Soil Science Functions and Services…

David Lindbo
Director, Soil Science Division

& the Role of the Soil Science Division

David Lindbo
Director, Soil Science Division

…after 10 weeks on the job

Why Soils?
Do we need to know about them?

Consider this…

• You are marooned
• No vegetation present
• You have water (of a sort)
• You have a few merger tools etc.
• You have some food but not enough until you can be rescued (hopefully)
• You have seeds

What type of scientist do you want to be?

A soil scientist of course!

But why?

• Soils are essential for food production
• Proper soil fertility enhances plant growth
• Healthy soils mean healthy food
• Soil properties relate to several factors
• Location of the best soils can be predicted
Soils Affects Everyone

- Agriculture
- Forestry
- Rangeland
- Human Health
- Soil Security
- Urban
- Art and Culture

Mission

Provide leadership and service to produce and deliver scientifically-based soil information to help society to understand, value, and wisely manage global resources

National Soil Survey Handbook

Congressional Mandate

- Inventory of the soil and vegetation resources (ecology)
- Make soil maps
- Analyze soil survey data
- Interpretive soil information
- Provide a form useful to a wide range of customers
- Keep soil survey relevant

What we do

- Inventory
  - Initial Surveys
  - Ecological Site Descriptions
- Make Maps
  - County
  - National
  - Global
- Analyze
  - Dynamic Soil Properties
  - Phosphorous behavior in soils
- Interpret
  - Soil CarbonScapes
  - Drought/ground water relations
- …in a useful form
  - Web Soil Survey
  - NASIS
- Keeping it relevant
  - Soil Data Join
  - Recorrelation
  - Update mapping

Has this mandate changed?
Has this mission changed?
Is it still relevant?
Simply put we...

- Inventory & Map
- Analyze & Interpret
- Provide a useful form
- Keep it relevant

So, we are done?

Where are we headed?
&
How do we get there?

Inventory & Maps

Initial Mapping Status

<table>
<thead>
<tr>
<th>Land Manager</th>
<th>Total Acres</th>
<th>Acres Mapped</th>
<th>Total Mapped</th>
</tr>
</thead>
<tbody>
<tr>
<td>Native American Lands</td>
<td>108,998,542</td>
<td>63,354,237</td>
<td>58.1%</td>
</tr>
<tr>
<td>BLM – Bureau of Land Management</td>
<td>229,734,213</td>
<td>208,971,745</td>
<td>91.0%</td>
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<tr>
<td>FS – Forest Service</td>
<td>196,679,815</td>
<td>140,801,970</td>
<td>71.6%</td>
</tr>
<tr>
<td>NPS – National Park Service</td>
<td>76,001,507</td>
<td>66,260,860</td>
<td>87.2%</td>
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<tr>
<td>Other federal lands</td>
<td>114,408,729</td>
<td>102,218,367</td>
<td>89.3%</td>
</tr>
<tr>
<td>Non-federal lands</td>
<td>1,574,094,114</td>
<td>1,536,421,156</td>
<td>97.6%</td>
</tr>
<tr>
<td>TOTAL</td>
<td>2,337,215,506</td>
<td>2,153,074,971</td>
<td>92.1%</td>
</tr>
</tbody>
</table>
Initial Survey Considerations

- Order 2 = 35,000 acres per FTE
- Order 3 = 55,000 acres per FTE
- Order 3+ = 100,000 acres per FTE (West region)

Considerations

- Assume mapping rate is 100,000 ac/FTE
- SSD has about 80 FTEs available for initial mapping;
  - 80 FTEs can map 8 million acres/yr
  - 184,140,535 acres remaining…
  - …23 years to complete the initial inventory

Continual Updates

- Use soil systems approach effectively
- Critical areas
  - Urban
  - Subaqueous
  - Soil Biology/Soil Health/Soil Carbon
- Use technology to identify areas of need
  - LiDAR
  - DSM
  - Etc.

Needs to know

- Soil Health (w/ Soil Health Division)
  - Soil Health Monitoring and Enhancement Network
- Ecological and Agriculture Site Descriptions (State and Transition)
  - Forests (east and west)
  - Rangeland
  - Agricultural Conservation Practices
- Soil Systems
- Data mining (let’s not reinvent the wheel)
- Measured and predicted data

Analysis & Interpretation
Relevance

Big Data and Interactivity

- Update Web Soil Survey
- Evaluate interface
  - User friendly and accessible data
  - New data bases
    - Pedon description parameters
    - Biological properties
    - Data mining

“The times they are a changing”

- Soil Health
- Soil Security
- Urban Soils
- Coastal and Subaqueous Soils
- Terraforming????

- “Selling” what we do – Public Relations
Coastal Zone Soil Survey

Coastal zone soil surveys include nearshore or subaqueous soils, along with adjacent terrestrial soils including upland tidal marshes or barrier beaches.

Partnerships

- National Cooperative Soil Survey (NCSS)
  - Clear roles
  - Greater involvement
  - Two-way communication
  - Funding
  - Strategic Plan
- Federal Lands Advisory Group (FLAG)
- Private Sector

Who uses the information?

- Conservationists
- Planners
- Farmers
- Geoscientists
- Modelers
- Engineers
- Private Citizens
  - …and on

Connectivity/Communication

- Internal
  - Field ↔ Center
  - All ↔ NHQ (the DC folks)
- External
  - NCSS ↔ NRCS-SSD
  - FLAG ↔ NRCS-SSD
  - USGS, EPA etc. ↔ NRCS-SSD
  - Private Sector ↔ NRCS-SSD

Mission (draft)

Provide scientifically-based soil and ecosystem information
Vision (draft)
A world where soil is more important than oil

Summary
- Work smarter with technologies
- Update and improve constantly
- Expand data collection
  - Soil Health & Soil Biology
  - Ecological Site Descriptions
  - Agricultural Site Descriptions
  - Climate Issues
- Work closer with cooperators/partners
  - Source of ideas
  - Test new procedures
  - Provide data for big ideas

Questions?

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