



National Park Service Soil Resources Inventory

Pete Biggam

Natural Resources Program Center

Denver, Colorado



Field Mapping Complete

Denali NP

Grand Canyon NP

Lake Mead NRA

Santa Monica Mountains NRA

Yosemite NP

Bandelier NM

Chaco Culture NHP

Crater Lake NP

John Day Fossil Beds NM





Field Mapping In Progress

Channel Islands NP

Redwood NP

Joshua Tree NP

Death Valley NP

Lake Mead NRA





“Updates” In Progress

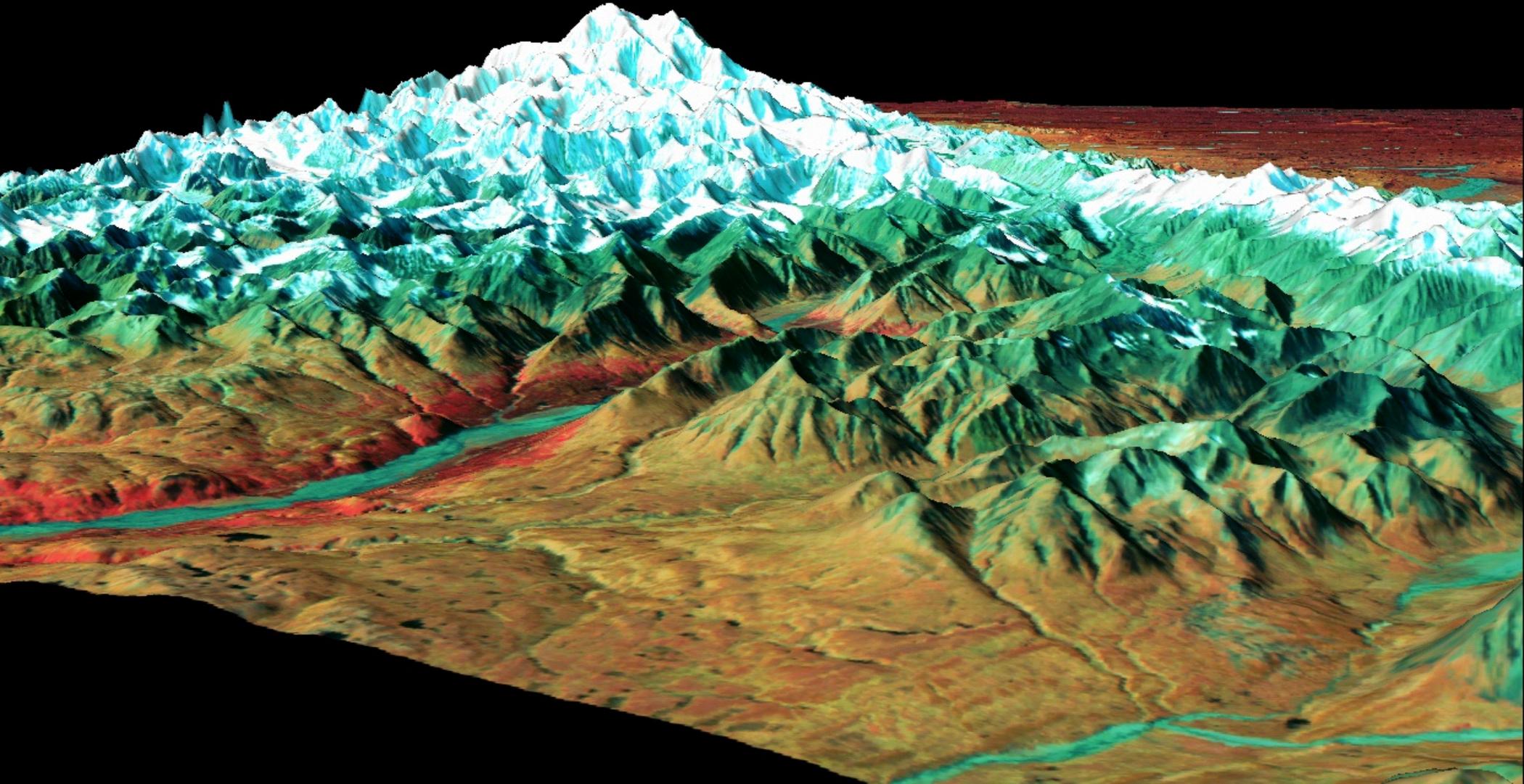
Dinosaur NM

Mesa Verde NP

Rocky Mountain NP



Use of New Technologies in Soil Mapping on NPS Units





Use of New Technologies in Soil Mapping on NPS Units

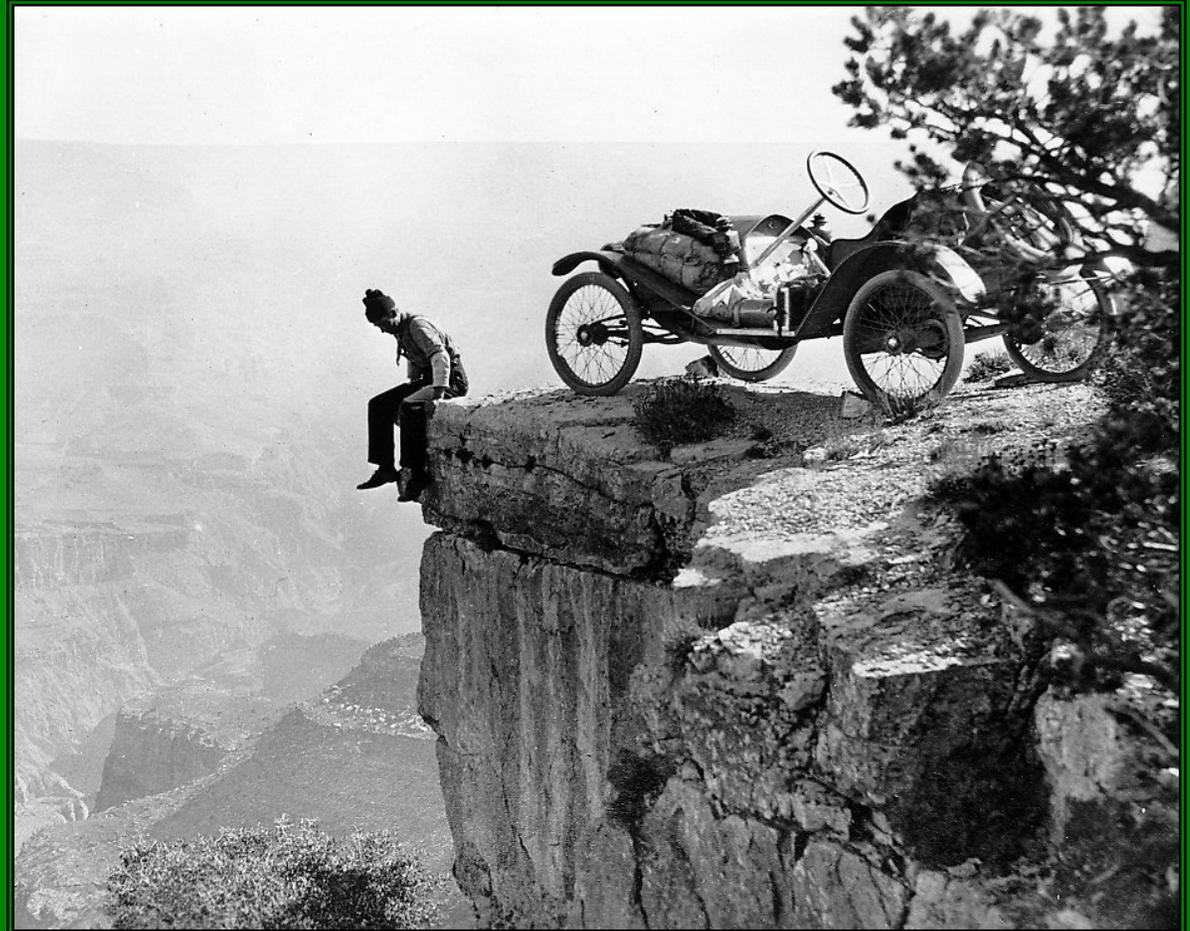
Due to issues regarding wilderness, cultural resources, or rugged inaccessible lands, NPS wants to pursue the use of new technology in the mapping of NPS units in the Western Region

Various methods used at Denali NP, Redwoods NP, and Joshua Tree NP

Need to “partner up” with NCSS cooperators to help develop applicable methodologies to meet local needs



“Historical Use of New Technologies” in Soil Mapping in the Western Region





Use of New Technologies in Soil Mapping on NPS Units

Potential for Use in Washington State at North Cascades NP, Mount Ranier NP, and Olympic NP

These parks contain vast areas of rugged, inaccessible areas, but still require sound soil resource information for park management needs

Currently acquiring 1:24,000 surficial geology and landform information at North Cascades NP

Working with Washington State University and Washington NRCS to develop potential partnership

Also very interested in Forest Service TEUI in surrounding Forests



Use of New Technologies in Soil Mapping on NPS Units

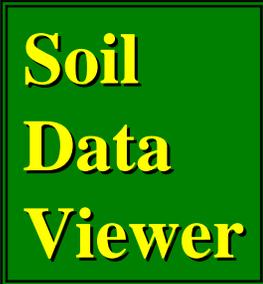
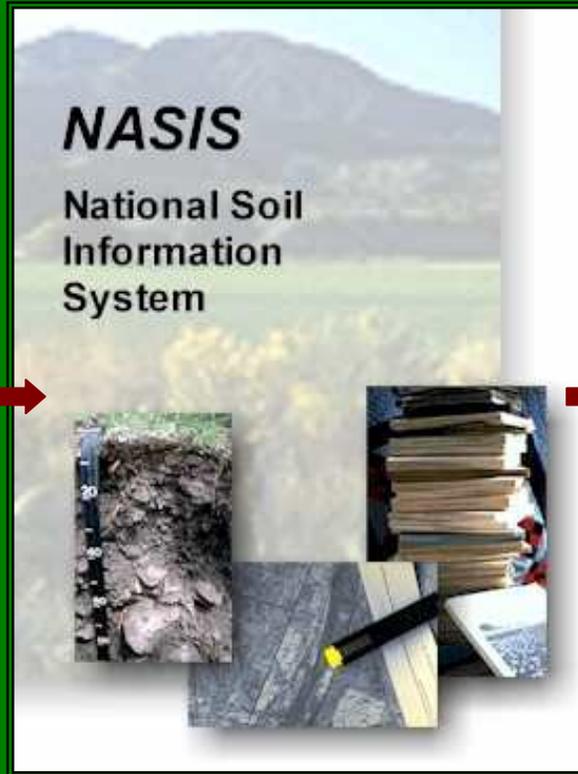
First Step

“Make the mappers comfortable in using these new techniques”





The Future of NPS Soil Resources Inventory



Soil Information and Education



"We have a challenge to not only collect sound, scientific information on our soil resources for proper management, but we also have a certain responsibility to educate our Park visitors on the role soils play within these ecosystems"



Soil Information and Education



- The NPS and the NCSS has an excellent opportunity to raise the awareness of the public in regards to the value of our soil resources nationwide
- Over 285 Million people visited Parks in 2001
- Over 137 Million people visited our website in 2001
- Over 7 Million people visited Colorado NPS Units in 2001



NPS Soil Information and Education Products

Soils “Fact Sheet” for concise information at an overview level

“Soil Forming Factors” maps/graphics to provide users concepts on why soils differ within a Park

Soil Monoliths

Soil/Landscape Genetic Key

Soil Quality and Vital Signs Monitoring

We need to know more about potential impairment to our valuable soil resources, and the ability of our soils to “properly function”

Rangeland Sheet 1

Soil Quality Information Sheet

Rangeland Soil Quality—Introduction

USDA, Natural Resources Conservation Service

May 2001

What is rangeland?

Rangeland is land on which the native vegetation is predominantly grasses, grasslike plants, forbs, or shrubs. This land includes natural grasslands, savannas, shrub lands, most deserts, tundras, areas of alpine communities, coastal marshes, and wet meadows.



What is rangeland health?

Rangeland health is the degree to which the integrity of the soil, the vegetation, the water, and the air as well as the ecological processes of the rangeland ecosystem are balanced and sustained.

What is soil?

Soil is a dynamic resource that supports plants. It consists of mineral particles of different sizes (sand, silt, and clay), organic matter, and numerous species of living organisms. Soil has biological, chemical, and physical properties, some of which change in response to how the soil is managed.

What is soil quality?

Soil quality is the capacity of a specific kind of soil to function within natural or managed ecosystem boundaries, sustain plant and animal productivity, maintain or enhance the quality of water and air, and support human health and habitation. Changes in the capacity of soil to function are

reflected in soil properties that change in response to management or climate.

What does soil quality affect on rangeland?

- Plant production, reproduction, and mortality
- Erosion
- Water yields and water quality
- Wildlife habitat
- Carbon sequestration
- Vegetation changes
- Establishment and growth of invasive plants
- Rangeland health

How are soil quality and rangeland health related?

Rangeland health and soil quality are interdependent. Rangeland health is characterized by the functioning of both the soil and the plant communities. The capacity of the soil to function affects ecological processes, including the capture, storage, and redistribution of water; the growth of plants; and the cycling of plant nutrients. For example, increased physical crusting decreases the infiltration capacity of the soil and thus the amount of water available to plants. As the availability of water decreases, plant production declines, some plant species may disappear, and the less desirable species may increase in abundance. Changes in vegetation may precede or follow changes in soil properties and processes. Significant shifts in vegetation generally are associated with changes in soil properties and processes and/or the redistribution of soil resources across the landscape. In some cases, such as accelerated erosion resulting in a change in the soil profile, this shift may be irreversible, while in others, recovery is possible.

Why is soil quality important?

Changes in soil quality that occur as a result of management affect:

- the amount of water from rainfall and snowmelt that is available for plant growth;
- runoff, water infiltration, and the potential for erosion;
- the availability of nutrients for plant growth;

Fragile and Unique Soils

Gypsiferous Soil

White Sands NM



Fragile and Unique Soils

Cryptobiotic Soil

Canyonlands NP



Dynamic Soil Properties





NPS Soil Information and Education Products

Soils information provided in a “more descriptive, less taxonomic” format

Integration with existing NPS Information and Education Systems currently being developed



Views of the National Park Service

“As stewards of the world’s finest system of national parks, we have the responsibility to widely share our knowledge about park resources in order to enhance the public’s ability to learn from, and enjoy, it’s national parks”

Views of the National Park Service

Natural Resource Information Division
 National Park Service
 U.S. Department of the Interior



Views of the National Park Service is developing a virtual experience for Tonto National Monument (AZ) that shows the connections between the natural resources of the Sonoran Desert ecosystem and the cultural resources of the Salado.

Overview

The concept of *Views of the National Park Service (Views)* was initiated in the Spring of 2000 to present National Park Service (NPS) information and messages in an educational and interactive format. This project is intended to help interpreters present the many stories associated with national parks and to allow the public to explore sites of interest that might be inaccessible.

Views consists of two complementary components. The first of these, knowledge centers, presents general information and principles on a variety of natural resource themes. These knowledge centers also contain park-specific case studies. Knowledge centers provide a means of connecting national parks that share these natural resource themes.

The second component of *Views* is a series of virtual experiences which provides multimedia gateways to park-based educational experiences. They will help park interpreters and education specialists reach a greater number of people, including park visitors that do not have time to take a ranger-led tour, students in classrooms (local and distant), handicapped visitors who can not reach remote park sites, or members of the public unable to visit the park. The virtual experiences also allow interpreters and educational specialists to re-create historical natural and cultural landscapes. The ability to

experience vanished landscapes will provide new understanding of the past.

Staff in the WASO-Natural Resource Information Division (NRID) coordinates the project. To ensure high-quality information, subject matter experts from WASO divisions, central offices, and parks are recruited to help design and build the knowledge centers and park-based virtual experiences. The project philosophy is that park educators, interpreters, and resource staff should select the material, the stories, and the best methods for presenting information from their park. This ensures park buy-in, bolsters WASO-park cooperation, and prevents duplication with existing park-based interpretive tools.

Goals

The overall goal of *Views* is to provide the NPS with a powerful interactive tool for the enhancement of interpretation and education programs. Major objectives of the project include:

- Highlight NPS stories
There are many interpretive messages found throughout the national park system that can be used to educate people about history, cultures, and the environment
- Connect parks by natural resources
Parks can be connected through such common natural themes as volcanoes, glaciers, and invasive species.

“As stewards of the world’s finest system of national parks, we have the responsibility to widely share our knowledge about park resources in order to enhance the public’s ability to learn from, and to enjoy, its national parks. .”

— NPS Natural Resource Challenge web site
<http://www.nature.nps.gov/challenge/nrc.htm>



Future Directions

Continued interaction with NCSS and its Cooperators to facilitate completion of the Soil Resources Inventory

Interaction with Soil Quality Institute and Universities to assist in the development of a soil quality and monitoring program for NPS Units

Pursue opportunities with soil scientists in the private sector to provide products and services as needed



Future Directions (continued)

Continue the use of “new technologies” in soil resource inventory mapping concepts

Utilization of Ecological Sites and State and Transition Models in Park Restoration efforts

Continued interaction with NRCS on implementation of Soil Data Viewer within NPS GIS Theme Manager