Acreage Living

IOWA STATE UNIVERSITY
Cooperative Extension

Ruth Freeman
Greene County Extension Education Director
104 West Washington Street
Jefferson, Iowa 50129-1920
515-386-2138

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County Soil Survey

By Shawn Shouse, ISU Extension Field Specialist/Ag Engineering
Ph: 712-769-2600 - e-mail: sshouse@iastate.edu

The county soil survey can be a valuable tool for land owners and users. Rather than trying to summarize the purpose of the soil survey myself, let me quote the four paragraphs from the foreword of a recent copy of the soil survey:

This soil survey contains information that can be used in land-planning programs. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to ensure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

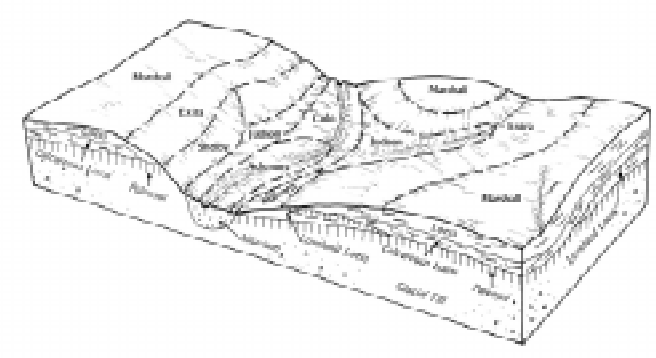
Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are shallow to bedrock. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

With that introduction, let me explain some of what you'll find in the county soil survey.

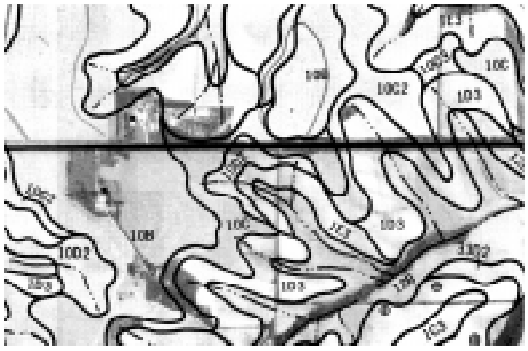
The survey begins with a general description of the county, including monthly temperatures and precipitation, and dates of first and last freezing temperatures in spring and fall.

The next section gives a description of the major types of soils (called associations), followed by detailed information on each specific soil type (called a soil map unit). The description lists the physical properties of the soil, its color, texture, and depth, along with common uses and limitations for the soil. I appreciate the way that the soil parent material and position of soil types on the landscape are shown with graphic representations like this one:



Another section includes tables listing the suitability and limitations of individual soil map units for different uses. Tables include expected crop yields and tree growth, suitability for recreational uses and wildlife habitat, engineering suitability for buildings, septic systems, road construction and ponds, and susceptibility to flooding and high water table.

All this information on soil map units is referenced to the actual soil maps. These maps are aerial photographs of the land with the boundaries of individual soil map units drawn over the top. Each 8" x 14" map covers an area of seven square miles. Here is an example of a section from one soil map. Note the two farmsteads on the north and south side of a road, and the creek in the lower right.



Each soil map unit is designated on the map with a number corresponding to the soil map unit, sometimes followed by a letter that indicates the steepness of slope, sometimes followed by a number that indicates the degree of erosion. On the example above, a 10C2 designates a Monona silt loam soil, with C slope (5 to 9 percent), and moderately eroded.

The soil survey has a wealth of information about the ground on which you live. For the techno-enthusiast, there is even a digitized electronic version – but that's a topic for a whole different article.

Modern soil surveys are available for nearly all counties in Iowa at no charge. To learn more or to obtain a copy, contact your county office of the USDA Natural Resources Conservation Service.

For web surfers, the Agronomy Department at Iowa State University has a web site with more information on soil surveys, land use, and nutrient and tillage management. This site lists the current status of Iowa soil surveys and also has information about digital soil maps. http://extension.agron.iastate.edu/soils/

ISU Extension Garden Calendar Now Available

Cindy Haynes, Horticulture Extension
(515) 294-4006, chaynes@iastate.edu

AMES, Iowa — Celebrating 25 years of garden calendars is the theme of the 2003 Iowa State University Extension garden calendar (PM 815). The full-color 12x12-inch calendar features monthly garden tips and includes a list of ISU Extension horticulture publications. For the first time the calendar is also being offered in Spanish. Calendars are available at ISU Extension county offices for $6, and from the ISU Extension Distribution Center's Web site at http://www.extension.iastate.edu/pubs/Order.html.

Reducing Damage to Trees During Construction

by Paul Wray, ISU Extension Forester
Phone: 515-294-1168 - e-mail: phw@iastate.edu

Trees and construction activities often interact nonconstructively resulting in damage and death to trees. Injury to aboveground parts of trees and its effect on the health of trees is easy to see, evaluate and avoid because of its high visibility. However, damage to the root system or the soil around the root system results in more loss and death than aboveground damage during construction. Root and soil damage is less obvious and may result in tree death or damage that is not evident for as long as 8 to 10 years.

Soils and Tree Growth

Most of the noninfectious disorders of trees in Iowa are related to the roots and the soil. Soils have physical, chemical and biological characteristics or systems that can be changed by construction activities. Ideal soils for tree growth consist of about half of its volume composed of solid matter, including mineral particles and some organic matter. The other half consists of pore spaces filled in varying proportions with air and water.

Soil texture refers to the size of individual mineral particles of clay, silt or sand. Soils with high clay content will hold more water for plant growth, yet may be more susceptible to soil compaction. Sandy soils hold less water and are less susceptible to soil compaction. Water and air movement and the ease of root growth through soils are determined by pore size, not necessarily the size of individual mineral particles. This soil structure is an indication of the degree or level to which soil particles are aggregated, creating more pore space. In general, the more structure a soil has, the more desirable it is for tree growth. Bulk density of a soil is the weight of a given volume of soil. Soil compaction increases the soil bulk density, resulting in less pore space and greater difficulty for tree roots to grow and expand.

Many of our urban soils have been disturbed. These soils are often shallow, with little soil depth, and often consist of subsoil material covered with less than 6 inches of topsoil. Root growth is often slowed by soil layers that are substantially different than the soil above or below. For example, a sandy surface soil on top of a compacted clay layer may be excessively wet at times because of poor drainage and droughty during dry periods because of poor root penetration.

Tree Roots

Tree roots are made up of large permanent roots that provide mainly anchorage and transport and many small, temporary feeder roots and root hairs. These small roots are the primary water and nutrient absorbers. They function for only 1 to 3 years and then either die or become part of the large root system. Most trees replace at least one-third of their feeder roots each year.

Tree roots do not penetrate soils to great depths. Most roots will concentrate in the top 6 to 18 inches of topsoil. Tree roots occupy a larger area than previously believed. They often extend out from the trunk in an irregular area that is 4 to 7 times larger than the area of their crown.

Minimizing Tree Damage

The surest method of minimizing damage to a root system or soil during construction is to do nothing around, in or on top of a tree's root system. Construct a sturdy fence at the outer drip line of the tree or trees to be saved and allow zero activity within this area. The larger the area of zero activity around the tree, the less damage. The more this zone is violated by construction activities, the more the tree may be damaged. Activities that damage tree roots are cutting or stripping surface soils, lowering grades, trenching, parking or operating any machinery in this area, storing supplies, filling or storing soil or excavation materials, building sidewalks and streets, creating sand or gravel piles over the roots and removing ground covers.

In most cases, zero activity in the root zone is not possible. If construction activity cannot be avoided, strive to minimize their affect on both the root system and the soil. For sidewalks, minimize any grade changes and excavation. When trenching for utilities, bore under the root system instead of cutting through roots and combine utilities in the same trench where possible. Use retaining walls as much as possible instead of complete site grading. Minimize compaction by working when soils are dry and using hand equipment instead of large mechanical equipment. When filling around a tree, make provisions for both air and water drainage and supplies or use fill material that is well drained. If possible, build structures on posts rather than footings or extensive foundations. Strive to minimize activities that cut roots or adversely affect soil characteristics.

Trees vary in their tolerances to construction damage. The ranges presented in the chart are based on my observations. In addition to species differences, the root distribution pattern for each individual tree affects its tolerance to construction. If most of a tree's roots are located away from the construction zone, it suffers minimal damage.

Tree saving practices during construction can be both time-consuming and expensive. First, make sure that the tree is worth saving; it should be a desirable species, in reasonably good health, and have a projected life expectancy of at least 20 years. In some cases, removal and replacement after construction may be the most viable alternative.

Tree Tolerance to Root Damage

Very Sensitive	**Moderately Sensitive**	**Fairly Tolerant**
Oaks	Sugar maple	Silver maple
Hickories	Black maple	American linden
Kentucky coffee tree	Ashes	Cottonwood
Larch	Walnut	White poplar
Pines	Sycamore	Willows
Serviceberry	Red maple	River birch
Redbud	Cherry	
Spruces	Hawthorn	
Firs	Ironwood	

Acreage Living is published monthly. For more information, contact your local county ISU Extension office.

Editor:
Shawn Shouse
ISU Extension FS/Ag Engineering
SW Area Extension
53020 Hitchcock Avenue
Lewis, Iowa 51544
PH: 712-769-2600

Layout & Design:
Paulette Cambridge
Office Assistant
SW Area Extension
53020 Hitchcock Avenue
Lewis, Iowa 51544
PH: 712-769-2600