



# PARK VITAL SIGNS MONITORING



**MOJAVE INVENTORY AND MONITORING  
NETWORK**

# The Law:

## **NATIONAL PARKS OMNIBUS MANAGEMENT ACT OF 1998**

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“The Secretary shall undertake a program of inventory and monitoring of National Park System resources to establish baseline information and to provide information on the long-term trends in the condition of National Park System resources. The monitoring program shall be developed in cooperation with other Federal monitoring and information collection efforts to ensure a cost-effective approach.”

“The Secretary shall ... assure the full and proper utilization of the results of scientific studies for park management decisions.



# Natural Resource Challenge

**“Clearly, the old management style will be insufficient to conserve our natural resources in the 21<sup>st</sup> century. ... our lack of information about plants, animals, ecosystems, and their interrelationships is profound.”**



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# **Inventory & Monitoring**

**Provide funding and technical support to parks with significant natural resources**

**LONG-TERM GOAL:** Implement ecological monitoring in all units of the NPS.

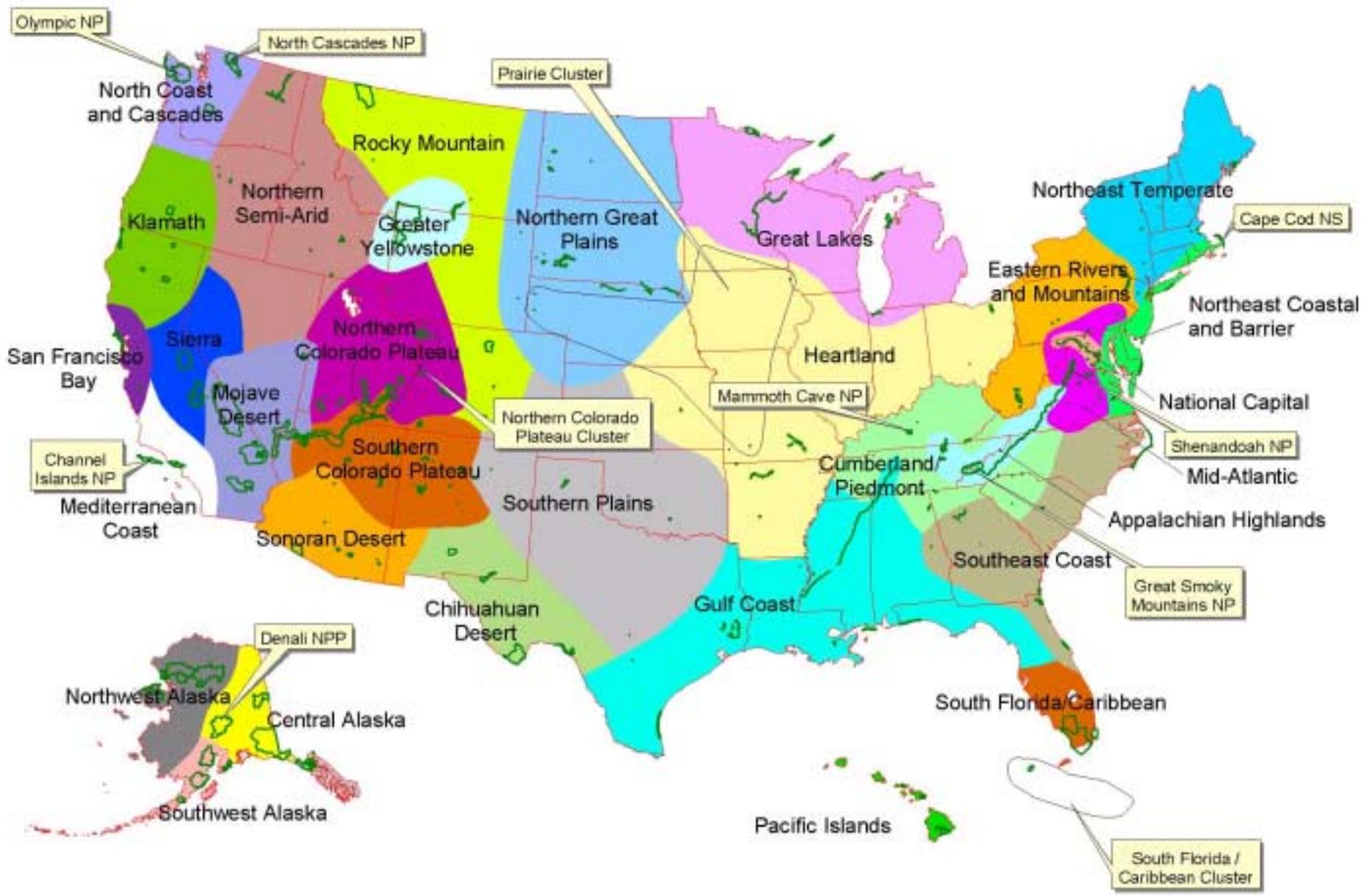
**SHORT-TERM GOALS (as of 1992):**

- 1. Complete baseline resource inventories.**
- 2. Learn how to design and conduct monitoring programs.**

# THE HOPE

**Each network will leverage core resources and funding with other resources and partnerships to build an integrated monitoring program that works best for that network of parks**





# Mojave

Death Valley

Great Basin

Joshua Tree

Lake Mead

Manzanar N

Mojave National Preserve

Grand Canyon-Parashant  
National Monument



# What are Vital Signs?

**Vital Signs are key elements that indicate the health of an ecosystem.** Vital signs may occur at any level of organization including landscape, community, population, or genetic levels.

They may be **compositional**

(referring to the variety of elements

in the system), **structural** (referring to the organization or pattern of the system),

or **functional** (referring to ecological

processes). Vital signs can be any

measurable feature of the environment that

provides insights into the state of the ecosystem.



# Generally Fall Into 3 Categories

- 1. Vital signs/indicators that are required to be included for legal reasons (e.g. T&E).**
- 2. Vital signs/indicators required for Performance Mgmt. Reporting purposes or because funding was provided for a specific purpose (e.g. impaired waters monitoring).**
- 3. Vital signs/indicators selected by networks from a list of recommended vital signs or identified as a priority by a network.**

*Each park can identify its own top priority monitoring needs and all parks in a network don't have to monitor the same thing.*

# Goals of Vital Signs Monitoring

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- 1. Identify status and trends in ecosystem health.**
- 2. Define normal limits of variation.**
- 3. Provide early warning of situations that require intervention.**
- 4. Suggest remedial treatments and frame research hypotheses.**
- 5. Determine compliance with laws and regulations.**



# **7-step Approach for Developing a Network Monitoring Program**

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- 1. Form a Board of Directors and a technical committee to lead/advise the process.**
- 2. Summarize existing data and understanding**
- 3. Prepare handouts and draft conceptual models for scoping workshop**
- 4. Hold a scoping workshop for input and peer review.**
- 5. Workshop report is written and widely reviewed.**
- 6. Board of Directors makes decisions on priorities and implementation.**
- 7. Monitoring plan is prepared, reviewed and approved**

# 3-Phase Monitoring Design

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- **Phase 1: Background work prior to selecting vital signs**
  - goals and objectives for monitoring
  - identify, evaluate, synthesize existing data and understanding (identify and catalog existing data sets)
  - draft conceptual models **(Due Oct. 1, 2004)**
- **Phase 2: Initial selection and prioritization of vital signs**
  - update and expand upon Phase I work
  - hold network/park vital signs scoping workshop(s)
  - select and prioritize vital signs
  - write workshop report and have peer reviewed **(Due Oct. 1, 2005)**
- **Phase 3: Development of full monitoring plan**
  - Detailed design work; protocols, spatial sampling design
  - Design database
  - Write Data Management Plan **(Final plan due Oct. 1, 2007)**

# Outline for Vital Signs Monitoring Plans

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- Executive Summary
- Introduction and Background
  - purpose, goals, objectives, important issues, overview of park resources, overview of past/current monitoring by parks and adjacent agencies.  
Who is interested in the monitoring information, and why?
- Conceptual Models (of park ecosystem, focusing on aspects relevant to the proposed monitoring).....↑ **Phase 1 Report** ↑.....
- Vital Signs
  - justification for vital signs selected, and those not selected; specific, measurable objectives, including “trigger points” or thresholds wherever possible.....↑ **Phase 2 Report** ↑.....
- Sampling Design
  - overall design that allows inferences to be made to larger areas; define populations and sampling units being sampled; stratification and collocation issues

# Outline for Vital Signs Monitoring Plans

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- Sampling Protocols
  - overview of sampling protocols to be used (include most of items in protocol narrative outline)
- Data Management
  - describe process for entering, storing, archiving; attach data management plan as an appendix
  - overview of database design (MS Access)
- Data Analysis and Reporting
  - data analysis procedures
  - describe reports and other products; who are they for, what will they include, how often, who is responsible for producing them?
- Administration/Implementation of the Monitoring Program
  - describe makeup of BOD and technical committees; staffing plan; integration of monitoring with other park operations; partnerships; reviews
- Schedule - frequency of sampling, what season; target dates for protocols to be developed
- Budget; Literature Cited; Appendices

↑ Phase 3 Report ↑

# How Is the NPS Using Monitoring Information?



# Prairie Cluster Prototype Monitoring Program

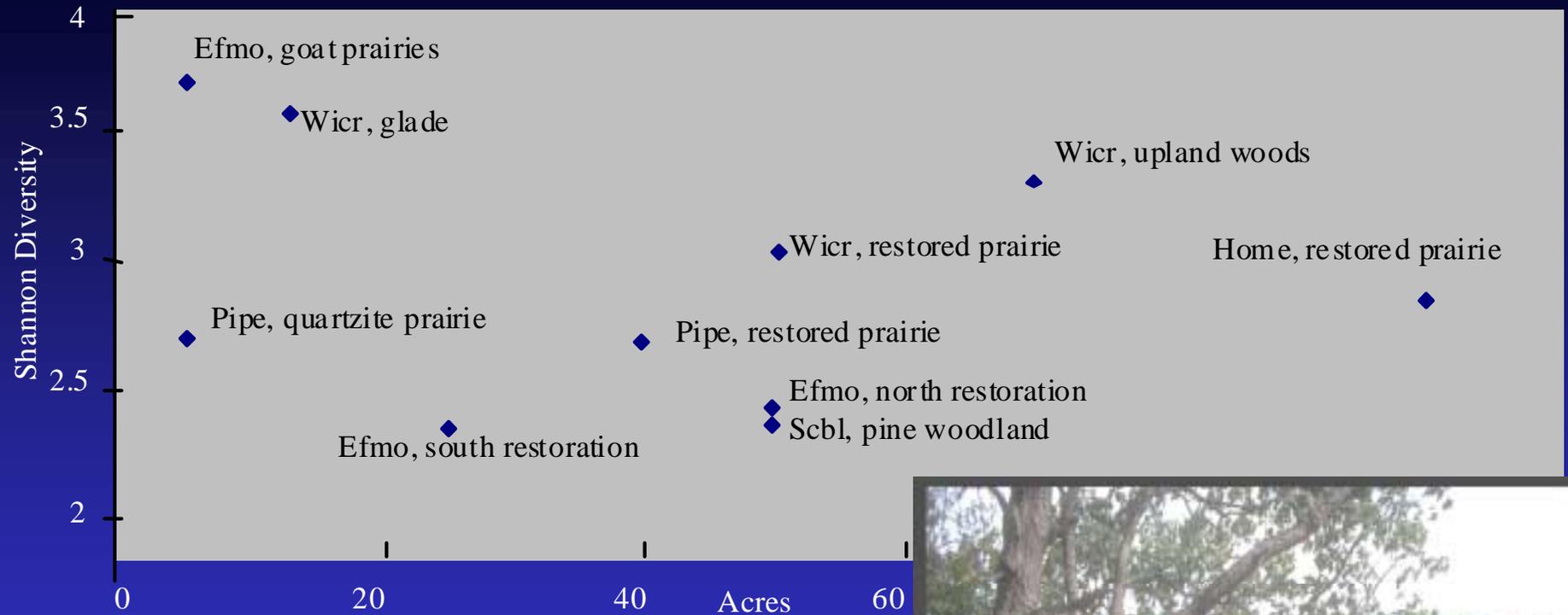
## A Network Success Story

### Uses of Plant Community Monitoring Data Prairie Prairie Cluster Monitoring Program:

- GMP planning meetings at PIPE and WICR
- NRPP project proposal to manage shrubs at HOME
- Cultural landscape report at WICR
- Trail expansion planning at EFMO
- Model for restoration seed mix at SCBL
- Savanna restoration plan at EFMO
- Trailside native plant signage at PIPE
- Vegetation Mapping at EFMO

# Using Monitoring Data in Management Decisions

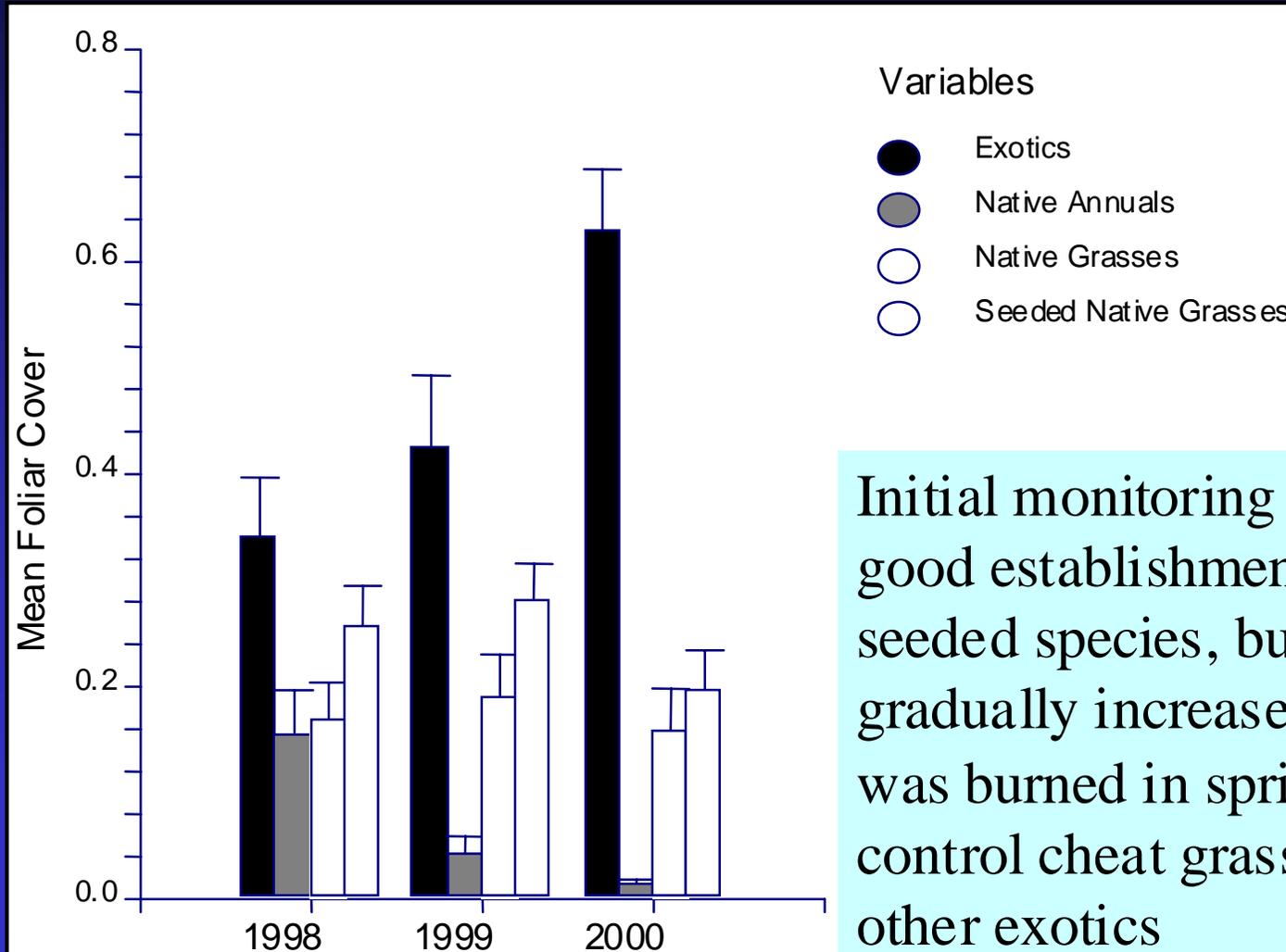
## Alternate site for Trail Expansion at Effigy Mounds



Where would you put the trail?

# Monitoring Results, Mixedgrass Prairie Restoration Scott's Bluff National Monument

Foliar cover of seeded grasses, native annuals & grasses, and exotic species

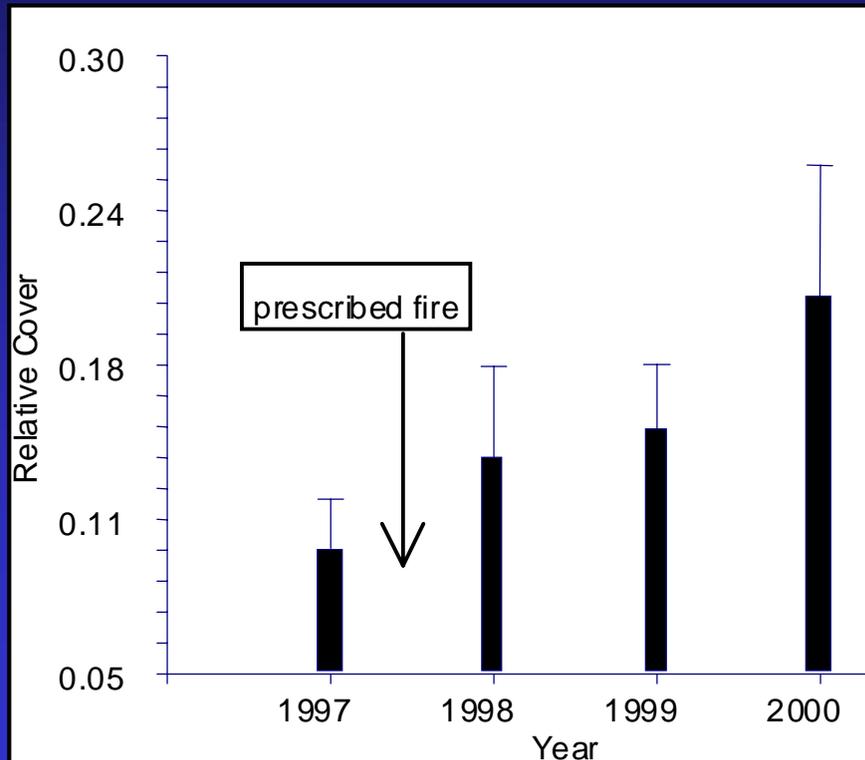


# Monitoring Results: Manley Woodlands

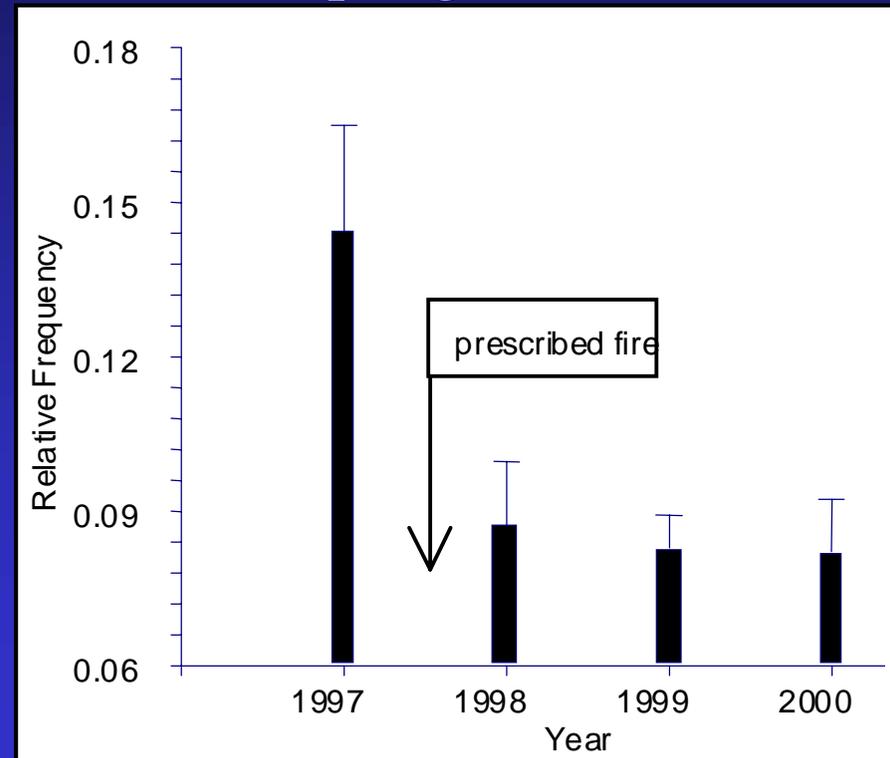
## Wilson's Creek National Battlefield

(timing of prescribed fire changed to spring based on monitoring results)

Relative cover of cool season  
grasses and sedges



Relative frequency of ephemeral  
spring forbs



# What Resources Are Available to NPS and Others?

*[www.nature.nps.gov/im](http://www.nature.nps.gov/im)*

*[www.nature.nps.gov/im/monitor](http://www.nature.nps.gov/im/monitor)*

Kristina Heister  
Mojave I&M Network Coordinator  
[kristina\\_heister@nps.gov](mailto:kristina_heister@nps.gov)  
775-234-7331 ext 227



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# Inventory and Monitoring

## Monitoring Natural Resources in our National Parks

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# The National Park Service

## Inventory and Monitoring

### Handbook for Monitoring Vital Signs in National Parks

#### Natural Resource Program center

- Air Resources Division
- Biological Resource Management Division
- Geological Resources Division
- Natural Resource Information Division
- Water Resources Division

The NRPC is beginning to develop this "Handbook for Monitoring Vital Signs in National Parks" to assist parks in designing their monitoring programs. The intent is for the handbook to be a 3-ring binder with chapters that can be downloaded from this website. The chapters will focus on different subject areas and will be continually improved and updated as parks learn new and better ways to monitor natural resources. Here are draft chapters available for this work in progress:

# Web-based Clearinghouse of Protocols and Database Components

Amphibian Call Counts	<u>Protocol</u>	<u>Database*</u>	<u>Data Analysis</u>
Bird VCP counts	<u>Protocol</u>	<u>Database</u>	<u>Data Analysis</u>
Breeding Bird Survey	<u>Protocol</u>	<u>Database</u>	<u>Data Analysis</u>
Coral reef video sampling	<u>Protocol</u>	<u>Database</u>	<u>Data Analysis</u>
Rare plants	<u>Protocol</u>	<u>Database</u>	<u>Data Analysis</u>
Rare plants	<u>Protocol</u>	<u>Database</u>	<u>Data Analysis</u>
Weather	<u>Protocol</u>	<u>Database</u>	<u>Data Analysis</u>
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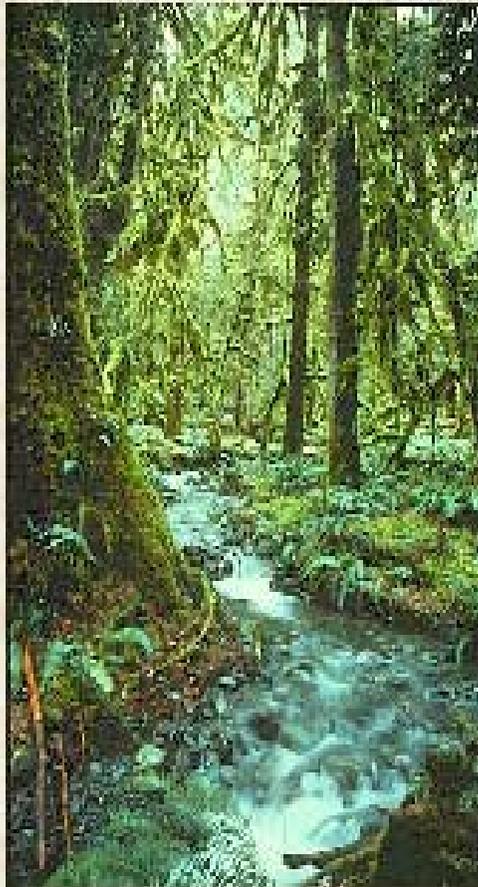
\* Database is an MS Access .mdb file with tables, queries, forms, reports designed for a particular protocol.



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# Inventory & Monitoring

## Inventory and Monitoring Applications and Databases



- [GIS Theme Manager](#)
- [Natural Resource Database Template](#)
- [NPSpecies](#)
- [NatureBib - Bibliography](#)
- [Dataset Catalog](#)
- [Synthesis](#)
- [Product Specifications](#)

# NPS Advisory Board Report:

**“A sophisticated knowledge of resources and their condition is essential. The Service must gain this knowledge through extensive collaboration with other agencies and academia, and its findings must be communicated to the public. For it is the broader public that will decide the fate of these resources.”**

Source: Rethinking the National Parks for the 21st Century. A Report of the National Park System Advisory Board, July 2001

*Visit us at [www.nature.nps.gov/im/monitor](http://www.nature.nps.gov/im/monitor)*