

National Park Service  
U.S. Department of the Interior  
Natural Resources Program Center



# National Park Service Update

Pete Biggam  
Soils Program Manager

Western Regional Cooperative Soil Survey Conference  
Las Vegas, Nevada  
June, 2010

EXPERIENCE YOUR AMERICA

# NPS Soil Resources Management

## Our Goal.....

Promoting the use of soils information in NPS decision making and making it accessible in a user friendly way to staff and partners.



# National Level

Acres to be mapped

84.5 Million

Parks to be mapped

270

Acres mapped thru FY09

33.5 Million (40%)

Parks mapped thru FY09

191 (71%)

Alaska Acres

54 Million (64%)

Alaska Parks

16 (6%)



# NCSS West Region Status

Parks to be mapped

134 (50% of total)

Acres to be mapped

76.5 million (90% of total)

Alaska Acres to be mapped

48 Million (26%)

Alaska Parks to be mapped

15 (4%)

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Parks completed thru FY09

79 (59%)

Acres mapped thru FY09

13.7 million (18%)



# NPS Alaska Strategy



United States  
Department of  
Agriculture



NRCS  
Natural  
Resources  
Conservation  
Service



National Park  
Service  
U.S.  
Department  
of the Interior

## Plan for Soil-Ecological Surveys on Park Service Lands in Alaska



Alaskan Parks 16 (6%)  
Alaskan Acres 54 Million (64%)

Denali National Park Complete  
(6 Million Acres)

15 Parks and 48 Million acres remain

Current Plan prioritizes Parks, will use multiple mapping scales and multiple levels of mapping orders to meet the needs of the parks

Have initiated mapping at Yukon-Charley Rivers National Preserve in FY08 – 2.5 million acres

## Current Interagency Agreements with NRCS in Western Region addresses;

- 9 states
- 23 parks
- 13 million acres
- \$2.25 million obligated annually via Interagency Agreements with NRCS



# Alaska

## Yukon – Charley Rivers National Preserve

2.5 Million Acres

Estimated Completion FY11

Initial mapping

Looking to initiate mapping  
at Klondike Gold Rush and  
Sitka NHP next



# Arizona

Just Completed Glen Canyon National  
Recreation Area - 1.25 Million Acres

Efforts recently underway at Sunset Crater,  
Walnut Canyon, and Wupatki National  
Monuments -



# California

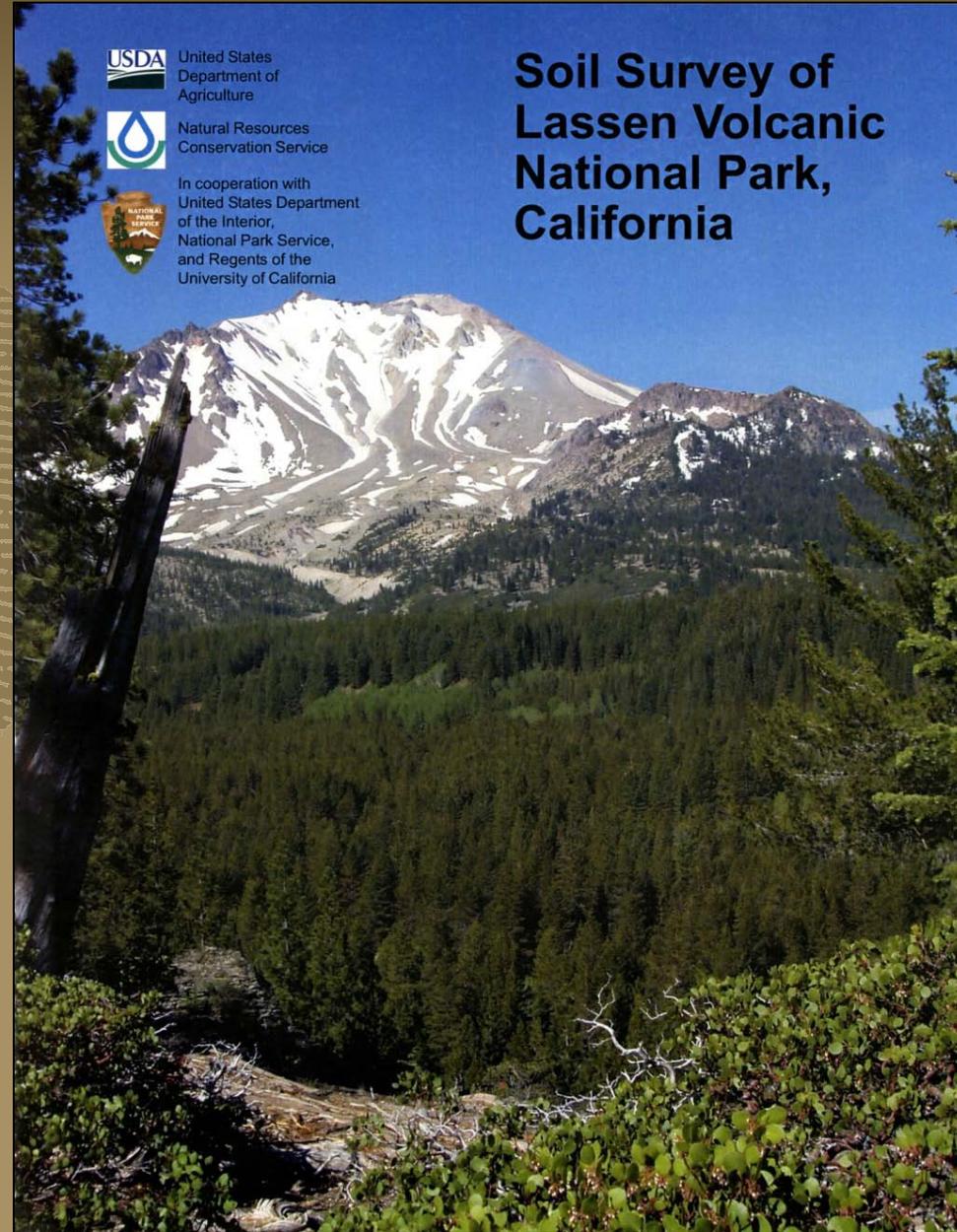
## Lassen Volcanic National Park (CA789)

Recently Completed

108,000 Acres

26 new soil series established

Numerous new ecological site descriptions developed that reflect the unique soil forming factors and vegetation communities in the park



# California

## Joshua Tree National Park (CA794)

1.05 Million  
Acres

Estimated  
Completion FY 10

Initial mapping



# California

## Mojave National Preserve (CA794)

Initiated in FY10

1.6 Million Acres

Estimated  
Completion FY 15

Initial and Update  
Mapping



# California

## Sequoia – Kings Canyon National Parks

Soils Scoping  
Session scheduled  
this September

865,952 Acres

Initial and Update  
mapping



# Colorado

## Black Canyon of the Gunnison National Park

Interested in initiating an update to the current mapping

Resides in 4 different soil survey areas

Current mapping does not meet the needs of the NPS

31,000 Acres



# Colorado

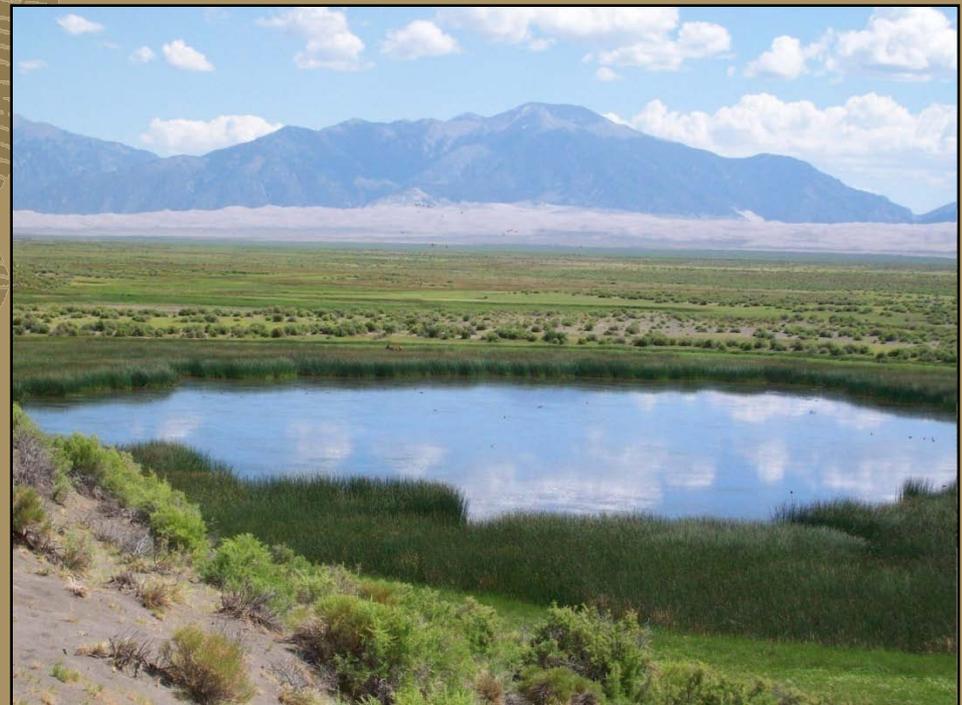
## Great Sand Dunes National Park and Preserve

Interested in initiating an update to the current mapping

Resides in 3 different soil survey areas, one of which is an USFS soil survey area with data in Terra-NRIS

Current mapping does not meet the needs of the NPS

86,500 Acres



# Colorado

 United States Department of Agriculture

 NRCS  
Natural Resources Conservation Service

 United States Department of Interior, National Park Service

In cooperation with the United States Department of the Interior, National Park Service and Colorado State University

## Soil Survey of Rocky Mountain National Park, Colorado



Currently working with NRCS and Colorado State University to get 415 soil pedons from Rocky Mountain National Park reviewed and entered into NASIS from PedonPC

NPS will also want to coordinate with NRCS and Colorado State University to develop a Laboratory Sampling Plan to support Rapid Soil Carbon Assessments and other data needs

# Idaho

## Craters of the Moon National Monument and Preserve (ID780)

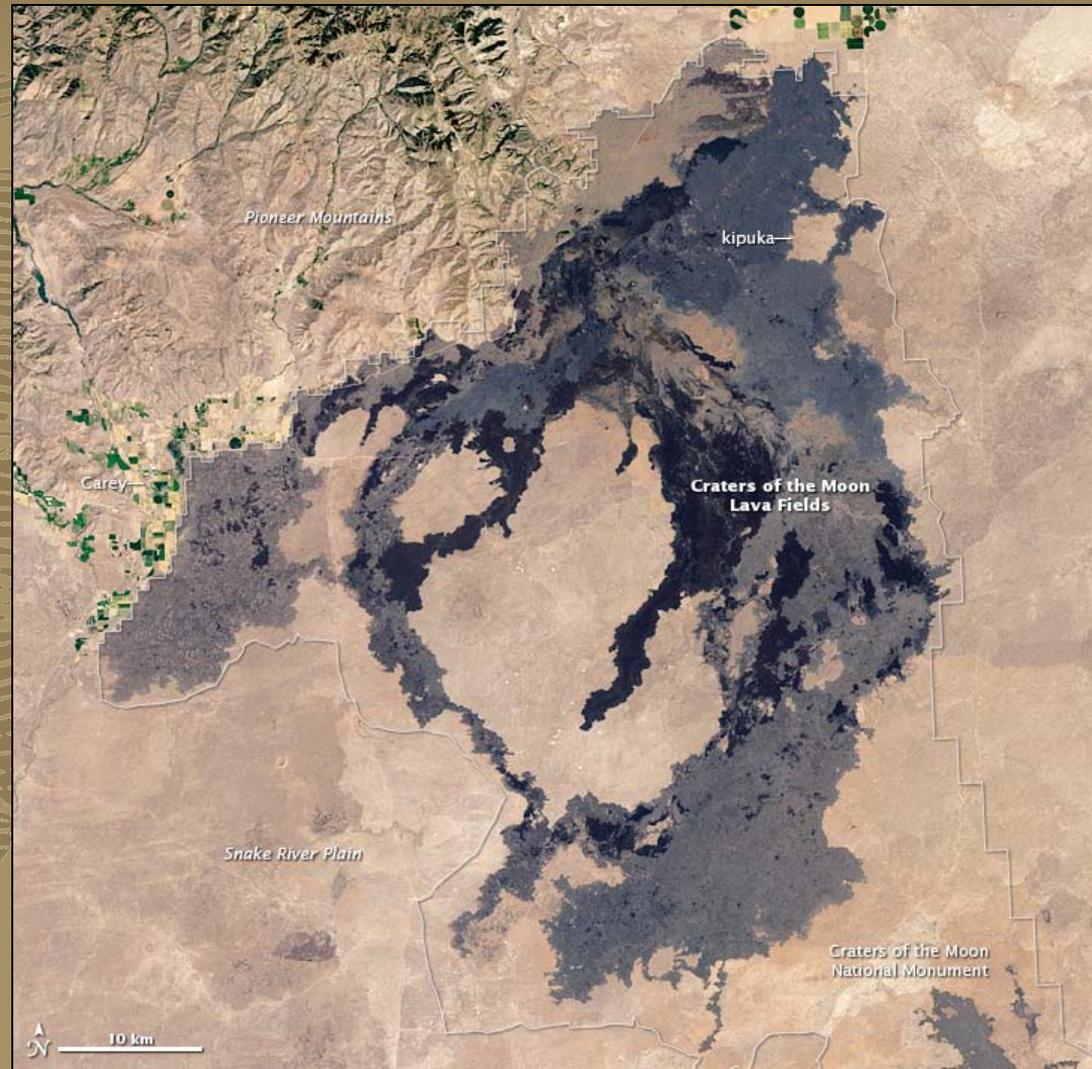
715,000 acres

SSURGO completed

Map finishing completed

Manuscript is being finalized

Update mapping



# Idaho

## City of Rocks National Reserve (ID721)

14, 200 acres

SSURGO completed

Map finishing  
completed

Manuscript is being  
finalized

Update mapping



# Montana

## Glacier National Park (MT633)

1,013,572 acres

Scoping Session held in 2009 to determine park needs

Looking to initiate mapping in FY11

Initial mapping



# Nevada

## Great Basin National Park (NV708)

Completed in FY09

78,000 acres

First use of point and linear map units in SSURGO

Strong emphasis on soils and ecological sites

Soil survey delivery ceremony hosted earlier this week at the park



United States  
Department of  
Agriculture



Natural  
Resources  
Conservation  
Service



United States  
Department of  
the Interior

National  
Park Service

In cooperation with  
University of Nevada  
Agricultural Experiment  
Station

## Soil Survey of Great Basin National Park, Nevada

TIC # NPS 148/100234



# Nevada

## Lake Mead National Recreation Area



United States  
Department of  
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Natural  
Resources  
Conservation  
Service



United States  
Department of the  
Interior



National  
Park  
Service

### Interim Report Soil Survey of Lake Mead National Recreation Area



Originally mapped via an  
Interagency Agreement  
with AZ NRCS in late  
1990's

Was never set up as a non-  
MLRA soil survey area

Soil data base is composed  
of 4 separate soil survey  
areas in 2 states and has  
some data base population  
and map unit join issues  
due to vintage of soil  
survey areas

# Nevada

## Lake Mead National Recreation Area

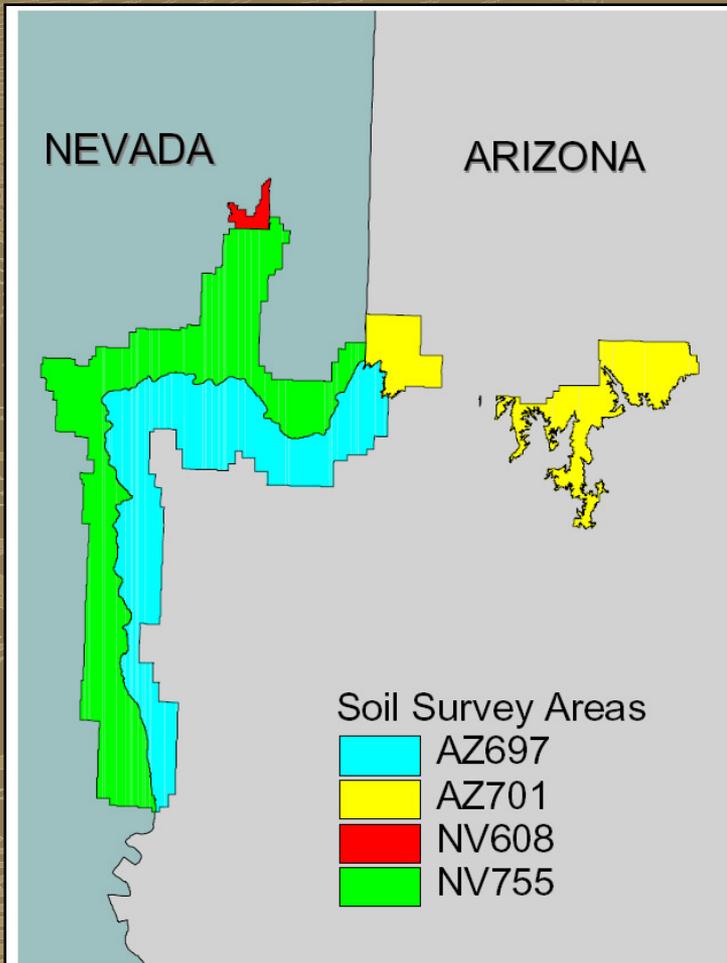


Figure 1. Lake Mead NRA and its associated soil surveys in Arizona and Nevada.

Each soil survey area was clipped by the NPS boundary

Shoreline and water levels do not match between soil survey areas

Differences in soil map unit design concepts exist due to various ages of the soil surveys

Does not currently meet the needs of NPS

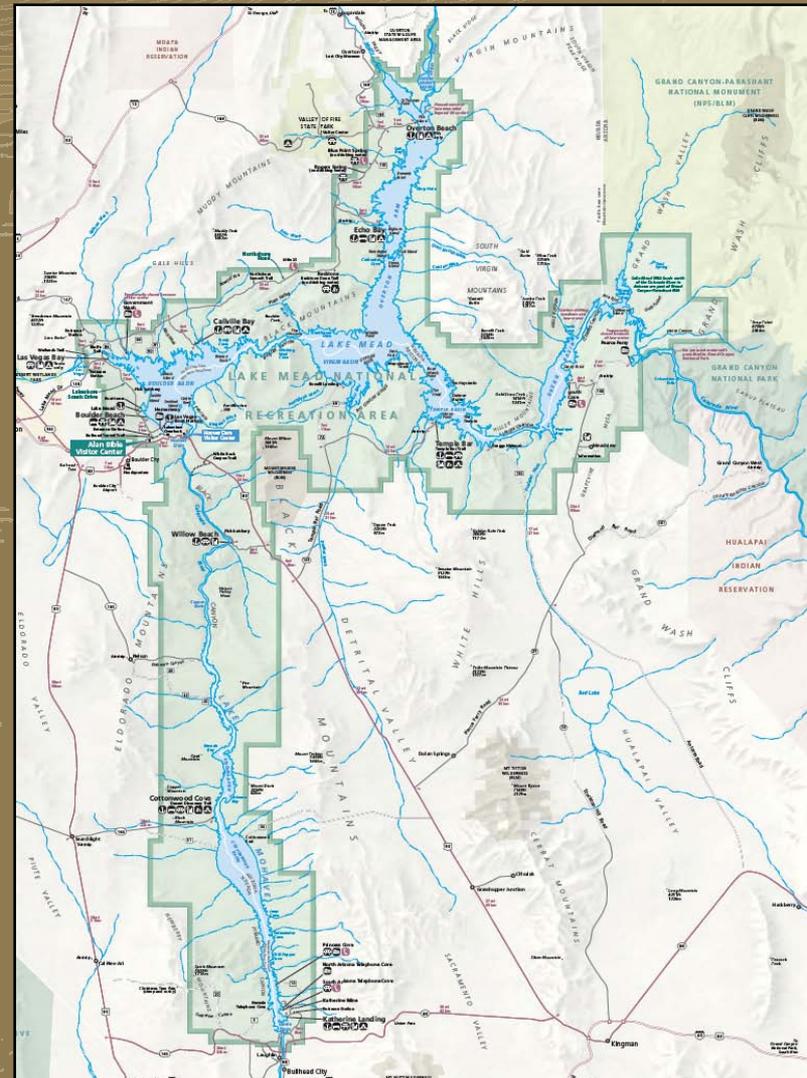
# Nevada

## Lake Mead National Recreation Area

NPS Would like to set up Lake Mead NRA as a new non-MLRA soil survey area to meet the agency's soil database management needs and to begin the process to fix some of the issues between the 4 soil survey areas

This is a priority for NPS, and potential to use soil survey crew in Page, AZ to assist in this effort

We will need to coordinate this request thru MO-2 Office, Davis, CA, as well as AZ and NV State Soil Scientists



# New Mexico

## White Sands National Monument

Initiated in FY10

143,733 acres

Will be set up as a  
new non – MLRA  
soil survey area

Adjacent to White  
Sands National  
Missile Range

Initial and update  
mapping

Lots of gypsiferous  
soils



# New Mexico

## Carlsbad Caverns National Park

Initiated in FY10

46,766 acres

Will be set up as a  
new non-MLRA soil  
survey area

Update mapping



# Utah

## Arches National Park (UT687)

77,000 Acres

Completed FY 09

Update mapping

Great improvement over previous information available



United States  
Department of  
Agriculture



Natural  
Resources  
Conservation  
Service



In cooperation  
with  
United States  
Department of  
Interior, National  
Park Service

Utah Agricultural  
Experiment  
Station

## Soil Survey of Arches National Park, Utah



# Utah

## Canyonlands National Park (UT688)

340,000 Acres

Completed FY 09

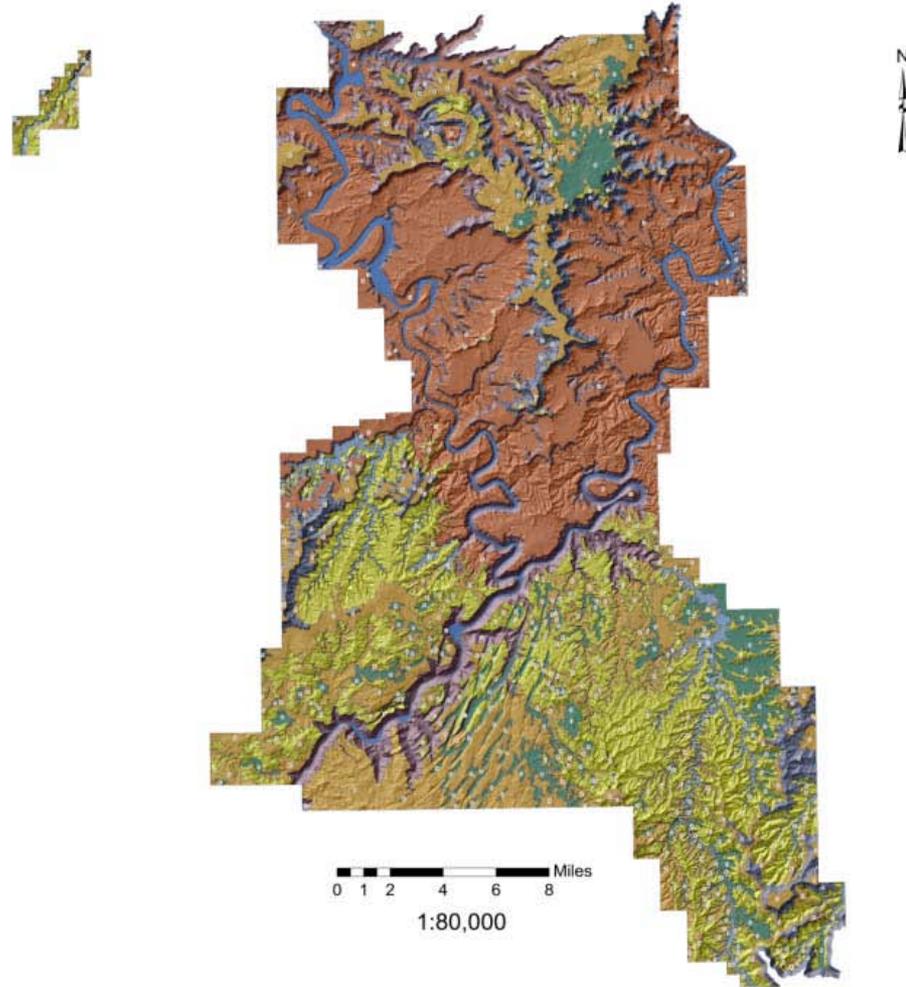
Awaiting Final Deliverables

Update mapping

Great improvement over previous data available

# GENERAL SOIL MAP

Canyonlands National Park, Utah



### Legend

#### Alluvial soils on flood plains, terraces, and alluvial flats

- 1 - Water-Green River-Trail association, nearly level to gently sloping, arid
- 2 - Mido family-Mido-Green River family association, nearly level to strongly sloping, semiarid

#### Colluvial soils on talus slopes, scarp slopes, ledges, and hills

- 3 - Torriorthents-Rock outcrop-Badland association, gently sloping to very steep
- 4 - Reef-Rock outcrop-Mathis family association, strongly sloping to very steep, semiarid

#### Shallow eolian and residual soils on mesas, structural benches, talus slopes, and hills

- 5 - Tsaya family-Moenkopie-Rock outcrop association, nearly level to very steep, arid
- 6 - Rizno-Arches-Rock outcrop association, nearly level to steep, semiarid
- 7 - Rock outcrop-Arches-Nalcasa association, nearly level to steep, semiarid

#### Deep eolian and slope alluvium soils on mesas and structural benches, in valleys and grabens

- 8 - Mido-Begay association, nearly level to steep, semiarid

# Utah

## Capitol Reef National Park - (UT685)

77,000 Acres

Estimated Completion  
FY 11

Update of existing  
mapping

Focus on soil –  
ecological site  
correlation



# Washington

## North Cascades National Park - (WA774)

505,000 Acres

Estimated Completion  
FY 10

Initial mapping

Utilized the Remote  
Area Soil Proxy (RASP)  
Methodology



# Washington

## Mount Rainier National Park - (WA774)

235,625 Acres

228,480  
Wilderness (97%)

Soils Scoping  
Scheduled FY 11

Initial mapping

Interest in using  
RASP and the  
TEUI Toolkit to  
facilitate mapping  
in remote areas,  
wilderness



# Washington

In cooperation and coordination with the NRCS, Forest Service, and Washington State University, the NRCS, NPS is interested in performing Rapid Soil Carbon Assessments on additional selected forest soils under various ownership and management scenarios



# Use of Soils Data to Address Current Issues in the NPS

- *Climate Change and Soil Organic Carbon, Soil Moisture and Soil Temperature Regimes*

# Soil Organic Carbon

The NPS has developed queries and reports in NASIS to allow us to estimate the amount of Soil Organic Carbon (SOC) by component, by soil map unit, for our Parks

Looking at a weighted average of the whole soil to a depth to 2 meters or to a restrictive layer (bedrock, duripan, etc) and adjusting for bulk density and rock fragments by layers/horizons

This provides us a look at what was populated in NASIS and allows us to assess if this information makes sense !

## Soil Organic Carbon (NPS)

Great Basin National Park, Nevada

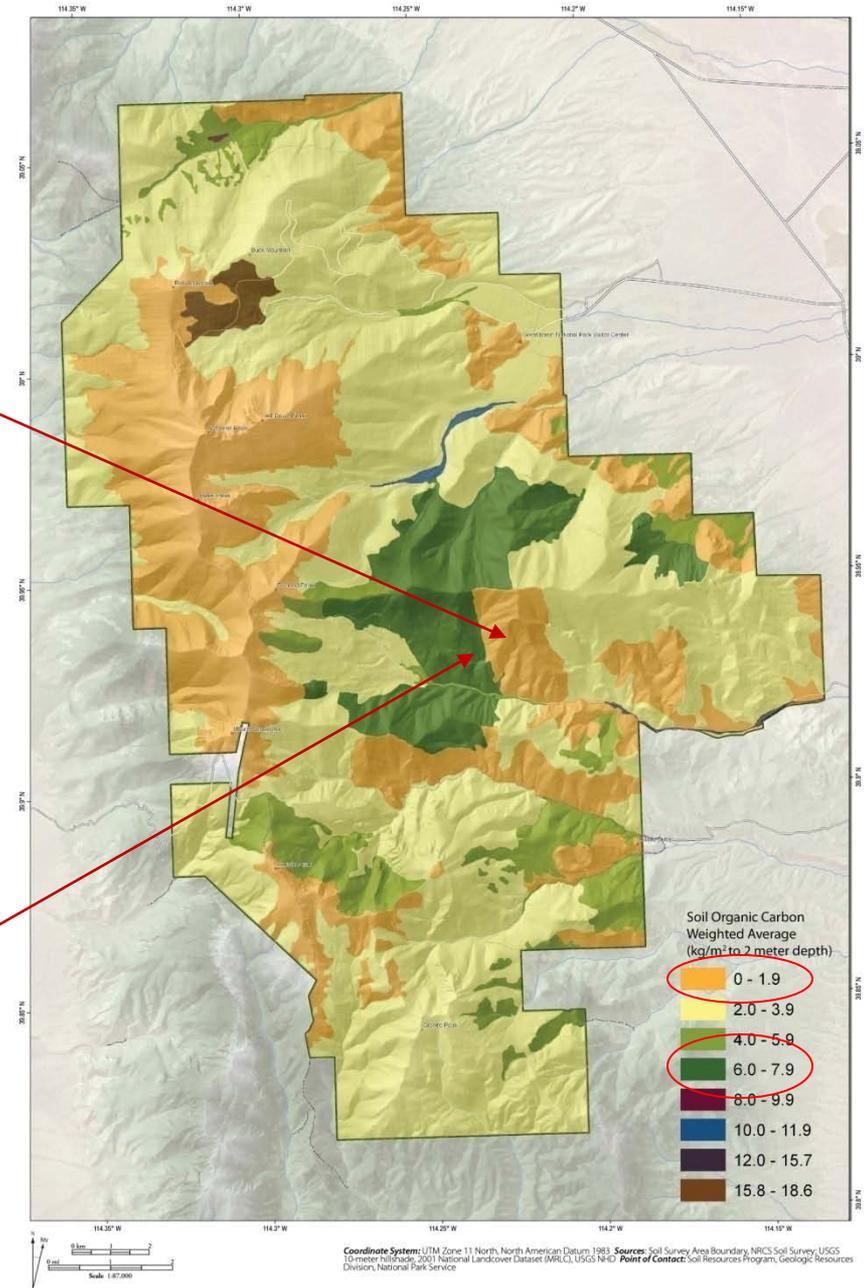
[Soil organic carbon (SOC) is carbon (C) in soil that originated from a biological source, such as plants, animals or microorganism. The term "soil organic carbon" refers only to the carbon found in soil organic matter. SOC can be found in organic or mineral horizons.

The SOC for the whole soil (which includes particles greater than 2mm) is calculated by adjusting the volume that is taken up by rock fragments. The SOC weights are converted to a mass basis by multiplying the weight by the density of the soil. A weighted average of the whole soil is determined by multiplying the carbon mass in each horizon by the horizon thickness then dividing by the entire depth of the observed soil. Soil organic matter (SOM) numbers are stored in the database. SOM contains 58% carbon. A conversion of 58% is used to convert SOM to SOC. Lack of a value in a column indicates the calculation was not performed for that soil]

Map symbol and soil name	Pct. of map unit	Soil Organic Carbon
		Kg/m2
5160:		
Hyzen	65	1.7
Rock outcrop	20	0
Lodar	6	1
Canyong	5	4.3
Hardol	4	7.5
5350:		
Goodski	35	7.7
Kious	35	5
Snacreek	15	11.3
Badhap	7	3.8
Rock outcrop	3	0



# Soil Organic Carbon



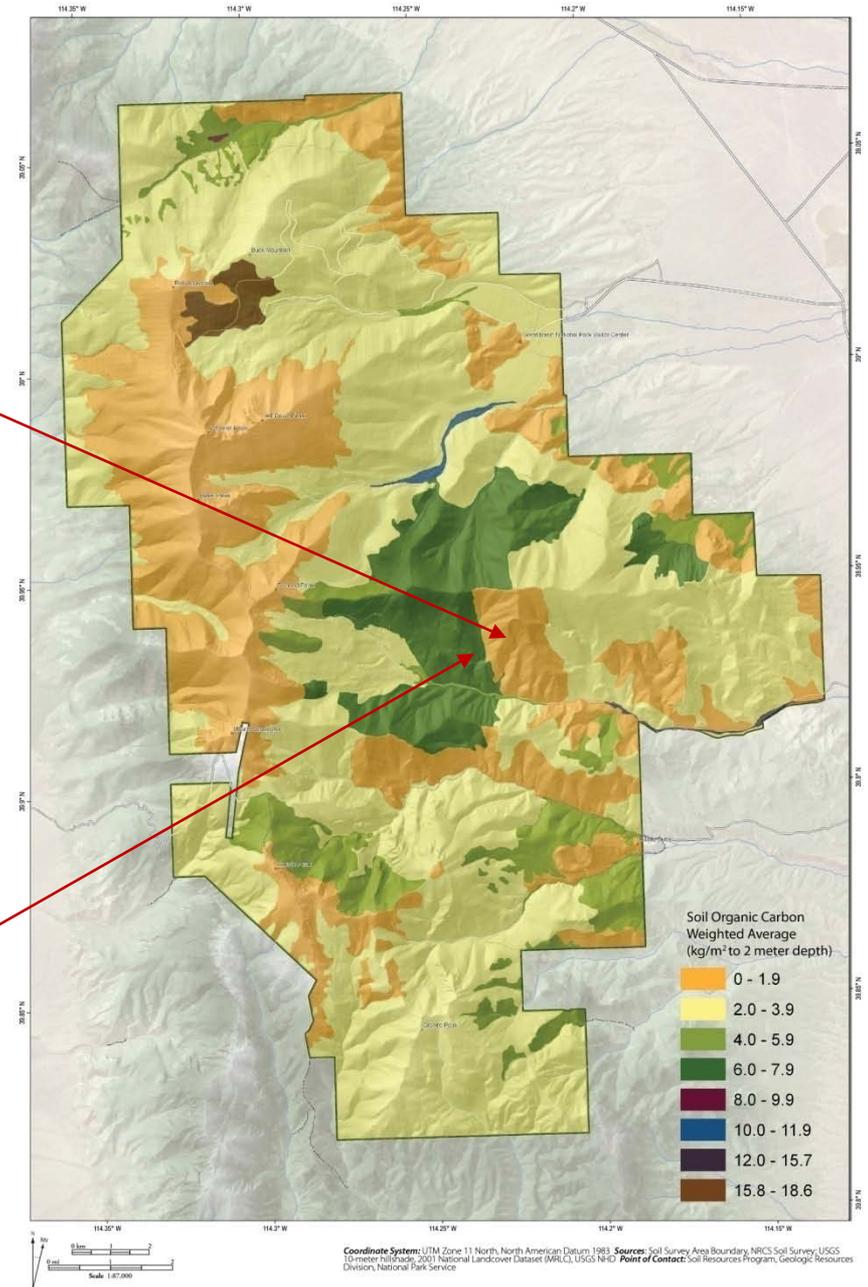
# Soil Organic Carbon



**MU 5160 – Hyzen-Rock outcrop association–  
Mollisols, frigid, aridic (torric) – PMG –  
Limestone Colluvium - ESD Limestone Hill –  
Pinyon pine & Juniper**



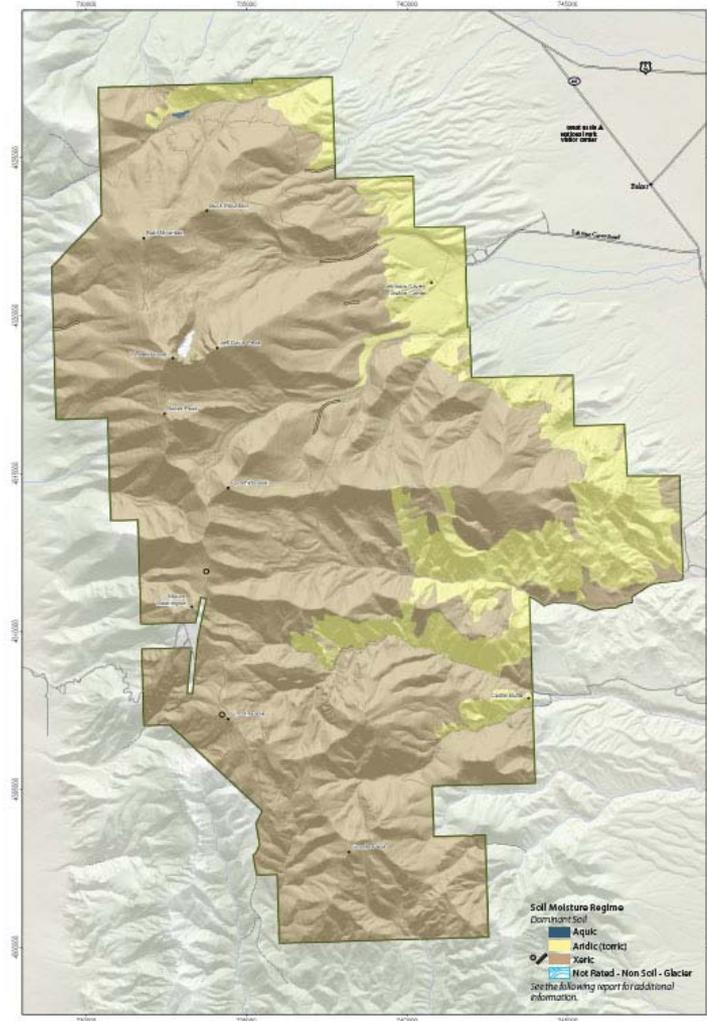
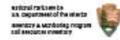
**MU 5350 – Goodski – Kious-Snacreek association  
– Mollisols, cryic, xeric - PMG – Granitic  
Colluvium – ESD Shallow Loam & Mahogany  
Savanna – Mountain Mahogany, Mountain  
Sagebrush, Idaho Fescue**



# Soil Moisture and Soil Temperature

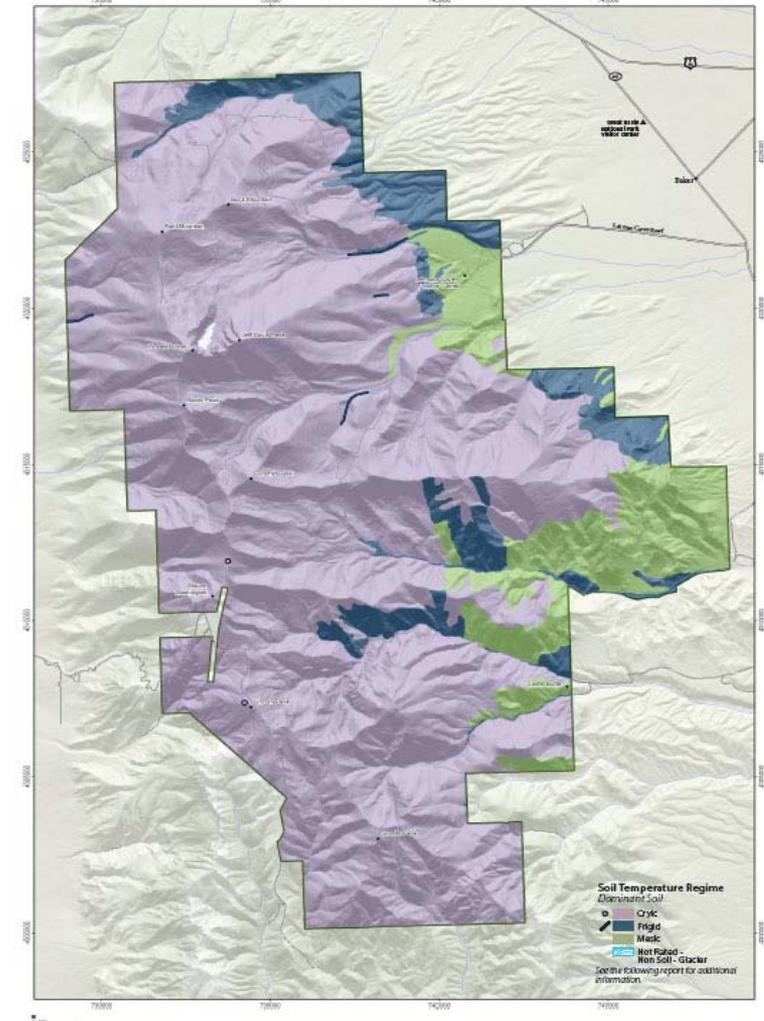
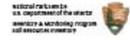
## SOIL MOISTURE REGIME

Great Basin National Park, Nevada



## SOIL TEMPERATURE REGIME

Great Basin National Park, Nevada



# That's About It!



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