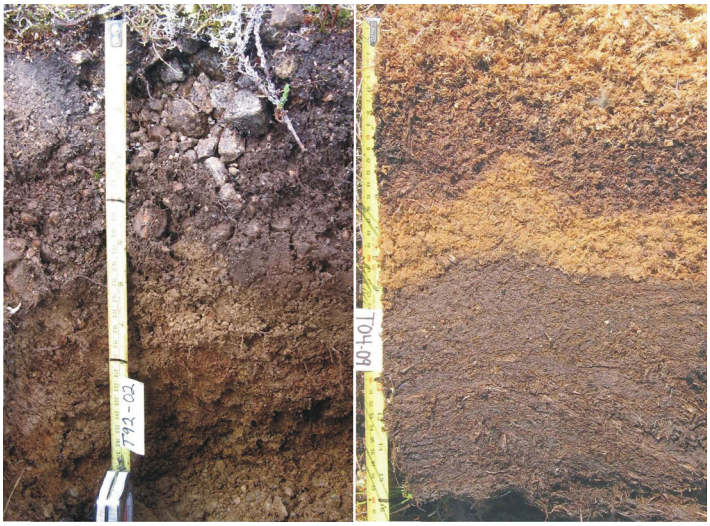
Soils Inventory

Background

The Alaska Regional Inventory and Monitoring Program manages the soil inventory, along with inventories of base cartography and vegetation, for national parks in Alaska. The state encompasses 16 park units that make up 65% of the acreage managed by the National Park Service throughout the country. Thus, a regional approach is the most efficient way of inventorying soils in the vast, remote parks of Alaska. Nine other inventories, which complete the set of inventories that form the baseline of biological and physical information in national parks, are managed through a combination of national, network, and park efforts.

Soil influences ecological processes that drive vegetation patterns, regional hydrology, nutrient dynamics, and habitat development. Soil inventories provide a snapshot of information on the condition and status of soil in a given area and provide valuable information about the influences soil has on landscapes and ecosystems. When conducting soil inventories, scientists study five factors that influence and form soil in order to identify and classify them: climate, topographic relief, biological activity, time, and parent material. Field work consists of digging 1 - 2 m holes, examining physical and chemical properties of the soil, and recording findings. Observations are also recorded for vegetation, landforms, surface hydrology, susceptibility to erosion or disturbance, thickness of permafrost, and effects of wildfire.



Photos: NPS

Soils vary widely across the landscape of national parklands in Alaska from a well developed rocky soil at an alpine site, left, to a thick peaty soil from a bog showing an upward transition from sedge peat to sphagnum moss, right.

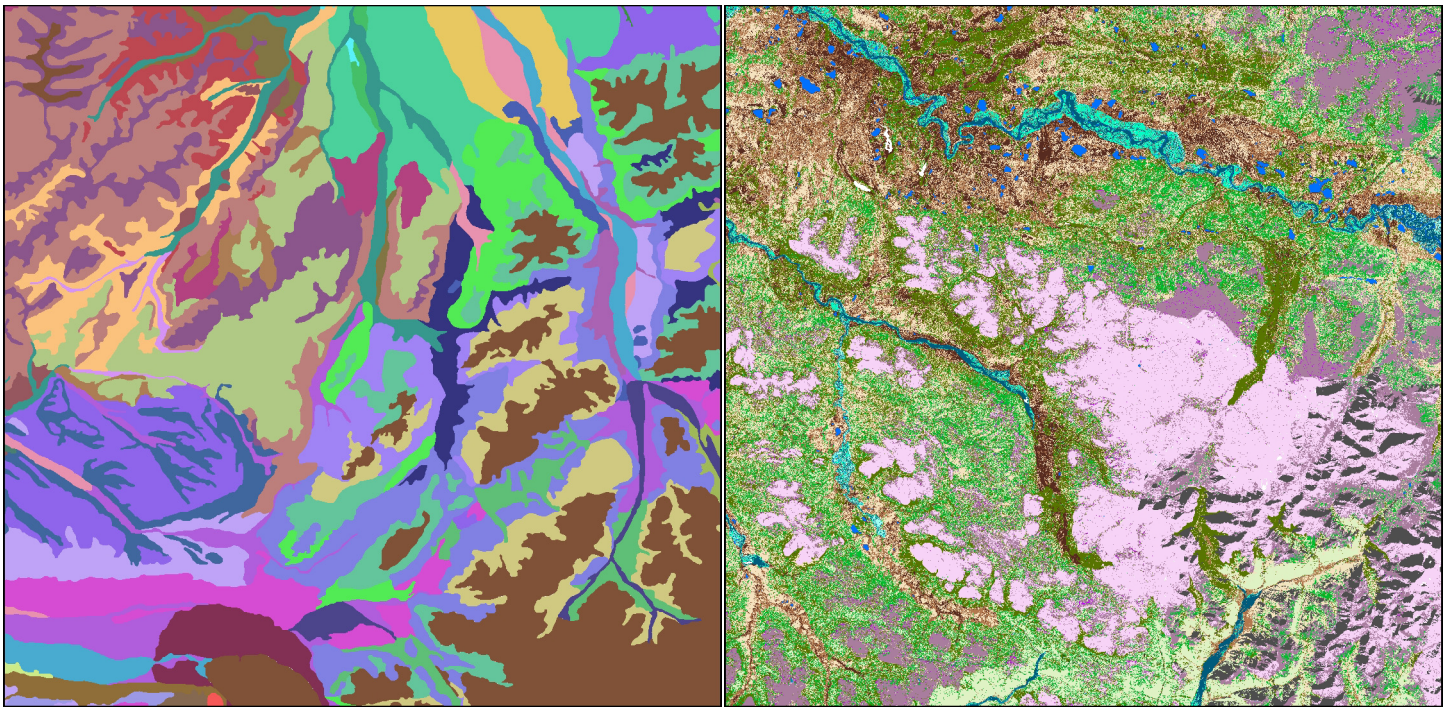
Photo: NPS

An inventory technician digs a soil pit in Yukon-Charley Rivers National Preserve. Both methods used to complete the soil inventory include significant amounts of field work.

Methods

The soil inventories for national parks in Alaska are conducted using two methods. The first method, which is used by Inventory and Monitoring Programs in other regions of the National Park Service, utilizes expertise from the Natural Resources Conservation Service (NRCS). The NRCS method, called a Soil/Ecological Site Inventory, uses three levels of mapping orders that range from more to less detailed depending on the terrain, combined with field collections, to classify soils. On average, soil surveys using the NRCS method are completed at a rate of approximately one million acres per year. Given the vastness of national parks in Alaska (54 million acres) and the lack of infrastructure in many of the parks, a second method is also being used to expedite the completion of the baseline soil inventory.

The second methodology creates a "Soil Landscapes" product for the areas mapped. This method uses contract support from ecological consulting firms to characterize soils in parks, and it combines ecological land survey information, satellite imagery, statistical analysis, and field data collection to classify soils. While the two methods produce compatible products, the Soil Landscapes method specializes in automated routines, which makes it suitable for mapping large areas in a relatively short amount of time.



The pair of images show a section of soil maps for two national parks in Alaska. The Soil/Ecological Site Inventory method (NRCS) was used to survey soils in Denali National Park and Preserve, left, and the Soil Landscapes method was used in Gates of the Arctic National Park and Preserve, right. While the two methods are slightly different, they produce similar, compatible products.

Status

To date, baseline soil inventories have been completed for 72% of the area in Alaska's national parks. Soil/Ecological Site Inventory (NRCS) mapping has been completed for Denali National Park and Preserve and is currently underway in Yukon-Charley Rivers National Preserve; both parks are located within the Central Alaska Inventory and Monitoring Network. Future soil surveys by NRCS are planned for parks in the Southeast Alaska Network, which includes Glacier Bay National Park and Preserve, Klondike Gold Rush National Historical Park, and Sitka National Historical Park.

Soil surveys using the Soil Landscapes method have been completed for parks in the Arctic Network, which includes Bering Land Bridge National Preserve, Cape Krusenstern National Monument, Gates of the Arctic National Park and Preserve, Kobuk Valley National Park, and Noatak National Preserve. Soil Landscape surveys have also been completed in Wrangell-St. Elias National Park and Preserve, which is the third park in the Central Alaska Network. Soil Landscapes surveys are now underway or planned for all parks in the Southwest Alaska Network, which includes Alagnak Wild and Scenic River, Aniakchak National Monument and Preserve, Katmai National Park and Preserve, Kenai Fjords National Park, and Lake Clark National Park and Preserve.

As part of the baseline soil survey, several products will be produced for all national parks in Alaska. They include descriptions of soil characteristics, maps showing soil types, and general information about landscapes and terrain.

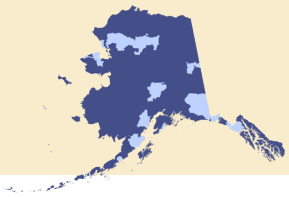
Applications of Soil Inventories

Soil inventories provide basic information needed to manage soil sustainability in parks. Soil inventories provide park managers with the ability to predict the behavior of a soil under alternative uses and determine its potential as an erosion hazard, for ground water contamination, suitability for native plant communities, and its potential for preservation of cultural sites and landscapes among other things (National Park Service, 2009). Soil inventories also serve as the baseline information for monitoring of soil resources by the Vital Signs Monitoring Program.

Products developed using the Soil/Ecological Site Inventory method are available through the NR Info portal (nrinfo.nps.gov). Products developed using the Soil Landscapes method are available by contacting the Regional Inventory Coordinator (see contact information below).

For more information on natural resource inventories:

National website: http://science.nature.nps.gov/im/

National Park Service. 2009. Strategic plan for natural resource inventories: FY 2008 - FY 2012. Natural Resource Report NPS/NRPC/NRR—2009/094. National Park Service, Fort Collins, Colorado.

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