Planning The “New” Soil Survey
Building on Technology

Micheal L. Golden
Director, Soil Survey Division
USDA-NRCS

National Cooperative Soil Survey
Conference
Madison, Wisconsin
June 5, 2007
Planning The “New” Soil Survey
- Building on Technology

- Soil Survey of the Future
  Predict and display spatial distribution of components within polygons on the landscape.

- Benchmark Landscape Catena’s
  Utilize what we have learned the last 100+ years by improving the spatial and tabular data to digitally join lines and fill in data gaps and voids in soil database.
Planning The “New” Soil Survey – Building on Technology

- **Stability Goals**
  - A More Balanced Soil Survey Program where Soil Maps, Soil Data, and Soil Interpretations will be Maintained and Enhanced while Expanding Technical Soil Services.
  - Accelerate funding ($35 M) to Complete the Initial Soil Survey on Non-Federal and Native American and Tribal Lands within 5 Years.
  - Paperless Soil Survey Program.
Total Soil Survey Acres Mapped
(millions of acres)

<table>
<thead>
<tr>
<th>Year</th>
<th>Acres</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>22.6</td>
</tr>
<tr>
<td>2003</td>
<td>22.5</td>
</tr>
<tr>
<td>2004</td>
<td>27.6</td>
</tr>
<tr>
<td>2005</td>
<td>31.9</td>
</tr>
<tr>
<td>2006</td>
<td>32.0</td>
</tr>
<tr>
<td>2007</td>
<td>34.0</td>
</tr>
</tbody>
</table>

Goals
## Soil Survey Status

<table>
<thead>
<tr>
<th>Land Owner</th>
<th>Total Acres</th>
<th>AcresMapped</th>
<th>Acres Remaining to Map</th>
<th>Acres in FY 05</th>
<th>%Left</th>
<th>Yrs Left</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLM</td>
<td>260,630,902</td>
<td>223,008,902</td>
<td>37,622,000</td>
<td>832,313</td>
<td>14%</td>
<td>45</td>
</tr>
<tr>
<td>USFS</td>
<td>192,730,805</td>
<td>134,713,302</td>
<td>58,017,503</td>
<td>575,328</td>
<td>30%</td>
<td>101</td>
</tr>
<tr>
<td>NPS</td>
<td>73,366,967</td>
<td>64,593,281</td>
<td>8,773,686</td>
<td>123,296</td>
<td>12%</td>
<td>71</td>
</tr>
<tr>
<td>Other Federal</td>
<td>118,310,239</td>
<td>108,108,597</td>
<td>10,201,642</td>
<td>325,512</td>
<td>9%</td>
<td>31</td>
</tr>
<tr>
<td>Native American</td>
<td>93,522,644</td>
<td>77,250,361</td>
<td>16,272,283</td>
<td>1,166,579</td>
<td>17%</td>
<td>14</td>
</tr>
<tr>
<td>Non-Federal</td>
<td>1,535,373,931</td>
<td>1,489,663,384</td>
<td>45,710,547</td>
<td>3,241,686</td>
<td>3%</td>
<td>14</td>
</tr>
<tr>
<td>Totals</td>
<td>2,273,935,488</td>
<td>2,097,337,827</td>
<td>176,597,661</td>
<td>6,264,714</td>
<td>8%</td>
<td>28</td>
</tr>
</tbody>
</table>
Planning The “New” Soil Survey
- Building on Technology

- Stability
  - MLRA Soil Survey Restructure
    - Based on MLRA Geographic Areas
  - 144 Permanent Soil Survey Offices
    - From 255 Offices (175 Offices had 1-2 SS)
  - Geographic Structure for “Update” of Spatial and Tabular Soil Data
Stability

- 18 MO Region Leaders & Senior Regional Soil Scientist
- 146 MLRA Soil Survey Areas & MLRA Soil Survey Leaders
- 3 Year Transition
Planning The “New” Soil Survey – Building on Technology

Stability

144 MLRA Project Offices
(Today 97 Offices in Place)

- By end of FY07 + 8 More = 73%
- FY08 +14 More = 83%
- FY09 +14 More = 92%
- FY10 & Beyond + 11 More = 100%
Planning The “New” Soil Survey – Building on Technology

Stability

146 MLRA Soil Survey Leaders GS-12
(Today 77 MLRA Leaders in Place)

- By End of FY07 + 25 More = 70%
- FY08 +13 More = 79%
- FY09 + 11 More = 86%
- FY10 & Beyond + 20 More = 100%
Planning The “New” Soil Survey – Building on Technology

Stability

18 MLRA Senior Regional SS GS-13
(Today 5 Regional Positions in Place)

- By End of FY07 + 7 More = 66%
- FY08 & 09 +2 More = 78%
- FY10 & Beyond + 20 More = 100%
Planning The “New” Soil Survey – Building on Technology

Efficiency

- Emphasis on **Enhancing** existing Soil Data
  - Provide High End Geospatial Workstations
  - Provide Viewable Field Tablets
- Develop One “National Geospatial Database”
Planning The “New” Soil Survey – Building on Technology

Efficiency

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

- Deploy “Soil Resource Inventory Tool Box”
  - PEDON PC
  - Soil Landscape Predictive Models
  - Pre-Mapping Tools
  - Series Extent Tool
  - Landscape Analysis Tools
Planning The “New” Soil Survey – Building on Technology

Efficiency

- Develop Work Plans
- Long Term Plan
  - Covers Whole Geographic Area
  - Identify Multiple Project areas
  - Prioritize Projects
- Project Plan
  - Covers 1-5 years of work
  - Include Special Studies & Sampling
- Annual Business Plan
  - Covers what will be done each year and by who
Planning The “New” Soil Survey – Building on Technology

Opportunities

- Mapping Details
  - 38 Volunteered (27 selected)
- Hiring of New Soil Scientists
- NCSS Partners
  - Develop Research Projects
Planning The “New” Soil Survey – Building on Technology

Where will New Employees Come From?

Why would they work for the Government?

- 47% - Helping people to make a difference
- 26% - Having good Pay and Benefits
- 15% - Serving your Community or Country
- 11% - Having Job Security
- 1% - Not Sure
# Retirement Projections by Mission Critical Series

<table>
<thead>
<tr>
<th>SERIES</th>
<th>DESCRIPTION</th>
<th>TOTAL</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>0454</td>
<td>Rangeland Mgt</td>
<td>92</td>
<td>-1</td>
<td>-8</td>
<td>-8</td>
<td>-6</td>
<td>-11</td>
<td>-7</td>
</tr>
<tr>
<td>0457</td>
<td>Soil Conservation</td>
<td>2096</td>
<td>-134</td>
<td>-148</td>
<td>-160</td>
<td>-157</td>
<td>-178</td>
<td>-185</td>
</tr>
<tr>
<td>0458</td>
<td>Soil Con Tech</td>
<td>613</td>
<td>-35</td>
<td>-45</td>
<td>-51</td>
<td>-52</td>
<td>-46</td>
<td>-59</td>
</tr>
<tr>
<td>0470</td>
<td>Soil Science (field)</td>
<td>526</td>
<td>-42</td>
<td>-42</td>
<td>-49</td>
<td>-47</td>
<td>-36</td>
<td>-36</td>
</tr>
<tr>
<td>0471</td>
<td>Agronomy</td>
<td>80</td>
<td>-7</td>
<td>-4</td>
<td>-9</td>
<td>-9</td>
<td>-2</td>
<td>-2</td>
</tr>
<tr>
<td>0802</td>
<td>Civil Eng Tech</td>
<td>276</td>
<td>-22</td>
<td>-22</td>
<td>-29</td>
<td>-15</td>
<td>-23</td>
<td>-26</td>
</tr>
<tr>
<td>0810</td>
<td>Civil Engineering</td>
<td>289</td>
<td>-16</td>
<td>-15</td>
<td>-14</td>
<td>-23</td>
<td>-25</td>
<td>-23</td>
</tr>
<tr>
<td>0890</td>
<td>Ag Engineering</td>
<td>71</td>
<td>-4</td>
<td>-9</td>
<td>-4</td>
<td>-5</td>
<td>-5</td>
<td>-4</td>
</tr>
<tr>
<td>1102</td>
<td>Contracting</td>
<td>52</td>
<td>-4</td>
<td>-5</td>
<td>-4</td>
<td>-3</td>
<td>-6</td>
<td>-6</td>
</tr>
</tbody>
</table>

* Represents actual retirements by year, not cumulative
Planning The “New” Soil Survey – Building on Technology

Efficiency

- Accessibility On-Line
  - “Web Soil Survey”
    - 2800 Spatial
    - 3000 Tabular
    - 660 Manuscripts
    - Generated Interpretations
Web Soil Survey Usage

Efficiency

- **Visits**
  - Over 1.5 million total since 8/05
  - Over 100,000 visits per month
  - Up to 5,000 visits per day

- **Hits**
  - Over 310 million hits since 8/05
  - 30 million hits per month
Planning The “New” Soil Survey – Building on Technology

Looking to the Future

- Soil Business Area Analysis Group
- Federal Lands Advisory Group
- NCSS Advisory Group
- State Conservationist Advisory Group
- Soil Interpretation Advisory Group
- NCSS and SSSA S-5 Digital Soil Mapping Committees
Planning The “New” Soil Survey
– Building on Technology

Benchmark Landscape Catena's
- Dynamic Soil Properties
- Subaqueous soils
- Investigation Plans
  (Study and Research)
Planning The “New” Soil Survey – Building on Technology

Dynamic Soil Properties

- Provide information on how soils change
  - Productivity
  - Sustainability
  - Environmental impacts

Dynamic soil properties change on the human time scale.
Planning The “New” Soil Survey – Building on Technology

**WILL**

- Use Web Soil Survey to Deliver our Information to Customers
- Use New Technologies to enhance our Efficiencies & Knowledge of Landscapes
- Provide Stability by Establishing Permanent Soil Survey Offices
- These will Prepare us for the: 
  
  “New Frontiers in Soil Survey”
Thank You!
Thank You!
Identified Priorities

- FS, BLM, NPS, DOD, & BIA Lands
  - Soil Mapping
  - Data Base Population
  - Correlation to Standards
  - Digitizing to Standards

- Develop Joint Plan for Completing areas
  - Leverage Funding/Resources
NCSS Conferences

2005 NCSS National Conference
- Corpus Christi, Texas

2006 NCSS Regional Conferences
- New Jersey, Utah, North Dakota, and Oklahoma

Recommendations
- Utilize Open File Reports
- New Standing Committee
  “NCSS Interpretations Committee”
NCSS Conferences

Standing Committees

- Standards/Soil Taxonomy
  - National Soil Handbook enhancements
- New Technology
  - Partnership in development & testing
- Research Needs and Priorities
  - NCSS Soil Pedon Database
The “New” Soil Survey

Efficiency

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

- Soil Resource Inventory
  "Tool Box"
  - PEDON PC (Data Collection)
  - Soil Landscape Predictive Models
  - Pre-Mapping Tools
  - Landscape Analysis Tools
Planning The “New” Soil Survey – Building on Technology

- NASIS 5.4 June 2007
- NASIS 6.0 Spring 2008
Planning The “New” Soil Survey – Building on Technology

Sampling Guide for Dynamic Soil Properties

draft

- Soil change
- Sampling design
- Statistics for quality assurance
- Sample methods (soil and vegetation)
- Data analysis
Planning The “New” Soil Survey – Building on Technology

- Soil Resource Inventory Toolbox
  - Field Data Collection
- Mobile Data Collection and Revision
  - National Geospatial Database
- Soil Landscape Predictive Models
  - SoIL M, PURC, RASP, TEUI
- Elevation Data
  - 10M, LIDAR, IFSAR
The “New” Soil Survey

“Web Soil Survey”

- 2,800 Spatial Layers
- 3,000 Tabular Layers
- 660 Manuscripts
- Generated Soil Interpretations