Modernizing the Soil Survey of the United States

Micheal Golden
Director, Soil Survey Division

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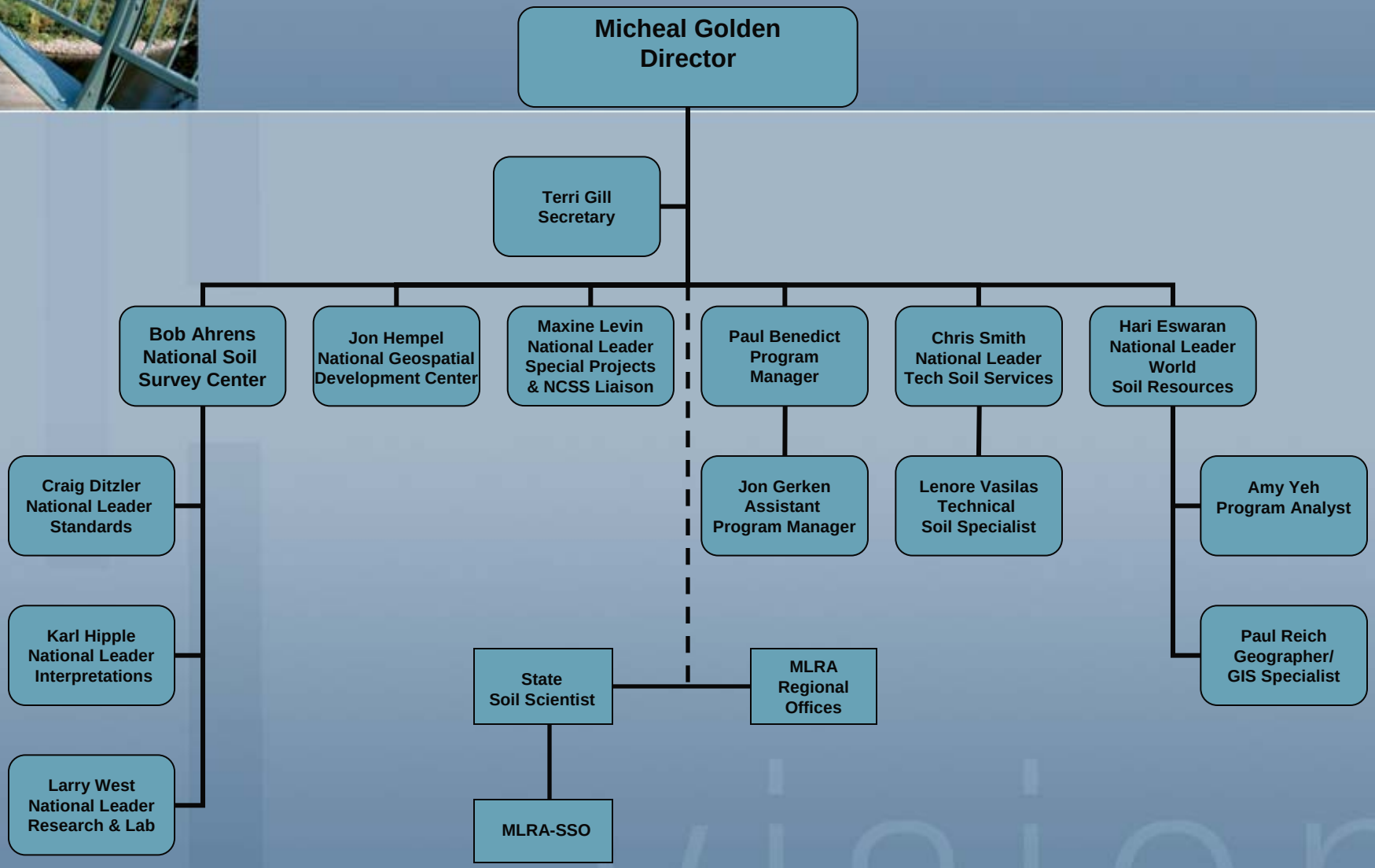
Soil Survey Division



Legislated 4 Core Mission Functions

Congress Has Directed The Secretary Of Agriculture To:

Make an Inventory of the Soil Resources of United States & Territories

Keep the Soil Survey Current & Relevant to Ever Changing Needs

Make Interpretations of the Information and Make it Available in Useful form

Promote the Soil Survey and Provide Technical Assistance "Soil Marketing"

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Soil Survey Division Priorities

- Continue MLRA Restructure Plans
  - Establish Remaining Offices
  - Staff with Soil Scientists
- Continue Technology Development
  - Enhance Web Soil Survey 2.2
  - Enhance NASIS 6.x
  - Enhance SRITB
- Accelerate Initial Soil Surveys

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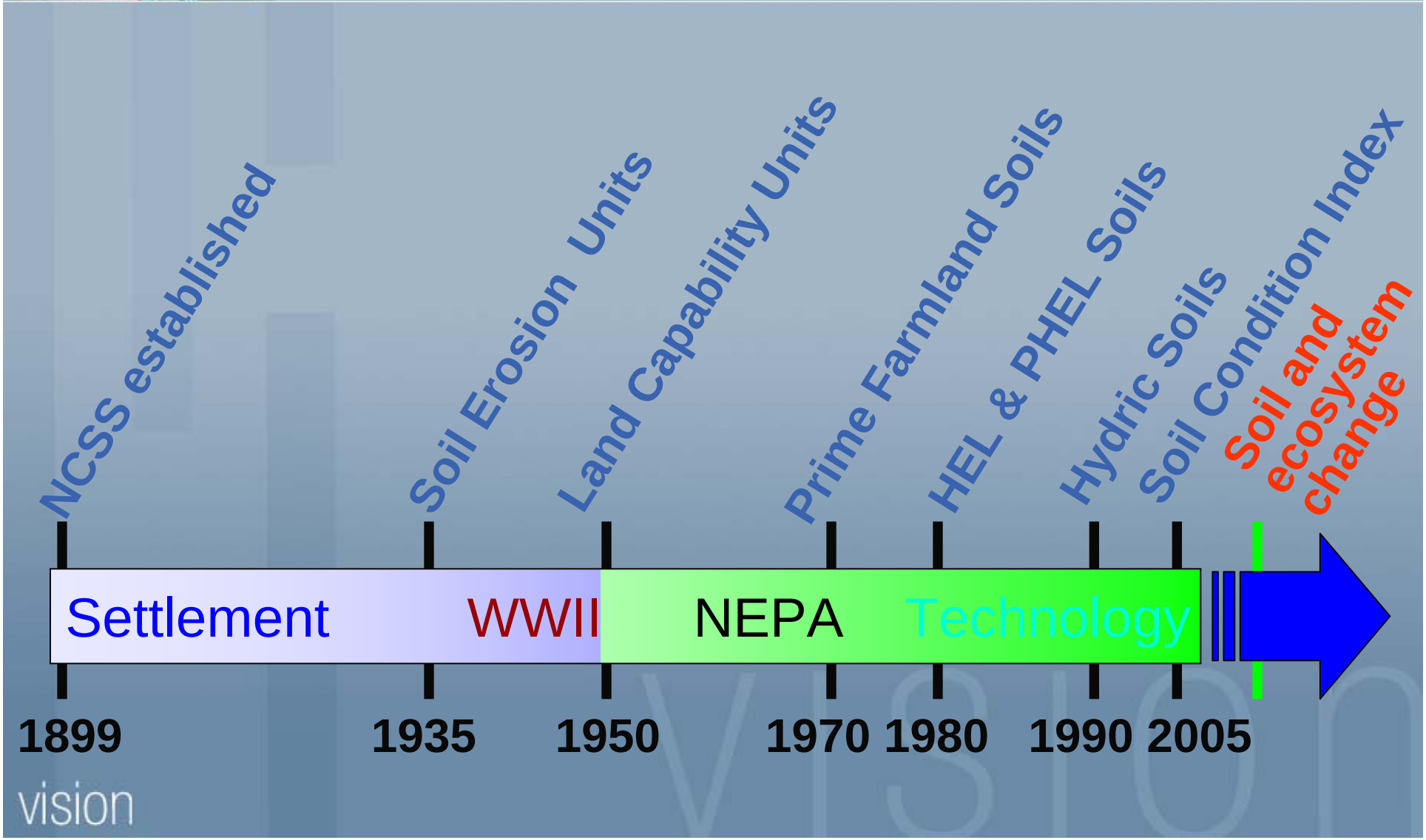
100+ Years of Meeting Customer Needs



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The Old Soil Survey Structure

- 255 **Temporary** Soil Survey Project Offices
- 175 Offices had 1-2 Soil Scientists
- Offices and Staff Moved Every 3-5 Years
- 3,000 Separate County Soil Survey Subsets

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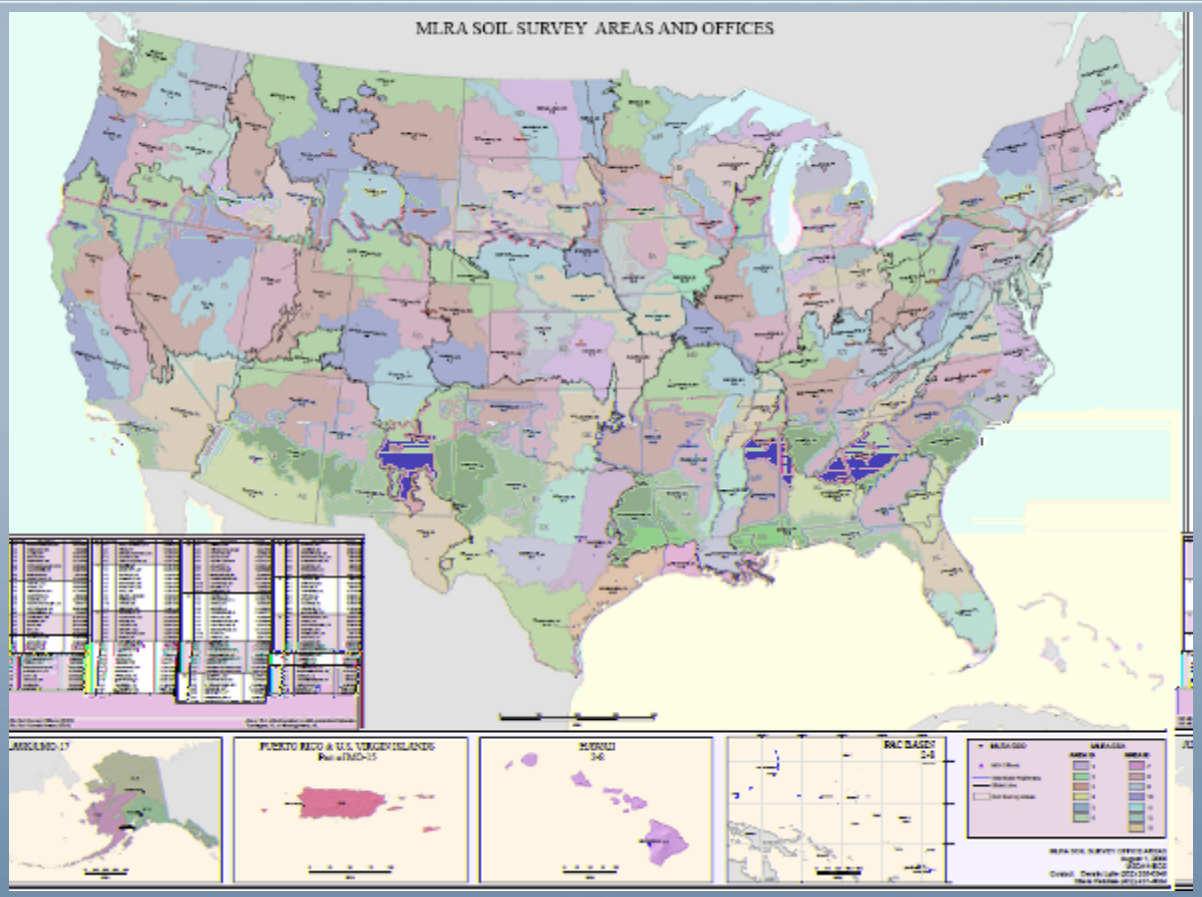
Soil Survey Restructure

- Stability
  - MLRA Soil Survey Restructure
    - Based on Major Land Resource Areas
    - Similar Soils, Climate, Geology, Land Use
  - Each Area Consists of 15 million Acres (average)
  - Soil Scientists Becomes the Expert on Soils in Area
  - Geographic Structure for "***Update***" of Spatial and Tabular Soil Data

Soil Survey Restructure

Stability

- **18 MLRA Soil Survey Region Offices**
- **146 MLRA Soil Survey Areas**
- **3 Year Transition 2007-2009**



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MLRA Soil Survey Staffing

Stability

146 MLRA Soil Survey Areas

(113 Offices in Place)

- Current = 77%
- Sept 2008 (+9) = 84%
- Sept 2009 (+20) = 98%
- > FY09 (+ 4) =100%

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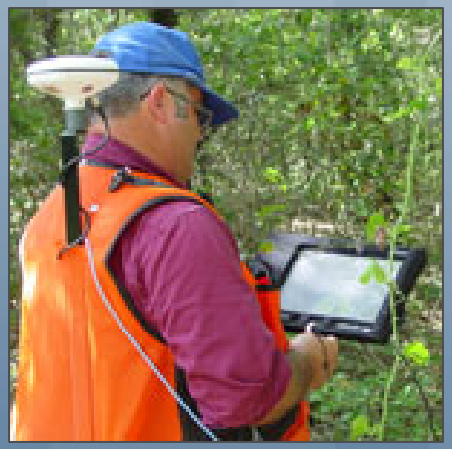
Building on Technology

Efficiency

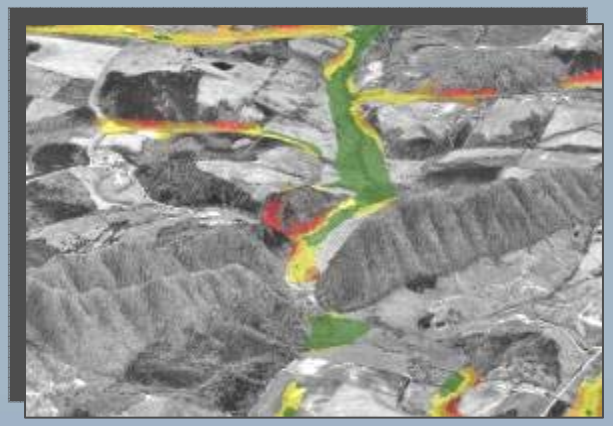
- Emphasis on ***Enhancing*** existing Soil Data
  - High End Geospatial Workstations that will handle geospatial processing
  - Rugged Outdoor Viewable, GPS enabled Field Tablet Computers



Building on Technology

Efficiency

- **Utilize New Technologies**
  - Complete the Initial
  - Accelerate the Update



- **“Soil Resource Inventory Tool Box ”**
  - **PEDON PC** Spatial Analysis Tools
  - **ARCMAP** Editing Tools
  - **Quality** Assurance Tools

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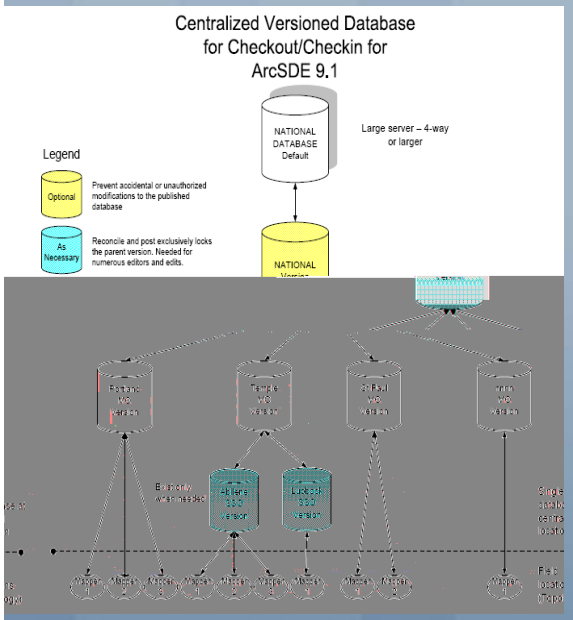
MLRA Soil Survey



- Spatial Integration to NASIS
  - **Current system is** separated into distinct tabular (NASIS) and spatial (SSURGO) databases
  - **The NSGD will combine** the tabular and spatial databases
- Soil Survey Schedule
  - Goals and Progress Reporting
  - Check Out - Check In NGDB
  - By MLRA Project Plan

MLRA Soil Survey

Long Range Plan

- Entire MLRA Soil Survey Area
- Prioritize Projects

Project Plan

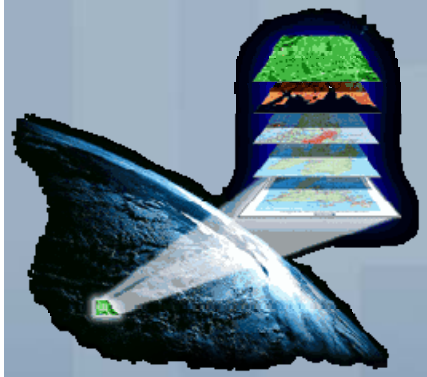
- Identify Activities

Annual Plan

-

Soil Survey Advisory Groups

Looking to the Future



- Soil Business Area Analysis Group
- Federal Lands Advisory Group
- NCSS University Advisory Group
- State Conservationist Advisory Group
- Soil Interpretation Advisory Group
- Soil Science Society Association (SSSA) S-5 Digital Soil Mapping Committees

Current Status

- 3,000 Separate Soil Surveys Areas Digitized
- NASIS - Soil Data Management System
- Soil Data Mart – Storehouse of Official Data
- Web Soil Survey – Delivery to Public
- 18 MLRA Soil Survey Region Offices - QA
- 146 MLRA Soil Survey Offices – QC
- Soil Database has 1 Representative Value for each soil property *NOT* based on land use

NCSS Research Opportunities

- Digital Soil Mapping
- Decision Support Systems
- Customer Driven Interpretations
- Soil Quality Measurements
- Dynamic Soil Properties
- Hyper-Spectral Imagery
- Better Ksat Methods

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NCSS Federal Partner Needs

- USFS
  - Initial 37 M Acres
  - Update 23 M Acres
- BLM
  - Initial 24 M Acres
  - Update 33 M Acres
- FWS
  - Initial 5 M Acres
  - Update 90 M Acres (Mostly AK)
- NPS
  - Initial 60 M Acres

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MLRA Soil Survey "Project Plan"

- Be a Scientist
- Involve NCSS Cooperators
- Utilize NSSC Liaisons
- Will Not "Walk ALL The Land"
- Will Enhance Current Soil Survey
- Clean up/Edit Topology

Future

- Content Manager
  - Author Text
  - Historical Soil Surveys
  - Historical Papers
  - Research Projects
- Local Lab Standards
  - Standard Lab Procedures – Larry West

Goal – Healthy & Productive Lands

Conservation Programs

Technical & Financial Assistance

Status & Trends of Resources

Resource Inventory

Soil Survey

Location & properties of soils

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Current situation

- Soil survey products do not adequately address Changes to the Soil - During the Human Time Scale
  - Soil properties under different management conditions are not addressed in standard soil survey information

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Soil Health

1) Soil Contamination
   - Point sources - landfills, mine tailings, chemical spills
   - Non-point sources - Atmospheric deposits of heavy metals
2) Soil Erosion
   - Loss of topsoil
3) Decline in Organic Matter
   - Contributes to atmospheric CO2, degrades ability of soil to function (lower CEC, water holding, crusting, etc.)
4) Soil Sealing
   - Covering the soil with pavement, buildings, etc (Urban Land)

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Soil Health

5) Soil Compaction
- From machinery, animal trampling, etc,
- Lowers infiltration, increases runoff, hinders rooting, etc.

6) Decline of Soil Biodiversity
- Loss of earthworms and other organisms such as bacteria, fungi, beneficial nematodes, etc
- Adversely impacts soil health and function

7) Salinization
- From irrigation practices leading to saline and/or sodic soils

8) Floods and Landslides
- As impacted by land use decisions and soil degradation

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Soil Change Vision

Enhance National Cooperative Soil Survey Data and Products with Information About How Soils Change

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Future Soil Survey

- Develop National Geospatial Data Base
  - Join 3,000 Separate SSURGO Layers
- Goals and Performance linked to Soil Survey "Projects" identified in 146 SSO's <u>Long Range Plans</u>
- Accomplishments linked to Update of Soil Series by Geographic Area
- Emphasis on Soil Quality/Health

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Soil Survey Program Plan 2005-2015

- Emphasis on Benchmark Soils
  - Important soils with
    - Economic Importance
    - Ecological Importance
    - Specialty Crops
    - Engineering Purposes
  - About 1400 Benchmark Soils in USA
  - Complete Soil Lab Characterization
  - Collect Near Surface or Dynamic Soil Properties Based on Land Use

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Dynamic Soil Properties

Soil Quality Field Test Kit

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Dynamic Soil Properties

Prototype Soil Carbon Field Test Kit

Designed to Estimate the Biologically Active Fraction of Soil Carbon

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Summary

- Soil Change on the Human Time Scale is an Emerging Concept for Soil Survey
- Start Collecting Dynamic Soil Properties
- Interpretations Will Emphasize Management Effects on Soil Functions
- Start to Measure and Identify Soil Quality

Implementing The "New" Soil Survey

WILL

- Provide Stability by Establishing Permanent MLRA Soil Survey Offices
- Use New Technologies to enhance our Efficiencies & Knowledge of Landscapes
- Use Web Soil Survey to Deliver our Information to Customers
- These will Prepare us for the:

"New Frontiers in Soil Survey"

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Thank You

Questions ???

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