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most informative one*

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October 13, 2000

N16 (2370)
Memorandum

To: Regional Directors

From: Associate Director, Natural Resource Stewardship and Science /s/

Subject: New Park/Network Monitoring Program: Vision and Implementation plan

In FY 2001, more than 100 park units in the National Park System will be beneficiaries of new funding and additional positions to begin developing programs for monitoring their most critical components. Of these, 55 are in networks that will receive close to full funding for their monitoring programs and the balance are in networks that will receive funding for a coordinator to begin the monitoring program development process and be proposed for fuller funding in FY 2002. This memo describes a Servicewide vision of how parks will organize the new monitoring program. Key features of the strategy are as follows:

- Initiate new, network-related monitoring in 270 units of the National Park System by FY04.
- Parks are organized into 32 networks linked by geography and shared natural resource characteristics to facilitate collaboration, information sharing, and economies of scale in natural resource inventorying and monitoring.
- Each network will receive 8-9 new positions and funding each year to develop a core program for monitoring key components and trends. These new positions and funding will be shared by parks in each network to augment existing personnel and monitoring funding. The level of funding available will provide a minimum infrastructure for initiating biological and physical resource monitoring in all parks. Individual parks can then build comprehensive monitoring through existing and future efforts.
- The Washington Office divisions for Air Resources, Biological Resource Management, Geological Resources, Natural Resource Information, and Water Resources are coordinating efforts to provide funding and technical support to park networks for developing these integrated monitoring programs.
- Emphasis on making inventory and monitoring information more readily available for planning, performance management, and other decisions and integrating it with park operations.

Details of the vision and implementation plan for the new monitoring program are included in the attached document. A list of the 32 networks and the parks with significant natural resources within each network is also attached. Finally, a list indicating the sequence in which networks will be proposed for monitoring is also attached, based on the number of networks per region and regions' priorities. It is based on the rationale presented to the Inventory and Monitoring Advisory Committee and the Regional Directors—regions achieving an equitable share of their networks funded over the course of the four years of proposed funding. The methodology for

this approach was modified based on those presentations and comments from regions. Please advise Gary Williams if the sequencing information for networks within your region is not correct.

Please share this memorandum and the attached document with all Superintendents in your region, and encourage them to participate directly through their network's Board of Directors. Additional information on funding levels for each network and other details of the implementation strategy for vital signs monitoring can be obtained from Dr. Gary Williams, I&M Program Manager, (970) 225-3539.

Attachments.

Sequencing for Proposed Funding of Monitoring Networks
(FY 2002 and 2003 based on planned Challenge funding and represent best estimate at this time)

FY 2001

North Coast and North Cascades
Northeast Coastal and Barrier
Heartland
Sonoran Desert
Cumberland/Piedmont

FY 2002

Central Alaska
National Capitol
Northern Colorado Plateau
PW network TBD
Greater Yellowstone
Appalachian Highlands
Possibly PW network (not certain whether seventh network will fit within planned budget, since Pacific West Region has yet to provide its priorities; will be first priority for 2003 if not in 2002)

FY 2003

Southwest Alaska
Northeast Temperate
IM network TBD
PW network TBD
Great Lakes
Gulf Coast
IM TBD

FY 2004

Balance of networks

Park Vital Signs Monitoring: Vision and Implementation Plan

This document describes a Servicewide vision of how parks will develop programs for monitoring their most critical environmental vital signs. Key features of the park vital signs monitoring strategy are as follows:

- Under the Natural Resource Challenge budget strategy, monitoring of environmental vital signs will be initiated in all 270 park units with significant natural resources by FY 2004 so that all parks can begin developing broadly-based, scientifically sound information on the status and trends of their natural resources.
- Parks have been organized into 32 networks linked by geography and shared natural resource characteristics to facilitate collaboration, information sharing, and economies of scale in natural resource management. Each network will receive approximately 8-9 new positions and a set amount of funding each year to develop a core program for park vital signs monitoring. Parks in each network will share these new positions and funding, and this core program will be augmented by additional personnel and funding from other sources. The level of funding available will not allow comprehensive monitoring in all parks, but will provide a minimum infrastructure for initiating natural resource monitoring in all parks that can be built upon through future efforts.
- Park networks will design a single, integrated monitoring program using existing personnel and funding and new personnel and funding through the Natural Resource Challenge. This single program will monitor physical and biological resources including air quality, water quality, geological resources, weather, fire effects, threatened and endangered species, exotic species, and other flora and fauna. The monitoring program should include short-term tactical monitoring as well as long-term monitoring. The Washington Office divisions for Air Resources, Biological Resource Management, Geological Resources, Natural Resource Information, and Water Resources are coordinating efforts to provide funding and technical support to park networks for developing these integrated monitoring programs.
- A major emphasis of the inventory and monitoring effort is to make information more readily available to decision makers and the public and to integrate natural resource information with other park operations such as interpretation and maintenance. Considerable resources will be allocated for improved information management, and several tools are being developed to make information more readily available to park managers and others for planning, management, and decision-making.

Sources of new funding for natural resource monitoring and funding strategy.

The strategy for the Natural Resource Challenge calls for monitoring at a level that would cost \$26.5 million and fund monitoring of the most critical park vital signs in 32 park networks. In addition, the Natural Resource Challenge includes monitoring of air and water quality, as well as activities to make natural resource data more useable for management decisions and the public. Additional actions are included for biological inventories, vegetation mapping, expansion of NRPP funding, T&E species recovery, and other activities that will be closely coordinated with park vital signs monitoring. The various funding sources and technical support will be coordinated at the national and regional levels to help parks develop a single, integrated

monitoring program. That program will provide scientifically sound information for managing park resources and informing the public and allow managers to confront and mitigate threats to the park and operate more effectively in regulatory, legal, and political arenas. Most parks already allocate funding and personnel to monitor park resources using base funds, FIREPRO funds, and other sources, and these existing sources will augment the core monitoring program to fund the integrated monitoring program. It is important for our report to Congress that we be able to document that new funding provided through the Natural Resource Challenge augments existing funding being allocated by parks for natural resources, and is not being used in place of those existing funding sources.

The NRC budget strategy is to initiate monitoring in 5 networks in FY 2001, approximately seven additional networks in FY 2002 and FY 2003, and the balance of the 32 networks in FY 2004, depending on the amount of new funding received each year. The first seven networks to be funded will include one from each region, with future sequencing of networks determined by the regions. To facilitate network readiness for funding, a portion of the FY 2001 networks' proposed funding will be withheld to forward fund the networks planned for funding for FY 2002. This will allow the FY 2002 networks to hire a network coordinator and data manager to begin compiling existing information and understanding in preparation for meetings and workshops as part of the design process. Thus, in FY 2001, more than 100 parks will benefit from funding to begin the design process for park vital signs monitoring. When the next round of networks is funded, the FY 2001 networks would then receive full funding. A similar procedure would be anticipated for future years. This procedure will facilitate preparing for future monitoring and funding. This strategy is also based on experience with prototype parks, which indicated that it is difficult to absorb large amounts of new funding in one year.

The Network Approach and its Relation to Prototype Monitoring Parks

In the early 1990s, the National Park Service initiated a program to gain experience with monitoring different types of natural resources in 11 prototype monitoring programs that included 22 parks. This program has never been fully implemented because of insufficient funding (only 7 of the 11 programs have received funding as of FY 2000), but much has been learned from these prototype programs that can now be transferred to other parks as they develop their monitoring programs. The seven funded prototype monitoring parks will continue to be funded at current levels and will serve as "centers of excellence" that will do more in-depth monitoring and continue research and development work to benefit other parks. The remaining four prototypes (Olympic NP, Northern Cascades NP complex, Mammoth Cave NP, and the 5-park Northern Colorado Plateau prototype), will be funded at \$400,000 per year, which is about half of their original funding request. USGS Biological Resources will provide additional funding for protocol development and assistance with designing the prototype programs. The prototype monitoring parks will be nested within the network structure, and will provide expertise and support to other parks in their network.

The network strategy for implementing park vital signs monitoring was adopted because it is currently unrealistic to expect that all parks will be able to obtain new funding and positions to allow monitoring at the scale and intensity being conducted at the prototype parks. Yet monitoring needs to be initiated as soon as possible in all parks with natural resources to meet

service goals and Congressional mandates. A monitoring program requires professional-level staff who can analyze data, interpret data, prepare reports, and provide the information in a useable format to park managers, scientists, and the other interested parties. However, it is not realistic at this time for every park to have a full professional staff including a botanist, wildlife biologist, hydrologist, geologist, soil scientist, data manager, etc. Thus, the compromise position is to provide consistent funding and as many as 8-9 FTEs to each network to develop a core program and identify what specialists it needs, allowing each network to then leverage these core resources with other resources and partnerships to build a monitoring program that works best for that network of parks.

The initial list of environmental vital signs selected for monitoring is expected to vary among networks depending on the priorities and monitoring needs of the parks in each network. The potential list of vital signs can be placed in three categories: (1) those vital signs or indicators that are required to be included in the monitoring program for legal reasons (e.g., T&E species or items included in a park's enabling legislation); (2) those that are required for Performance Management reporting purposes or because funding was provided for a specific purpose (e.g., impaired waters monitoring); and (3) those selected by networks from a list of recommended vital signs or identified as a priority by the network. Each park can identify its own top-priority monitoring needs, and it is not necessary for all parks in a network to monitor the same vital signs. Staff from the WASO divisions of Air Resources, Biological Resource Management, Geological Resources, Natural Resource Information, and Water Resources are developing a "Handbook for Monitoring Environmental Vital Signs in National Parks" and various guidelines, reference materials, and information management tools to assist networks in the development of their monitoring programs. WASO staff will also provide technical support to networks throughout the planning process, and regional I&M coordinators from other regions will also be available to share information and assist networks in other regions as they develop their monitoring programs. Project funding at Cooperative Park Ecosystem Studies Units can also support technical assistance with monitoring protocols and implementation.

Partnerships with other agencies

The National Park Service must work with others to achieve its natural resource goals. The design and implementation of monitoring in networks and parks requires cooperation with public agencies, universities, and non-governmental organizations. Key partnerships include the US Geological Survey (USGS); the expanding system of Cooperative Ecosystem Studies Units (CESUs); and the Environmental Protection Agency; and the USDA Forest Inventory and Management Program, as well as many state and local partnerships. The USGS funds the biological research component for the prototype monitoring parks and has a long-term commitment to the NPS to provide research support. The CESUs engage university scientists throughout the nation.

Administration of the network approach and the NR-PRO funding model

Additional input and review is needed to explore creative solutions to managing a cooperative, collaborative network of monitoring programs and the best administrative structure for sharing technical expertise and infrastructure burdens among parks. Currently, network monitoring programs are coordinated by the Servicewide Inventory and Monitoring Program with assistance from other divisions of the Natural Resource Program Center of the Washington Office. The Servicewide I&M Program provides funding to each region for a full-time I&M coordinator, and each network is expected to hire a network coordinator, when funded.

The initial networks will be guided by a Board of Directors made up of park superintendents, the Regional I&M Coordinator, and the Network Coordinator, who will specify desired outcomes and evaluate performance for the network's monitoring program. The Board of Directors will make decisions regarding the development and implementation of the monitoring strategy, including decisions on hiring, budgeting, and scheduling, and will promote accountability for the monitoring program. The committee should be chaired by one of the superintendents, with the network I&M coordinator acting as staff to the chair to help arrange meetings and logistics, produce agendas, and coordinate between the Board of Directors and the Science Advisory committee. In general, the Board will be responsible for ensuring the overall effectiveness and success of the network's monitoring efforts. These working relationships and descriptions of the procedures the Board will use to make decisions should be codified in the form of a "Network Charter" signed by each superintendent on the Board.

A Science Advisory or technical committee comprised of natural resource managers and scientists, including scientists from outside of the NPS who work in the parks and are familiar with park issues, should be formed to provide technical assistance and advice to the Board of Directors. The Science Advisory committee should be chaired by the network monitoring coordinator and will be responsible for compiling and summarizing existing information about park resources and developing the materials needed at the scoping workshop, and will draft the workshop report and monitoring strategy for review and approval by the Board of Directors. Care needs to be taken to avoid conflicts with the Federal Advisory Committee Act in using outside scientists on advisory committees.

The minimum critical staff for each network will include, but not be limited to, a network coordinator and data manager, 3 or 4 applied scientists, and several technicians for monitoring the physical environment (e.g., weather, air and water quality, soil erosion), aquatic/marine systems, vegetation, and wildlife. Each network will decide on the job series, grade, and duty station of network personnel. In some cases, network personnel will be based in parks and may be supervised by a park Superintendent, whereas in other networks, network personnel will be based in a central location such as a town or university and be supervised by someone in the regional office. This will be a decision between the Regional Director and the park networks. The positions and support will be funded through the new NR-PRO program in which funding is held in base by the Servicewide I&M program and other national resource programs and will be transferred to each network on an annual basis to support the monitoring.

It is important to keep flexibility in the administrative structure because the program is expected to grow and adapt as the Service gains more experience with monitoring during the next several years. The configurations of personnel and their duty stations that provide the best support to all

of the network parks will probably change over time. As the programs mature, larger parks will be able to support base-funded programs, whereas smaller parks may continue to find it advantageous to carry out monitoring through the networks. Regardless of future changes, however, networking will facilitate both efficiencies and integration of monitoring efforts, both among parks and with neighboring land managers.

Emphasis on data management and making information more available and useful

A major emphasis of the inventory and monitoring effort is to make information more readily available to decision makers and the public and to integrate natural resource information with other park operations such as interpretation and maintenance. Tools such as Synthesis, the GIS Theme Manager (aka GIS Databrowser), and Servicewide databases such as the NPSpecies database and the Natural Resource Bibliography will make information more readily available and useful to park managers, resource professionals, and others in the field. During preparations for both inventory and monitoring, the large body of existing data will be cataloged and evaluated, and the more useful datasets will be converted to modern databases and GIS products.

The public also needs better information. The public does not generally recognize or understand the significance of parks as preserves of our nation's natural heritage. The disciplines of natural resources and interpretation/education need to be better integrated throughout the National Park Service, and the public needs to be informed of the status and trends of its natural heritage preserved in the parks in simple, clear-language reports.

Recommended approach for developing a network monitoring program

The recommended approach that each network of parks should take to develop their strategy for monitoring natural resources involves seven steps:

- Phase 1 { 1. Form a network Board of Directors and a Science Advisory committee.
2. Summarize existing data and understanding.
- Phase 2 { 3. Prepare for and hold a scoping workshop.
4. Write a report on the workshop and have it widely reviewed.
- Phase 3 { 5. Hold meetings to decide on priorities and implementation approaches.
6. Draft the monitoring strategy.
7. Have the monitoring strategy reviewed and approved.

1. Form a network Board of Directors and a Science Advisory committee.

- A Board of Directors comprised of park superintendents or their designee, the regional I&M coordinator, and the network monitoring coordinator, should be formed to oversee the development of the monitoring strategy for the network. The committee will make decisions regarding the development and implementation of the monitoring strategy, including decisions on hiring, budgeting, and scheduling, and will promote accountability for the monitoring program. The committee should be chaired by one of the superintendents, and all members should have authority to make on-the-spot decisions on personnel, budgets, office space, and commitments of existing park personnel and funding to the monitoring effort. A charter should define the roles and functions of the

different members and outline the process to be used to make decisions related to monitoring within the network. The charter must be signed before funding is released to the network. The network I&M coordinator should act as staff to the chair to help arrange meetings and logistics, produce agendas, and coordinate between the Board of Directors and the technical committee.

- A Science Advisory or technical committee comprised of natural resource managers and scientists, including scientists from outside of the NPS who work in the parks and are familiar with park issues, should be formed to provide technical assistance and advice to the Board of Directors. The Science Advisory committee should be chaired by the network monitoring coordinator and will be responsible for compiling and summarizing existing information about park resources and developing the materials needed at the scoping workshop, and will draft the workshop report and monitoring strategy for review and approval by the Board of Directors.

2. Summarize existing data and understanding.

- One of the most important steps in the process of developing a monitoring strategy is the task of identifying, summarizing, and evaluating existing information and understanding of park ecosystems. Much of this needs to be done before the scoping workshop is held.
- To accomplish this task, it is anticipated that most networks will need to hire, assign or contract at least one or two full-time persons (e.g., a Monitoring Coordinator and data management specialist) and allow at least a year prior to the scoping workshop for this step to be accomplished.
- This step will include a literature review, a review of the Resource Management Plan (RMP), General Management Plan (GMP), and other applicable plans for each park, and an inventory of existing datasets and other information on park ecosystems.
- Superintendents and other park managers should be interviewed regarding the key management issues facing their park and the types of information they need from the monitoring program.
- Current or historical monitoring of natural processes and resources in each park should be summarized, including data from monitoring of fire effects, T&E species, water quality, air quality, physical processes/changes, and other resources. Data sets and the sampling design used should be evaluated to determine whether the monitoring is meeting the needs of park managers and is providing reliable and credible data to help manage the park. Maps showing the locations where monitoring has occurred should be prepared.
- Monitoring that is being conducted by neighboring agencies, partners, and related parks should be identified and summarized to help determine where comparable data sets and sampling protocols exist.
- Where understanding exists regarding cause-effect relationships between environmental stressors and the park's natural resources, or where the linkages among ecosystem components are understood, draft conceptual models should be prepared to help summarize this understanding.

3. Prepare for and hold a scoping workshop.

- A scoping workshop should be held to obtain additional input and peer review of existing information and understanding of park ecosystems from park managers and subject experts from within and outside of the NPS.

- In preparation for the workshop, the monitoring coordinator and technical committee will be responsible for preparing handouts, maps, and presentations of the material summarized in Step #2.
- The monitoring coordinator and technical committee should define the goals and preliminary objectives of the monitoring program prior to the scoping workshop. The goals and objectives should be approved by the Board of Directors.
- Additional material that should be developed prior to the scoping workshop include:
 - ✓ Draft lists of important management issues for each park;
 - ✓ Draft lists of important natural resources and focal species or processes for each park;
 - ✓ Draft lists of known stressors that may cause changes in park resources;
 - ✓ Draft conceptual models of portions of the park ecosystem;
 - ✓ Draft list of measurable objectives for the monitoring program;
 - ✓ Criteria for indicator selection.
- Workshop participants will be asked to review the material prepared for the workshop and provide additional input and understanding, including additional development and modification of conceptual models.
- Participants will also be asked to identify and provide an initial prioritization of potential indicators to be monitored by the network. Include short-term, tactical monitoring as well as long-term monitoring needs.
- Participants will also indicate where appropriate sampling methodologies exist, and where there is a need to develop new sampling protocols for the high-priority indicators that are identified.
- A three-day workshop with facilitated breakout sessions focusing on different components of the park ecosystem is recommended.

4. Write a report on the workshop and have it widely reviewed.

- The results of the scoping workshop should be widely circulated for additional input and comment. It should be sent to all interested parties, including people that did not attend the scoping workshop.
- The additional input provided through the review process should be incorporated into the final version of the workshop report.

5. Hold one or more meetings to decide on priorities and implementation approaches.

- The Board of Directors, based on recommendations of the Science Advisory committee, should meet to make decisions regarding priorities for monitoring and how to implement the monitoring strategy within the network
 - The set of indicators that will be monitored by the network should be selected based on the preliminary list of indicators developed during the scoping and review process, and the availability of funding and personnel from the I&M program and other sources (e.g., base funding from parks, partnerships).
 - Decisions should be made on which sampling protocols are most appropriate for the network. Where protocols already exist, they may need to be adapted for the particular conditions within the network. In cases where no suitable protocol exists, the committee and managers should decide on an approach for developing these protocols through contracts or technical workshops.

- Staffing issues should be addressed at this meeting. Each network will hire a number of professional-level monitoring specialists and technicians that will be shared by the network parks, and decisions should be made regarding the appropriate job series and grade level of these positions and where they should be stationed.
- The Science Advisory committee and Board of Directors should discuss data management and reporting issues. Experience from the prototype monitoring parks indicates that at least 30% of the total resources should be allocated to data management and reporting. A data management plan needs to be developed before the final monitoring strategy is approved.

6. Draft the monitoring strategy.

- A report describing the monitoring strategy and the various tasks and decisions that contributed to the final selection of indicators to be monitored by the network should be written by the technical committee. This document describing the monitoring strategy should include the following:
 - ✓ An overview of each park and its natural resources, including a summary of the park's enabling legislation, the park's natural resources in a regional or national context, and a summary of the important natural resources in each park;
 - ✓ A summary of the management issues and scientific issues facing each park, including stressors or other agents of change that affect park resources;
 - ✓ A summary of the understanding of the park ecosystem, including conceptual models developed during the scoping and review process;
 - ✓ Descriptions of the indicators to be monitored by the network and the sampling protocols that will be used, including justification for why these were selected. The report should also list and describe the indicators that were considered but not selected for monitoring, and the reasons why they were not selected;
 - ✓ The overall statistical sampling design for the network;
 - ✓ The staffing plan;
 - ✓ Data management plan, including how often reports will be generated and who will be responsible for ensuring that results are provided to managers in a timely manner.

7. Have the monitoring strategy reviewed and approved.

- The draft monitoring strategy document should undergo a peer review by the managers and scientists involved in its development and the network Board of Directors, and then be forwarded through the regional office to the Servicewide I&M Program for final review and acceptance before it is fully implemented.