



Monitoring Landscape Dynamics

Background and Audience

NPScape is a landscape dynamics monitoring project that produces and delivers to parks, a suite of landscape-scale data sets, maps, reports, and other products to inform resource management and planning at local, regional, and national scales. Changes in the composition and configuration of different land cover types within and adjacent to National Parks has been shown to greatly affect biological and physical processes within those parks, such as habitat availability, animal movements, potential for invasion by exotic plants, water quality, and in-stream habitat for fish and other aquatic organisms. Information about changes and trends in landscape-scale indicators in and around parks can help park managers anticipate, plan for, and manage associated effects to park resources.

The target audience for NPScape spans the range from GIS specialists who will benefit from the geospatial data and tools, to network ecologists or park resource management specialists who will be interested in general landscape metrics presented in a local and regional context, to park superintendents who can incorporate the maps and graphics into reports or briefings.

Measures

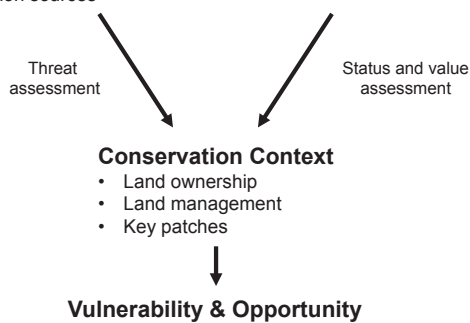
At its core, NPScape delivers a suite of products that focus on a set of information-rich, landscape-scale indicators for 270+ parks with significant natural resources. The initial analyses summarized and delivered measures in 6 major categories (population, housing, roads, land cover, pattern, and conservation status) that broadly address the environmental drivers, natural attributes, and conservation context of NPS units. Example measures in each category are illustrated in the diagram below. In aggregate, these measures contribute to assessments of current natural resource status, potential threats, and conservation vulnerability and opportunity.

Human Footprint / Drivers

- Human population
- Roads / rails / power lines
- Impervious surface
- Hydrological impoundments
- Pollution sources

Natural Systems

- Area of habitats
- Core area
- Connectivity / fragmentation
- Disturbances



NPScape measures are produced at two relevant spatial extents: (1) a local area within 30 kilometers (18.6 miles) of the park boundary, which captures landscape dynamics most proximate to parks; and (2) at the scale of the Geographic Areas proposed by



The area surrounding Saguaro National Park is experiencing rapid urban and suburban development. Changes in the amount and configuration of different land cover types, changes in housing and road density, and other landscape-scale indicators can provide managers with a better understanding of park resources within the context of the surrounding landscape.

the Department of Interior for 21 Landscape Conservation Cooperatives to address landscape-scale climate change adaptation and conservation.

Where data permit, NPScape provides estimates of change in measures over time. Both the temporal and spatial resolutions of NPScape measures are determined by the availability of suitable data that encompass most parks.

Products

NPScape products represent the culmination of a significant amount of data mining, processing, analysis, and summarization. Existing products provided for each park and surrounding landscape and include:

- Source and processed GIS data and associated metadata
- An interpretive guide report (under review) describing the ecological relevance of NPScape data and measures as they relate to our understanding of current and anticipated landscape dynamics
- An example draft report demonstrating the applicability of NPScape to management and planning at one park (Saguaro NP)

Continued >>>

More Information

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Products (Continued)

- A Standard Operating Procedure (SOP) for each metric consistent with I&M protocols, as well as data processing scripts and tools for parks and networks to efficiently generate new customized products

- Park-based maps of each measure in multiple formats for non-GIS specialists, including interactive kml files for Google Earth and geo-pdf files for Adobe Acrobat

- Graphical summaries of the measures to enable parks and networks to understand their results in a comparative context

Further information on NPScape, including access to all products, is available through the NPScape website (see More Information) and the NPS Integrated Resource Management Applications (IRMA) data system (<http://irma.nps.gov>).

NPScape measures and key data attributes (years of coverage, spatial resolution and coverage).

Measure	Metric	Years	Resolution	Geographic coverage					
				Alaska	Lower 48	Pacific	Caribbean	Mexico	Canada
Population	Current: total and density	1990, 2000	Census block groups	X	X	X	X		
	Historic: total and density	1790-2000, by decade	County		X				
	Projected: total and density	2010-2030, by decade	County	X	X				
Housing	Housing density	1970-2100, by decade	100 m cells		X				
Roads	Road density	Varies, up to 2005	Varies	X	X	X	X		X
	Distance from roads	Varies, up to 2005	Varies	X	X	X	X		X
	Area without roads	Varies, up to 2005	Varies	X	X	X	X		
Land cover	Natural vs. converted	Varies, 1992-2006	30 or 250 m cells	X	X	X		X	X
	Anderson Level I & II	Varies, 1992-2006	30 or 250 m cells	X	X	X		X	X
	Impervious surface	2001, 2006	30 m cells		X	X			
Pattern	Patch size	2001 or 2005	30 or 250 m cells	X	X			X	X
	Morphology	2001 or 2005	30 or 250 m cells	X	X			X	X
	Area density	2001 or 2005	30 or 250 m cells	X	X			X	X
Conservation status	Area protected	Varies	Varies	X	X	X	X	X	X
	Ownership	Varies	Varies	X	X	X	X	X	X