A Natural Resource Condition Assessment for Sequoia and Kings Canyon National Parks: a forthcoming publication

Why a SEKI Natural Resources **Condition Assessment?**

Sequoia and Kings Canyon National Parks (SEKI) hosts a diversity of landscapes and microclimates that give rise to a rich diversity of plants, animals and ecosystems. These interact as functional and regionally-important systems. SEKI protects 865,964 acres (350,443 ha) of wilderness land in one of 25 globally-recognized hotspots of endemic biodiversity. SEKI has also been designated as a unit of the International Man and the Biosphere Program. SEKI's high elevations capture significantly more precipitation than the region around it. This water is used downstream by one of the largest agricultural regions of the U.S. Thus, the condition of the ecosystems that SEKI protects is of regional and global ecological and economic significance.

What is an NRCA?



The nested watersheds of SEKI form the spatial basis for the NRCA analyses

The SEKI Natural Resources Condition Assessment (NRCA) is a spatial analysis of the condition of multiple resources and their stressors across the parks' landscape. The NRCA provides a scientifically credible assessment that informs management strategies like the Resource Stewardship Strategy. While it is designed to meet SEKI needs, the NRCA follows national NPS guidelines/standards for study design and reporting products common to each of the ~ 270 parks.

Resources and Stressors Analyzed

Landscape Dimension: Landscape Context

Chemical and Physical: Air Quality, Erosion and Mass Wasting, Glaciers, Soils, Water Quality, Water Quantity

Biological-Plants: Alpine Ecosystems, Five-needle Pine, Foothills Vegetation, Giant Sequoias, Intact Forest, Meadows, Plants of Conservation Concern, **Biological-Animals:** Animals of Conservation Concern, Bats, Birds, Cave

Invertebrates,

Biological-Comprehensive: Biodiversity

Stressors: Air pollution, Altered fire regime, Human-use and fragmentation, Climatic change, Non-native plants and animals

A Collaborative Process



A resource expert, or group of experts, analyzed each focal resource. Some resources received condition assessments while others, which did not have the necessary data, had a status report. Most of the resources were analyzed by working groups made up of individuals from multiple agencies and/or universities, including the Universities of California-Berkeley, -Davis and -Merced, NPS-SEKI, NPS-Sierra Nevada Inventory & Monitoring, US Geological Survey, US Forest Service, Institute for Bird Populations, Spatial Informatics Group, and Microsoft Research. Thirteen reports were also peerreviewed by experts outside these working groups.

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Scientifically based integrity metrics were selected for each focal resource.



Area Summaries

Physical/Chemical

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Watersher' Units

Better

Relative Conditio

Intermediate
Worse

No Informatio

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Integrity metrics were represented spatially.





Results: Condition of Resources in Sequoia and Kings Canyon National Parks

Biological-Plants



Condition Metrics by River Basin

Kings River Basin

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Kern River Basin

	Resource
Air Qu	ality- NDEP
Air Qu	ality-Ozone
Climat	te-Temperature
Climat	te-Precipitation
Water	Quantity-Snowpack
Water	Quantity-Streamflow Timing
Water	Quality-Summary
Giant	Sequoias
Intact	Forest
Five N	eedle Pine
Meado	ows (grazed)
Brown	Bear
Califor	mia Condor
Foothi	II Yellow-legged Frog
Mt. Ye	llow-legged Frog
Native	Fish
Sierra	Nevada Bighorn Sheep
Lands	cape fragmentation
Air Qu	ality-Summary
Climat	e Change-Summary
Altered	d Fire Regime
Five-n	eedle Pine-Blister Rust
Invasiv	ve Plants
Invaeiv	e Animals-Non-native Fish

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Process and Products



Biological-Animals of Conservation Concern National Park Service



Stressors



Here we present the results as summarized in the final chapter of the report. Maps show each watershed's relative condition, calculated as the average condition for each ecological category (Physical/Chemical, Biological-Plants, Biological-Animals, and Stressors). Tables show the relative condition of individual metrics that were averaged to make the maps.

It is important to note that the results are highly dependent on the selection of resources and stressors for analysis. The selection of resources/stressors was based on data availability and importance to managers. Some resources and stressors did not have necessary data to make a geospatial condition assessment.

In general, resources appear to have higher ecological integrity in the more remote and/or higher elevation regions. These are the farthest away from human stressors of air pollution, plant invasion, and pests/pathogens. Based on the stressors analyzed, the Kaweah River basin appears to have lower integrity than other areas of the parks. Here, air pollution is the highest, snowpack and streamflow timing are most accelerated by warming temperatures, invasive plants, pests and pathogen impacts are highest, and here is where fire frequency is furthest from its historic frequency.

At the same time, the Kaweah River basin appears to be a hotspot of biodiversity. Here, sequoia groves and caves are abundant, and there is a large tract of Sierra Nevada foothill vegetation. Together, the combination of physical and biological resources and human stressors interact to make the Kaweah River basin a resourcerich area and also one heavily impacted by stressors.







Kaweah River Basin



The report will be available in April 2013.

National Park Service, 2013, Natural Resource Condition Assessment for Sequoia and Kings Canyon National Parks. Natural Resource Report NPS/SEKI/NRR-2013/XXX. Eds. J.A. Panek and C.A. Sydoriak. National Park Service, Fort Collins, CO.

It will be available electronically at: http://www.nature.nps.gov/publications/NRPM.