Glen Canyon Dam Adaptive Management Work Group
Agenda Item Information
September 9-10, 2008

Agenda Item
National Park Service Resource Challenge

Action Requested
✓ Information item only. We will answer questions but no action is requested.

Presenter
Steve Martin, Superintendent, Grand Canyon National Park

Previous Action Taken
N/A

Relevant Science
N/A

Background Information
The National Park Service Resource Challenge (http://www.nature.nps.gov/challenge/) is an internal NPS program that has invested tens of millions of dollars in developing inventory and monitoring programs throughout the Service. The intent of the program is to be thoughtful about both what is being inventoried and monitored and how it is accomplished across the country. The purpose is to give the managers better tools for preserving the resource.

Superintendent Steve Martin will provide an overview of the program to AMWG members so they will have a better understanding of National Park Service (and Grand Canyon National Park) background and proficiency in both inventory and monitoring. He will discuss future opportunities for the park to assume some of the monitoring responsibility of the AMP where it overlaps with existing NPS Inventory and Monitoring programs. Benefits of such an arrangement could include saving AMP program dollars, increased efficiency and effectiveness, enhancing the amount of data available to the program, and providing integrated resource-based information for adaptive management decisions.
“The Secretary has an absolute duty, which is not to be compromised, to fulfill the mandate of the NPS Organic Act of 1916 to take whatever actions and seek whatever relief as will safeguard the units of the national park system.”

Steve Martin, Superintendent
Grand Canyon National Park
September 2008
National Parks Omnibus Management Act of 1998

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

2006 NPS Management Policies

The Service will:

• **identify, acquire, and interpret needed inventory, monitoring, and research**, including applicable traditional knowledge, to obtain information and data that will help park managers accomplish park management objectives provided for in law and planning documents;

• **define, assemble, and synthesize** comprehensive baseline inventory data describing the natural resources … and identify processes that influence them;

• **use qualitative and quantitative techniques to monitor** key aspects of resources and processes at regular intervals;

• **analyze the resulting information to detect or predict changes** that may require management intervention and provide reference points for comparison;

• **use the resulting information** to maintain – and where necessary restore – the integrity of natural systems
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.
FY 2001 I&M Program Expenditures

- **Inventories**: $10,790,000
- **Monitoring**: $5,588,000
- **Data Management**: $675,000 (3.7%)
- **Program Admin.**: $807,000 (4.3%)
- **Regional Coords.**: $605,000 (3.3%)
12 Basic Natural Resource Inventory Datasets

Natural resource bibliography
**Base cartographic data**
Geology map
Soils map
**Weather data**
Air quality
Location of air quality monitoring stations
Water body location and classification
**Water quality data**
Vegetation map
Species list of vertebrates and vascular plants
Species distribution and status of vertebrates and vascular plants of high priority to each park

*Integrate data sets and make them more available to managers using GIS Theme Manager.*
Grand Canyon

U.S. Department of the Interior
National Park Service
Grand Canyon National Park

270 Parks Grouped into 32 Monitoring Networks

The map shows a network of parks across the United States, grouped into networks like Arid West, Rocky Mountain, and Eastern Coastal and Barrier. Each network is color-coded for distinction.
PARK VITAL SIGNS MONITORING

Taking the pulse of the national parks

• 1991 - NPS develops a comprehensive strategy based upon the “Vail Agenda”
• 1992 - Inventory and Monitoring Committee’s Developed for each Region
• 1993 - Program Design Begins with Prototypes established for:
  • Channel Islands National Park
  • Great Smoky Mountains National Park
  • Shenandoah National Park
  • Cape Cod National Seashore
  • Denali National Park
  • Great Plains Prairie Cluster
  • Virgin Islands/Southern Florida Cluster
  • Olympic National Park
  • North Cascades National Park Service Complex
  • Mammoth Cave National Park
  • Northern Colorado Plateau Cluster

• 2002 – Vital Signs Monitoring Programs Implemented across the NPS
PARK VITAL SIGNS MONITORING WILL

“Focus on most significant indicators of long-term ecological trends and highest concerns among the parks in each network”

- Enable managers to make better informed management decisions;
- Provide early warning of abnormal conditions in time to develop effective mitigation measures;
- Provide data to convince other agencies and individuals to make decisions benefiting parks;
- Satisfy certain legal mandates;
- Provide a means of tracking resource condition and measuring performance.
### Core Vital Signs Organized within the NPS Ecological Monitoring Framework

<table>
<thead>
<tr>
<th>LEVEL 1</th>
<th>LEVEL 2</th>
<th>VITAL SIGN</th>
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<tbody>
<tr>
<td>Air and Climate</td>
<td>Air Quality</td>
<td>Air quality</td>
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<td>Geology and Soils</td>
<td>Weather and Climate</td>
<td>Climate conditions and soil moisture</td>
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<td>Soil Quality</td>
<td>Soil stability and upland hydrologic function</td>
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<td>Geomorphology</td>
<td>Channel morphology</td>
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<td>Water</td>
<td>Hydrology</td>
<td>Depth to groundwater</td>
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<td>Water Quality</td>
<td>Stream flow</td>
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<td>Water quality of streams and springs</td>
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<td></td>
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<td>Aquatic macroinvertebrates</td>
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<td>Biological Integrity</td>
<td>Focal Species or Communities</td>
<td>Spring, seep, and tinaja ecosystems</td>
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<td>Vegetation composition and structure (upland &amp; riparian)</td>
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<td>Ecosystem Pattern and Processes</td>
<td>Invasive Species</td>
<td>Habitat-based bird communities</td>
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<td>Ground-dwelling arthropods</td>
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<td>Land Cover / Land Use</td>
<td>Invasive non-native plants</td>
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<td>Fire</td>
<td>Vegetation condition and disturbance patterns</td>
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<td>Soundscape</td>
<td>Natural soundscape condition</td>
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<td>Viewscape</td>
<td>Night sky condition</td>
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Natural Resource Challenge Funding History
Grand Canyon

U.S. Department of the Interior
National Park Service
Grand Canyon National Park

NPS, USGS, FWS, Tribes & Cooperators together
“The National Park Service will protect, preserve, and foster appreciation of the cultural resources in its custody and demonstrate its respect for the peoples traditionally associated with those resources through appropriate programs of research, planning, and stewardship.” (Management Policies 2006)

“The National Park Service will conduct a coordinated program of basic and applied research to support planning for and management of park cultural resources” (NPS Management Policies 2006)
National Historic Preservation Act of 1966 (as amended)

“Section 110 of the National Historic Preservation Act requires park managers, in consultation with their SHPO’s, to establish programs to locate, inventory, and nominate to the National Register of Historic Places all properties that appear to qualify.” For archaeological resources, the Service’s systemwide archaeological inventory program establishes requirements, standards and priorities …” (NPS 28)

“The effects of natural processes and human activities on archaeological resources are assessed and documented. A schedule to monitor the condition of affected resources is established and implemented.” (NPS-28)
The Service’s cultural resource management program involves

- **research** to identify, evaluate, document, register, and establish basic information about cultural resources and traditionally associated peoples;

- **planning** to ensure that management processes for making decisions and setting priorities integrate information about cultural resources and provide for consultation and collaboration with outside entities; and

- **stewardship** to ensure that cultural resources are preserved and protected, receive appropriate treatments (including maintenance) to achieve desired conditions, and are made available for public understanding and enjoyment.

*NPS Management Policies 2006*
Basic Cultural Resource Inventory Datasets

Servicewide Inventories and Databases

- Cultural Landscape Inventory
- Cultural Sites Inventory – Archeology and Ethnography
  - Systemwide Archaeological Inventory Program
  - Archaeological Sites Management and Information System
  - Ethnographic Resource Inventory
- List of Classified Structures
- National Catalog of Museum Objects
- National Register of Historic Places
Inventory Total = 5.5% of the Park (65,176 acres)

Number of Sites Recorded = ~ 4300

Estimated Number of Sites in Park = 50,000

On-going program of data collection and documentation to support inventory, assessment, monitoring, and mitigation.
Integration of Tribal Perspectives And Values into NPS Management
Nowhere else in North America can you find such well preserved examples of ancient and historic architecture than in the arid Southwest. As a Vanishing Treasures park, Grand Canyon manages architectural remains through a program of preservation involving research, documentation and fabric treatment.

Architecture as Artifact
is the concept that architectural remains provide tangible links to a rich cultural history that spans thousands of years. Architecture is cared for and treated like irreplaceable artifacts. Archaeologists at Grand Canyon are fortunate to work with a wide variety of architecture.

The Vanishing Treasures Program
In 1997, the National Park Service envisioned an architecture preservation program that would provide funding for emergency stabilization projects and promote professional careers in archaeology.

Specialized Fields
- Archaeologists: research, documentation and treatment
- Exhibit specialists: documentation and conservation
- Masonry workers: test and apply preservation materials
- Structural engineer: maintenance of building systems
- Historical architect: preservation treatment applications

Vanishing Treasures Projects
Grand Canyon receives funding for condition assessment, architectural documentation and stabilization projects.

Condition Assessments: collecting information on types of deterioration and solving preservation problems.

Architectural Documentation: collecting information on structure layout, design and building materials.

Preservation Treatments: repairing preservation problems with documentation, hands-on fabric treatments and education.

Preservation Methods and Materials
The methods used in architectural preservation are aimed at preventing rapid deterioration of intact original fabric.

Indirect Treatment: architectural documentation, controlling exterior drainage, redirecting access, placement of erosion control fabric and public education.

Direct Treatment: repairing eroded mortar joints, resetting loose wall stones and contouring floor surfaces for interior drainage.

Digital Preservation Technology
- Digital photography for scaled drawings
- Total station survey equipment for mapping
- Global positioning system for survey control
- 3D laser scanning for modeling and drawings
- Computer-aided design for scaled drawings
In addition, Permanent Base Funding for VT Parks has increased by $3.7 million (61 base positions in 23 parks)
The National Park Service will conduct a coordinated program …
**WHAT IS MOST IMPORTANT TO MONITOR?**

- Define monitoring goals
- Identify important park resources, stressors, & resource concerns
- Identify key characteristics of ecosystem integrity
- Complete literature review and develop conceptual models of significant ecosystems
- Hold expert workshops to propose & evaluate vital signs
- Hold Science & Technical Advisory Committees workshop to select network vital signs
- Protocol development for core vital signs
- Implement monitoring of core vital signs

**WHY?**

**HOW?**

**TIMEFRAME:**
- 2003
- 2003 - 2004
- 2004
- 2004
- 2005-2009
- 2007-2010
NPS Vital Signs and the AMP – How We Work Together

• Build upon Existing Funded Programs; in so doing, we save the AMP funding and create opportunities for enhanced project funding

• Maintains the High Standard of Science the AMP and NPS require; peer reviewed and established protocols that provide consistency with data collection and management

• Helps the NPS meet the broad management objectives for Grand Canyon