# **Soils Information used in Conservation Planning (SSURGO)**

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# Overview

This article is tries to summarize how soils information in conservation planning.

## CART Soils is a decision SUPPORT

It is a tough concept to explain and there are several assumptions built in. A key assumption (built into all parts of CART, but perhaps most clearly spelled out in the soils algorithms) is that CART assumes the “worst case” scenario. That is why we chose to use most limiting factor.

The soils scripts essentially disaggregates the components in a mapunit and puts it in a giant bucket (planned land unit). It then makes a determination on that planned land unit. The aggregation is different from how we normally aggregate data such as dominant condition, weighted average, or dominant component.  What we have been doing is a dominant critical aggregation. Fields rarely are comprised of a single soil map unit with uniform topography. To ensure that the planned system is adequate for the significant parts of the field or conservation management unit, the dominant critical area needs to be identified. The dominant critical area is the area of the field that is used to represent the entire field or Planning Land Unit (PLU) for conservation plan development on that field or PLU. The dominant critical is determined at 10% of the area that meets the most limiting factor for the planned land unit. Basically, if we created an AOI for a state it would determine if for the entire state and not at the ground level.

A PLU can be designated high risk if a significant (we defined that arbitrarily as 10%, could have been 20%, whatever – best professional judgment and all that), but that doesn’t mean that the entire PLU needs the same uniform level of treatment. You put the terraces or the grassed waterway over in the steep part; you don’t go out and say that you need to terrace the entire field.

## CART – Assessment

1. Sheet and Rill Erosion
2. Wind Erosion
3. Subsidence
4. Compaction
5. Organic Matter Depletion
6. Concentration of Salts or Other Chemicals
7. Soil Organism Habitat Loss or Degradation
8. Aggregate Instability
9. Ponding and Flooding
10. Seasonal High-Water Table
11. Seeps
12. Emissions of Greenhouse Gases (GHGs)
13. Nutrients Transported to Surface Water (field sediment, nutrient, and pathogen loss)
14. Nutrients Transported to Groundwater (field loss)
15. Nutrients Transported to Surface Water (storage and handling of pollutants)
16. Nutrients Transported to Groundwater (storage and handling of pollutants)
17. Pesticides Transported to Surface Water
18. Pesticides Transported to Groundwater

## CART – Environment Assessment

Flagged for any area of the planned land unit for the following:

* Hydric Soils
* Farmland Classification (Prime, statewide importance, local importance, unique importance)
* Drainage Class (Poorly or Very Poorly Drained)

## CART – Easements

Must meet 50% or greater of the planned land unit for the following:

* Hydric Soils
* Farmland Classification (Prime, statewide importance, local importance, unique importance)
* Drainage Class (Poorly or Very Poorly Drained)

## Conservation Desktop

Nutrient Sensitive Areas Analysis - Soil Sensitivity (Nutrient Runoff)

* Nutrient Sensitive Areas Analysis – The Soil Sensitivity (Nutrient Runoff) model provides a science-based methodology, a tool and visualization for the conservationists to use with clients in Conservation Desktop. Conservationists can use this pre-planning tool and map to assist clients with a plan to reduce nutrient runoff from their operations.   Conservation planners will be able to select practices and fields to run the sensitivity analysis to help with planning alternatives. Results of the sensitivity analysis will be stored for future use within the CART assessment and ranking process.  The Conservation Products module will retrieve the results and develop a map and report and to provide to the client with information for planning practices on their operation.

**How Soil Scientist Can Help Conservation Planning:**

If there are questions, training and educational needs related to soils such as Compaction, Subsidence, Salts, Organic Matter Depletion, Aggregate Stability and Aerobic soil organisms please work with your State Soil Scientist and/or local soil scientist. A soil scientist is a person who is qualified to evaluate and interpret soils and soil-related data for the purpose of understanding soil resources as they contribute to not only agricultural production, but as they affect environmental quality.

Few people, besides soil scientists, know enough about soils, and about the interactions among the many soil characteristics that define each kind of soil and the health of the soils, to do the job by themselves. Few others have interest in all the uses and interpretations. Once a kind of soil is defined and mapped, few besides the soil scientist are concerned with all the interpretations needed, the field and horticultural crops that can be grown; the erosion hazard; the native plants and their ecological successions; how the soil will serve as subgrade for roads or foundations for buildings; and so on. Experience shows that the soil scientist must take leadership in developing the interpretations. This leadership responsibility includes getting the assistance of others, who may develop all or part of certain interpretations. Commonly, the soil scientist prepares a draft for others to react to. Responsibility to see that their work is interpreted for use is inherent in the duties of every soil scientist in the Soil Survey. –Kellogg

At the end of the day, the soils information is a is an invaluable tool to help a user plan. It can dramatically facilitate planning, preparation and help build a model in your head of what’s out there. It provides an irreplaceable tool for basic and objective based resource planning. However, the user cannot just rely on the output from a computer. They must verify and validate of what is out there on the ground and plan.

Soils provide the basic information needed to make decisions about land management, including those operations that must be combined for satisfactory soil performance. For example, soil survey information is useful in planning, designing, and implementing an irrigation system for a farm. A knowledge of the characteristics of the soil helps in determining the run length, water application rate, soil amendment needs, leaching requirements, general drainage requirements, and field practices needed to maintain optimal soil conditions for plant growth. Sandy soils will indicate weaker aggregate stability or steeper slopes might indicated a greater chance or organic matter depletion. Therefore, conservation planning might require more practices for those land units that show those resource concerns.

**Things Soil Scientist Can Do To Provide Technical Assistance:**

1. The soil scientist can provide this training. Planners also need to consider land variability for erosion and topographic features, differences in texture and organic matter content, and any potentially high-risk areas, such as areas where the water table is high or areas where the soils have a high infiltration rate and leaching hazard.

1. Soil scientists are trained in soil fertility and nutrient dynamics and can assist with sampling and with reviewing the analysis of samples from waste lagoons, manure, and soils. Proper sampling procedures for all sources should be communicated to planners and producers so that representative data are used for the comprehensive nutrient management plan.
2. *Farm and Ranch Inventory and Planning.* The soil scientist can work with planners to assist land users in the implementation of conservation systems and in complying with provisions affecting highly erodible land and wetlands. The purpose of conservation systems is to improve soil and water quality and improve cropland, pasture, and rangeland conditions for sustainable production.

1. During the inventory and planning steps, a trained soil scientist can identify resource concerns that another planner might not recognize. Indicators of poor infiltration, degraded structure, erosion, low content of organic matter, acidification, salinization, compaction, and evidence of a water table (saturation) are some of the characteristics that conservation planners can be trained to recognize. In some complex landscapes, field verification of the soils may be necessary to ensure that the correct soil property values are being used.

1. Soil scientists should play an integral part in soil quality determinations and in training field office personnel to identify soil health indicators and concerns and the management practices needed to address them.

1. The soil scientist can also aid in developing locally adapted conservation tools, such as (1) automated spreadsheets that will assist the planner in using soils information to make planting recommendations for grass (forage) and trees and (2) automated risk assessment tools for the development of comprehensive nutrient management plans using local soil legends and interpretations. Although automated spreadsheets can increase efficiency, the planner should have the knowledge and skills necessary for determining and describing the appropriate soil properties and characteristics.

1. A soil scientist understands use-dependent properties and how changes can occur in the soil with different management practices. Below-ground investigations of the soil food web, infiltration, compaction, and bulk density address some of the indicators that can be taught to field office personnel. Understanding and teaching dynamic soil properties and how they can be improved by management practices can be important roles for the soil scientist. The soil scientist needs to work with field offices to identify the need for any new interpretations or for revisions to existing interpretations.