National Park Service Overview

“...to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.”

- “National Park Service Organic Act “ - 1916
Using Science to Protect our Parks:
“... to improve park management through the greater reliance on scientific knowledge, the Inventory and Monitoring (I&M) Program collects, organizes, analyzes, and synthesizes natural resource data and information, and provides the results in a variety of useful formats.”
Inventories identify the resources we manage...

- Bibliography
- Water quality
- Water quantity
- Air quality
- Climate
- Species occurrence
- Species distribution and abundance
- Geology
- Base Cartography
- Vegetation
- Soils
Three Regional Inventories for Alaska’s National Parks

- Baseline Information
  - What, Where, and How Much...
- Managed Regionally
  - Produced at a park level
  - Uses contractors/cooperators
Base Cartography: High Resolution Imagery & DEMs

KLGO IKONOS
Natural Color
8/12/2005

NED
IKONOS
IFSAR

Pleiades Satellite Imagery
© CNES Astrium / Spot Image Corp.
What’s in a Soil Resource Inventory?

“A systematic examination, description, classification, and mapping of soils in an area.”

• General Soils map
• Soil Interpretations
• Soil Taxonomic Classifications
• Soil - Vegetation Relationships
• Soil - Water Relationships

• Geomorphic Information
• Physical, Chemical, and Biological Properties
• Literature Citations
• Glossary of Terms
Regional Soils Inventory

Supervised Classification

Photo Interpretation
Permafrost

Derivative products of soil inventories...

Permafrost
1,868,841 acres
30.8% of the Park
GOALS:
• Determine the status and trends in selected indicators

• Provide early warning of abnormal conditions of selected resources

• Provide data to understand the dynamic nature and condition of park ecosystems

• Provide data to meet legal and Congressional mandates related to natural resource protection and visitor enjoyment.

Long-Term Monitoring Projects...
MODIS Satellite image time series of lake ice breakup on Lake Iliamna
April 15 – May 10, 2005
ARCN Permafrost Thaw Slump Study
Denali caribou winter range study

20 years of caribou radiotelemetry location data in Denali NPPr

1. Assign each lichen species a forage preference “score” based on caribou diet literature.
2. Calculate an integrated forage score for each vegetation monitoring plot based on the abundance of the lichen species that occur there, using forage preference score as a multiplier.
3. Determine the LANDSAT reflectance values for each plot location. Run a set of analyses to correlate the forage score with the image reflectance values for the entire dataset.
4. Extrapolate scores from plots to entire Denali landscape using the correlation between the LANDSAT satellite image scores (= winter forage quality map).
5. Analyze patterns in caribou radiotelemetry locations recorded over twenty years in relation to winter forage quality map. Can we predict their movement patterns based upon forage variables?
6. Perform vegetation change scenario to determine possible impacts of climate change on lichens and thus caribou winter forage.
This monitoring project uses imagery (i.e., Landsat, IKONOS) to track the number, size, and distribution of shallow lakes and ponds on a landscape scale. On-the-ground field sampling is also conducted at a subset of lakes to track water quality, macroinvertebrate, and plant communities.
1. Sensors need to be able to support long term (20+ years) monitoring programs.

2. Inventory & monitoring varies in scale, resolution, and collection intervals, i.e., MMU < 1 ha, and daily observations, or MMUs = sqkms and decadal observations.

3. Topography and/or vegetation height would be useful information if they would allow observations over decade time scales.

4. SMAP products could augment on-going growing-season monitoring activities.

5. Having a statewide dataset on glacial ice thickness would be a major asset to the glacier monitoring projects.

6. The freeze/thaw product looks promising.
Questions?

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http://science.nature.nps.gov/im/units/akro/AKR_Inventories.cfm

Autumn on Teluquana Lake in Lake Clark National Park & Preserve.
Photo Taken By: Jeanette Mills