



# NPScape Landscape Dynamics Monitoring in US National Parks

Introduction and Overview

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Inventory and Monitoring Program  
Fort Collins, CO

# Overview of Workshop



1. 10:00 – 10:15. Bill Monahan:  
*This introduction to NPScene*
2. 10:15 – 10:30. Lisa Nelson:  
*Demo of NPScene ArcGIS Toolboxes for running analyses*
3. 10:30 – 10:45. Tom Philippi:  
*Landscape predictors of bird distribution*
4. 10:45 – 11:05. Shepard McAninch:  
*Landscape drivers of fish habitat & corridor mapping*
5. 11:05 – 11:35. Cheryl McIntyre:  
*GYA, Capulin Volcano NM, and SODN applications*
6. 11:35 – 12:00. Bill Monahan  
*Applications to Saguaro National Park*

# NPScape Key Themes



- *Putting science* (landscape-level data/analyses) *into hands of park managers and planners*
- Acknowledge influence of *external changes* to internal *resource dynamics*
- Take a *common, systemic approach* to high-priority vital sign for most, if not all, Networks
- *I&M's role and involvement in multi-agency climate change response* – applicable to vulnerability assessments and subsequent adaptation planning

# NPScape Objectives



Key NPScape objectives are to provide:

1. A coherent *conceptual and analytical framework* for conducting landscape-scale analyses and evaluations that can inform park-level decisions
2. Credible *methods* that are well documented, founded on strong science, and *readily repeatable and extensible with local data*
3. Informative and useful *data* and related products at the broad scales *not typically available at the park level*
4. *Assistance to parks* in interpreting results

# NPScape Conceptual Model



## Human Footprint / Drivers

- Population / housing
- Roads
- Impervious surface
- Converted land cover

## Natural Systems

- Natural land cover
- Core areas
- Connectivity
- Intactness

*Threat  
assessment*

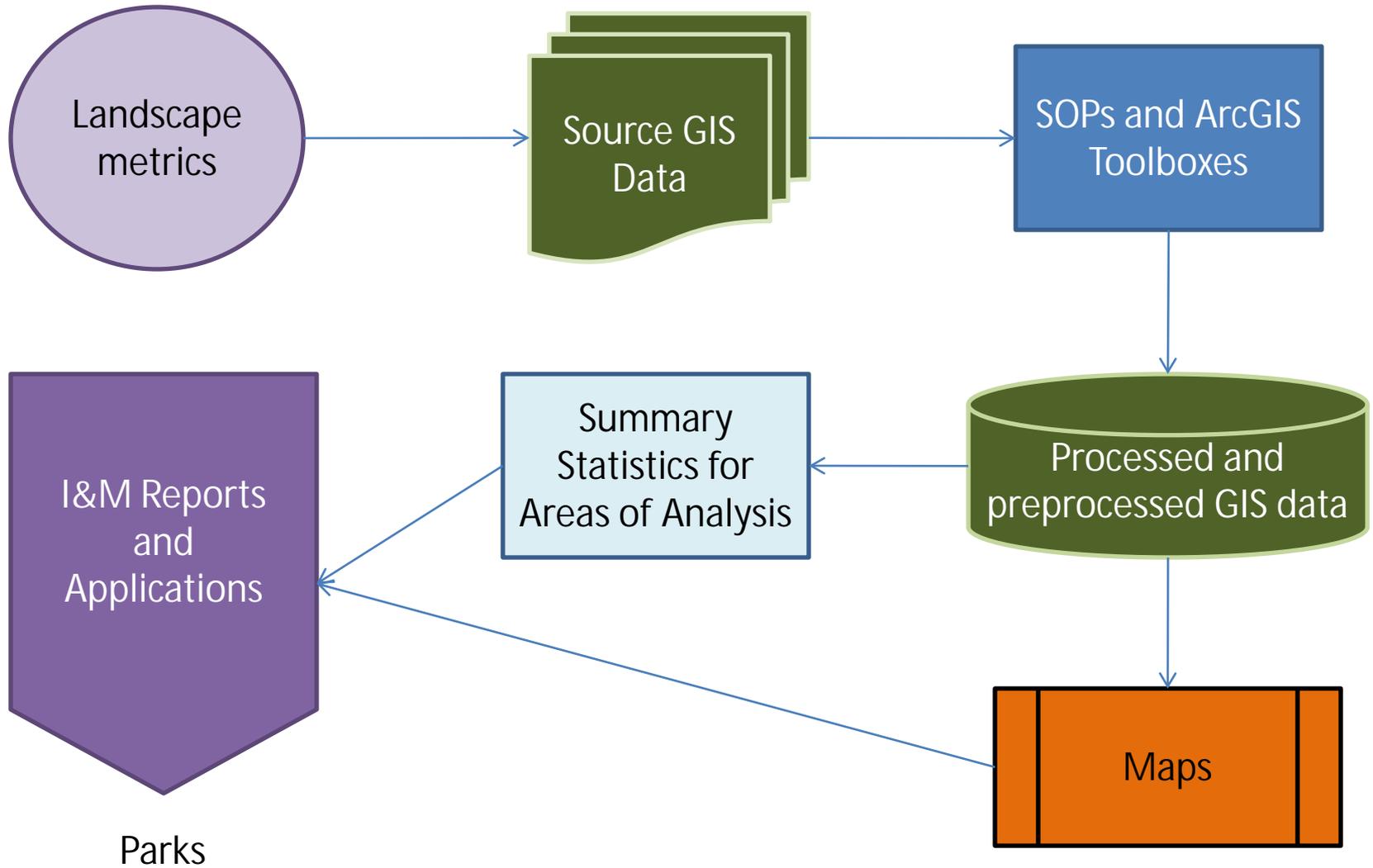
*Status and value  
assessment*

## Conservation Context

- Land ownership
- Land management

**Vulnerability & Opportunity**

# NPScape Product Development Model

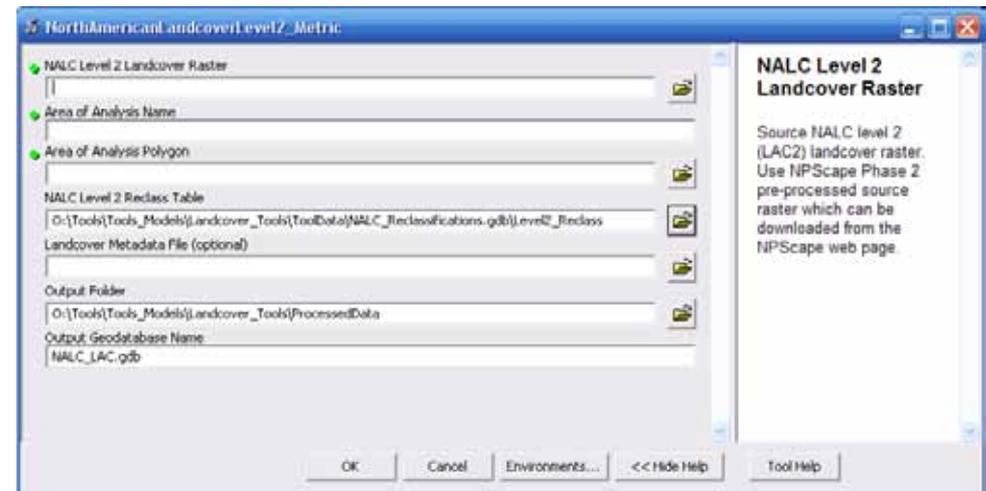
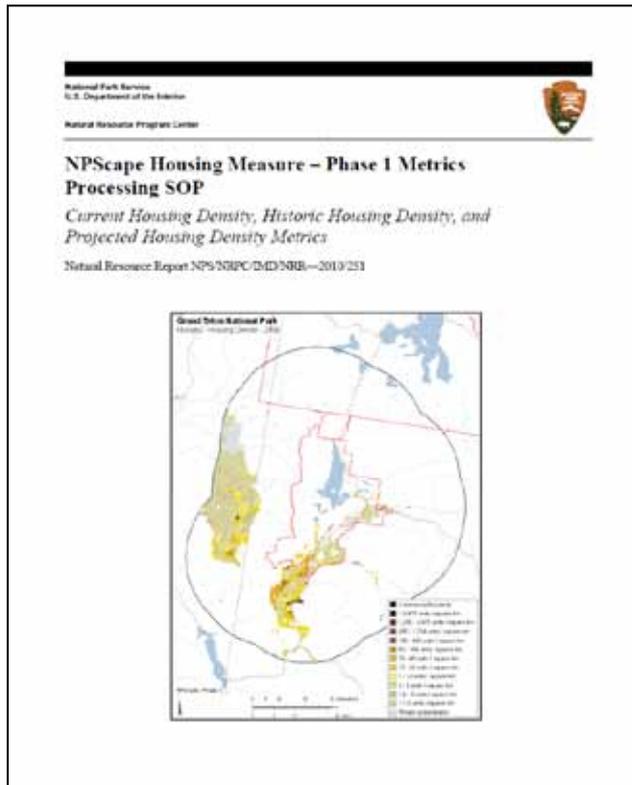


# NPScape Metrics & Data



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	1940-2100, by decade	100 m cells		X				
Roads	Road density (all, major and weighted roads)	Varies, up to 2005	Varies	X	X	X	X		X
	Distance from roads (all and major roads)	Varies, up to 2005	Varies	X	X	X	X		X
	Area without roads (all and major roads)	Varies, up to 2003	Varies	X	X	X	X		
Land cover	Percentage natural vs. converted	1992 and 2001, or 2005	30 or 250 m cells	X	X	X		X	X
	Area / category	1992 and 2001; 2005; 1996, 2001, 2005-2006	30 or 250 m cells	X	X	X		X	X
	Percentage impervious	2001	30 m cells		X	X			
Pattern	Patch size (grassland or forest)	2001 or 2005	30 or 250 m cells	X	X			X	X
	Morphology (grassland or forest)	2001 or 2005	30 or 250 m cells	X	X			X	X
	Area density (grassland or forest)	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 area / category	Varies	Varies	X	X	X	X	X	X

# Methods: SOPs and Script Tools



```
# Load required toolboxes...
```

```
gp.AddToolbox("C:/arcgis/ArcToolbox/Toolboxes/Analysis Tools.tbx")  
gp.AddToolbox("C:/arcgis/ArcToolbox/Toolboxes/Conversion Tools.tbx")  
gp.AddToolbox("C:/arcgis/ArcToolbox/Toolboxes/Data Management Tools.tbx")
```

```
Output_Feature_Class = Output_Workspace_or_Feature_Dataset + "\\\" + NPS_Unit_Code + "_AOA_" + Layer_Suffix  
nps_bound_all_albers_Layer = "nps_bound_all_albers_Layer"
```

```
# Process: Make Feature Layer...
```

```
Argument = "[UNIT_CODE] = '" + NPS_Unit_Code + "'"   
gp.MakeFeatureLayer_management(Input_NPS_Feature_Class, nps_bound_all_albers_Layer, Argument, "", "UNIT_CODE UNIT_CODE VISIBLE NONE.
```

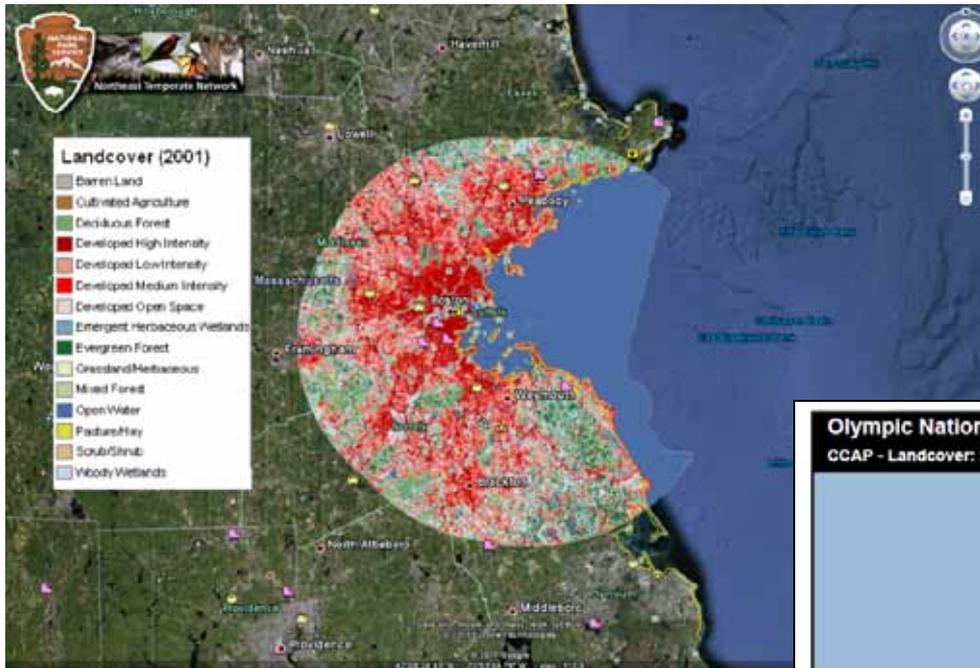
```
# Process: Create 30km Buffer...
```

```
gp.Buffer_analysis(nps_bound_all_albers_Layer, Output_Feature_Class, BufferArea, "FULL", "ROUND", "NONE", "")
```

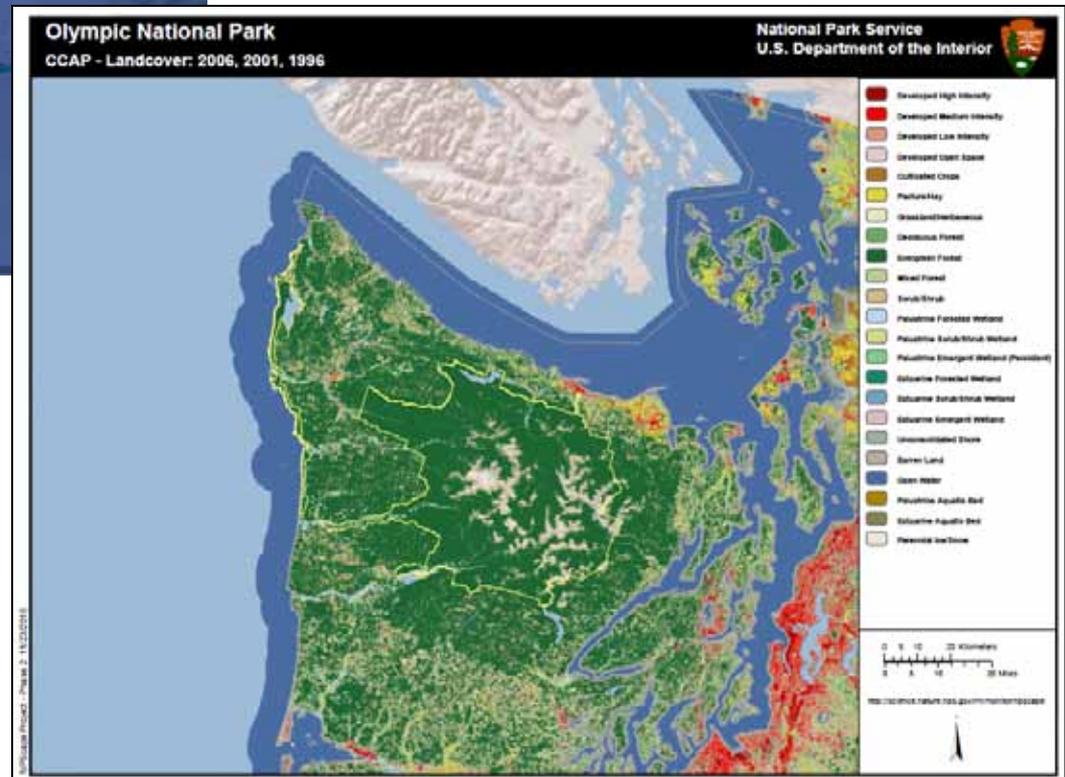
```
# Process: Add AOA_SQKM (4)...
```

```
gp.AddField_management(Output_Feature_Class, "AOA_SQKM", "DOUBLE", "8", "3", "", "", "NULLABLE", "NON_REQUIRED", "")
```

# NPScape Maps



KMZ files for use in Google Earth



Geo-PDF's for use in Adobe Reader

# Reports and Resource Briefs



## A Guide to Interpreting NPScape Data and Analyses

Natural Resource Report NPS-DM/NRR-2011-XXXX



## Landscape Data Guide Available to Parks

Patrick H. Fisher, Data Manager, Appalachian Highlands E-M Network

NPScape is a landscape dynamics monitoring program that provides landscape-level data and evaluations for park natural resource management and planning at local, regional, and national scales. The need for such a program is critical because changes in land cover, land use, habitat connectivity and isolation, natural ecological disturbance regimes, and other landscape-level factors profoundly affect park natural resources. The maps, graphs and tables produced from the data will assist park managers

in identifying potential threats and vulnerable landscapes.

A detailed data interpretation guide available to every park will provide best practices for creating maps, graphs, and tables to communicate findings. The reference records are presently available via the NREIS Data Portal (<http://nreis.nps.gov/Home.mvc>) and Natural Resources Information Portal. Geospatial data may be obtained by contacting park GIS Specialists and Data Managers.



Map used for depicting impacts of a proposed road.

More information may be found through the NIS internet at <http://science.nature.nps.gov/im/monitor/npscape/index.cfm>



## NPScape Landscape Dynamics Reporting for Saguaro National Park

Natural Resource Report NPS-XXXX/NRR-2011-XXXX



## Resource Monitoring Brief NPScape

National Park Service U.S. Department of the Interior Natural Resource Program Center Inventory and Monitoring Program

## 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 graphs 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.



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 Area 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 resource 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 encompasses most parks.

### Products

- Source and processed data and associated metadata
- A draft interpretive guide 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 (Buffalo NPO)

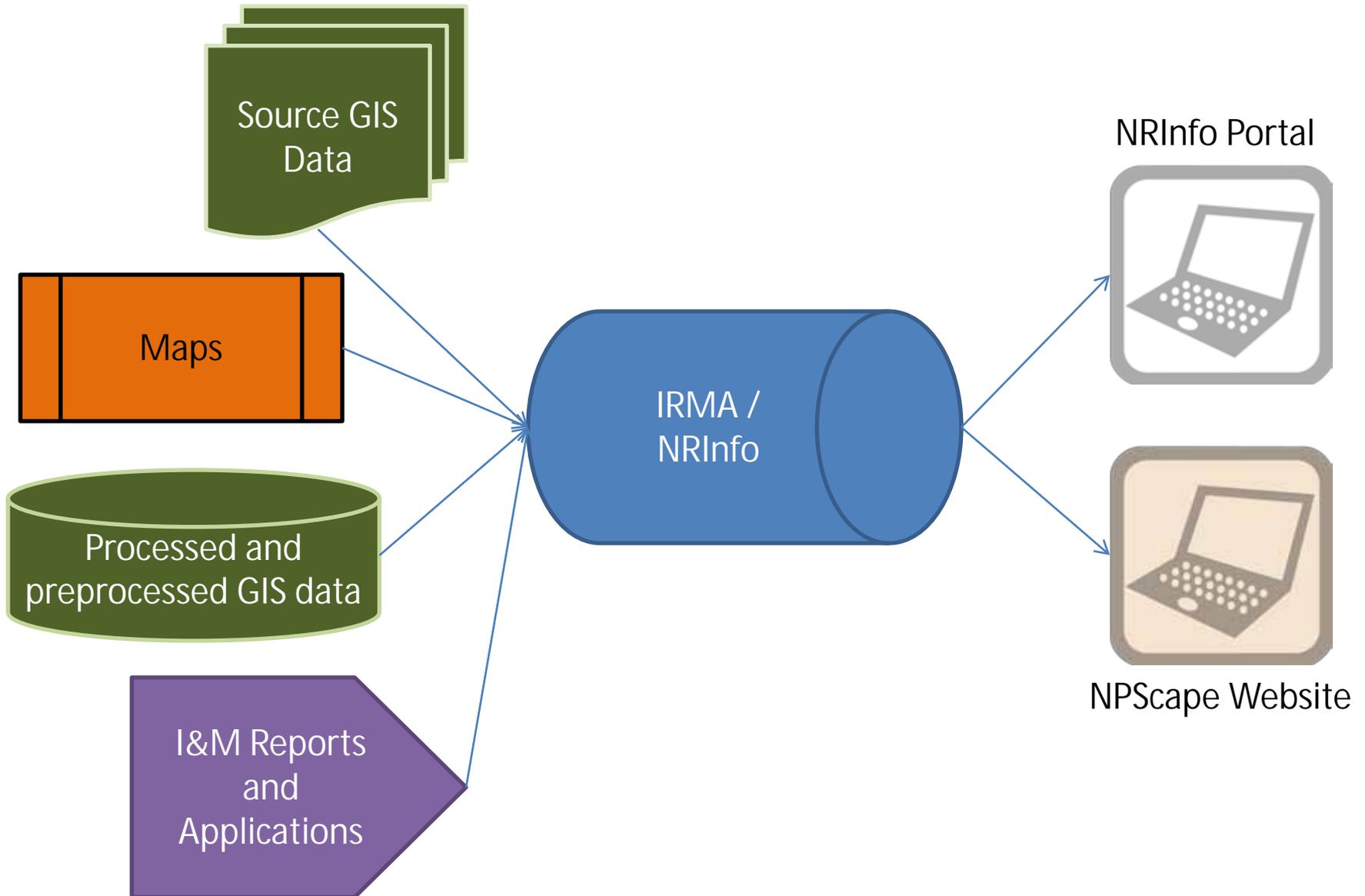
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### More information

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Terrace Resource Program Center  
Inventory and Monitoring Division  
1201 Osborne Drive, Suite 110  
Fort Collins, CO 80525  
<http://science.nature.nps.gov/im/monitor/npscape>

# NPScape Product Delivery Model



# Access to NPSCape



**Natural Resource Information Portal**  
National Park Service  
U.S. Department of the Interior  
Natural Resource Program Center

Home References Biology Geospatial Air & Climate Geology & Soils Water Landscapes Human Use Tools

Welcome: CFJohnson

Welcome

**Welcome to the Natural Resource Information Portal**

To get started, click on one of the subject tabs above, or use the quick navigation below. For now, the NRInfo Portal is limited to NPS users. Public access to non-sensitive data will be available in late 2010.

**Quick Navigation**

- Search for documents and datasets
- Search for a Park-Species list
- Geographic search for documents, datasets, and species lists

Comments or questions? Please email ([nrinfo\\_feedback@nps.gov](mailto:nrinfo_feedback@nps.gov)).

**NRInfo News**

- NRInfo Portal weekly web
- About the NRInfo Portal
- Work underway for public access to the portal

Best viewed in Internet Explorer

NRPC Intranet NRPC Internet

**National Park Service**  
Nature & Science

NPS » Nature & Science » Inventory & Monitoring » Vital Signs Monitoring » NPSCape » GIS Data

**NPSCape - Monitoring Landscape Dynamics of Parks**

GIS Data Overview Phase 1 GIS Data Phase 2 GIS Data

**About Phase 1 GIS Data**

NPSCape GIS data for Phase 1 are available for download at two different scales: (1) park-wide for each NPS unit plus 30 kilometer buffer, and (2) regionally for each Landscape Conservation Cooperative (LCC). Select a park or LCC and you will be directed to a new page where you can download the data (zip files) as "Holdings".

**Note on Browser Compatibility:** The data links are best viewed in Internet Explorer version 7.0 or higher. Some features may not currently work if you are using Firefox, Opera, Chrome or other browsers.

Choose a Park:  go

OR, select a Landscape Conservation Cooperative (LCC) from the map below.

**Landscape Conservation Cooperatives  
NPSCape Phase 1 Nomenclature**

TOP OF PAGE

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Natural Resource Information Portal

<http://nrinfo>

NPSCape Website

<http://science.nature.nps.gov/im/monitor/npscape/>