USDA United States Department of Agriculture

Natural Resources Conservation Service

Soil Science Division
Dynamic Soil Properties

Soil Survey Dynamic Soil Property (DSP) Enhancement Project

The Soil Science Division is currently ==supporting== MLRA Soil Survey Office projects to collect and utilize DSP data to enhance soil survey products and information. Dynamic soil properties (DSPs) are properties that change with land use, management, and disturbance over the human time scale (decades to centuries). The ultimate goal of DSP projects is to provide comprehensive information about the impact of land use and management on all soils in the U.S. to inform conservation planning and other resource and land management policies, priorities, and field activities. Enhanced information from DSP projects will support soil health and resource management by linking management and land use conditions with soil survey products.

DSP Vision

Deliver scientifically-defensible soil change information to support

Conservation management for healthy soils and sustainable ecosystems

DSP Projects

It is not practical to collect DSP data on all soil components under all relevant conditions (states, management systems etc.). However, DSP products need to be locally and regionally extensive. In order to do this, MLRA projects should use the ecological hierarchy and benchmark soil lists to organize projects and extrapolate results. In order to be useful and shareable, DSP data must be collected and organized in such a way that it can be linked to corporate soil survey databases and infrastructure. To make full use of enhanced DSP information, new methods of data sharing are being developed.

Design of DSP projects (including planning, sample collection, and analysis) is given in Chapter 9 of the Soil Survey Manual.

DSP projects are one kind of MLRA project and can be used to meet multiple objectives. Flexibility is given to meet local NRCS conservation and soil survey needs.

Products of DSP projects

Soil properties and observations with known condition and land management information

Those products can be used to:

- **Improve Soil Condition Assessment**
  - Provide baseline and potential values for soil health assessment
- **Answers to Conservation Questions**
  - Compare individual practice impacts for given soils or conditions
- **Enhanced Understanding of Conservation and Change**
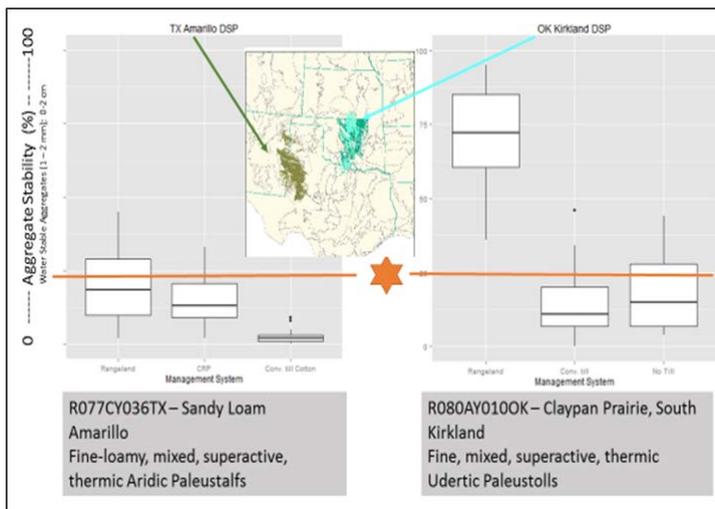 - Improve calibration and validation of conservation effects models

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Detailed DSP Example:

As part of the Dynamic Soil Property program, the Soil Science Division is collecting data on groups of soils called ecological sites under different states or management systems. Traditional soil survey only provides a representative value, typical of the soil with the most common land use; the DSP program looks to differentiate possible properties by common management systems and native or reference conditions. The figure provides an example of using DSP results in such a scenario.

R077CY036TX – Sandy Loam Amarillo
Fine-loamy, mixed, superactive, thermic Aridic Paleustalfs

R080AY010OK – Claypan Prairie, South Kirkland
Fine, mixed, superactive, thermic Udertic Paleustolls

The rancher's sample is represented by the star, with 25% aggregate stability. The interpretation of that value depends on the kind of soil. In a sandy Amarillo soil, 25% is very good for any land use. In a Kirkland soil, 25% is good for a tilled soil, but is far below a typical rangeland. The rancher on a Kirkland soil should evaluate their management plan and consider applying conservation methods to avoid rangeland degradation and a loss of forage production.

NRCS partners include:

Agriculture Research Service

U.S. Forest Service

Bureau of Land Management

National Park Service

Soil Health Partnership

Soil Health Institute

National Cooperative Soil Survey – Universities and Colleges