Alfisols*
- *Inceptisols*
- *Entisols*

For example, a soil that qualifies for the Histosol order should be placed in the Histosols, regardless of whether or not the soil meets any of the requirements of an order or orders further down the list. Similarly, a soil that does not qualify for the Histosols but does qualify for the Spodosols should be called a Spodosol, whether or not the soil has a relatively fine-textured subsoil, and regardless of base saturation.

Conservation Practices

Part Two of the Land Judging Score Card deals with conservation practices. Local conditions may require some modifications of the following recommendations. Consult your County Extension Agent, NRCS District Conservationist, or Vocational Agriculture Teacher.

Vegetative

Practices Number 1, 2, 3, and 4. Use soil-conserving and soil-improving crops. -- Prevent or retard erosion, maintain or improve rather than deplete soil organic matter, improve soil structure and tilth, increase water intake, and increase fertility. Use of close-seeded crops and/or incorporation of green manure into the soil would help to achieve these results. Use crops that conserve and improve soil every year between cash crops on Class I land. Use them every other year on Class II land. Use them two years out of three on Class III land. Use them three years out of four on Class IV land.

Number 5. Contour strip cropping -- Grow row crops with strips or bands of close-growing cover crops in a systematic arrangement on the contour. Use on Classes II through IV where the slope is 2 percent or more, except where sandy soil extends from the soil surface to a depth of more than 20 inches.

Number 6. Manage crop residue -- Turn in rather than burn off crop residue, or provide a protective cover, leaving the residue of any previous crops as a mulch on the surface. Employ conservation tillage where feasible and consistent with overall farm management strategy, Use on Classes I through IV.

Number 7. Use sod-based rotation -- Grow crops in recurring succession on the same land using grass pasture three years out of four or six years out of eight. Use on Class IV.

Number 8. Wind strip cropping -- Produce row crops in long, relatively narrow strips between strips of tall growing grasses or legumes placed across the direction of the prevailing wind. Use on Classes I through IV when a wind erosion problem is indicated on the conditions poster.

Number 9. Use field windbreaks -- Use a border of trees and shrubs, usually three or more rows, to reduce the force of the wind for the protection of fields, orchards, groves, feedlots, and homesteads. Use on Classes I through IV when a wind erosion problem is indicated on the conditions poster.

Number 10. Control noxious plants -- Keep undesirable vegetation to a minimum. Mowing and spraying with chemicals are two methods of control. Use on Classes I through VII.

Number 11. Establish recommended grasses and/or legumes -- Establish a protective cover on land not producing suitable permanent vegetation or on unprotected land not suitable for cultivated crops. Use on Classes V and VI.

Number 12. Manage pasture or range properly -- Apply practices to keep plants growing actively over as long a period as possible, and encourage the growth of desirable grasses and legumes through controlled grazing and use of fertilizers and lime. Use on Classes V and VI.

Number 13. Protect from wildfire -- Self-explanatory. Use on Classes V through VIII.

Number 14. Plant recommended trees -- Use recommended varieties of trees for post lots and woodland plantings. Use on Class VII.

Number 15. Harvest trees selectively -- Remove mature or undesirable trees and encourage reproduction under the remaining stand. Use on Class VII.

Number 16. Use for wildlife or recreational area -- Protect or develop areas that are not suitable for cultivation, grazing, or forestry. Use on Class VIII.

Mechanical

Number 18. Terrace -- Use terraces, which are ridges or embankments of soil constructed across the slope, to control runoff, minimize erosion, and increase infiltration of water into the soil. Use on Class II through IV when slope is 2 or more percent but less than 8 percent, if surface texture is loamy or clayey.

Number 19. Farm on the contour -- Conduct field operations such as plowing, planting, and cultivation on the contour (i.e., at right angles to the direction of slope) , with or without the use of terraces and/or contour strip cropping. Use on Classes II through IV where the slope is 2 percent or more, except on excessively drained soils.

Number 20. Maintain terraces -- Keep terraces in shape to work effectively. Do not cultivate across them. Use with practice No. 18 or 2l.

Number 21. Construct diversion terraces -- These are larger terraces constructed to handle a larger flow of water than a normal field terrace. Use when an upslope water problem is indicated on the conditions poster.

Number 22. Develop waterways -- Use natural or constructed courses to accommodate runoff from terraces and contoured land. Generally seeded to grass or hard-surfaced. Use with all terraced and/or contoured land (practices 18, 19, 20, 21, or 24).

Number 23. Install water control system -- Control water on land by means of surface or sub-surface drains and structures. Use where the rooting zone is thin or thick due to a seasonally or permanently high water table.

Number 24. Control gullies -- Prevent further erosion in gullies by grading the heads and sides of gullies, building temporary check dams, establishing perennial vegetation, constructing diversion terraces to divert water from the heads of gullies, and fencing out domestic animals. Use where gullies are present.

Number 25. Subsoil -- Till soil below the normal plow depth, sometimes referred to as chiseling. The intended purpose is to break or shatter a spodic horizon, claypan, or plowpan that is restrictive enough to limit the rooting depth and/or to impede internal soil drainage. Use only where a compaction problem is indicated on the conditions poster.

Fertilizer and soil amendments

Use proven soil testing methods, fertilizer recommendations based upon research, and good production records as a basis for managing fertilizer and soil amendment applications. This approach to fertilization will conserve our resources and still maintain a highly productive soil.

The ratings given to soil tests indicate the level of productivity expected if a given nutrient were not applied to the soil as fertilizer, and the probability of crop response if the nutrient were applied. The following definitions are used by the IFAS Extension Soil Testing Laboratory to determine if phosphorus (P) or potassium (K) fertilizer should be recommended. These definitions assume that no other factor, such as water, will limit growth.

Very Low. Less than 50 percent of crop yield potential is expected without addition of the nutrient. Yield increase in response to added nutrient is always expected.

Low. 50 to 75 percent of crop yield potential is expected without addition of the nutrient. Yield increase in response to added nutrient is expected.

Medium. 75 to 100 percent of crop yield potential is expected without addition of the nutrient. Yield increase in response to added nutrient will probably occur if the test value is in the lower end of the range.

High. Soil can supply sufficient quantities of the nutrient for the crop. Yield increase in response to added nutrient is not expected. Test again next year if the nutrient is not applied this year.

Very High. Soil can supply the nutrient in far greater quantities than considered adequate. Yield increase in response to added nutrient is never expected. Addition of nutrient will be wasteful, could induce nutrient imbalance, and could decrease yields.

Since factors that cannot be determined on-site must be considered in making fertilization decisions, the following information will be given on the conditions poster for the Land Judging Contest (see sample poster in Table 6):

1. The interpretation of whether or not the crop to be grown will benefit from liming the soil.
2. The phosphorus soil test rating.
3. The potassium soil test rating.
4. A list of other nutrients interpreted to be deficient for the crop to be grown.

A short discussion of the fertility factors on the contest score card follows:

Number 27. Lime -- Apply agricultural limestone to reduce soil acidity (increase soil pH). Lime need is based upon the crop to be grown and soil test results. The interpretation of whether or not the crop will benefit from liming will be given on the conditions poster.

Number 28. Nitrogen -- Nitrogen (N) fertilizer will almost always be needed for non-legume crops grown on mineral soils. Soil testing is not used for guiding N fertilizer recommendations in Florida. Mark N on the score card if the conditions poster lists N as deficient.

Number 29. Phosphorus *-- Addition of P fertilizer is a recommended practice when soil test levels are rated very low (soil test shows <10 ppm Mehlich-I extractable P in topsoil), low (10-15 ppm P), or medium (16-30 ppm P) (mark P on the score card); but is not recommended when the tests are rated high (31-60 ppm P) or very high (>60 ppm P) (do not mark P on the score card). Florida soils range from very low to very high in P. Soil testing is a useful tool in determining the need for P fertilization.*

Number 30. Potassium *-- Addition of K fertilizer is a recommended practice when soil test levels are very low (soil test shows <20 ppm Mehlich-I extractable K in topsoil), low (20-35 ppm K), or medium (35-60 ppm K) (mark K on the score card); but is not usually recommended when tests are high (61-125 ppm K) or very high (>125 ppm K) (do not mark K on the score card). Potassium leaches in sandy soils and thus must be managed differently on sands than on finer-textured soils. Build-up of K is not practical on most Florida sands.*

Number 31. and 32. Micronutrients -- The nutrient elements manganese (Mn), zinc (Zn), copper (Cu), iron (Fe), boron (B), and molybdenum (Mo) are required by plants in very small quantities. A deficiency of any one of these micronutrients will result in reduced plant performance. Tests are helpful, but experience with the soil and crop are also important in determining if one or more of the micronutrients should be added as fertilizer. Mark No. 31 on the score card if only one of the micronutrients is listed on the conditions poster as deficient. Mark No. 32 on the score card if two or more are listed as deficient.

How to Use the Land Judging Score Card

The Land Judging Score Card (Figure 6) is available separately as IFAS Publication SL144 (http://edis.ifas.ufl.edu/SS144).

1. Score cards must ALWAYS be identified with Field No. and Name.
2. An "X" is used to mark your answers for Part One, Part Two and Soil Order. Land Capability Class should be circled.
3. In case the land is in Class I, the rule is to mark no factors! For other classes, the rule is to mark the factors that keep the land from being Class I.
4. The perfect score of each field is variable, depending on the number of conservation practices required.
5. The blank lines (items 17 and 26) on the Land Judging Score Card can be used to write in soil-conserving and soil-improving practices not listed. When they are to be used, officials will make this announcement before the contest begins so that everyone may write in the practice or practices.
6. In selecting conservation practices for Part 2 of the score card, consider the most intensive use that could be made of the land based on its limitations.
7. Select only the number of conservation practices needed for each site. If you use more conservation practices than are necessary, the judges will give credit for correct practices and deduct penalty points for those practices that have been checked but are incorrect.

LAND JUDGING SCORE CARD

Name . . . . . Field No. . . . . .

Indicate your answer by an X in the ☐

LAND CHARACTERISTICS - PART ONE

SURFACE TEXTURE
- Sandy . . . . . ☐
- Loamy . . . . . ☐
- Clayey . . . . . ☐
- (Organic) . . . . . ☐

ORGANIC MATTER (SURFACE SOIL)
- High . . . . . ☐
- Medium . . . . . ☐
- Low . . . . . ☐

THICKNESS OF ROOTING ZONE
- Thin . . . . . ☐
- Thick . . . . . ☐
- Very Thick . . . . . ☐

MOVEMENT OF AIR AND WATER IN THE SOIL (PERMEABILITY)
- Rapid . . . . . ☐
- Moderate . . . . . ☐
- Slow . . . . . ☐

SLOPE
- A Nearly level . . . . . ☐
- B Gently sloping . . . . . ☐
- C Moderately sloping . . . . . ☐
- D Strongly sloping . . . . . ☐
- E Steep . . . . . ☐
- F Very steep . . . . . ☐

EROSION - WIND AND WATER
- None to slight . . . . . ☐
- Moderate . . . . . ☐
- Severe . . . . . ☐
- Very severe . . . . . ☐

DRAINAGE
- Poor . . . . . ☐
- Somewhat poor . . . . . ☐
- Moderately well or well . . . . . ☐
- Excessive . . . . . ☐

FACTORS DETERMINING LAND CLASS
- Texture . . . . . ☐
- Organic matter . . . . . ☐
- Thickness of rooting zone . . . . . ☐
- Permeability . . . . . ☐
- Slope . . . . . ☐
- Erosion . . . . . ☐
- Drainage . . . . . ☐

LAND CAPABILITY CLASS

I II III IV V VI VII VIII

Circle one of the above

SOIL ORDER

Alfisol	☐	Mollisol	☐
Aridisol	☐	Oxisol	☐
Entisol	☐	Spodosol	☐
Histosol	☐	Ultisol	☐
Inceptisol	☐	Vertisol	☐

CONSERVATION PRACTICES - PART TWO

VEGETATIVE

Use soil conserving and improving crops:
- ☐ 1. Every year between cash crops.
- ☐ 2. Every other year.
- ☐ 3. Two years out of three.
- ☐ 4. Three years out of four.

- ☐ 5. Contour strip cropping.
- ☐ 6. Manage crop residue.
- ☐ 7. Use sod-based rotation.
- ☐ 8. Wind strip cropping.
- ☐ 9. Use field windbreaks.
- ☐ 10. Control noxious plants.
- ☐ 11. Establish recommended grasses and/or legumes.
- ☐ 12. Manage pasture or range properly.
- ☐ 13. Protect from wildfire.
- ☐ 14. Plant recommended trees.
- ☐ 15. Harvest trees selectively.
- ☐ 16. Use for wildlife or recreational area.
- ☐ 17. . . . . .

MECHANICAL
- ☐ 18. Terrace.
- ☐ 19. Farm on the contour.
- ☐ 20. Maintain terraces.
- ☐ 21. Construct diversion terraces.
- ☐ 22. Develop waterways.
- ☐ 23. Install water control system.
- ☐ 24. Control gullies.
- ☐ 25. Subsoil.
- ☐ 26. . . . . .

FERTILIZER & SOIL AMENDMENTS
- ☐ 27. Lime.
- ☐ 28. Nitrogen.
- ☐ 29. Phosphorus.
- ☐ 30. Potassium.
- ☐ 31. One micronutrient.
- ☐ 32. Two or more micronutrients.
- ☐ 33 . . . . . .

SCORE PART I . . . . . .

SCORE PART II . . . . . .

TOTAL SCORE . . . . . .

Figure 6. Land Judging score card.

Conditions of Fields for Land Judging

A Conditions Poster at each site will give information useful in judging individual sites. An example of the poster is shown in Table 6:

Table 6. Example of a land judging conditions poster.

CONDITIONS OF FIELDS FOR LAND JUDGING
FIELD NO. _____

Assume that the following interpretations of farm records and soil tests have been made for the crop to be grown:

1. Thickness of the surface soil was _____ .
2. Other conditions are:
   _____
   _____
3. Pay no attention to current practices on this field.
4. Consider the most intensive use of the land.
5. The crop _____ (will, will not) benefit from reduction of soil acidity,
6. Phosphorus soil test is rated as _____ .
7. Potassium soil test is rated as _____ .
8. The following nutrients will be deficient: _____ , _____ ,
   _____ , _____ .

HOMESITE EVALUATION

The following information is designed to show the importance of soils and their limitations for non-agricultural purposes. While the discussion is restricted to homesites, the importance of a soil's suitability for parks and playgrounds, roads and streets, and other uses should also be kept in mind.

Many of the features used in judging soils for agricultural use will also be used in evaluating an area for a homesite.

This information will help in filling out the Homesite Evaluation scorecard shown in Figure 7.

Limitation Ratings

Soils are rated according to their limitations for specific uses. The limitations are defined as follows:

Slight limitations

Soils or locations have properties favorable for the planned use and present few or no problems.

Moderate limitations

Soils or locations have one or more properties considered somewhat restrictive for the planned use. Limitations can be overcome or modified with special planning, design, treatment, or maintenance.

Severe limitations

Soils or locations have one or more properties unfavorable for the planned use. Limitations are difficult and costly to modify or overcome for the use desired.

Very severe limitations

The soil or location has features so unfavorable for a particular use that overcoming the limitation is very difficult and expensive. For the most part, this kind of soil should not be used for the purpose being rated.

Factors Affecting Limitations

Texture (See previous discussion and definitions)

Texture refers to the texture of the surface soil. Surface texture is not considered here in relation to septic systems because such systems usually are dug below the surface.

Sandy. Slight to moderate limitations -- This soil may require stabilization with organic material and/or loamy topsoil to improve moisture and nutrient holding/supplying capacity for desired plant growth. Washing and blowing may be a problem during construction. Shrink-swell potential is low.

Loamy. Generally slight limitations -- Care should be exercised during construction to ensure that the surface soil is not covered by less desirable material. Shrink-swell potential is moderate in loamy soils **if** the clay particles are dominantly made up of montmorillonite or other smectite minerals; shrink-swell potential of all other loamy soils is low.

Clayey. Severe limitations -- Soil is sticky when wet, hard when dry, difficult to work when used for lawns, shrubs, and gardens. The soils crack when dry, swell when wet. Clayey soils have a high shrink-swell potential **if** the clay particles are dominantly made up of montmorillonite or other smectite minerals; otherwise, shrink-swell potential is moderate. Special planning and design are required for foundations.

Organic. Severe limitations -- Soil is dominated by non-mineral, organic materials that are subject to subsidence when drained.

Permeability (See previous discussion and definitions)

Permeability refers to the rate of water or air movement through the most restrictive layer in the soil, including bedrock, if present, and may be considered as internal drainage of the soil. Laterals for septic systems may be located below restrictive layers in some soils. Final design of septic systems should be based on detailed studies of permeability and of seasonally high water tables. Such investigation is an important factor in deciding between a septic tank system or a community sewage system. Soil percolation tests may be required before making final plans.

Rapid. *Soils are generally not finer than sands to fine sandy loam throughout the profile, with little if any defined structure other than being structureless (i.e., single-grained) (very little restriction to*

movement of water and air). Organic soil material (e.g., muck or peat) is generally rapidly permeable, unless compaction or some other soil feature gives cause to think otherwise. Slight limitations in use for septic tank absorption fields, or foundations and basement construction. Moderate limitations for lawns and shrubs.

Moderate. Slight limitations for all uses. *These soils generally include medium-textured loamy soils, light silty clay loam (i.e., on the coarser-textured side of the silty clay loam category), light clay loam, or light sandy clay loam with prismatic to granular or blocky structure, and have no severely restrictive layers. Weakly cemented sandy material is also included.*

Slow. Severe limitations for septic tank systems. Soils generally would be on the fine side of the loamy group, such as heavy silty clay loam to heavy sandy clay loam and clay. Strongly cemented sandy soil material has slow permeability, as does impermeable or slowly permeable bedrock. Such soils would be structureless (massive) or have platy, weakly expressed blocky, or weakly expressed prismatic structure. The cost of modification or size of filter field necessary would generally be prohibitive. Limitations would be moderate for foundations and for lawns, shrubs, and gardens.

Soil depth

This refers to the vertical depth of a soil to bedrock, such as limestone or consolidated clays, that restrict or prohibit excavations. Severity of limitations due to depth may vary greatly for different uses; therefore, Table 7 should be used as a guide for evaluation of soil depth for alternate uses.

Table 7. Guide for the evaluation of soil depth for homesite evaluation.

Adjective Rating	Depth (in)	Foundations	Lawns, Shrubs, and Gardens	Septic Systems
Shallow	0 - 19.9	Severe	Very Severe	Very Severe
Moderately Deep	20 - 39.9	Moderate	Slight	Severe
Deep	40 +	Slight	Slight	Slight

Slope

Slope refers to the steepness of the surface, or to the vertical rise or fall per 100 feet of distance, expressed in percent. Table 8 will aid in interpretation of the slope.

Table 8. Aid for the interpretation of slope.

Adjective Rating	Slope %	Foundations	Lawns, Shrubs, and Gardens	Septic Systems
Nearly level	0 - 1.9	Slight	Slight	Slight
Gently sloping	2 - 4.9	Slight	Slight	Slight
Moderately sloping	5 - 7.9	Moderate	Moderate	Slight
Strongly sloping	8 - 11.9	Severe	Severe	Moderate
Steep	12 - 16.9	Very Severe	Very Severe	Severe
Very Steep	17 +	Very Severe	Very Severe	Very Severe

Erosion (See previous discussion and definitions)

Erosion of the soil can increase the expense of landscaping. Severe gullying will impose additional limitation on septic disposal fields.

None to Slight and Moderate Erosion. Slight limitation for any use.

Severe Erosion. Moderate limitation for any use. Modification of surface or bringing in of top soil may be required for lawns, shrubs, and gardens.

Very Severe Erosion. Severe limitations; usually severely gullied, requiring much filling or leveling, extra cost on septic disposal systems, extensive modification for lawns, shrubs, and gardens. Time of development should be selected for the least erosive time of year.

Shrink-swell

Shrink-swell potential is implied in the permeability, texture, and mineralogy of a soil. Because it is important in foundation design, it should have special consideration. The most clayey layer in the profile is generally considered in relation to shrink-swell. Shrink-swell potential is not generally a factor for lawns, shrubs, and gardens.

Low shrink-swell. *Sandy soils, and those loamy soils whose clay-size particles are not influenced by smectite or montmorillonite clay. Slight limitations for foundations and septic systems.*

Moderate shrink-swell. *Loamy soils with clay particles dominated by smectite or montmorillonite minerals, and clayey soils not dominated by smectite or montmorillonite clay. Moderate limitations for foundations and septic systems.*

High shrink-swell. *Fine-textured soils having clay particles dominated by smectite or montmorillonite. Severe limitations for foundations and septic systems.*

Note: Organic soil material as defined under "Surface Texture" in the "Land Judging" portion of this circular has low shrink-swell potential. (Organic soil may be subject to "subsidence," but shrink-swell is a different phenomenon from subsidence.)

Drainage (See previous discussion and definitions)

Poor. Limitations would be severe for foundations, lawns, shrubs, and gardens and very severe for septic systems.

Somewhat poor. Limitations would be none to slight for foundations; moderate for lawns, shrubs, and gardens; and severe for septic systems.

Moderately well or well. Limitations are none to slight for foundations, lawns, shrubs, and gardens, and moderate for septic systems.

Excessive. Limitations are none to slight for foundations and septic systems, but moderate for lawns, shrubs, and gardens.

Flooding

The occurrence of flooding is a factor frequently overlooked in planning the use and management of land. Flooding may not occur on an area for many years; then a serious flood can occur. Urban development on the watershed of a small stream can increase runoff by as much as 75 percent, thus greatly increasing flood hazards. Soils may give an indication of flooding, but records must be studied to determine the true condition. Position in the landscape and proximity to nearby streams are good indicators of frequency of flooding. In contests, this is normally given information.

No flooding. Slight limitations for any use.

Occasional flooding. Less frequent than one year in five. Severe limitations for development.

Frequent flooding. Flooding is at least as frequent as one year in five. Very severe limitations for development.

Summary Table (Table 9)

Table 9. Summary of factors affecting limitations.

Characteristic		Planned Use and Interpretation		
		Foundations	**Lawns, Shrubs, and Gardens**	**Septic Systems**
Texture:	Sandy	Slight	Moderate	(No Rating)
	Loamy	Slight	Slight	
	Clayey	Severe	Severe	
	Organic	Severe	Severe	
Permeability:	Rapid	Slight	Moderate	Slight
	Moderate	Slight	Slight	Slight
	Slow	Moderate	Moderate	Severe
Depth:	Shallow	Severe	Very Severe	Very Severe
	Moderately deep	Moderate	Slight	Severe
	Deep	Slight	Slight	Slight
Slope:	Nearly level	Slight	Slight	Slight
	Gently sloping	Slight	Slight	Slight
	Moderately sloping	Moderate	Moderate	Slight
	Strongly sloping	Severe	Severe	Moderate
	Steep	Very Severe	Very Severe	Severe
	Very steep	Very Severe	Very Severe	Very Severe
Erosion:	None to slight	Slight	Slight	Slight
	Moderate	Slight	Slight	Slight
	Severe	Moderate	Moderate	Moderate
	Very severe	Severe	Severe	Severe
Shrink-Swell:	Low	Slight	(No Rating)	Slight
	Moderate	Moderate		Moderate
	High	Severe		Severe
Drainage:	Poor	Severe	Severe	Very Severe
	Somewhat poor	Slight	Moderate	Severe
	Moderately well & well	Slight	Slight	Moderate
	Excessive	Slight	Moderate	Slight

Characteristic		Planned Use and Interpretation		
		Foundations	**Lawns, Shrubs, and Gardens**	**Septic Systems**
Flooding:	None	Slight	Slight	Slight
	Occasional	Severe	Severe	Severe
	Frequent	Very Severe	Very Severe	Very Severe

How to Use the Homesite Evaluation Score Card

The Homesite Score Card (Figure 7) is available separately as IFAS Publication SL144 (http://edis.ifas.ufl.edu/SS145).

1. The total perfect score at one site is 70 points.
2. The total perfect score on Part I is 16 points. The total perfect score on Part II is 54 points (18 points for each use).
3. Part I of the score card has to do with those factors the contestant must determine about the site. With the exception of depth, shrink-swell, and flooding, the factors are similar to those for land judging.
4. After Part I is completed, determine the severity of limitations that the existing soil conditions impose on the planned uses as listed on Part II of the score card.
5. The final evaluation of the site is determined by the worst degree of limitation found for the particular planned use.
6. The contestants should be given 15 to 20 minutes to fill in the answers on their score cards on each site.
7. In order to insure that the contests are not lengthened too much by the addition of homesite evaluation, and that grading does not become too burdensome, several alternatives are possible; for example:
    a. Three land sites and one or two homesites to judge.
    b. Other.

The primary concern is to make sure that there are enough interpretative uses required to test the contestants' skills in homesite evaluation.

HOMESITE EVALUATION SCORE CARD

Name _____ Site No. _____

Indicate your answer by an X in the ☐

PART ONE CHARACTERISTIC		PART TWO	PLANNED USE AND INTERPRETATION		
		Degree of Limitation	Foundations	Lawns, Shrubs, Gardens	Septic Systems
SURFACE TEXTURE:					
Sandy	☐	Slight	☐	☐	☐
Loamy	☐	Moderate	☐	☐	☐
Clayey	☐	Severe	☐	☐	☐
(Organic)	☐	V. Severe	☐	☐	☐
PERMEABILITY:					
Rapid	☐	Slight	☐	☐	☐
Moderate	☐	Moderate	☐	☐	☐
Slow	☐	Severe	☐	☐	☐
		V. Severe	☐	☐	☐
DEPTH:					
Shallow	☐	Slight	☐	☐	☐
Moderately deep	☐	Moderate	☐	☐	☐
Deep	☐	Severe	☐	☐	☐
		V. Severe	☐	☐	☐
SLOPE:					
Nearly level	☐				
Gently sloping	☐	Slight	☐	☐	☐
Moderately sloping	☐	Moderate	☐	☐	☐
Strongly sloping	☐	Severe	☐	☐	☐
Steep	☐	V. Severe	☐	☐	☐
Very steep	☐				
EROSION:					
None to slight	☐	Slight	☐	☐	☐
Moderate	☐	Moderate	☐	☐	☐
Severe	☐	Severe	☐	☐	☐
Very severe	☐	V. Severe	☐	☐	☐
SHRINK - SWELL:					
Low	☐	Slight	☐	☐	☐
Moderate	☐	Moderate	☐	☐	☐
High	☐	Severe	☐	☐	☐
		V. Severe	☐	☐	☐
DRAINAGE:					
Poor	☐	Slight	☐	☐	☐
Somewhat poor	☐	Moderate	☐	☐	☐
Moderately well or well	☐	Severe	☐	☐	☐
Excessive	☐	V. Severe	☐	☐	☐
FLOODING:					
None	☐	Slight	☐	☐	☐
Occasional	☐	Moderate	☐	☐	☐
Frequent	☐	Severe	☐	☐	☐
		V. Severe	☐	☐	☐
FINAL EVALUATION:		Slight	☐	☐	☐
		Moderate	☐	☐	☐
		Severe	☐	☐	☐
		V. Severe	☐	☐	☐

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SCORE PART ONE .....
SCORE PART TWO .....
TOTAL SCORE .....

Figure 7. Homesite Evaluation score card.

General Rules for Land Judging and Homesite Evaluation Contests

1. Do not use bulletins, books, notes, levels, drawings, soil samples or other sources of assistance or information in the contest. It is permissible to carry a knife and a small bottle of water to moisten the soil for making a determination of surface texture.
2. Do not copy information from others in the contest.
3. There will be no talking between contestants during the time of the contest.
4. Twenty minutes will be allowed to make the placings on each field unless otherwise designated.
5. Location of the fields for the contest will not be announced before the start of the contest.
6. It is very important that you comply with the rules. Your cooperation is appreciated. Please pay close attention to guides or leaders and be prompt in following instructions.
7. *Field 1 will be the first tie breaker. The tabulators will continue in this manner with fields No. 2, 3, and 4 if necessary to break a tie. If a tie still exists after comparing scores from Fields 1 through 4, judges should either*
    - *In the case of **hand-graded** scorecards, determine the winner based on the score of **Part 1** of Field 1, **Part 1** of Field 2, etc.; or*
    - *In the case of **machine-graded** scorecards, declare a tie between individuals (and/or teams) having identical scores, and provide duplicate plaques/rosettes to these individuals (and/or teams) as soon as possible following the contest.*
8. Paid agricultural workers are ineligible to compete for prizes.
9. Decisions of the judges will be final!

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