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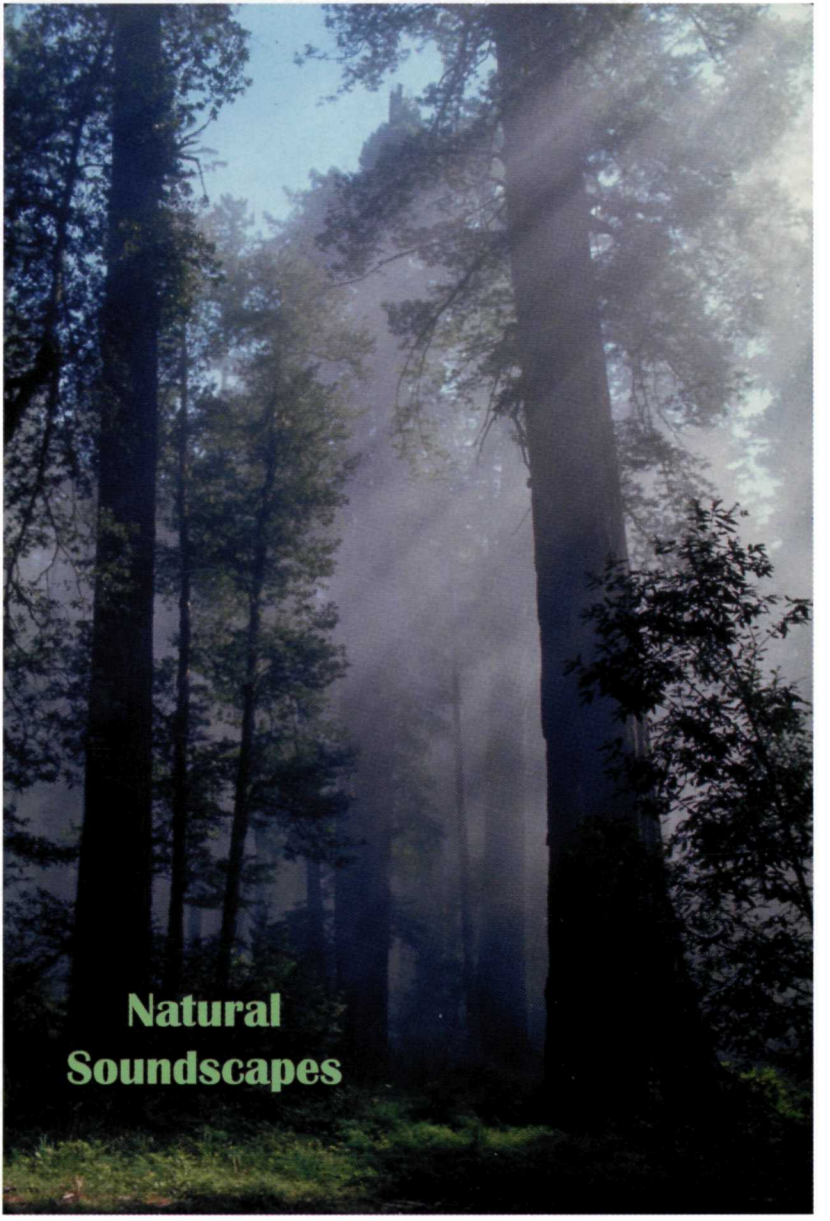

Origins

Founded in 1980, the George Wright Society is organized for the purposes of promoting the application of knowledge, fostering communication, improving resource management, and providing information to improve public understanding and appreciation of the basic purposes of natural and cultural parks and equivalent reserves. The Society is dedicated to the protection, preservation, and management of cultural and natural parks and reserves through research and education.

Mission

The George Wright Society advances the scientific and heritage values of parks and protected areas. The Society promotes professional research and resource stewardship across natural and cultural disciplines, provides avenues of communication, and encourage public policies that embrace these values.

Our Goal

The Society strives to be the premier organization connecting people, places, knowledge, and ideas to foster excellence in natural and cultural resource management, research, protection, and interpretation in parks and equivalent reserves.

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The George Wright Society is a member of US/ICOMOS (International Council on Monuments and Sites—U.S. Committee), IUCN–The World Conservation Union, and The Natural Resources Council of America

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On the cover: A grove in Redwood National Park symbolizes the cathedral-like stillness associated with natural soundscapes. *National Park Service photo*

Society News, Notes & Mail

Douglas H. Scovill, 1932–2003

Doug Scovill, a former president of the GWS, died on December 5, 2003, at his home in San Leandro, California. After graduating from California State University–Sacramento, Scovill began his career with the National Park Service at Mesa Verde National Park. Following that, he was part of the NPS's park planning team for the Hashemite Kingdom of Jordan, helped create the Western Archeological and Conservation Center, and served as the agency's chief archeologist and chief anthropologist, among other assignments. He was instrumental in the success of the first World Conference on Cultural Parks, held at Mesa Verde National Park in 1984, and helped create national databases on archeological sites and ethnographic resources in the parks. Scovill was the second president of the GWS, serving from 1983 through 1985.

Wes Henry Memorial Fund Established

Wesley R. Henry, Jr., wilderness program manager with the National Park Service, died on December 16, 2003—his 55th birthday. Earlier in the month, Henry received a Special Achievement Award from the Society for his work in protecting natural soundscapes and wilderness resources and values in the national parks. His professional accomplishments were spelled out in detail in the "Society News" column of the last issue of the *Forum.* A Wes Henry Memorial Fund, with the GWS as beneficiary, has been established to support education about wilderness-related issues. Donations to the fund will help underwrite wilderness sessions at the 2005 GWS Conference. Contributions can be made payable to the GWS (write "Wes Henry Memorial Fund"on the memo line of the check) and sent to the Society at P.O. Box 65, Hancock, Michgan 49930-0065.

Nominations Open for 2004 GWS Board Election

Nominations are now being accepted for the 2004 election. It is for two seats: one, an open seat that is currently held by Rick Smith, who will be completing his second term and is ineligible to run again; the other, for the seat currently held by Abby Miller, who is eligible for re-election and has indicated that she intends to run again. We are now accepting nominations from GWS members who would like to be candidates for these seats. The term of office runs from January 1, 2005 through December 31, 2007. Nominations are open through July 1, 2004. To be eligible, both the nominator and the potential candidate must be GWS members in good standing (it's permissible to nominate one's self). The potential candidates must be willing to travel to Board meetings, which usually occur once a year; help prepare for and carry out the biennial conferences; and serve on Board committees and do other work associated with the Society. Travel costs and per diem for the Board meetings are paid for by the Society; otherwise there is no remuneration. Federal government employees who wish to

serve on the Board must be prepared to comply with all applicable ethics requirements and laws; this may include, for example, obtaining permission from one's supervisor, receiving ethics-related training, and/or obtaining a conflict of interest waiver. The Society can provide prospective candidates with a summary of the requirements.

The nomination procedure is as follows: GWS members nominate candidates for possible inclusion on the ballot by sending the candidate's name to the Board's nominating committee. The committee then, in its discretion, determines the composition of the ballot from the field of potential candidates. Among the criteria the nominating committee considers when determining which potential candidates to include on the ballot are his/her skills and experience (and how those might complement the skills and experience of current Board members), the goal of adding and/or maintaining diverse viewpoints on the Board, and the goal of maintaining a balance between natural- and cultural-resource perspectives on the Board. It also is possible for members to place candidates directly on the ballot through petition; for details, contact the GWS office. To propose someone for possible candidacy, send his or her name and complete contact details to: Nominating Committee, The George Wright Society, P.O. Box 65, Hancock, MI 49930-0065 USA. All potential candidates will be contacted by the nominating committee to get background information before the final ballot is determined. Again, the deadline for nominations is July 1, 2004.

Gearing Up for GWS2005

Initial planning is underway for the 2005 GWS Conference, which will be held March 14–18 in Philadelphia. A ten-member conference committee has been named and will meet soon to decide on a theme and draft a Call for Papers. The CFP will be issued in June of this year, and at that time the conference website (www.georgewright.org/gws2005.html) will be activated. All GWS members will receive a notification e-mail when the site is running.

Crespi Honored with Retrospective Issue of Journal

The winter 2004 issue of *Practicing Anthropology* is devoted to the career of the late Miki Crespi, who was instrumental in developing the National Park Service's ethnography program. Guest-edited by Gretchen Schafft, the issue include articles by Jerry Rogers, Allsion Peña, Alexa Roberts, Jacilee Wray, Jenny Masur, Benita Howell, and others. *Practicing Anthropology* is published by the Society for Applied Anthropology. For more information, contact the journal's editor, Jeanne Simonelli, at simonejm@wfu.edu.

Errata

In the last issue, the paper by Minteer and Manning ("The Deconstruction and Reconstruction of Conservation") should have been acknowledged as being based on the proceedings of a symposium held at the University of Vermont in Woodstock, Vermont. Major sponsors of the symposium were The Woodstock Foundation, the National Park Service Conservation Study Institute, the

Rubenstein School of Environment and Natural Resources at the University of Vermont, and the Trust for Public Land. The proceedings were published by Island Press as *Reconstructing Conservation: Finding Common Ground* and in a report entitled *Speaking of the Future: A Dialogue on Conservation*, published by the Conservation Study Institute.

Also in that issue, an incorrect URL for the American Association of Museums was given at the end of Ann Hitchcock's article "Through the Fog of War in Iraq: Lessons Learned in Heritage Preservation." The correct web address is http://www.aam-us.org/hottopics.cfm?mode=list&id=24.

MISSION STATEMENTS

From Deep History to the Century of the Environment: The National Park Service as Environmental Leader

Edward O. Wilson

[*Ed. note: on September 12, 2000, the renowned biologist, Edward O. Wilson, addressed the National Park Service's Discovery 2000 conference in St. Louis. An audience of 1,500 listened as he explained the global importance of national parks and the biodiversity they protect, and challenged the National Park Service to assume a mantle of leadership along a broad front of environmental concerns. Later, in an on-stage colloquy with Peter Raven, Wilson recounted how, as a child growing up poor in Washington, D.C., the free access he enjoyed to Rock Creek Park, the National Zoo, and the Smithsonian museums marked him indelibly as a naturalist—and demonstrated "the great benevolent power of a well-administered and visionary federal presence in our lives." Below, we offer an abridged version of his remarks as this issue's "Mission Statement."*]

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Director [Roger] Kennedy, Director [Robert] Stanton, other members of the national park community, colleagues, friends; I thank you all for the opportunity to speak to this potent audience in such a crucial time. For the National Park Service and for the environment generally, I take it as a great honor and opportunity to be here, and believe me, the benefit I see runs more strongly to my own inspiration and excitement for the future.

I don't need to tell you, I only need to stress it as an independent observer, that Americans love the national parks. They trust you. And you have enormous credibility, probably the greatest credibility of any part of the federal government. In 1983, the late poet–naturalist Wallace Stegner correctly said, "National parks are the best idea we ever had. Absolutely American, absolutely democratic, they reflect us at our best rather than our worst."

Much of the appeal that Stegner had in mind has to do with what is called "civic egalitarianism." Some major art galleries, archives, museums, and state and national parks are so important and unique and expensive to establish that they must be created by public discretion, and then, in a democratic society, made available to everybody with free and equal access there to mingle without distinction—from the richest to the poorest.

Deep within us, those national parks set aside for nature, in distinction from the cultural parks, satisfy an innate craving for a sense of wildness, a part of the world that we can see and enjoy whenever we wish. One dear to our hearts, yet not part of us, but instead one that exists independently of humanity, that was here on Earth before the coming of humanity, and would stay much the same if we were

to disappear as a species. To know that it exists, to have the freedom to go there and see it at its best, that capacity is surely one of the marks of high civilization.

It's also a part of the American heritage celebrating a continuous stream of existence that dates back not to 1775, or 1619, or 1492, or even before the coming of the Indians 12,000 or more years ago, but farther back in geological time. You of the National park Service are the stewards of what can be called America's "deep history." There is a distinction in this Service between cultural and natural programs, but they are the same, in terms of long-term continuity…. The cultural deals with a few centuries or at most millennia; the natural goes back and back through history 200 million years.

Little wonder that many of our national parks are overcrowded, given their essential and irreplaceable nature. We need additional national parks, so I'll make a comment now that is strictly as a private citizen and not representing or reflecting any particular organization.

There is a great deal to be said for converting more and more land from the public domain, including state and national forest holdings, into national parks. That's what was done in the past to create Bryce, Glacier, Great Basin, Olympic, Yosemite, and others. If all the forests and other natural, terrestrial habitats managed [by other agencies] could be converted, it would more than quadruple the size of the [national] park system and it would also be consistent with the public needs and the current uses of these habitats as presently managed. Consider the national forest system's own estimate. For example, its contribution to the gross domestic product in the year 1999, the last for which we have concrete figures, was $35 billion, of which 78% was from recreation and only 14% from logging. At that, timber extraction is supported substantially by public subsidy.

Public lands, including the national forests, contribute only about 6% of the U.S. timber yield. The picture seems too clear, at least to me—despite [the Forest Service's] more enlightened newer policies, such as no additional roads (except for the Tongass)—for extraction to continue runs counter to the aims of the more important recreation policy. It is also economically counter-productive and contrary to the needs and desires of the American people as a whole who, let us not forget, own the land. America's timber needs can be met from the 94% of forests on private land, and from the burgeoning tree farms and the growing technology of woodland extension on already cleared lands. [These timber needs] should not be extracted from our national forests.

But there is another reason why the national parks, beyond what I have just stated, are destined to play an ever-larger role in this country, and as part of America's leadership role in the world. It has to do with a historical period we have now entered ... that I believe can be properly called the *century of the environment.* The facts are very simple. Let me briefly recite them because they produce a bottom line very different from that recognized and promulgated by most economists and public philosophers.

The world's population is now past 6 billion, and it's expected from United Nations projections to reach 8–10 billion before peaking and starting to descend in the second half of

this century. Natural researchers suggest that this many people can be accommodated, but just barely. Per capita fresh water and arable land are descending steadily ... to levels experts agree are risky. The great majority of people are very poor and about 1 billion live in absolute poverty, suffering malnutrition. In fact they exist on the edge of starvation. All are struggling to raise the quality of their lives by any means at their disposal, including, unfortunately, conversion of the surviving remnants of the natural environment. The great tropical forests where a majority of the world's plant and animal species live are half gone, and disappearing at the rate of about 1% of cover per year. In every way, with reference to the environment, *Homo sapiens* is moving very close to the edge. The planet is near the end of its human population explosion, fortunately, and is bracing now for what is likely to be the greater aftershock of the development.

Let me give you the bottom line now that matters. It's the ecological footprint, the average amount of productive land and shallow [oceans] appropriated from people by bits and pieces around the world for food, housing, water, energy, transportation, commerce, and waste management comprising a bit of Saudi Arabia for your oil, for example, a small piece in Costa Rica for your coffee, and so on. That ecological footprint is 2.5 acres per person in the developing world and 10 times that much—24 acres—in the United States. Here, then, is the bottom line that counts for the future. For every person in the world to reach present U.S. levels of consumption would require four more planet Earths. Let me repeat that. For every person in the world to reach present U.S. levels of consumption, and I should add with existing technology, would require four more planet Earths. The 4 billion people of the developing nations may never wish to attain our level of profligacy, but in trying to achieve a decent standard of living they have joined the industrial world in destroying most of the last of the natural environment and driving to extinction a large part of the world's fauna and flora. If present trends continue unabated, the planet could easily lose a quarter of its plant and animal species within the next 30 years, and half by the end of the century.

Meanwhile, *Homo sapiens* has become a geophysical force. The first species in life to attain that dubious distinction, we have driven carbon dioxide to the highest levels in the last 200,000 years, unbalanced the nitrogen cycle, and contributed to a global warming that will ultimately be bad news everywhere, including incidentally, creating severe pressure on the national parks, probably within a matter of just several decades.

I've burdened you with these projections that are, I assure you, solidly based on the best data and consensus of environmental experts, in order to put into context what I and many other scientists see as the inevitable growing importance of the national parks in this country and other countries for scientific research and education vital to the future of society. Science and technology have led us into the present bottleneck of overconsumption and environmental deterioration, a bottleneck that we must pass through, and come out the other end as the population begins to subside, with as much dignity and as high a quality of life and with [as] much of the rest of life accompanying us as

possible.

Now science and technology, guided by a sound environmental ethic, must see us out. The national parks are our treasure houses of the remnant natural ecosystems. They protect much of the nation's biodiversity. They are the baselines of our relatively undisturbed environment, and they need to be thoroughly understood, not only for their beauty and their wildness and deep history, but also to realize their unique and vital contribution to science and education, particularly of the future.

In sum, I can only endorse the Natural Resource Challenge launched last year by the Director, Robert Stanton, to revitalize the scientific arm of the Service, a large step into the century of the environment. It meets the provision of the National Parks Omnibus Act of 1998, and addresses the "house divided" issue raised in Richard Sellars' history of the National Park Service. I am happy that Congress has appropriated funds this year for biodiversity censuses.

In so doing I speak for a growing number of scientists who look to the National Park Service as a major force in fundamental research on biodiversity, ecology, and conservation, in much the same way that medical scientists look to the National Institutes of Health and space scientists [do] to NASA. Many scientists will be glad to form partnerships with the National Park Service. They will welcome access to the parks, and collaboration with the staff. They will help you further the primary aims of the Service with support and solid information of the kind needed to solve the complex and accelerating problems you face in this century.

The National Park Service can further the country's needs, even more than in the past, to promote science education, a high priority now as seen by more and more of our political leaders. There's no better classroom than our national parks, no more respected teachers than their guides and experts. Its educational potential alone, quite apart from the scientific potential, is a persuasive argument to Congress to provide badly needed support for the growth and the strengthening of this absurdly underfunded Service. The National Park Service can help this country provide an example to the rest of the world, which is desperately needed to protect and make full use of the natural environment. If we don't expand our national parks, if we don't make them centers of research, if we don't develop the scientific capability of fulfilling a global environmental ethic, who will? We can't expect Ghana or Paraguay to do it. You are, whether you planned it that way or not, natural leaders on a broadening front whose actions will have growing influence in the United States and elsewhere, especially in the developing countries and far beyond the traditional venue of the national parks.

Almost 50 years ago, in the summers of 1951 and 1952, as a young graduate student at Harvard, I first visited some of our parks—the Great Smoky Mountains, Glacier, Yosemite, and Yellowstone to conduct research on my favorite group, the ants. I collected specimens in violation of the law and I made confession directly to Director Stanton yesterday, and was provided provisional absolution.

The parks are magic still. They're a potential new source of strength in a rapidly changing and still dangerous world, a world that is becoming dan-

gerous in a new environmental way. We're all looking to you for that kind of leadership and inspiration, added to the noble service you already give.

"Mission Statements" *is an occasional column that presents compelling statements of values and ideals that are important to the people, places, and professions that the Society serves. We are looking for inspirational and insightful writings that touch on close-to-the-heart issues that motivate us to do what we do as park professionals. We invite readers to submit their own Mission Statements, or suggest previously published essays that we might reprint in this column. Contact GWS executive director Dave Harmon at dharmon@georgewright.org.*

Marvin Jensen
Howie Thompson

Natural Sounds: An Endangered Species

Introduction

Only in designated wilderness areas of the United States are there management goals and objectives such that natural sounds are preserved. While the criteria for listing under the Endangered Species Act are not directly applicable to natural sounds, the policy behind the act—to protect threatened and endangered species—is directly relevant. Much like the populations of plants and animals we now see on the endangered species list, the opportunity to hear natural sounds in wilderness areas has considerably diminished over the years. Designated wilderness areas collectively comprise probably less than 3% of the landmass of the country. In protected wilderness areas exceptions exist so that values such as solitude and the opportunity to experience areas untrammeled by people, and to engage in primitive and unconfined forms of recreation, are management goals that are not always met. Without considerable focus of management agencies on these declining resources, they will be lost.

Only a few National Park Service (NPS) units have enabling legislation or current planning documents that mention protection of natural sounds (e.g., Grand Canyon National Park Enlargement Act of 1975, Zion general management plan, Glacier general management plan). NPS and other land management agencies rely on the Wilderness Act to address protection of natural sounds. However, NPS, through implementation of Director's Order no. 47, has initiated a more encompassing approach to protecting, preserving, and restoring park soundscapes.

Within the past 20 to 25 years, inappropriate sounds have proliferated in both number and type. Fifty years ago, noise intrusions were only a minor issue. For example, in 1964 Marvin Jensen was conducting range survey work for the Bureau of Land Management in the Escalante River drainage. He hiked into the Cathedral of the Desert, where the meanders of Davis Gulch in the southern Utah slick rock had created an overhanging cavern, complete with a lush hanging garden of maidenhair fern, cardinal flower, columbine, and white aster. The hanging garden was fed by a small desert seep from the wall of the smooth, vertical red–brown cliff. The slanting afternoon sun generated a golden bronze glow off the walls of the deep canyon. The dominating sound was that of a slow, intermittent, plinking drip from the seep onto the slope several feet below. Through his senses of sight, hearing, and smell there was an incredible awareness of the surrounding natural environment, and no penetrating noises from aircraft of any kind. Lake Powell, which was being filled at the time, was not yet a source

of boat motor noise, and the infrequently traveled Hole-in-the-Rock Road was more than 1,000 feet above and several miles to the west. Only the sounds of nature could be heard. Unfortunately, that area of the Cathedral of the Desert has been inundated by Lake Powell (Figure 1), and there are now fewer such places that remain in the lower 48 states where a variety of natural sounds can be heard for an extended period of time without inappropriate sounds.

Within the last 25 years or so, the numbers and types of sound sources have dramatically increased. Use of park maintenance and operational equipment has increased substantially over the years. Personal watercraft did not even exist in 1964 when the Wilderness Act was passed. In 2000, however, 1.3 million personal watercraft were estimated to be in operation in the United States. Snowmobile use has dramatically increased. In the winter of 1999–2000, more than 76,000 snowmobile passengers entered Yellowstone National Park. Aircraft numbers and types have also increased significantly over the years. In 1999, more than 200,000 general-aviation aircraft were in use in the United States, with 35 million flights. Air tours at national parks have increased at such a rate that air tour management plans for over 100 parks will be jointly developed by the Federal Aviation Administration and NPS in the next several years. In 1987, there were an estimated 50,000 commercial air tour operations at Grand Canyon National Park, and the number has increased considerably since then. In 2003, more than 24,000 air

Figure 1. Lake Powell has inundated many spectactular and remote canyons in Glen Canyon National Recreation Area. *National Park Service photo.*

tour operations occurred at Hawaii Volcanoes National Park, while 23,000 occurred at Haleakala National Park. Military overflights occur near or over 150 NPS units. A number of parks have operational aircraft that are used for search and rescue, firefighting (Figure 2), research, and law enforcement. Motorcycles, buses, trucks, automobiles, and NPS

Figure 2. A helicopter is used for firefighting at Rocky Mountain National Park. *National Park Service photo.*

operational and maintenance equipment in parks further add to the growing level of sound in national park units. Even in NPS-designated wilderness areas, there are inappropriate sounds.

Society is increasingly expressing concern about and interest in preserving places of natural sounds. Bernie Krause, president of Wild Sanctuary, has spent the past 30 years recording natural sounds in various places throughout the world. When he first initiated his recordings, it took him 15 hours of recording in wilderness and backcountry areas to obtain one hour of natural sounds. Today, due to increased noise intrusions, it takes Krause 2,000 hours of recording to obtain the same amount of natural sounds. There are few places left in the lower 48 states where natural sounds predominate for the benefit of wildlife and for the enhancement of visitor experiences.

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Natural Soundscapes in the National Park System

Introduction

Director's Order no. 47 (NPS 2000) states:

> *An important part of the National Park Service mission is to preserve and/or restore the natural resources of the parks, including the natural soundscapes associated with units of the national park system. Natural sounds are intrinsic elements of the environment that are often associated with parks and park purposes. They are inherent components of "the scenery and the natural and historic objects and the wild life" protected by the NPS Organic Act. They are vital to the natural functioning of many parks and may provide valuable indicators of the health of various ecosystems. Intrusive sounds are of concern to the NPS because they sometimes impede the Service's ability to accomplish its mission.*
>
> *Intrusive sounds are also a matter of concern to park visitors. As was reported to the U.S. Congress in the "Report on the Effects of Aircraft Overflights on the National Park System," a system-wide survey of park visitors revealed that nearly as many visitors come to national parks to enjoy the natural soundscape (91 percent) as come to view the scenery (93 percent). Noise can also distract visitors from the resources and purposes of cultural areas—the tranquility of historic settings and the solemnity of memorials, battlefields, prehistoric ruins, and sacred sites....*

Natural Sounds Program Office

Office background and overview. The National Park Service (NPS) has been working in partnership with the Federal Aviation Administration (FAA) to manage air tours over Grand Canyon National Park as directed by Public Law 100-91, the 1987 National Parks Overflights Act. That act also required a report to Congress on the management of commercial air tours over the remainder of the national parks. An executive memorandum in April 1996 resulted in establishment of a national parks overflights working group composed of aviation, environmental, and Native American interests. The group's recommendations formed the basis of the National Parks Air Tour Management Act of 2000, which was enacted as Public Law 106-181 on 5 April 2000. The act requires FAA and NPS to cooperatively develop air tour management plans

(ATMPs) for parks where commercial air tour operations exist or are proposed.

The NPS Natural Sounds Program Office was officially established in October 2000 primarily to assist park and regional staffs working with the FAA to develop air tour management plans for the more than 100 parks experiencing commercial air tour operations. ATMPs can be integrated into overall park soundscape management plans and/or park general management plans that address noise intrusions of concern to park management. The intent of such plans is to characterize and protect park soundscapes. In addition, the office provides services such as

- Technical assistance, training, and expertise in baseline acoustical data collection, analysis, and interpretation;
- Assistance in soundscape management planning;
- Assistance in coordinating with the military to prevent or minimize/mitigate intrusive noise from flying over or near parks;
- Coordination with FAA and local officials to mitigate inappropriate sounds to parks from adjacent or nearby airports; and
- Assistance in planning for management of sounds from other activities, such as use of personal watercraft, snowmobiles, and NPS operational aircraft and equipment

Organization and contacts. Our central office is located in Fort Collins, Colorado, where a technical assistance staff has been assembled. We have a liaison office in Lakewood, Colorado, to coordinate with the planning, design, engineering, and contract professionals. The manager of the Natural Sounds Program Office is Karen Trevino. She can be reached at 1–970-225-3563.

Mission. The Natural Sounds Program Office works to protect, maintain, or restore natural, cultural, and other soundscape resources in parks in a condition unimpaired by inappropriate or excessive sounds. We fulfill this mission by working in partnership with parks and others to increase scientific and public understanding of the value and character of the acoustic environment.

Purpose. The Natural Sounds Program Office functions as a national office that provides advice, guidance, and technical support in characterizing and preserving park soundscapes.

Goal. Our goal is to heighten public and agency awareness of the value and character of park soundscapes so that park resources are preserved unimpaired and visitors can appreciate the full range of park settings and have the opportunity to enjoy tranquility, solitude, and the sounds of nature.

Core values. The office adheres to these values: commitment to the resource—public service; adherence to scientific principles in the decision-making process; respect, patience, and encouragement of co-workers and stakeholders; integrity and honesty; appreciation for diversity in all capacities—in approaches, in thinking, people, etc.; and excellence/innovation (forward-thinking and progessive approaches).

Education Efforts

A variety of educational materials and opportunities are available to assist parks in interpretation, understanding, appreciation, and preservation of park soundscapes and in

becoming familiar with characterizing such soundscapes and determining sound levels, types, and sources. The Natural Sounds Program Office has developed an information card that describes the office's purpose, goal, background, capabilities, organization, and contacts. The card has been distributed at various NPS and interagency meetings and public forums. It is also available on the office website at ftp://ftp.nps.gov/incoming/soundscape. In addition, a natural sounds activity card has been jointly developed by the San Francisco Nature Sounds Society and the NPS Natural Sounds Program Office and distributed to numerous park units. This card is designed to enhance visitor enjoyment of natural sounds through active listening and recording of observations. We will continue to work with the Nature Sounds Society and will seek out other grassroots organizations to share our expertise and to enhance their efforts to reach out to local communities on a variety of sound issues.

Staff from the Natural Sounds Program Office collaborated with the Center for the American West and the Natural Resources Law School at the University of Colorado to develop and host "The Silence of the Lands" conference on the CU campus in February 2003. The conference was a forum to discuss natural sounds. Pat Williams, the former U.S. representative from Montana, was guest speaker and several panels of individuals represented various points of views on sound issues. More than 200 students, citizens, government employees, and representatives from various organizations attended the conference. The conference was covered by a variety of media (radio, TV, newspapers), which made presentations and discussions available to a wider audience. Our office will continue to work with newspapers and other media to heighten awareness of these issues and seek other approaches and solutions.

The Natural Sounds Program Office worked with the U.S. Air Force and National Parks Conservation Association to develop the *United States Air Force/National Park Service Western Pacific Regional Sourcebook.* This sourcebook provides organizational histories, descriptions of decision-making processes, and outlines of agency structures. It also has information on developing relationships at the field level, presents several success stories, and depicts on maps the military overflights in relationship to parks and airbases. A brief synopsis of park units that experience military overflights accompanies the maps. Copies of the sourcebook were sent to relevant parks in the NPS Pacific West Region and those in Arizona in the Intermountain Region. Additional copies can be obtained on the Air Force website at www.afranges.net/sourcebook.html.

Our office will be working with interpretive staffs at a few park units within the next year or so to develop visitor center soundscape exhibits, videos, and brochures. We have developed a PowerPoint presentation that describes the acoustical data acquisition equipment used to characterize park soundscapes and noise intrusions, the acoustical methodology, and the nature and use of acoustical metrics. This presentation will be given by a member of our office to the superintendent and park staff at the initiation of the air tour management plan. A copy will also be posted on the office website.

Over the past few years the office has conducted an NPS national workshop (in Denver) and an Alaska regional workshop on our program. We have given numerous presentations at various conferences (e.g., George Wright Society Conference, National Mountain Conference, HAI Conference, and The Silence of the Lands Conference), ATMP parks, NPS management meetings, and training sessions. We have also actively participated in the U.S. Air Force Airspace and Range Council meetings to present our office program, to proactively address military park overflights, and to promote the development of relationships between the two organizations. All of these educational efforts have been effective; however, our office will continue to expand the number and type of media utilized to more effectively educate NPS leaders and appropriate employees and to reach out to agencies, groups, and organizations outside the NPS.

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Impairment of Park Soundscapes

Soundscapes in National Parks

Soundscapes in national parks are a resource that is experienced by people, and which affects wildlife habitat and cultural resources. Soundscapes in parks often are composed primarily of natural sounds, but also are frequently composed of natural and non-natural sounds. Protection of this resource is part of the National Park Service (NPS) mandate to "conserve the scenery and the natural and historic objects" of the parks.

Inappropriate Sounds

Inappropriate sounds can adversely affect the desired soundscape conditions in a national park. Inappropriate sounds can also adversely affect other park resources or values, including but not limited to cultural resources, wildlife, and visitor experiences. Not all non-natural sounds are inappropriate, only those that are inappropriate to the particular time and place in the park.

Guiding Regulations and Policies

The management of the National Park System is guided by the Constitution, public laws, executive orders, regulations, and directives of the secretary of interior and the assistant secretary of fish, wildlife, and parks. All NPS policies must be consistent with these higher authorities. Relevant legislation includes:

- **National Park Service [Organic] Act, General Authorities Act, Wilderness Act, and Redwoods Act.** All of these acts address leaving parks and wilderness areas (which constitute a major part of park areas) *unimpaired* for the enjoyment of future generations or not *derogating* the values and purposes for which these various areas have been established.
- **Grand Canyon National Park Enlargement Act (1975), National Overflights Act (1987), and National Parks Air Tour Management Act of 2000.** These laws address "natural quiet" as a value or resource in its own right to be protected from significant adverse effect. They state that air tour operations have the potential to cause a significant adverse effect on natural quiet and visitor experiences of the park.
- **NPS regulations.** A variety of provisions in NPS regulations address issues of sound management. Key regulations address audio disturbance, snowmobiles, and sound abatement.
- **NPS policy.** A number of policy statements address or relate to soundscape management. In the current NPS management policies, Section 4.9, "Soundscape Management," states: "The National Park Service will preserve, to the greatest extent possible, the natural soundscape of parks" (NPS 2000:44)
- **Director's Order no. 47, Soundscape Preservation and Noise Management (NPS 2000a).** This order requires, "to the fullest extent practicable, the protection,

maintenance, or restoration of the natural soundscape resource in a condition unimpaired by inappropriate or excessive noise sources." Park soundscape conditions should be consistent with park purposes as delineated in the authorization legislation and park management plans. Director's Order no. 47 sunsets on December 1, 2004.

Impact Thresholds

The development of impact thresholds for analysis of proposed actions depends upon establishing indicators and standards based on park management zone objectives that are developed in the general management plan or other park planning documents. Indicators for impact/threshold analysis include various acoustical metrics, such as area and duration of audibility, time above natural ambient level, and sound exposure level (decibel level). Indicators must be viewed in the context of where and when inappropriate sounds occur. Context, time factors (e.g., duration, frequency of occurrence, and sensitivity of the time period of occurrence), location, and intensity interact in a complex manner to determine the level of sound for a given activity. For example, it follows logically that regular aircraft overflights at relatively low altitudes that occur over critical wildlife habitat or backcountry visitor-use areas will likely have more of an impact upon the affected wildlife or visitor experience than the same flights over a non-critical wildlife habitat or high visitor-use frontcountry areas of the park.

In addition to its impacts on the park soundscape, inappropriate sounds may have additional or different impacts on other resources. For example, a certain duration and intensity of noise may have a moderate impact on the natural soundscape of a park but a completely unacceptable impact on a species of concern or on a particular cultural or religious site. Also, a given intensity would have greater impact if it occurred more often, for a longer duration, or over a greater area. The time of day or time of year a given noise occurs can also significantly influence the impact.

The various thresholds shown in Table 1 are types of criteria that *may* be applied in describing effects of inappropriate sounds on park soundscapes. Thresholds must be set by management zone for each park. For example, a national recreation area (NRA) is required to allow recreational boating uses, which will produce sounds, and therefore the thresholds for an NRA would be significantly different than for the wilderness areas of a park. However, where similar zones exist, the standard should be relatively consistent.

Impairment Determination

An impact on the natural soundscape is more likely to constitute impairment if:

- The natural soundscape is linked to the park purpose in the enabling legislation and/or subsequent general management plan (GMP); and
- The area of audibility is large;
- The sound level is at or above the natural soundscape level, or it produces frequencies not heard in the natural setting; or
- It occurs frequently, continuously, or indefinitely over long periods of time. An impact that achieves higher levels in most or all of these areas is likely to constitute impairment.

The decision-maker has the responsibility and authority to make a

Table 1. Examples of impact criteria.

Threshold / Management Zone		Definition
Negligible[1]	**Wilderness**	Inappropriate sounds are audible up to 5% of the time. For the time when inappropriate sound is audible, the level of that sound for any 1/3-octave band (20–20,000 Hz) is no more than 3 dB over the natural ambient sound level. The intent of the Wilderness Act of providing solitude and quiet is never affected by inappropriate sounds.
	Development	Inappropriate sounds are audible up to 5% of the time. For the time when inappropriate sound is audible, the level of that sound for any 1/3-octave band (20–20,000 Hz) is no more than 3 dB over the existing ambient sound level.
Minor[2]	**Wilderness**	Inappropriate sounds are audible up to 5% of the time. For the time when inappropriate sound is audible, the level of that sound for any 1/3-octave band (20–20,000 Hz) is no more than 6 dB over the natural ambient sound level. The intent of the Wilderness Act of providing solitude and quiet is rarely affected by inappropriate sounds.
	Development	Inappropriate sounds are audible up to 10% of the time. For the time when inappropriate sound is audible, the level of that sound for any 1/3-octave band (20–20,000 Hz) is no more than 6 dB over the existing ambient sound level.
Moderate[3]	**Wilderness**	Inappropriate sounds are audible up to 10% of the time. For the time when inappropriate sound is audible, the level of that sound for any 1/3-octave band (20–20,000 Hz) is no more than 6 dB over the natural ambient sound level. Inappropriate sounds interfere with the intent of the Wilderness Act on infrequent occasions.
	Development	Inappropriate sounds are audible up to 20% of the time. For the time when inappropriate sound is audible, the level of that sound for any 1/3-octave band (20–20,000 Hz) is more than 10 dB over the existing ambient sound level.
Major[3]	**Wilderness**	Inappropriate sounds are audible 20% or more of the time. For the time when inappropriate sound is audible, the level of that sound for any 1/3-octave band (20–20,000 Hz) is more than 10 dB over the natural ambient sound level. Inappropriate sounds significantly interfere with the intent of the Wilderness Act.
	Development	Inappropriate sounds are audible 25% or more of the time. For the time when inappropriate sound is audible, the level of that sound for any 1/3-octave band (20–20,000 Hz) is more than 10 dB over the existing ambient sound level.

[1] Short-term impacts of a generally lesser degree are likely to fall into this category, whereas long-term impacts must be evaluated specific to the criteria. Short-term impacts are those that occur for the duration of a time-finite project such as facility construction or maintenance, or a one-time-only event. A general rule for short-term determination is any impact whose total duration is less than five years. Impacts that are caused by a use or an action that is permitted for a term of more than a year, or allowed to continue programmatically and indefinitely, could be considered long-term (as in 10-year term permits).
[2] Short-term impacts of a generally greater degree are likely to fall into this category, whereas long-term impacts must be evaluated specific to the criteria.
[3] Short-term impacts are not likely to fall into this category; long-term impacts must be evaluated specific to the criteria.

determination of impairment on park resources and visitor experiences. This determination must be based upon consideration of direct, indirect, and cumulative impacts—as defined in the impact thresholds.

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Military Overflight Program

Based on the results of repeated surveys of park superintendents conducted by the National Parks Conservation Association, an estimated 150 parks, approximately 40% of all units in the National Park System, are actually or potentially affected by military overflights. Many of these parks are situated within 10 miles of military training routes (MTRs), military operations areas, or military ranges, such as the Nellis (Nevada) and Goldwater (Arizona) ranges, which are run by the U.S. Air Force, and the Fallon (Nevada) Range, which is operated by the U.S. Navy.

In the late 1980s, as the Cold War was ending, the Air National Guard (ANG) hosted the first regional airspace and range council meeting. That meeting, held in the Northeast, was designed to give all stakeholders information about and a chance to comment on ANG training operations that could affect them. It was so successful that the ANG soon applied the concept to other geographic regions of the country, with similar results. In 1994, the Air Force joined as a cosponsor. As part of its policy of "constructive engagement" with the armed services, the National Park Service (NPS) has not only participated in Air Force regional airspace and range council meetings around the country each year since 1995, but also has been on the agenda at each meeting.

As a result, NPS has managed to reach a large number of key Air Force military and civilian representatives, from top-level senior executives and general officers to installation and squadron commanders, airspace managers, and individual pilots and the crews who support them. Those Air Force officials now understand the Park Service's mandate to maintain or restore natural sound environments to national parks and to reduce human-produced noise, including that associated with aircraft, to the lowest practicable levels. With the establishment of an ongoing partnership and a relationship of trust between the two agencies, the NPS has been able to gain the understanding, empathy, and support of the Air Force for the missions and objectives of national park units.

This special relationship is illustrated by the fact that NPS is the only agency outside of the Department of Defense (DoD) to have hosted one of the Air Force regional meetings, and has now served as host for four such meetings, including two in 2003 (the Western Pacific Region meeting in San Francisco and the Southern Region meeting in Pensacola, Florida).

This partnership has produced numerous success stories. For example, in 2000 the Air Force facilitated a working relationship between NPS and the Navy that culminated in modifying a military training route, VR-1257, over Joshua Tree National Park. The relocation of the route, which was proposed by the park superintendent, resulted in enhanced low-level training for the Navy while having less impact on park resources and visitor experiences. The final environmental assessment was signed by both the

Navy and NPS.

Other success stories include that of Big Bend National Park in Texas, where the Air Force, which had been flying over heavily visited areas of the park, generating a number of noise complaints from park visitors, agreed to use an alternative MTR during the park's peak visitation periods. At Pipe Spring National Monument, located in northwestern Arizona in a remote and quiet natural setting, the Air Force voluntarily provided an additional buffer zone of one-half mile at an altitude of no less than 1,000 feet above ground level. This relocation of the MTR prevented the disruption of historic re-enactments and precluded possible damage to the park's historic structures from vibrations from low-level flights without causing a negative impact on military readiness training. Sequoia and Kings Canyon National Parks and Death Valley National Park benefited from a decision by the DoD's Joint Policy and Planning Board, strongly supported by the commanders of Edwards Air Force Base and LeMoore Naval Air Station, to place a voluntary floor of 18,000 feet above mean sea level (MSL) on military aircraft using the R-2508 training complex, a route considered vital to systems development and aircrew training. The voluntary floor has greatly reduced noise intrusions on those parks and is in effect unless lower-level flight is deemed absolutely critical.

In some cases, the relationships established via NPS participation in Air Force regional airspace and range meetings have led to other kinds of success stories. One prominent example is Crater Lake National Park, in southwestern Oregon, site of the deepest freshwater lake in the United States (Figure 1). In the summer of 2000, Crater Lake had contracted with the research vehicle *Surf Surveyor* to map the lake bottom, but the company that was to airlift the ship in and out of the lake exercised its option to extricate itself from the contract because all of its aircraft were in use fighting wildland fires. With time running out, the Park Service's Pacific West regional director asked the Air Force for assistance. The Air Force's military liaison to the Department of the Interior contacted officials at Fort Lewis, Washington, which was able to send a CH-47D Chinook helicopter to airlift the research vehicle onto and off Crater Lake. The mapping project was a complete success. Without the assistance of the Air Force and the Army, the Park Service would have been unable to conduct the project and would have forfeited payment for the research vessel. Fort Lewis also benefited from a real mission in lieu of a training exercise.

Another major contributor to the strong relationship between the two agencies has been mutual visits to parks and military installations. For example, Sequoia and Kings Canyon National Parks have conducted annual horseback-riding trips into the parks' backcountry for a number of key Air Force, Navy, and other DoD officials to heighten their awareness of the parks' preservation mission and the types of visitor experiences they are trying to protect (e.g., the opportunity to hear natural sounds, to have peace and quiet, and to have solitude). Since the backcountry trips began, the number of deviations from DoD altitude restrictions over the park has plummeted to nearly zero. Meanwhile, DoD has taken the chief ranger for Sequoia–Kings Canyon and other

Figure 1. In the summer of 2000 at Crater Lake National Park, the U.S. Army, U.S. Air Force, and the National Park Service collaborated on airlifting a research vessel onto and off the lake. The research vessel was used to map the lake bottom. Without the two service branches' assistance, this important research project would not have been conducted.

NPS officials on orientation flights, and Edwards Air Force Base has hosted NPS officials for tours of the base.

The relationship between NPS and the armed services reached new heights in 2002 when they, in partnership with the National Parks Conservation Association, developed the *Air Force/National Park Service Western Pacific Regional Sourcebook.* This sourcebook, designed to enhance communication between the agencies and to facilitate problem-solving at the field level, features critical information about each agency. The final chapter profiles each Air Force installation and national park unit in the region. Color geographic information system maps are included for each installation and park unit to cross-reference the major park features underlying military airspace and the military uses of airspace overlying the parks.

The sourcebook was approved by the NPS director and the Air Force chief of staff in December 2002 and was distributed to each park and installation in the region. While the two agencies may appear at first glance to have very different and potentially conflicting missions, the sourcebook quotes General Thomas White, Air Force chief of staff from 1957 to 1961, on the relationship between the defense of the nation and preservation of its resources: "The mission of the Department of Defense is more than aircraft, guns and missiles. Part of the defense job is protecting the lands, waters, timbers, and wildlife—the priceless natural resources that make this great nation of ours worth defending."

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Air Tour Management Plan Program

Public Law 106-181, the National Parks Air Tour Management Act of 2000, required that the Federal Aviation Administration (FAA) and the National Park Service (NPS) jointly develop air tour management plans (ATMPs) for all parks with actual or proposed commercial air tour operations. The FAA issued a rulemaking on October 25, 2002, that codified the act and completed the definition of a commercial air tour operation. The rulemaking also required that existing and new-entrant operators apply to the FAA for operating authority to continue park overflights or to initiate such actions. As a result, air tour operator applications were submitted from over 100 parks and several Native American reservations. That means that approximately 110 ATMPs will be developed for the appropriate parks and tribal lands in the next six to ten years.

An ATMP park priority list was initially developed in 2000 after consultation with park superintendents or key staff at parks that were believed to have commercial air tour operations. At that time, 56 parks were identified as having such operations. A variety of criteria addressing noise issues, interpretation of park sounds, sound issues in park planning documents, presence of park wilderness, and other factors were applied to each of these parks. Points were assigned to the criteria and a total point value was derived to determine the priority of the parks for development of ATMPs. The priority list was subsequently modified in the first half of 2003 to include the expanded number of ATMP parks and to cluster parks for logistical efficiency and cost savings.

In preparation for development of the ATMPs, the FAA and the NPS Natural Sounds Program Office have developed a memorandum of understanding (MOU) spelling out roles and responsibilities of each organization, procedures for development of the National Environmental Policy Act (NEPA) compliance document/ATMP, the conflict resolution process, products and services to be provided, and a joint funding approach. A joint FAA/NPS implementation plan that tiers off of the MOU is being developed. This plan will further define the process of producing and implementing ATMPs and complying with applicable environmental requirements.

The ATMP planning process will consist of data acquisition, scoping, formulation of alternatives, development of a draft NEPA compliance document (environmental assessment or environmental impact statement) and ATMP, public involvement, production of the final NEPA compliance report/ATMP, and signing of the NEPA record of decision (ROD). The Air Tour Management Act of 2000 designated FAA as the lead agency and NPS as a cooperating agency. However, since both agencies must sign the ROD, it is truly a joint or collaborative process in every sense. If any tribal lands are situated within or adjacent to a park unit, the tribe(s) will be a cooperating agency. The act also requires that at least one public meet-

Figure 1. Buffalo are part of the natural sounds and natural resources at Badlands National Park. An air tour management plan was initiated at the park in the late summer of 2003.

ing be held during the ATMP planning process.

Acoustical data acquisition to characterize park soundscapes and to ascertain the level, type, and duration of noise intrusions was initiated at Hawaii Volcanoes National Park in late October 2002. Pre-scoping meetings with the Hawaiian parks staff, FAA, Natural Sounds Program Office, and the U.S. Department of Transportation's Volpe Center were held in late winter and spring 2003 to determine the project management and public involvement approaches, roles and responsibilities, logistics, and schedules. Additional acoustical data acquisition and analysis were conducted concomitantly at Haleakala National Park and several other Hawaiian parks. Acoustical equipment was set up in identified park acoustical zones to characterize the various park soundscapes and noise intrusions. Other park ATMPs that began in fiscal year 2003 (FY03) were Badlands National Park, Mount Rushmore National Memorial, and Lake Mead National Recreation Area. The number of new ATMPs that will be started this fiscal year is predicated upon available funding and personnel, as well as progress on the FY03 planning efforts.

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Shan Burson

Soundscape Studies in National Parks

The National Park Service (NPS) recognizes the value and importance of natural sounds. NPS management policy 4.9 states: "The National Park Service will preserve, to the greatest extent possible, the natural soundscapes of parks. Natural soundscapes exist in the absence of human-caused sound. The natural soundscape is the aggregate of all the natural sounds that occur in parks, together with the physical capacity for transmitting natural sounds. Natural sounds occur within and beyond the range of sounds that humans can perceive, and can be transmitted through air, water, or solid materials. The Service will restore degraded soundscapes to the natural condition wherever possible, and will protect natural soundscapes from degradation due to noise (undesirable human-caused sound)" (NPS 2000).

NPS has initiated acoustical studies in several national parks in recent years. In many parks, these studies are conducted with acoustics staff from the Volpe Center (part of the U.S. Department of Transportation) to collect acoustical data necessary to develop air tour management plans (ATMPs) with the Federal Aviation Administration (FAA) as called for in the Air Tour Management Act of 2000. For these and other acoustical studies, a scientifically credible, standardized approach to measuring and managing soundscapes is essential. This paper presents an acoustical primer and outlines the NPS approach to studies of national park soundscapes.

"Soundscape" can be defined as the total ambient acoustical environment associated with a given area such as a national park. In a national park setting, soundscapes may be natural sounds only, or both natural and human-made sounds. Sound is measured in terms of frequency content and amplitude, and can be adjusted ("weighted") to match the hearing abilities of a given animal. "Frequency" is defined as the number of times per second (Hz) that the wave of sound repeats itself, and "amplitude" is the relative strength of the pressure level (in decibels, or dB). Humans with normal hearing can hear sounds between 20 Hz and 20,000 Hz, and as low as 0 dB at 1,000 Hz. The range of pressures a human can detect is greater than 1,000,000:1. Because of this very large range, the decibel scale is used. A decibel is the logarithm of a ratio of the measured pressure to a reference pressure.

Figures 1 and 2 illustrate the components of sound; frequency and amplitude. One-third octave band frequency data (31 bands between 20 and 20,000 Hz) are along the X-axis, and amplitude data are along the left Y-axis. The wideband metric (far right) is a single number representing the sum of all the energy in the frequency data. This example is from Jackson Hole, Wyoming, and includes an airplane at 100 Hz and elk bugling between about 1,250 Hz and 5,000 Hz. In Figure 1, all data are flat, or unweighted, and in Figure 2, all data are A-weighted (dBA), or adjusted for the hearing ability of humans. Humans and many other animals do

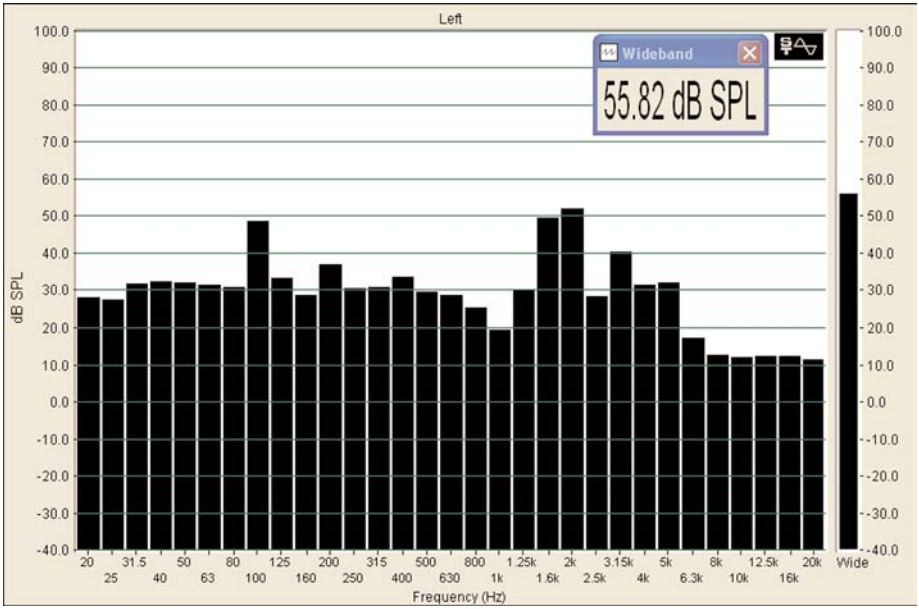

Figure 1. Jackson Hole, Wyoming: airplane (100 Hz) and elk (1,250-5,000 Hz); frequency and wideband: unweighted.

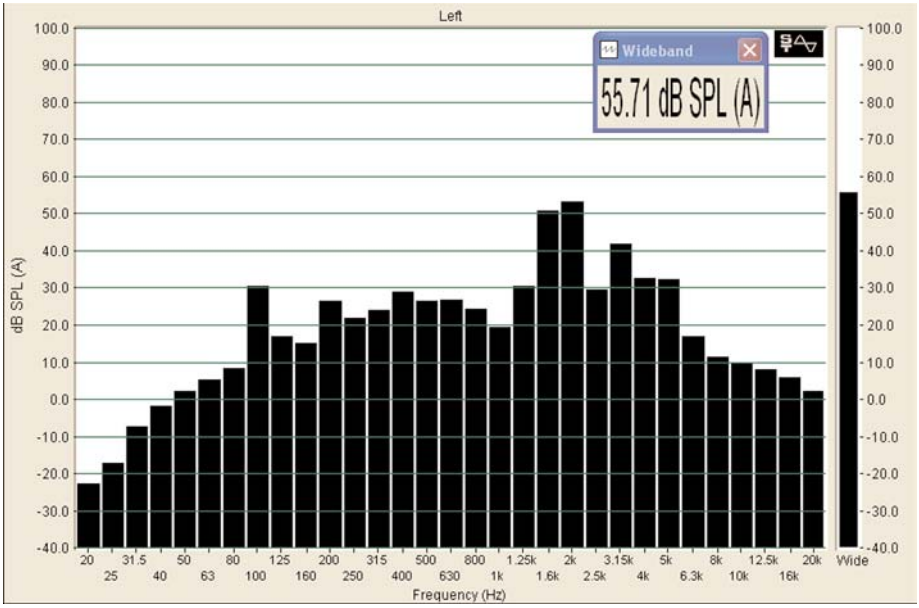

Figure 2. Jackson Hole, Wyoming: airplane (100 Hz) and elk (1,250-5,000 Hz); frequency and wideband: A-weighted.

not hear well at very low or very high frequencies. For example, at 20 Hz, A-weighting subtracts 50.4 dB from the unweighted amplitude, and at 20,000 Hz, A-weighting subtracts 9.3 dB. In the middle frequencies, there is very little adjustment for A-weighting (at 1,000 Hz there is no adjustment).

Although many animals are like humans in that they do not hear well at very high or low frequencies, some species hear very well at low frequencies (whales) while others hear very well at high frequencies (bats).

Sound levels in national parks can be very low. For example, in the crater in Haleakala National Park, minimum sound levels are between 0 and 10 dBA. In Grand Canyon National Park along some remote trails, minimum sound levels measure between 10 and 20 dBA. In contrast, sound levels in a typical suburban area are between 50 and 60 dBA. An increase of 10 dBA represents a perceived (to human hearing) doubling of sound pressure level; hence, 50 dBA would be perceived as 16 times louder than 10 dBA. Examples of sound pressures and dBA measured in national parks are provided in Table 1.

Acoustical Data Collection

Collection of acoustical data in national parks needs to follow specific, standardized methods and protocols. This section provides guidelines for collection of acoustical data in national parks for use in establishing natural ambient sound levels, against which future conditions can be compared and assessment of potential impacts can be modeled. Specifically, this section provides guidelines for planning data collection, selection of measurement locations, determining adequate measurement periods, and identifying acoustic data to be collected.

Measurement locations. Prior to initiating measurements, potential locations should be reviewed by individuals familiar with the park in order to ensure that measurements are made in the primary land/vegetation types of the park, with consideration of park management zones, specific soundscape management objectives of those zones, and any sound-sensitive areas. Areas of like vegetation and topography are often referred to as "acoustic zones," with the assumption that, in general, the same mammals, birds, insects, and other sources of natural sounds (wind, water, etc.) occur in

Table 1. Representative sound levels in some national parks.

	dBA
Threshold of human hearing	0
Haleakala National Park: in volcano crater	10
Canyonlands National Park: leaves rustling	20
Zion National Park: crickets (5 m)	40
Whitman Mission National Historic Site: conversational speech (5 m)	60
Yellowstone National Park: snowcoach (30 m)	80
Arches National Park: thunder (distance unknown)	100
Yukon–Charley Rivers National Preserve: military jet (100 m above ground level)	120

similar habitats, and, as a result, similar habitats will have similar natural sound levels, propagation, and attenuation properties.

In some management zones, patterns of human-caused sounds (originating from travel corridors, visitor centers, air traffic routes, seasonal patterns, etc.) generate different, non-natural acoustical conditions. In developed zones, there is often less sensitivity to noise, and a greater incidence of human sound that may be regarded as consistent with or necessary for park purposes. In backcountry or wilderness zones, the soundscape is expected to be natural, with little if any human-caused noises.

Final selection of places to inventory is made through a screening process that considers access; equipment availability, capability, and maintenance needs; sources of ambient human-caused sound; statistical factors; and availability of personnel. The process's geographic scope depends on the range of alternatives (for example, in the ATMP process, the potential variations in flight paths) and the areas that likely would be affected. If the analysis is park-wide, then it is likely that the acoustic zone selection would cover the entire park. Alternatively, if there is only a small area of the park within the scope of analysis, only the potentially affected acoustic zones would need to be inventoried. In reality, it is often difficult to anticipate what alternatives may be considered in detail in an environmental document, so care must be taken in ruling areas out. It is better (and more efficient) to collect more data at once than to return later and collect additional data for a new area.

Measurement period. The variability of sound pressure level, frequency, and audibility over long periods (weeks, months, seasons, and years) is not well understood. Until it is, measurement periods must be of sufficient duration to ensure statistical confidence in data, and must include all periods of potential acoustical variability (such as diurnal/nocturnal, seasonal, and annual). For the most part, it will not be feasible to collect acoustical inventory data for long periods before planning and management decisions are initiated; however, data that represent all sources of variability should be obtained to the fullest extent possible. Once long-term data are available, an assessment of an adequate measurement period for a given area can be made. For example, initial review of data collected at one site in Hawaii Volcanoes National Park from October 2002 to January 2003 revealed the following. For the 80-day measurement period, variability was such that 50% of the period would need to be sampled to ensure that data collected were representative of the entire measurement period. Additional statistical review of long-term acoustical data from other parks is being conducted, and will aid in estimating future needs for measurement duration. It is almost certain that appropriate measurement periods will vary among parks, and may vary among different areas within the same park, but will also likely result in optimal measurement periods of weeks, not days.

Acoustical data. Acoustical studies in national parks should collect sound pressure level, frequency, and audibility data (adequate to describe natural and existing ambient sound levels, calculate the percentage of time that human-caused noise is audible, determine noise-free intervals, and

identify sources of sounds). These data can then be used to characterize natural ambient sound levels and current ambient sound levels, including human-caused noise.

Sound pressure level (SPL) data and frequency data. Sound pressure is the physical characteristic of sound; it is the actual pressure produced by a sound wave. Sound pressure level (SPL) is the logarithmic form of sound pressure; in air, it is 20 times the logarithm (to the base 10) of the ratio of the actual sound pressure to a reference sound pressure (20 micropascals). Acoustical data collected in national parks should include 1-second L_{eq} for 31 one-third octave bands between 20 and 20,000 Hz for the entire measurement period; the appropriate measurement period depends on acoustical variability. From these 1-second L_{eq} data, other acoustical metrics can be calculated (hourly, monthly, and seasonal dB, dBA, L_{max}, L_{min}, exceedences, L_x values, etc.). L_{eq} is an energy-equivalent metric, and is not a good measure of "average" sound level. L_x is a percent exceedence metric, that is, the sound pressure level (L) exceeded x percent of the time, such as L_{50} or L_{90} or L_{66}. The L_{50} is the median, and the L_{90} is the sound level exceeded 90% of the time (or the quietest 10 percent). The term "sound level" is generally used in conjunction with *weighted* sound pressure level data, such as dBA, while *unweighted* "sound pressure level" (dB) is generally used with frequency data. Sound levels in many national parks can be very low, so low that specialized equipment is needed to measure them. Most commercially available sound level meter/microphone combinations measure down to 15 to 20 dBA; however, in some cases, equipment that measures down to 0 dBA will be needed.

Audibility data. Audibility represents the biological aspects of sound. Audibility is the ability of animals, including humans, with normal hearing, to hear a given sound. This ability is affected by both frequency content (different species of animals hear some frequencies better than others) and amplitude (again, species differ in their sensitivity to amplitude). Currently, audibility data are collected and determined using human hearing abilities, but as techniques become available, audibility analysis will be extended to include other animals' hearing abilities. Audibility data are collected by making high-quality recordings either continuously or at regular, frequent intervals (sampling schemes may vary among different habitats or seasons) throughout the measurement period. Recordings should include a representative sample of events that exceed a user-defined threshold and duration. Recordings can be replayed at a later date to identify sources of human-caused noise and natural sounds. The audibility data collected must be of sufficient quantity to provide an adequate representation of audibility of natural and non-natural sounds throughout the measurement periods, including samples during all hours of the day and during all seasons. The standard practice of recording two to four digital audio tapes or one-hour attended logging sessions per season is not sufficient for assessing audibility. In addition to the time that human-caused noise is audible, the time between human-caused noises ("noise-free interval") is important to soundscape management. Audibility data are not intended for use solely to

assess impacts on visitors, although interpretations could be made from these data to achieve this purpose.

Source identification data. Data that allow the identification of sources of sounds (both natural and human-caused) must be collected in order to fully understand the soundscape in a given area. For the most part, past acoustical studies in national parks have included the collection of decibel data with limited recordings or attended logging for audibility data and source identification data. A major element of NPS soundscape management (as well as assessment of potential impacts of air tours) will be the percentage of time that human-caused noise is audible. Using source identification data in combination with audibility and sound pressure level data, metrics of natural sounds and human-caused noise can be calculated.

Meteorological data. Meteorological data (wind speed, wind direction, temperature, and humidity) can improve the utility of acoustical data. When appropriate and feasible, these data should be collected with acoustic data.

Biological data. Current acoustical studies often include making high-quality recordings in conjunction with collection of decibel data. These recordings are most often used for assessing audibility and source identification, and also can, with appropriate processing, provide decibel data. However, such recordings also have the potential to provide a wealth of biological information (avian inventories, and mammal and insect vocalizations). Acoustical studies in national parks should make every effort to include collection of biological data that would provide an archival record of natural sounds in the parks.

Natural, Existing, and Traditional Ambient Sound Level

Ambient sound levels (natural, existing, and traditional) are the baseline levels against which potential impacts will be compared during impact assessment. Therefore, it is essential that these levels be clearly defined. The natural ambient sound level of a given area is composed of the natural sound conditions in that area that exist in the absence of any human-caused noise. Natural ambient sound is considered synonymous with "natural quiet," although the former is more appropriate because nature is often not quiet. The existing ambient sound level of a given area is composed of all sources of sound in that area, including natural sounds and human-caused noise. The traditional ambient sound level of a given area is composed of all sources of sound in that area, including natural sounds and human-caused noise, excluding the noise source of interest. In the case of ATMPs, the noise source of interest would be air tour aircraft.

Metrics

Traditionally, acoustical studies and impact assessment in national parks have relied on a single metric, LA_{eq} (A-weighted L_{eq}). L_{eq} is an energy-equivalent metric, and is well-suited for near-continuous noise. However, for measuring a series of distinct noise events, such as aircraft or vehicle noise, the L_{eq} is not a good measure. Further, the A-weighted metric is a single number adjusted for human hearing and can be very misleading. Two very different acoustic states can have the same dBA. Aircraft noise at lower frequencies can have the same dBA as birds singing at higher fre-

quencies. Many countries and organizations (such as the World Health Organization) acknowledge that reliance on a single metric, LA_{eq}, is not appropriate for describing and assessing impacts of certain types of human-caused noise, and that supplemental metrics should be used (Hendin 2001). This is especially true in park-like settings where natural sounds predominate and human-caused noise, such as aircraft noise, consists of several distinct noise events. Supplemental metrics that should be considered for soundscape management in parks include:

- One-third octave band data;
- Exceedence percentiles (L_{50}, L_{90}, L_x);
- Sound exposure level;
- Number of events/time;
- Time above an appropriate baseline or pre-selected level;
- Percent time audible; and
- Noise-free interval.

The use of one-third octave band frequency data is a much more accurate method for describing both natural sounds and human-caused noise. Additionally, the use of one-third octave band data can provide a more accurate assessment of impacts. This is especially true in national parks where assessment of impacts must include consideration of animals that perceive sounds differently than humans.

While selection of appropriate metrics and analysis for soundscape management in parks will be driven in large part by specific objectives of each park, the standard practice of relying on a single metric, such as dBA, is not appropriate. In most parks, soundscape management standards will likely rely on the percentage of time that human-caused noise is audible, the level of human-caused noise when it is audible, and the interval without human-caused noise (noise-free interval).

Acoustical Equipment

A variety of acoustical monitors and recording instruments can collect the data listed above. Sound level meters that collect one-third octave band data are commercially available, as is specialized software that can be programmed to store acoustical data and make high-quality digital recordings. In addition to standard sound level meters, continuous recordings of the entire measurement period can provide acoustical data (through post-processing). Long-term recordings can also provide a wealth of biological data, and are currently the best method to provide an archival record of soundscapes of natural parks. The NPS is working with companies and individuals to develop systems that can make long-term, high-quality recordings. These recordings, if collected properly, can provide both physical and biological characteristics of the soundscape. Additionally, recordings can be an archival record for current and future studies of biological components that generate sound. Acoustical studies in national parks should make every effort to include high-quality recordings. Sound level meters used in Yukon–Charley Rivers National Preserve and Canyonlands National Park are shown in Figures 3 and 4. respectively.

Specific methodologies (standards or protocols) for equipment type; microphone type, placement, and height; and other factors for work in national parks are available from the

Figure 3. Microphone with foam wind screen and bird spike set up in Yukon–Charley Rivers National Preserve, 2002. *National Park Service photo.*

Figure 4. Acoustical monitor: notebook computer and sound level meter set up in Canyonlands National Park, 2002. *National Park Service photo.*

NPS Natural Sounds Program Office. These standards are based in part on American National Standard ANSI S12.9-1992, Part 2, and the FAA's *Draft Guidelines for the Measurement and Assessment of Low-level Ambient Noise* (Fleming, Roof, and Read 1998).

Impact Assessment

Every unit of the National Park System was established for specific purposes, which are described in enabling legislation, general management plans, and the National Park Service organic act. Soundscape management and impact assessment is based on those purposes and plans. NPS management policy 4.9 states: "Using appropriate management planning, superintendents will identify what levels of human-caused sound can be accepted within the management purposes of parks. The frequencies, magnitudes, and durations of human-caused sound considered acceptable will vary throughout the park, being generally greater in developed areas and generally lesser in undeveloped areas. In and adjacent to parks, the Service will monitor human activities that generate noise that adversely affects park soundscapes, including noise caused by mechanical or electronic devices. The Service will take action to prevent or minimize all noise that, through frequency, magnitude, or duration, adversely affects the natural soundscape or other park resources or values, or that exceeds levels that have been identified as being acceptable to, or appropriate for, visitor uses at the sites being monitored" (NPS 2000).

Impact assessment—determining the level of impact of a human-caused noise on park resources—requires two types of acoustical data: the metrics of the human-caused noise and the metrics of the park soundscape against which the human-caused noise is being compared. The goal of acoustical studies in parks is to provide the data necessary to monitor and manage park soundscapes.

Recent and Ongoing Acoustical Studies in Parks

With passage of the Air Tour Management Act in 2000, acoustical studies were initiated in several national parks. Studies were recently completed in Zion, Hawaii Volcanoes, Haleakala, five small parks in Hawaii, Mount Rushmore, and Badlands. Additional studies are currently underway in Arches, Bryce Canyon, Grand Teton, Yellowstone, and Denali. More than 100 parks have commercial air tours and thus will need acoustical data for preparing ATMPs. Director's Order no. 47 directs all parks to manage park soundscapes, and these parks will need acoustical data as well.

Summary

The National Park Service recognizes the importance of protecting, maintaining, and restoring natural soundscapes. The Natural Sounds Program was established to assist parks in addressing these concerns. As NPS becomes more involved in soundscape management, park staff must become more familiar with acoustics. A scientifically credible, standardized approach to measuring and managing soundscapes is essential. The Natural Sounds Program Office, working with federal and state agencies and private organizations, is developing specific methods and standards for acoustical studies in national parks. New approaches are needed for

soundscape measurement and management in national parks, and the Natural Sounds Program Office is working to address those needs.

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Gary B. Nash

For Whom Will the Liberty Bell Toll? From Controversy to Collaboration

The Liberty Bell controversy, which began in late 2001, had a painful beginning but appears to be nearing a productive ending that will please most Philadelphians, most visitors to Independence National Historical Park (INHP), and most National Park Service people. Some public squabbles waste time and bring about no lasting good. This controversy has been different. By now it is widely known that the controversy centered on how INHP would present the Liberty Bell in its new pavilion built at the southeast corner of Sixth and Market streets.

Much was at stake here, and nobody knew it better than the superintendent and staff at Philadelphia's INHP. Each year several million people from home and abroad troop past the Liberty Bell and neighboring Independence Hall, eager to see one of the premier sites of America's heritage. The Liberty Bell and Independence Hall are beacons attracting people to find links between the past and the present. But what do visitors hear from Park Service rangers these days, and what will they see as they gaze at what has become one of the nation's most memorable icons—a 2,000-pound piece of unstable mixed metals molded 250 years ago that has achieved an almost global reach as a symbol of freedom and human rights? Now, with some $13 million for a new pavilion, INHP had a new chance to rethink what the Liberty Bell meant at different points in its history and what it means today. INHP shouldered a weighty responsibility—and enjoyed a rare opportunity.

What has added to the drama in presenting the Liberty Bell anew is the chunk of real estate upon which the new pavilion was to be erected. The site is where the widow of William Masters, mighty merchant and Philadelphia mayor in the 1750s, erected a fine mansion in about 1767–68. As it turns out, Masters was probably Philadelphia's largest slave owner. In 1761, after his death, his probated estate listed the names of 34 slaves. Some may have helped build the house. In 1772, Widow Masters gave the mansion to her daughter Polly, who had married Richard Penn, grandson of William Penn. Polly and Richard Penn were also slave owners, but on a small scale. The mansion's next occupant, shortly after the Revolution erupted, was Sir William Howe, the British general whose army occupied Philadelphia from September 1777 to June 1778. After Howe's recall, Sir Henry Clinton moved in and, like Howe, his enslaved Africans toiled on this site. After the British decamped, Benedict Arnold arrived to declare martial law and occupy the Masters–Penn mansion. Two enslaved Africans were among his household retinue of seven. Then in 1781, Robert Morris, financier of the American Revolution as he has been called, purchased the house and began to reconstruct it, probably with the labor of his several slaves (though

not including Hero, who had fled to the British just before they took the city). Thus, for the entire revolutionary period, the lives of the free and unfree mingled intimately on this piece of Philadelphia ground.

The rebuilding of the Masters–Penn House made it suitable quarters for George and Martha Washington after the nation's capital moved from New York to Philadelphia in 1790. But some alterations were needed, especially for sheltering a household staff of about thirty—a mixed lot of white indentured servants and enslaved African Americans. Through the work of Ed Lawler, an urban archeologist and architectural historian, who has been writing a history of the Morris mansion and its use by Washington, we know that each day the thousands of visitors at the Liberty Bell Pavilion will be walking directly over the "Servants Hall," as it was called, over the smokehouse, over the octagon icehouse, and over the added slave quarters apparently built by Washington with Robert Morris's consent (Figure 1). After the Washingtons decamped for Mount Vernon, John and Abigail Adams became the new tenants at what Philadelphians were coming to call the President's House.

For nearly seven years, George Washington and the first lady occupied the Morris House, and no day went by without the services provided by the indentured servants and slaves who prepared the meals, cleaned the mansion, drove the coaches, managed the horses, tended the fireplaces, hauled the ashes, and performed countless other tasks indispensable to running the executive office efficiently and graciously. Like their well-to-do owners, these men and women had emotions, ideas, spiritual yearnings, hopes, and fears; they also had family commitments, agendas to pursue, and thoughts of improving their condition. They speak to us as much as Martha and George about what it meant to live in Philadelphia at the center of the new American republic, though history had dictated that they carry out their lives at very different social levels and in severely circumscribed stations.

They speak to us, however, only if we give them voice. Here are two stories that have come, as it were, from underground—stories about life at Sixth and Market streets, stories that have found their way neither into the history books nor into the national

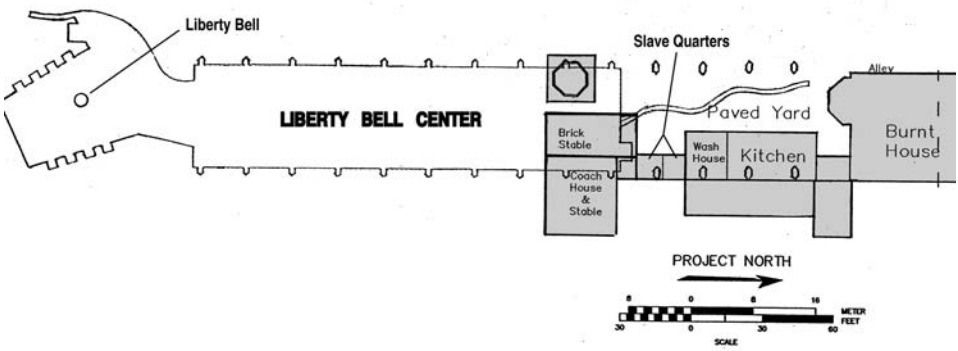


Figure 1. Ground plan of Liberty Bell Center, showing the former site of the President's House and associated structures (shaded). National Park Service map (2002), with additions by Edward Lawler, Jr.; courtesy of www.ushistory.org.

consciousness, stories that ought to be restored to memory in the maturity of our 21st-century democracy.

Oney Judge, born of a Mount Vernon enslaved seamstress and sired by a white indentured servant from Leeds, England, had served Martha Washington since 1784, when the young mixed-race girl was about ten years of age. Martha Washington brought her to Philadelphia in 1790 when Oney was sixteen. Six years later, in 1796, her privileged position in the Washington household notwithstanding, she fled the president's mansion just before the Washingtons were ready to return to Mount Vernon for summer recess. Her days of helping the first lady dress and powder up for levees and state functions, running errands for her, and accompanying her on visits to the wives of other political and diplomatic leaders were now at an end. Many years later she recalled to a journalist of *Granite Freedom*, a New Hampshire abolitionist paper, "I had friends among the colored people of Philadelphia, had my things carried there [to a waiting ship] before hand, and left while [the Washingtons] were at dinner."

The Washingtons railed at the ingratitude of Oney Judge fleeing slavery—"without the least provocation," as Washington wrote. Oney's "thirst for compleat freedom," as she called it, did not register with the president. The Washingtons sent agents after her, to cuff her and bring her back or bargain her into returning. Hunted down, Oney sent word that, if guaranteed freedom, she would return out of affection for the Washington family. The first family refused. With several hundred of their enslaved Africans at stake, they feared that rewarding her flight from slavery with a grant of freedom would set "a dangerous precedent." At that, Oney Judge swore she "should rather suffer death than return to Slavery." When Washington persisted, his agent in Portsmouth, New Hampshire, reported in September 1796 that "popular opinion here is in favor of universal freedom," which made it difficult for him to seize and shackle Oney. Two years later, the Washington family was still trying to snag Martha's ingrate chambermaid by sending George's nephew, Burwell Bassett, after her. Not until Washington's death in 1799 could Oney feel some measure of safety. By now she was married, had a baby, and had put roots down in New Hampshire where she lived out her life, poor but free.

Just as the site on which the new Liberty Bell Pavilion was rising was a stage for a personal declaration of independence by a 22-year-old enslaved woman, it became so again nine months after her escape, just as the Washingtons were leaving Philadelphia to take up life as private citizens on their beloved Mount Vernon plantation. To the Washingtons, Hercules enjoyed a special status in the executive mansion, one that in their view should have made him immune to the fever for freedom. As their prize cook, he had prepared countless state dinners for a number of years. But Hercules, like Oney Judge, had mingled with numerous free black Philadelphians, who by this time had built two churches of their own, started schools and mutual aid societies, carved out niches in the urban economy, even purchased homes, and began mounting attacks on the fortress of slavery.

Hercules slipped away from the president's house, melted into the

countryside, and outwitted all of Washington's attempts to capture him. When a visitor to Mount Vernon asked Hercules' six-year-old daughter whether she was broken-hearted at the prospect of never seeing her father again, she replied, "Oh sir! I am very glad because he is free now."

All of Washington's fears, since his first arrival in Philadelphia, were being realized. In 1791, he wrote to his secretary, Tobias Lear, that he did not think his slaves "would be benefited" by achieving freedom, "yet the idea of freedom might be too great a temptation to resist," and breathing the free air of Philadelphia, where the pesky Quakers were helping enslaved Pennsylvanians break their shackles, might "make them insolent in a state of slavery." Near the end of his presidency, and still grating at Oney Judge's flight, he ordered his secretary to get his slaves back to Mount Vernon. "I wish to have it accomplished under a pretext that may deceive both them and the public," he wrote. "I request that these sentiments and this advice may be known to none but yourself and Mrs. Washington."

Site and symbol, freedom and slavery, black and white, upstairs and downstairs: how should the INHP explain the Liberty Bell and its new site to the swarming visitors who will come to venerate the bell? In December 2001, I had an inkling that the Liberty Bell story line, as it had been devised by INHP, would be simplistic and vainglorious and that the piece of history-soaked land the bell would occupy would be ignored. Philadelphia's National Public Radio station, WHYY, had interviewed me on December 5, 2001, by hookup in Los Angeles; and having read Ed Lawler's account of the eight slaves from Mount Vernon who had served the first family at this site for nearly seven years (soon to be published in the *Pennsylvania Magazine of History and Biography*), I mentioned that it would be a misfortune to perpetuate the historical amnesia about the founding fathers and slavery at the Liberty Bell venue. But the alarm bell I tried to ring had no effect whatever. I had not read the script written by INHP, nor did I know that they were moving ahead at flank speed to get bids to construct the new exhibits. That became apparent when I returned to Philadelphia on March 12, 2002, to give a talk on my *First City: Philadelphia and the Forging of Historical Memory*, published by University of Pennsylvania Press a few months before.

After reaching Philadelphia, I called the chief of interpretation at INHP to ask what visitors would learn about the history of the president's house, its many illustrious tenants, and their slaves and servants? Not much, he replied. The interpretative plan had been researched for several years, scholarly and public input had been solicited, and the decision had been made to keep the focus squarely on the Liberty Bell and its venerable history. Drawing attention to the site on which the new pavilion was being built, he explained, would confuse the public and divert attention from the venerable Bell. I objected that the Liberty Bell meant many things to many people, among them slaves for whom the biblical inscription on the bell—"Proclaim liberty throughout the land and to all the inhabitants thereof"—surely had a hollow ring. Were not liberty and unfreedom locked together in deadly embrace? Wasn't the liberty of some built on the

enslavement of others? Whether true or not, he replied, "the train has left the station"—a metaphor that has become the standard rationale for those who do not want to entertain dissenting views. We are out of time, out of money, and the interpretive plan was put before the public with plenty of opportunity for comment and criticism, explained the chief of interpretation. Would the public hear not a word about how they were walking over the slave quarters Washington built as they approached the entrance of the Liberty Bell Pavilion? Would they learn nothing about how they were stepping in the footprints of Richard Penn, Benedict Arnold, Sir William Howe, Robert Morris, Abigail Adams, and a host of others? The most I could eke from him was a half-promise to consider a wayside panel out on Market Street that would note that this was the site of the Masters–Morris house that became the executive mansion of our first two presidents.

Muttering to myself as I walked to the old Friends Meetinghouse to give a talk on *First City*, a book about the contest for public memory that had agitated Philadelphia for generations, I pondered whether my concluding chapter, titled "Restoring Memory," was too optimistic. I mused about how "the property in history has been redistributed as collecting institutions have broadened their vision about what is collectible and as the access to the means of producing stories about the past has widened greatly." I related how the Republican National Committee had sanctioned a 30-foot-high mural portraying the Underground Railroad and its radical abolitionist leaders in Philadelphia and unveiled it as the convention of July 2000 met to nominate George W. Bush. And I remembered the letter which Martha Aikens, the superintendent of INHP, showed me: from Mr. Tony Johnston of Williamstown, New Jersey. Johnston had written how his children wanted to see Independence Hall when he and his family were visiting Philadelphia on July 4, 1995. "I did not want to go," explained Johnston. "I am an African-American and spent most of my life in the west. I did not think this place had anything to do with me." But their tour guide, Frances Delmar, changed his mind. "She made me understand that even if I am not blood related to those men in Independence Hall, I am idea and dream related," he wrote. "She told her story just like my mother used to do her quilts. She put the pieces together and when she was done I saw the pattern and white I fit in the pattern." Johnston concluded that Ranger Delmar "saw I was uneasy being African American in that place. She faced the race thing head on with charm and truth. Thank you for giving us tour guides like her. Bless you."

Here is exactly how the National Park Service was changing from my boyhood days in Philadelphia. This was why our historians' group was convinced that serious missteps were being made. Was the process of memory-making, the process of overcoming historical amnesia, going into reverse gear at the Liberty Bell Pavilion?

At the Quaker Meetinghouse, I concluded with what I had just heard from the Park Service. One after another, those attending deplored INHP's inattention to the Liberty Bell's historically rich site. Up jumped Randall Miller, former editor of the *Pennsylvania Magazine of History and Biography*, prolific author, and crown

jewel of the History Department at St. Joseph's University, to suggest that I write an op-ed piece for the *Philadelphia Inquirer* to bring the issue before the public. Not quite ready to have him paint a bulls-eye on the back of someone who had made useful target practice for the ultra-patriotic attack on the National History Standards in 1994–96, I agreed only on the condition that he would co-author the piece. When Miller agreed, we were off to the races. The next day, Marty Moss-Coane, host of WHYY's "Radio Times," interviewed me on *First City*, and she followed my suggestion that she segue into a discussion of the planned Liberty Bell exhibits. This gave me a chance to be provocative. "Our memory of the past is often managed and manipulated," I said. "Here it is being downright murdered." The switchboard began to light up as people called in from all compass points. Overwhelmingly, they supported my plea for presenting the history of the Liberty Bell site, along with the bell, in ways that mingled stories of freedom and unfreedom, black and white, mighty and humble, leaving the public with food for thought rather than simply a warm, cozy glow about the old cracked bell.

Fifteen minutes of discussion about the Liberty Bell on "Radio News" proved a crucial turning point. The public was getting aroused. Equally important, Stephan Salisbury at the *Inquirer* decided to cover the story. Writing with Inga Saffron, he splashed the story on the front page, Sunday, March 24, with a headline reading "Echoes of Slavery at Liberty Bell site." Thousands of *Inquirer* readers were learning about a chapter of forgotten history—"the presence of slaves at the heart of one of the nation's most potent symbols of freedom." Salisbury and Saffron included a defensive statement from INHP that "the Liberty Bell is its own story, and Washington's slaves are a different one better told elsewhere." Philadelphia's African American mayor, John Street, was quoted as being disturbed by this and calling for "a very earnest dialogue ... about how to address the issue of Washington and his slaves." Randall Miller was quoted at length, pointing out that Park Service was missing an opportunity "to tell the real story of the American Revolution and the meaning of freedom. Americans, through Washington, were working out the definition of freedom in a new republic. And Washington had slaves. Meanwhile, the slaves were defining freedom for themselves by running away. There are endless contradictions embedded in this site." I was quoted that "[m]aybe the National Park Service feels it would besmirch the Liberty Bell to discuss [the slavery issue] and that the Liberty Bell should be pure. But that's not history [in the whole that] ... people deserve to know."

Two days later, the *Inquirer* devoted a full page to the issue with a clever headline "Site Unseen" about the Morris–Washington house along with an article about how Mayor Street was dialoguing with Park Service officials, who now seemed willing to rethink their exhibits a bit, especially if the mayor agreed that work on the new pavilion would not be delayed. Meanwhile, Miller and I organized a committee of well-known historians and Philadelphia institutional leaders to hold the feet of Park Service officials to the fire, while offering to work with them to rethink their plans for the

Liberty Bell pavilion and the site on which it would arise. Among them were Charlene Mires, an American historian at Villanova University and author of a soon-to-be-published history of Independence Hall, who told the press about how not only the president's house was involved with slavery but that Independence Hall itself was where runaway slaves were tried as late as 1854. "These issues of slavery and freedom run throughout Independence Mall," Mires said to the *Inquirer*. "It doesn't diminish the story to address them."

Upping the ante, the *Inquirer*'s March 27 lead editorial was titled "Freedom & Slavery, Just as they coexisted in the 1700s, both must be part of Liberty Bell's story." The *Inquirer* wagged its finger at INHP, reminded them that "the old cracked bell will be situated on ground that enhances it as a cherished symbol of the struggle for liberty, especially to African Americans" and expressed confidence that "the Liberty Bell in its new home will not bury an ugly part of the country's history."

And then the *Inquirer* published an op-ed piece that Randall Miller and I wrote on Easter Sunday, March 31, along with an essay by Charlene Mires, The next day, the Associated Press put a story on the wire, to be picked up around the country, titled "Historians Decry Liberty Bell Site." The history of slavery on Independence Mall was now becoming a hot issue. Letters were pouring in to the *Inquirer.*

In our op-ed essay, Miller and I argued that the Park Service should enlist historians to help bring out the rich stories showing how freedom and slavery commingled at the Liberty Bell site and elsewhere. "Washington was the living symbol of freedom and independence," we wrote, and "Washington's slaves were living symbols of the most paradoxical part of the nation's birth—freedom and unfreedom side by side, with the enslavement of some making possible the liberty of others. An exhibition of documents and artifacts should show slavery's and freedom's many meanings at the dawn of the new nation. Doing so will make the Liberty Bell's own story ring loud and true." "A free people," we concluded, "dare not bury evidence or silence long-forgotten African Americans, whose stories make the meaning of the Liberty Bell and the Revolution real and palpable, here and abroad."

From this point forward, the key was to move from publicity to concrete results. To this end, we asked INHP Superintendent Martha Aikens to meet with us to discuss what we regarded as a flawed plan. "The planned interpretation of the Liberty Bell's new site, as we understand it," we wrote in a letter to her, "will focus on the Liberty Bell, its history, and its significance as a national icon symbolizing the commitment to freedom in America. But the Liberty Bell story so envisioned speaks mostly to the achievement of American independence and the devotion to the ideal of freedom thereafter. This does not address the braided historical relationship between freedom and slavery, how interdependent they were, and how the freedom of some was built upon the unfreedom of others. Moreover this singular focus on liberty as the achievement of white Americans leaves African Americans out of the story, except as objects of others' benevolence and concern. The issue of how white freedom lived cheek by jowl with slavery, and how

this played itself out on the now sacred ground of the Independence Hall area (including the presidential house in the 1790s), is what has occasioned so much public interest and comment." We ended our letter with a request for the interpretive plan, which we had not been able to pry from her office.

Protracted negotiations with the Park Service leaders now ensued. Three stages evolved. First, INHP's leaders, under a barrage of negative press commentary and intensified by a long *New York Times* article on April 20, tried a finger-in-the-dike approach. In late April, Superintendent Aikens released a brief description—our first glimpse of the interpretive plan—of the ten zones planned to interpret the Liberty Bell inside the pavilion and invited five of our ad hoc historians' group to review *one* panel on slavery that they agreed to fit into one of the ten exhibit zones. But the superintendent denied us access to the script sent out for bids, would not agree to consider all ten zones of the exhibits, and warned that the Park Service would not contemplate any major changes inside the pavilion because "the plans and specifications for the Liberty Bell Center were completed on March 22, 2002." However, she invited us to discuss possible interpretations of the President's House site, where people will line up to enter the Liberty Bell Pavilion.

Second, the intervention of NPS's Chief Historian, Dwight Pitcaithley, became crucially important. When he first saw the interpretative plan, Pitcaithley was dismayed to find a chest-thumping, celebratory script, "an exhibit to make people feel good but not to think," an exhibit that "would be an embarrassment if it went up," and one that "works exactly against NPS's new thinking," as he wrote. Pitcaithley now wrote Superintendent Aikens urging an approach similar to that advocated by our ad hoc group. "The potential for interpreting Washington's residence and slavery on the site," he counseled "presents the National Park Service with several exciting opportunities." The President's House, he prodded, should be explained and interpreted, and "the juxtaposition of slave quarters (George Washington's slave quarters, no less) and the Liberty Bell" provided "some stirring interpretive possibilities." "The contradiction in the founding of the country between freedom and slavery," he continued, "becomes palpable when one actually crosses through a slave quarters site when entering a shrine to a major symbol of the abolition movement.... How better to establish the proper historical context for understanding the Liberty Bell than by talking about the institution of slavery? And not the institution as generalized phenomenon, but as lived by George Washington's own slaves. The fact that Washington's slaves Hercules and Oney Judge sought and gained freedom from this very spot gives us interpretive opportunities other historic sites can only long for. This juxtaposition is an interpretive gift that can make the Liberty Bell 'experience' much more meaningful to the visiting public. We will have missed a real educational opportunity if we do not act on this possibility."

Shuttling between Washington and Philadelphia, Pitcaithley's meetings with the INHP staff and its regional-office supervisors bore fruit. This brought us to the third stage of the process: many months of parleying and jockeying. During this period,

Superintendent Aikens had delegated her responsibilities to Deputy Superintendent Dennis Reidenbach because she was departing for a new NPS assignment. At meetings with our group on May 13, 2002, with the air fairly crackling with electricity and Pitcaithley playing the role of Metternich, the *entire* exhibit, not just one panel in one of ten zones, was put on the table for discussion, contemplation, and revision. The door that had been opened just a crack was now flung wide open. It was agreed that the meaning of freedom in a democracy built on slave foundations would be a central theme in the exhibit; that the treatment of the President's House outside the pavilion would be interpreted with attention to the enslaved Africans and indentured servants who toiled there; and that the Park Service would rewrite the script and send it out for review by noted scholars of the African American experience and the history of liberty in America. David Hollenberg, Associate Northeast Regional Director of the Park Service, pledged that "we are looking at the bell as a symbol of an ongoing continuous struggle for liberty rather than [as a symbol] of liberty attained."

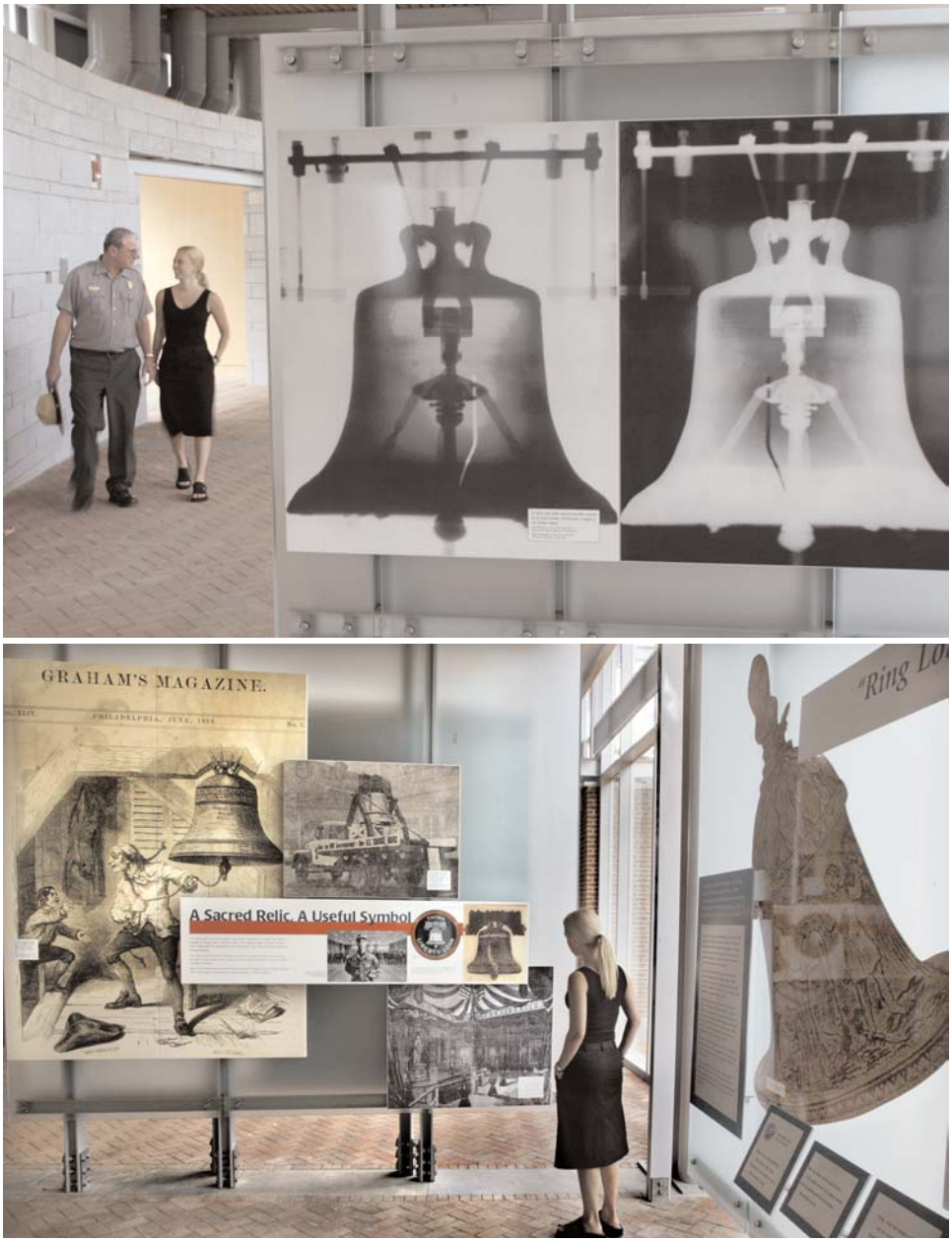
In two days in late May 2002, the Liberty Bell exhibits were overhauled. Five of the ten zones were reorganized, rescripted, and changed to drop some images while adding others. For example, INHP agreed to adopt my suggestion to use a slave head harness with a bell that announced slave flight—what might be called an "unfreedom bell" intended to thwart those seeking freedom. In many other cases, mindful of the need to use as many images already contracted for as possible, INHP agreed to new text designed to give visitors varying interpretive readings of an artifact rather than simply an informational caption. Here is one example. In the initially planned exhibit, in a section on how the Liberty Bell traveled around the country in the late 19th and early 20th centuries, the INHP interpretive team juxtaposed four photographs of visitors at San Francisco's 1915 Panama–Pacific Expo, with a caption reading: "1915 scenes: men holding children up to the Bell, top-hatted men lining up for a picture at the Bell, Native American, Thomas Edison." The new text reads: "As the Liberty Bell increased in popularity as a symbol of freedom and liberty for white Americans during the last quarter of the 19th century, it reminded African Americans, Native Americans, other ethnic groups, and women of unrealized ideals. While the Bell traveled the nation as a symbol of liberty, intermittent race riots, lynchings, and Indians wars presented an alternative picture of freedom denied." Under the photo of Chief Little Bear, the caption now read: "Forced to choose between segregation and assimilation that insisted upon the suppression of their unique cultural practices, Native Americans may not have seen the hope of fair treatment and equal rights embodied in the Bell."

In sum, INHP abandoned the attempt to restrict changes to one zone and work only around the edges of the original script. Rosalind Remer, historian at Moravian College and director of museum planning and programming at the National Constitution Center from 1997 to 1999, reported back to our committee that after two exhausting days "an amazingly thoughtful, provocative exhibit" was being hammered out, one "that will ask visitors to confront the complex

relationship of freedom and unfreedom as part of their consideration of Liberty Bell-as-icon. The ongoing struggle for equality is central to all of the panels. The celebratory tone is gone, replaced by subtle discussion of symbols and popular uses of the past.... The complicated story of Reconstruction and racism is at the heart of the exhibit—in some ways, I think, a pivotal section that makes clear that all of the appropriations of the Liberty Bell image are not the same—nor do they stem from the same impulses.... Images that were before seen simply as celebratory odes to the bell can now be interpreted in various ways." The major reconceptualization and rewriting left the INHP staff "a little nervous," reported Remer, "but also strengthened ... because they very clearly seemed to see that this is now an exhibit to be proud of, rather than one to hide from scholarly scrutiny."

A team of IHNP staffers, including Doris Fanelli, Coxey Toogood, and Joe Becton, none of whom had been given an opportunity to help shape the original script, produced a much-revised script, which then went out to a brace of scholars, just as the Park Service's general management plan requires. Replies brought further changes to the script, which was then on its way toward a final review, with our ad hoc historians' group involved. "The paradox of slavery in a land of the free will be a major exhibition theme when the $12.6 million Liberty Bell Center ... opens next spring," reported the *Inquirer* on August 11. "The text of the exhibition ... has been completely reworked over the last three months and is nearing completion, according to NPS officials." The completion would take another ten weeks. After INHP mounted the new script on their website, complete with most of the images, our group offered small but important changes in the wording of what several million visitors each year would read. Betokening the new spirit of collaboration with non-NPS historians, most of the changes were accepted and woven into the nearly final text (see Figures 2 and 3).

What gave special urgency to revising the Liberty Bell exhibit and incorporating site interpretation into it was the involvement of black Philadelphians, who represent about half the city's population. On July 3, 2002, hundreds of African Americans demonstrated at the Liberty Bell site, while the Avenging the Ancestors Coalition, headed by lawyer Michael Coard, organized a letter writing campaign and a petition with several thousand signatures that called for a monument to commemorate Washington's slaves. The African People's Solidarity Committee wanted more discussion of slavery, though much along the lines that our committee was pursuing. In what would turn out to be a key move, Congressman Chaka Fattah introduced an amendment to the 2003 budget of the Department of the Interior, requiring that the Park Service report to Congress about an appropriate commemoration of the President's House and the slaves who toiled there. The appropriations committee, which oversees the NPS budget, voted unanimously for the Fattah amendment. Shortly, the Multicultural Affairs Congress, a division of the Philadelphia Convention and Visitors Bureau, joined the call for a "prominent monument or memorial" fixing in the public memory the contributions of Washington's slaves to the early years of the new republic and making



Figures 2–3. New exhibits at the Liberty Bell Center. *Photos by R. Kennedy for the Greater Philadelphia Tourism Marketing Association.*

Philadelphia a premier destination for African American visitors. The city council followed suit with a resolution endorsing this idea.

With general agreement on what would be seen inside the Liberty Bell Pavilion, the focus now shifted *outside*—to the site of the President's House and its interpretation. The power of the place—some 12,000

square feet—is enormous. What Park Service ranger would not want to stand on this history-drenched site and tell stories to knots of visitors waiting to enter the pavilion? I fantasize that I am starting a new career as an INHP ranger. "Come over here," I say to a group of overseas visitors. "Here the first two presidents wrestled with how the infant United States would deal with the French Revolution, which divided Philadelphians, like the nation at large, into warring camps." "Step right here," I tell a group of school children. "Just over where you are standing, on the second floor, Nelly Custis helped her grandmother, Martha Washington, two centuries ago, preparing for bed and kneeling in prayer with the first lady and singing her grandmother to sleep." "Now come a few yards this way," I tell a group of African American visitors. "From this spot, George Washington watched white slave planters, who were fleeing the black revolution in Haiti in the early 1790s, tumbling off ships a few blocks east of here with scores of slaves in tow. These French-speaking slaves would soon be free in Philadelphia, as the gradual abolition act of 1780 required, and many would worship at the city's Catholic churches." When I see some visitors from Oklahoma, I say: "Please stand right here, good people. You are standing just over the place where the young John Quincy Adams sat in the front hall with President Washington and seventeen visiting Chickasaw chiefs, passing a ceremonial peace pipe around the circle."

In the end, INHP and Northeast Region staffers agreed that the executive mansion and the people who lived and worked there deserved commemoration. Representing our historians' group, Professor Stephanie Wolf presented three important themes that INHP had earlier dismissed as a diversion and source of confusion from the Liberty Bell focus: the need to make visible the executive branch of government that has always been missing in the Independence Mall interpretation since park rangers had no physical representation around which to work this interpretation; the need to interpret the president's house as home and office of Washington and Adams —the one a slave owner, the other a proto-abolitionist—as a way of expressing the split that runs through the nation's history; and the need to focus on the many and diverse people who lived and worked at this site or in neighboring households.

By late summer, INHP had commissioned two design firms, Olin Partnership of Philadelphia and Vincent Ciulla Design of Brooklyn, to work on a plan. On January 15, 2003, the Park Service unveiled plans for the outside exhibits. They included all of what we and other community organizations had asked for, and even more: (1) inscriptions of passages condemning slavery that were stricken from drafts of the Declaration of Independence on the front wall of the visitor center (which faces the Liberty Bell site); (2) physical representations of the President's House—a partial footprint of it, perhaps in slate; (3) side walls detailing the presidencies of Washington and Adams; (4) a curved black marble wall winding through the spacious approach to the pavilion with stories of the free, unfree, and partially free people who labored there; (5) the history of slavery in Philadelphia and in the nation at large; (6) material on the emergence of the free black com-

munity in Philadelphia and the struggle to dismantle the house of slavery, represented by a breach in the wall through which the enslaved figuratively escaped; and (7) large sculptures of Oney Judge and Hercules, 12–16 feet high and visible from both inside and outside the site, with a contemplative garden space as well as a third sculpture interpreting enslavement and emancipation. In the view of our ad hoc historians' group, the design was innovative, exciting, and responsive to what we and the Park Service's chief historian had urged. Michael Coard from the Avenging the Ancestors Coalition applauded the designs, predicting that "our little Black boys and girls [will] beam with pride when they walk through Independence Mall and witness the true history of America and their brave ancestors."

The story of the Liberty Bell Pavilion and the site it occupies is not quite over. Money must be raised to transform the 12,000 square feet outside the pavilion into a contemplative and commemorative set of exhibits. The design of the exhibits—whether statues, symbolic walls, plaques—needs final approval. The "words on the walls" that will explain the President's House, the administrations of Washington and Adams, and the lives of those who served there have yet to be written. The images, such as the painting of Hercules that has been uncovered in a Spanish museum, still need to be selected. But the process for reaching the finish line is in place, and the finish line is within view. The new superintendent of INHP, Mary Bomar, has opened her door to interested parties to this dispute and has participated vigorously in several meetings and roundtable discussions, where she has given encouragement to most of the parties concerned with her open-mindedness and commitment to see this important presentation of history through to a satisfactory conclusion.

Here are the two most salient points that marked the Liberty Bell contretemps and distinguish it from the history wars of the early 1990s. Almost all such squabbles in recent years involve an old question: whose story gets told, who gets to speak, and who has a say-so on stimulating—or anaesthetizing — public memory? First, the media—whether newspapers, radio, or television—was overwhelmingly opposed to the narrow and unflinchingly heroic story of the Liberty Bell and the exclusion of the rich history about the site on which it will rest. In particular, not to treat the conjunction of freedom and slavery in the historic heart of old Philadelphia and the nation's capital in the 1790s, and not to bring forward the stories of African Americans, indentured servants, women, and others struggling to find their place under the canopy of freedom and equal rights, seemed offensive and mistaken. The *Philadelphia Inquirer* ran about a dozen stories, three editorials, at least six op-ed essays, and dozens of letters to the editors, while WHYY, Philadelphia's National Public Radio station, interviewed many of the contestants in this battle. Because of this mini-media blitz Park Service staffers came to recognize they were missing a major opportunity in telling a story, laced with paradox and ambiguity, worthy of the American democracy in what is destined to become one of the most visited historic sites in the world.

Second, the leadership team at INHP mistakenly lost faith in collaborative interpretive planning with

scholars and the public, as well as with some of its talented historical researchers and park rangers. We may never know exactly why. Yet the train that had left the station was made to return for an overhaul. Something of great importance to those involved in public history finally gained acceptance all around the table where the cards were dealt: that it is not unhealthy in a democracy that a tension between the commemorative voice and the historical voice should manifest itself in public history sites, and that the National Park Service can serve the American democracy best if its sites become forums, as historian Edward Linenthal has said, where "diverse interpretations of complex historical events can be aired or taken home to contemplate." What started out as a nasty fight turned into a cooperative effort to revamp a misguided interpretive plan. The struggle was not between historians and the National Park Service but between a handful of Park Service officials and a combination of historians, the public, media moguls, the Park Service chief historian. After several months of resistance, the originators of the plan to commemorate and interpret the Liberty Bell came to understand that they were much in the minority and that it was best to move ahead with what David Hollenberg now describes as a "radically transformed" plan. It probably helped that the historians' group tried not to personalize the argument or ascribe dark motives to anyone involved; rather, we argued that the Park Service staffers had underestimated the public's capacity for grasping complex issues and—most of all—did not follow the Park Service's own dictates, namely the general management plan, which calls for close collaboration with historians and other scholars, as well as the public, in arriving at a final exhibition plan.

In the heat of the National History Standards controversy in 1995, historian Kenneth Moynihan asked whether the scholars' history can be the public's history and hoped that Americans were weaning themselves from a "just-get-the-facts-straight history" and reaching an understanding that history is "an ongoing conversation that yields not final truths but an endless succession of discoveries that change our understanding not only of the past but of ourselves and of the times we live in." Eight years later, this appears to be the case—at least here. When the Liberty Bell Center opened in October 2003, the old cracked bell began to toll symbolically for all the people, and the scholars' history became the public's history.

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Jonathan Meade

Business Models for Protected Areas

Introduction

The application of private-sector solutions to policy problems in the environmental arena has resulted in the availability of a greater diversity of tools to decision-makers and managers. While this has occurred primarily in the remediation of pollution, such as sulfur dioxide permitting programs (Chertow and Esty 1997), innovative business management tools used to solve conservation or natural resource management problems at the operational level have not traditionally been applied.

Though the use of private-sector management principles in public management of the environment has expanded significantly in the past two decades, innovations in public land management have lagged considerably. The primary innovations have been wide-ranging advances in reserve design, community conservation, ecosystem management, sustainable development, and financing mechanisms (Repetto 1992; The World Bank 1997; Phillips 2000). In concert, much attention has been paid in the scientific community to the specific effects of management decisions on resources at the field level. The result is a focus at either too fine or too large a scale. The functional administrative unit—a park or protected area—has been ignored as the fundamental leverage point for influencing the state of resources in protected areas. In essence, while park managers, particularly in developing countries, have reams of advice for conceptual approaches to various problems (e.g., species and visitor management, water resources, community interaction), there is minimal guidance for developing strategic plans, gaining financing, and identifying priorities for management (Worboys 2001; Thomas 2003). This area of research and scholarship greatly needs expansion.

The administration of protected areas, both newly created and well-established, usually follows a strict, traditional model, defined by foresters and park managers in the United States in the early 1900s (Adams 1993; Clarke and McCool 1996; Sellars 1997). This is not to say innovation does not exist. In fact, many non-traditional management applications exist outside the U.S. where historical trends do not heavily influence contemporary decision-making. The conservation community is becoming more interested in the development of innovative mechanisms for managing public lands that are moving away from the traditional Yellowstone model of national parks. For example, park managers are experimenting with non-traditional approaches to managing hunting, tourism, and wildlife, including being more and more permissive of indigenous peoples living within park boundaries (Bishop, Green, and Phillips 1998).

The problem explored here is a lack of organizational management guidance for park units. This may be due to inadequate funding levels provided by managers at organizational

levels of the federal government higher than National Park Service administrators, or due to deficiencies in park management. By clarifying the alternatives to managing resources at national parks, the use of business models provides for increased success in achieving conservation goals. Employing this private-sector tool can assist park managers in the decision process of scarce resource allocation. These alternative tools, however, must be evaluated through a comprehensive policy analysis process, such as the policy sciences framework. Only through such an analysis can park managers proceed with adequate information and consensus.

Very recent scholarship has begun to help define a modern model of a park or protected area (Mitchell 2003; Phillips 2003). These are critically important as park managers reassess their goals and core values. However, even these newly defined models tend to continue to define parks or protected areas rather than offer a method for identifying a management approach, While they incorporate the most recent principles of resource management, they neglect to incorporate modern thinking in business management. The advent of an innovative public–private partnership in 1998 between the National Park Service, the National Parks Conservation Association (NPCA), and several philanthropic organizations to write business plans for national parks has signaled a new approach to managing parks in the U.S., adjusting the focus from crisis management to forward-thinking, proactive prevention of conflict and crisis (Reinhardt and Huntsberger 2003). From this business planning experience, conceptual development of business models for protected areas arose.

The business models can be used both to describe and prescribe park operations. Park managers can also use these models to identify more precisely the requirements of park operations, to focus those operations, and to improve strategic planning. Use of these models can allow park managers to focus internally on results and performance, and externally communicate mission, vision, operational requirements, and financial needs.

In addition to enhancing management capacity, the application of business models can aid in the development of better national policies for administering the national system of protected areas. While in the past, comprehensive studies of the National Park System have been limited by the diversity of park units, using business model policy studies can go further towards an understanding of functional differences between types of parks and protected areas, and therefore add significant value to future studies when guided by the groupings suggested here.

Methods

Overview of protected areas. The United Nations system for categorizing protected areas, which includes six types, is listed in Table 1 (IUCN 1994). While offering some direction for management, the categories are generally vague in relation to operations, activities, and infrastructure. Much like the National Park Service's principal designations for national park units in the U.S., shown in Table 2, these designations are useful for high-level categorization, but offer insufficient guidance for management and policy decisions. Further, while able to broadly capture the "identity"

Table 1. IUCN categories of protected areas.

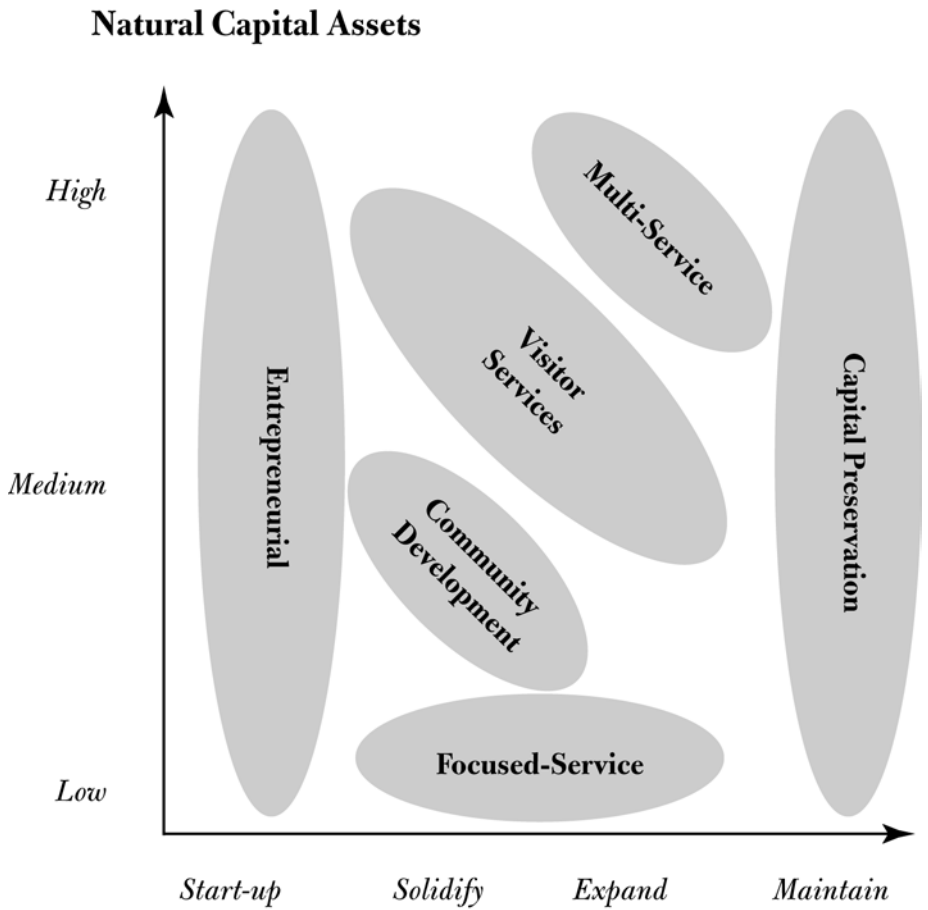

Table 2. Principal U.S. National Park Service unit designations.

U.S. Park Unit Type	Description
National Park	These are generally large natural places having a wide variety of attributes, at times including significant historic assets. Hunting, mining, and consumptive activities are not authorized.
National Monument	The Antiquities Act of 1906 authorized the president to declare by public proclamation landmarks, structures, and other objects of historic or scientific interest situated on lands owned or controlled by the government to be national monuments.
National Preserve	National preserves are areas having characteristics associated with national parks, but in which Congress has permitted continued public hunting, trapping, oil/gas exploration, and other extractive activities. Many existing national preserves, without sport hunting, would qualify for national park designation.
National Historic Site	Usually, a national historic site contains a single historical feature that was directly associated with its subject. Derived from the Historic Sites Act of 1935, a number of historic sites were established by secretaries of the interior, but most have been authorized by acts of Congress.
National Historical Park	This designation generally applies to historical parks that extend beyond single properties or buildings.
National Memorial	A national memorial is commemorative of a historic person or episode; it need not occupy a site historically connected with its subject.
National Battlefield	This general title includes national battlefield, national battlefield park, national battlefield site, and national military park. In 1958, an NPS committee recommended national battlefield as the single title for all such park lands.
National Cemetery	There are presently 14 national cemeteries in the National Park System, all of which are administered in conjunction with an associated unit and are not accounted for separately.
National Recreation Area	Twelve NRAs in the system are centered on large reservoirs and emphasize water-based recreation. Five other NRAs are located near major population centers. Such urban parks combine scarce open spaces with the preservation of significant historic resources and important natural areas in locations that can provide outdoor recreation for large numbers of people.
National Seashore	Ten national seashores have been established on the Atlantic, Gulf, and Pacific coasts; some are developed and some relatively primitive. Hunting is allowed at many of these sites.
National Lakeshore	National lakeshores, all on the Great Lakes, closely parallel the seashores in character and use.
National River	There are several variations to this category: national river and recreation area, national scenic river, wild river, etc. The first was authorized in 1964 and others were established following passage of the Wild and Scenic Rivers Act of 1968.
National Parkway	The title parkway refers to a roadway and the parkland paralleling the roadway. All were intended for scenic motoring along a protected corridor and often connect cultural sites.
National Trail	National scenic trails and national historic trails are the titles given to these linear parklands (over 3,600 miles) authorized under the National Trails System Act of 1968.
Other Designations	Some units of the National Park System bear unique titles or combinations of titles, like the White House and Prince William Forest Park.

of a protected area, they do a poor job of describing the functional niche of a park.

While national parks are the primary focus of this paper, comparison to protected areas managed by other federal agencies (e.g., national forests) and their broad models for land management is both useful and informative. National forests, managed in the United States by the U.S. Forest Service, preserve forested and grassland areas with a mandate for multiple use, including timber harvesting, hunting, fishing, and recreation. The U.S. Fish and Wildlife Service manages the nation's wildlife refuges and generally allows more extensive use than in national park units, but less so than on the national forests. Other land management agencies, such as the Bureau of Land Management and the Bureau of Reclamation, manage sizable portions of the public domain, guided primarily by the concept of multiple use, though they provide far less infrastructure and visitor services than the National Park Service, the Fish and Wildlife Service, or the Forest Service.

As defined by relative priorities for management, national park units are managed primarily for resource protection with significant non-consumptive visitor services, while national forests, Bureau of Land Management areas, and Bureau of Reclamation lands are managed primarily for mixed, consumptive, and non-consumptive uses. Wildlife refuges represent a moderate level of use, with a focus on resource conservation and management, while doing so with less extensive visitor services than at national parks. The models elucidated here may be applicable to non-park protected areas; however, it should be remembered that they were developed specifically for national parks and may need further refinement for other types of protected areas.

There are nearly 400 national park units administered by the U.S. National Park Service, ranging from 137 years to just several months old, from less than 1 acre to 13 million acres. Their budgets range from hundreds of thousands of dollars to over $50 million (National Park Service 2003; Mantell 1990). The diversity is also reflected in the variety of resources protected by national park units, both natural and cultural. Indeed, one of the principles of biodiversity conservation and the design of national systems of protected areas is representativeness: to preserve the best examples of what is left. This diversity of purpose, size, and scope makes management difficult. Yet, it is the mission and vision of the Park Service and of individual park units that drives the variations in business models. Consequently, a singular, uniform business model for all parks or protected areas would not suffice.

It is the statement of purpose, derived from the National Park Service's mission statement, that provides the foundation for park operations. This mission statement is often derived from the park's enabling legislation; separate laws are enacted to create every national park. This legislation, the congressional record of discussion prior to the creation of a park unit, and the general management plan serve as guidelines for overarching management principles for the park. However, these are often far too general to aid park managers executing operational decisions at the field level.

There are many business models in the private sector, but is there one sim-

ple model to serve all park units? The immediate answer is no; the National Park System is too diverse for a simple solution. Still, while every park's enabling legislation (and hence purpose) is unique, drawing parks together in functional groups instead of defining them by types of resources or levels of protection serves to better guide managers through difficult policy decisions. By examining the missions, strategies, and management styles at 60 national park units involved in business planning in the U.S. National Park Service, several business models applicable to national parks, both domestically and internationally, have become apparent. These business models are based on traditional private-sector business models, but employ the principles of public administration to identify elements of revenue streams, markets and customers, and goods and services comparable with the private sector. As Paul Light suggests, nonprofits need not necessarily become more businesslike, but rather better define what it means to be "nonprofit-like" (Light, Light, P.C. 2001). In this case, the business principles best suited to federal land management were adapted for use at the National Park Service. The six described in this paper do not represent the entirety of business models applicable to protected areas; instead, the intent here is to begin a discourse on those which are specifically available for adoption by park managers.

Competitive landscape mapping. Using a private-sector business analysis called *competitive landscape mapping,* the potential "business" of national park units was identified using a crosswise comparison of two factors: resource area and services offered. The competitive landscape approach graphically maps the potential business focus of a company by understanding where competitors focus their business and comparing strengths and weaknesses of several with many factors. Applying this to the public-sector management of national parks is not without difficulty, but the benefits of a greater understanding of park management are important and achievable.

The landscape, described in Table 3, shows how a sample of park units can be distributed according to the resource management focus, here using the six IUCN categories, and the services offered, mapping how they focus their mission and organizational energies. For example, a park with significant sensitive natural resources can provide a variety of visitor services, but should make critical choices about which ones to provide so as to limit resource impacts. Conversely, a park with resources that are resistant to visitor impacts can emphasize visitor infrastructure development and focus on providing visitor services (McNeely, Thorsell, and Lecourant 1992).

Companies can avoid competitors in order to maximize their profits and create successful marketing of their products (Brandenburger and Nalebuff 1996). It is argued here that since units of a national system are intended to be unique representations of nationally important cultural and natural resources, they should avoid overlap in the specific application of their mission and strategy. This relates both to national system planning as well as from individual park perspectives.

In the public sector, the government provides unique services that

Table 3. Competitive landscape for selected national parks in the United States.

	Where Do We Work? ***Park Resources and Level of Human Intervention***					
What Do We Do? ***Functional Niche***	**Category I:** Strict nature reserve/wilderness area	**Category II:** National park	**Category III:** Natural monument	**Category IV:** Habitat/species management area	**Category V:** Protected landscape/seascape	**Category VI:** Managed resource protected area
Frontcountry visitor services	Great Smoky Mountains NP	Shenandoah NP	Devil's Tower NM	Muir Woods NP	Cape Hatteras NS	Lake Mead NRA
Backcountry visitor services	Canyonlands NP	Sequoia-Kings Canyon NP	Hawaii Volcanoes NP	Joshua Tree NP	Olympic NP (coastal unit)	Wrangell-St. Elias NP&P
Wildlife protection and management	Isle Royale NP	Yellowstone NP	Grand Teton NP	Olympic NP	Padre Island NS	Big Cypress NPRES
Ecosystem and watershed protection	Death Valley NP Big Bend NP	Grand Canyon NP Yosemite NP	Badlands NP	Everglades NP	Ozark NSR Voyageurs NP	Redwoods NP
Cultural resource management and protection		Mesa Verde NP	Mount Rushmore NM		Keweenaw NHP Lowell NHP	Golden Gate NRA
Community Development and Interaction	Gates of the Arctic PRES	Acadia NP	Apostle Islands NL	Santa Monica NRA	Cape Cod NS	Delaware Water Gap NRA
Existence value	Bering Land Bridge NPRES		Cape Krusenstern NM		National Park of American Samoa	

cannot or should not be provided by the private sector. Still, park units essentially compete against each other; they also compete with all forms of leisure and entertainment, but this paper focuses on comparing types of nationally administrated protected areas. They compete for funding and visitors, both against each other as well as with other public and private options for recreation and outdoor experience. This can logically be extended to serve as a proxy for private-sector competitiveness, whereby park units should strive to avoid overlapping responsibilities for protecting and preserving the nation's resources. That is, parks should seek to find a niche where few other parks exist, thereby maximizing the representativeness of the National Park System and their own effectiveness. This is essentially the value proposition of park management: providing protection for areas of national heritage (cultural or natural) not found elsewhere. However, the services provided may overlap. This is where the potential for competition and collaboration begins. Parks should provide those services, both visitor-related and resource management, where they are strongest. Parks with competitive advantage in one or both areas should seek to exploit that advantage by focusing management skills and energies.

Of course, parks also benefit tremendously from each other's existence, and should generally continue to support each other through partnerships and resource sharing. Where parks find advantages in partnering, they should do so to improve their overall competitiveness. This occurs often in the private sector and methods for "co-opetition" can be adapted by the public sector (Brandenburger and Nalebuff 1996). The purpose of this paper is not to argue for an antagonistic approach to park management, but rather a concerted effort on behalf of all park managers to specialize their operations, and to do it in a conscientious manner.

Types of Business Models

The business models presented here are not the only models available to protected areas managers. While historically parks have been unable to clearly communicate their primary management focus, particularly in the setting of operational priorities, park managers should not be daunted by clearly communicating their business focus, especially if it is different from the current or historical focus.

A park need not adopt a model with the assumption that it will be in place forever. While long-term ecological stability should always be a high priority, altering a business model, especially when it does not provide adequate direction or hampers goal achievement, is important and natural. For example, the entrepreneurial model would serve a young park well, but could be laid aside in favor of a visitor services model at the appropriate time. Similarly, should important endangered species be discovered, a park might choose to move from a multi-services model to a capital preservation model. Understanding where a park is currently and where it should be moving towards on Figure 1 (described later in this paper) is critical to knowing how best to prepare for future funding and staffing needs. The strategic planning process would ideally inform this aspect of management direction.

Visitor services provider. Using principles of good management, park

managers can provide a diverse set of appropriate tourism-related services, while managing for other objectives as well (e.g., resource protection). As such, the primary focus for managers adopting this model should be providing high-quality visitor services. Success should be measured against the number of visitors and citizens that the park reaches and educates, the quality of these services, and the satisfaction of the visitors.

This does not mean that protecting resources is ignored in management strategies. In fact, the opposite might well be the result, as resource degradation would likely impair tourism, reducing revenues. However, the decision-making focus would be serving visitors and responding to their needs. A primary goal of park managers should be adjusting the level of services to meet changing visitor demands, minimizing emphasis on resource protection and management. At its most extreme, the focused service provider model results in a multiple-use model based on both consumptive and nonconsumptive use of park resources by visitors.

Practically speaking, the visitor services provider model stimulates fee revenue maximization. Higher entrance or user fees and other targeted visitor charges would provide a significant level of revenue, which could then be reinvested in infrastructure such as trails and visitor centers, in order to maximize the visitor experience. Additional reinvestment in interpretive services, signs and information would also enhance the visitor experience, further augmenting the level of business services provided. Critical to success for these types of parks is a consistent, though not necessarily high, volume of visitors. Though a high volume can potentially have a large impact on park resources, visitation that is manageable by park staff can ensure sufficient levels of revenue and exploit economies of scale to both cover costs and provide for reinvestment as infrastructure depreciates and resources are degraded. Consequently, marketing would play a significant role in the attraction and retention of park visitors, and so would be an emphasis area for managers.

The suite of visitor services a park could provide is quite diverse, and includes both frontcountry and backcountry services. Frontcountry services might include a combination of both high levels of park- or concessioner-managed operations, such as formal guided walks, self-directed interpretation, hotels, gas stations, and visitor centers. These are the services most demanded by pass-through visitors—those that stay only a few hours. Park infrastructure should be directed towards ease of access through the park as well as restroom, picnicking, and other day-use facilities. Backcountry services might include wilderness trip planning, travel and weather information, search and rescue operations, and roving or informal interpretation. Infrastructure for backcountry services would focus on trailhead and backcountry camping needs.

The operational costs at parks adopting visitor services provider models—particularly the frontcountry model—can be high due to several factors, including significant infrastructure and concentrated impacts on resources. However, the higher costs are frequently offset by the potential for collecting more revenues (which in turn can be used to mitigate visitor impacts), as well as by the fact that services are concentrated geographi-

cally, reducing overall costs. Frontcountry parks can be very successful if the fee structures are designed to provide for both immediate cost recovery and long-term preservation of park resources. The consequence of neglecting the first is a precipitous decline in visitor services due to deteriorating infrastructure and limited staffing capabilities as funding levels drop. On the other hand, the consequence of not providing for the second is that the impacts on the very resources visitors come to see—the drawing power of the park—will increase to the point that visitors cease to arrive at the park gates. Minimizing the infrastructure costs while focusing on interpretive and other services can offer greater flexibility from year to year.

The ecotourism industry recognizes that visitors come in all shapes and sizes and bring with them a diverse set of interests (McNeely, Thorsell, and Lecourant 1992). Parks adopting a focus on visitor services would do well to identify with one or several of these primary interests in order to better focus park operations. If the park wants to identify primarily with the day-use tourist, visiting for lunch with the family, then an emphasis on frontcountry infrastructure is appropriate. On the other hand, if the park is more interested in providing services for the backcountry hiker, mountaineer, or explorer, then backcountry trails, search and rescue services, and the like are more important. While some parks can succeed at providing both of these types of services to visitors (see the multi-service provider model below), parks that emphasize their strengths and maintain a focus on the long term will succeed more at both managing their operations, and achieving their mission goals.

Multi-service provider. The traditional national park in the United States has been providing a diverse set of services for visitors for over a century (Sellars 1997). In recent decades, the public—and public administrators of national parks—have recognized that additional services parks provide to the country as a whole, as well as services provided by the ecosystem (e.g., watershed protection and air quality preservation), are important and should be emphasized by parks adopting this model. In contrast to the visitor services model, the multi-service provider model is adopted to reach a much broader group of "customers." The multi-service provider does not focus solely on reaching a subset of visitors, nor on all visitors, but rather strives to provide services to visitors and non-visitors, to humans and non-humans, to present and future generations. This broad-based model is one of the most difficult to implement. For example, Yosemite National Park provides services to visitors in frontcountry and backcountry areas, ecosystem and watershed protection services to the surrounding areas, and finally existence value as a World Heritage site. In this broad suite of services, managers must strive for a balancing of priorities and interests. Large parks with well-developed infrastructure can be considered long-term public investments in intergenerational equity. The national, international, and generational importance of the multi-service provider park means that each management decision and action is highly scrutinized, and so managers in turn must be responsive to most, if not all interest groups. Somewhat paradoxically, parks in this category have an

inward focus, and, as a consequence, are usually isolated from the surrounding community—a result of historic biases, a disincentive towards experimentation, and past negative experiences.

Visitor services are necessarily diverse in order to match the nature of the park's visitors. In order to provide such an array of services, parks adopting the multi-service provider model often require large staffs with specialized experience and abilities, as well as significant infrastructure. The nature of the organizational hierarchy further complicates decision-making. The infrastructure required to service large numbers of visitors takes time to develop. At parks that have the necessary roads, buildings, and other structures, maintenance requirements are quite large. In order to maintain the infrastructure in working order, a comprehensive cyclic maintenance program is critical. Unfortunately, most older parks in the United States have failing infrastructure precisely due to inadequate cyclic maintenance programs.

While infrastructure reinvestment is key to maintaining visitor services, reinvestment in natural capital is also important to the viability of the park. This would provide for long-term growth and buffer against ecological instability, incompleteness, resource degradation, and visitor impacts. Reinvestment could take the form of either land acquisition—not always a practicable option for large parks—or through resource enhancement. Land acquisition could take place either within the park or outside the park's current boundaries. There are frequently inholdings of private property within a park, some of which may represent ongoing management challenges. Similarly, resource enhancement could take place either inside or outside the park. Through partnerships with the local community, park managers can provide for a buffer against resource perturbation or degradation; for example, by working to improve wildlife habitat on private property adjacent to the park (Wondolleck and Yaffee 2000). Carefully directed reinvestment in natural capital can provide for stability of the current portfolio of resources, while avoiding the stigma of encroachment on private lands around the park. In the long term, stable resources and environmental systems will provide a better foundation for management decisions about both resources and visitors.

While competition can drive businesses to avoid each other's strengths, natural capital-rich parks can provide a broad set of services without suffering from or being disadvantaged by other parks providing similar services. This comes in part from significant "customer" support at many levels, and from the high-quality "product" that high-profile parks can provide, particularly when the resources at the park are in fact globally unique. Still, this approach is a difficult one to implement at small parks or those where visitor impacts on natural resources would be great.

Entrepreneurial. With the rise and decline of the Internet technology industry, the concept of a "start-up" company has gained national recognition. Newly created businesses, some often still in the conceptual phase, dominated investor attention for several years. The strategic principles utilized to leverage funding and create important, lasting companies can be applied to some park units in similar

start-up phases. The business focus for this model—the start-up model—is to exploit the abilities of a small, flexible staff to respond to visitor needs and operational requirements, while providing for a clear vision of the future of the park.

Newly established national park units might be provided modest start-up investment capital, and even less operational capital to provide visitor services and resource protection. This can generally be attributed to the fact that new parks will usually have low levels of visitation, and hence minimal impacts on resources and demands for services. Exceptions to this trend occur where parks established for specific natural or cultural restoration purposes or when areas with existing operations are transferred to an agency of the federal government (e.g., from BLM to NPS). In the United States, park establishment comes with enabling legislation, from which the mission statement is derived. Despite this fact, the possibility of poorly implementing the park's mission is great. For example, parks created following significant local opposition or other controversy often experience protracted battles with local communities as animosities developed at the outset intensify and fester.

In the United States, few new large natural parks are being established. Consequently, new parks that might adopt the entrepreneurial model are not typically rich in natural capital, but rather more frequently are established to protect specific natural or cultural resources, such as an endemic species. This situation is quite different in many other parts of the world where large parks and reserves are still being established, such as in Madagascar (Ravalomanana 2003) and Gabon (Quammen 2003). As new lands are acquired, new resources are identified, and the mission may even expand. For example, a park may be established through a specific resource acquisition—e.g., purchase of a historic home—with the intention of expanding the resource base to include other buildings nearby. Entrepreneurial parks might choose to adopt a high-growth model, whereby significant investment in infrastructure and visitor services would serve to establish the park physically and socioeconomically. This might be of particular importance in rural or remote areas. Further, the implementation of a high-growth approach might lead directly towards the community business model in the next stage of development, where management policy would focus on a mutually beneficial relationship with the local community. In contrast, a "start small, stay small" approach might also be effective for entrepreneurial parks. Finding a particular niche would allow the park to maintain its presence with less capital investment, and a smaller ecological footprint.

These parks, due in part to their small budgets and limited staff, enjoy virtually no administrative oversight. The park staff functions with an interdisciplinary, can-do focus, frequently working with many collateral duties. One benefit of the start-up business model is that the organizational structure is flexible and potentially more responsive due a smaller staff. This, however, is tempered by the potential for limited diversity of knowledge, experience, or technical capacity.

The most important component of the entrepreneurial model is adequate strategic thinking, particularly with respect to future staffing and invest-

ment needs. Greater innovative funding and management opportunities exist for the entrepreneurial park, but without internal or external reward for these innovations, park managers can fall prey to managing for no net loss.

Running the organization purely on energy can accomplish some goals initially, but long-term thinking is important to focus and refine the management's vision as the park moves into the future. Additionally, a clear vision and strong strategic thinking will allow the park to succeed in the difficult initial years by providing a reinforcing idea of purpose to park staff. This purpose, when clearly communicated to constituents and appropriators, will also ensure the development of strong support for the park. Though many new businesses fail within the first year, a permanent reservation creating a park will not likely be reversed. Still, failures to lay the groundwork for sound management early can hamper the long-term success of the park and its staff.

Capital preservation. While the above models provide for either visitor services as a focus or a multi-faceted approach to providing services, the capital preservation model emphasizes maintaining and enhancing the natural and cultural capital of the park (Lovins, Lovins, and Hawken 1999). While the capital preservation model does not exclude visitor services, resource protection is prioritized above visitor services in all elements of park operations, and consequently must be integrated into decision-making.

"Natural capital" in this context is broadly defined as the park's collection of physical and natural resources that can be utilized by a corporation, agency, government, or individual. While currency is the capital that drives the modern marketplace, natural capital has been offered as the driving force for a newly defined economy, one that incorporates depletion and reinvestment in physical and natural resources. In order to properly value the resource base of a nation, protected areas systems such as national parks should be managed with a clear, uniform understanding of the underlying economy. If the economy to be understood is the public management of lands and resources, then natural capital is perhaps the most appropriate foundation for exploring the how and why of park management as a business. With complicated or non-existent market mechanisms, limited understanding of the economics issues such as non-market valuation of environmental services (e.g., watershed protection of water quality), natural capital provides a single denomination for understanding scaled evaluation of strategic park management in a diverse range of park types. Using natural capital as a basic currency provides an initial focus for why parks are established: (a) to protect unique resources not protected elsewhere, (b) to provide formal protection for resources where currently informally protected, and (c) to acquire important lands and assets for the purpose of restoration. The concept incorporates a paradigm shift from mere production of goods and services upon demand in a traditional market system, to a focus on providing a continuous flow of service or value.

The management of parks with a single focus on natural capital preservation could, in contrast to other models, be considered a pure public good since no consumptive or extractive activities would be permitted (Turner

2002), though most are more typically club goods. [Ed. note: "Club goods" are those provided by a voluntary club to its members. Within the club, consumption of the club good by members is non-rival and non-excludable, but non-members are excluded from enjoying it.] In contrast, visitor services are a private good since they are excludable. A business focus on long-term stabilization and preservation of resources, as well as on enhancing natural wealth, would clearly communicate the priorities of park managers. Often this is possible only when such a clear mandate is provided in the enabling legislation of the park.

As mentioned, reinvestment in natural capital can be a beneficial focus for parks in preserving or enhancing their resources. Some parks that are in need of restoration or management attention may benefit from this approach, while others benefit from a mandate to improve resources degraded prior to designation, and still others may benefit from an approach that proactively strives to prevent further degradation. Above all, the management focus is on preservation, maintenance, and improvement of the stock of natural and cultural capital at the park. Improving or acquiring resources can achieve this. For example, the restoration of an endangered species, such as the reintroduction of wolves into Yellowstone in the late 1990s, would significantly enhance the natural capital stock of a park.

An important concept that managers must adopt in concert with this model is that resources must be managed so they cannot be consumed, degraded, or eroded in quality or quantity. While one dollar can be traded for one dollar in the private sector, it is far more difficult to trade ecological units for others. As such, even replacing land for land, or species for species, can result in a net loss of natural capital. However, where natural resources are exchangeable managers could permit consumption if this improved the natural capital of the park. For example, consumption might be permitted for targeted services if the goal were enhancing a different component of the ecosystem, or to preserve the quality of the entire ecosystem. Prescribed fire and mechanical thinning are good examples of consumption of resources to preserve an ecosystem. This means that managers must prevent both temporary and permanent impacts from infrastructure development, visitor impact, or ecological degradation. Visitor access might further be constrained by limiting broad access to areas of both backcountry and frontcountry. This would be done, for example, to protect an important species during mating season. Maintaining this approach will certainly require significant investment in management, monitoring, and inventorying of species, ecosystems, and ecological variables. Without these, adequate management of park resources cannot be achieved. An adequate inventory must be in place before major decisions are made concerning specific species of ecosystems. Additionally, restoration and research are also important to continuously refine management policies and prevent potential problems from developing. This scientific feedback provides information to policy analysis and development, so that, ultimately, the program's goals can be achieved.

Parks have always been considered important for long-term preservation of natural resources; however, concur-

rent with the rise of the field of ecology, the importance of parks as vehicles for long-term ecological research and protection of natural heritage has been clearly identified (Burger, Ostrom, and Policansky 2000). This research is another programmatic avenue that parks adopting this model can take to forward goals of ecological integrity.

With a specialization in resource protection, preservation, and restoration, parks adopting the capital preservation model may find their revenue availability somewhat limited, particularly due to the reduction in visitor gate and user fee receipts. One approach to offset this consequence would be to more directly link the fee for backcountry use to the protection of various species so visitors could better identify the benefits their potentially higher fees have on park resources. Alternatively, parks could seek funding from communities benefiting from the indirect effect of ecosystem and watershed protection (Wondolleck and Yaffee 2000).

In the competitive landscape, parks adopting the capital preservation model would find substantial room for specialization. An example of this is the jaguar preserve in Belize where tourists come, not necessarily with the hope of seeing a jaguar, but more often to simply be in the presence of them (Eagles and McCool 2002). Parks with a high level of natural capital could benefit from this model by capitalizing on the uniqueness of the park's resources. Marketing themselves as a species-specific park would provide focus for external communications, while not confining or limiting visitation for other reasons, and attracting specialized funding and achieve business goals of preserving resources.

Community development. In its creation and through a long-term relationship, the community park model is designed to have a positive influence on both the local community as well as on the professional development of staff. If there are important ongoing changes in the park or its resources that can be influenced using the appropriate business management practices, adopting this model would mean acknowledging the tight bond to local community many parks have. Currently, few park models identify socioeconomic objectives as an important part of overall management direction (Bishop, Green, and Phillips 1998). Still, greater emphasis is being placed on integrated conservation methods in the developing world, and, to a lesser extent, in developed nations. Further, finance and economic issues are increasingly moving to the forefront of discussions about impacts parks and protected areas have on local communities (Eagles 2003).

This model focuses on relationships with the communities outside park boundaries in order to support the achievement of the park's mission. The more interaction with local citizens, community groups, and businesses, the better integrated the park can be in the surrounding community and the better opportunities for mutual improvement. Principles of sustainable development usually applied to parks and protected areas in developing nations are appropriate to this model. One particular aspect of community interaction that is critical to successful park management with this business model relates to planning (Dixon and Sherman 1990; Machlis and Field 2000). For example, fluctuations in seasonal tourism can greatly affect small towns found near the

entrances to national parks, often called "gateway communities." As such, planning for major park infrastructure disturbances, for example, should be coordinated with the community to help prevent significant loss of revenue. Overall, park managers must reach out not only to local community leaders in order to prevent problems and enhance resource stewardship, but should also involve other federal, state, and local land managers, including specific private citizens, so that impacts to resource protection can be minimized (Machlis and Field 2000).

The interaction with the community can potentially result in arrangements where consumptive use of park resources, such as hunting at a national preserve, are permitted. Including these uses can result from ongoing historic uses or their reinstatement. These are very difficult policy decisions, and so parks with high levels of natural capital—irreplaceable and irreparable features—should avoid consumptive use of park resources, especially if they contradict the park's mission. This model could be successful at parks with moderate to low levels of natural capital where "experimentation" can take place.

With the community model, there are many opportunities for parks to maintain a local or regional focus while providing substantial and high-quality services to visitors. The competitive landscape is open to parks with important but not irreplaceable resources to be utilized to develop relationships with surrounding communities. In general, many park units have failed to develop long-term, productive relationships with gateway communities and regional organizations. Consequently, the opportunity for many newer parks to take chances and explore new ground is ripe for the large number of parks units in the middle range of budget, visitation, and resource availability.

One characteristic of the transformation model is a high degree of flexibility on the part of the staff and management. This is most likely a consequence of a number of factors, but invariably staff at these parks are mid-career or rising stars in the organization, those with a particular interest in improving parks willing to take a chance. The result is that moderately sized parks, not typically in the public limelight, can serve as a proving ground for young park managers. With smaller budgets, and a more flexible staff organizational structure, park mangers can hone their skills with less to lose.

The community park model would be most applicable to those parks with moderate visitation, localized to the state or region, and with relatively modest budgets. While this model would be an option for parks with either cultural or natural resources or both, the important characteristic is that the resources are important to the local community in the long-term.

This model is perhaps the most flexible, and innovative, next to the entrepreneurial model. As such, the options for developing new revenue streams are far greater than with other business models. For example, the myriad of potential partnerships with organizations, schools, and other agencies could be leveraged to either increase funding or shift some of the financial burden of operations to the partner organization. For example, while a local chamber of commerce might help obtain new private donations to be used to develop a visitor

center, a neighboring university might commence research the park requires before making policy decisions.

Focused-service provider. While the models discussed so far have focused on broad management goals and strategies, there are many parks where more specific strategies and objectives are necessary for effective park management. These parks, often small in acreage and visitation, need more specific guidance. Unfortunately, the value of the guidance found, for example, in the park's enabling legislation either becomes diminished over time, thereby stagnating management, or else is insufficiently specific for the development of park operations.

As with any park business model, the primary management goal for focused-service providers should be the long-term stabilization of park resources and revenue streams. However, this is even more important for this model, for two reasons. First, focused-service or niche parks simply are not as competitive for most funding sources, so dependable funding is imperative to long-term preservation of park resources, as well as to consistent visitor services. Second, the missions of focused parks are inherently narrow, so a management approach for the longer term is most appropriate. Still, neither of these factors precludes growth in services, nor a change from a focused business model to a broader one; rather, they reflect a priority being placed on key strengths of staff or a highly focused purpose.

National parks serve the collective good by providing environmental, educational, and tourist services to both visitors and non-visitors, for this generation and future ones. Focused-service parks perhaps embody this principle more than any other business model. The consequence of providing services to a very small subset of the population is that the value of the park is heavily weighted to existence values. Still, managers should focus operational energies on providing for specific requirements of the visitor base.

While the park's resources are important to visitors from the present generation, they are perhaps even more important as representative of intergenerational equity. For example, remote wilderness parks, though attracting only modest visitation, have a purpose rooted in the preservation of a core national value and key elements of our natural history.

Long-term relationships with friends' groups and partner organizations are very important for the focused-service park, but since these parks do not necessarily require substantial amounts of operational funding to run the park, the partnerships do not have to be based on financial relationships. Rather, partnerships with friends' groups can take the form of bartered services, such as interpretation and historic maintenance. These friends' groups can also become tightly linked to membership organizations that support and utilize the park. Strategies for the focused-service park might include development of membership-specific resources and programs. For example, where repeat visitation is significant, the park might choose to create a membership program whereby members would gain additional benefits. With a dedicated and somewhat focused visitor base, these parks draw consistent visitation, but are not likely to experience significant growth or expansion. Other parks that could benefit from adopting this model

include small sites located near cities or town centers. By definition, the focused-service park protects and interprets very unique resources.

Revenue streams might be limited due to specialization, but competition is also limited for the same reasons. If competition is limited, the focused-service park might be presented with funding options not available to other parks. However, focused-service parks may find themselves poor competitors for the larger, more traditional funding sources, particularly government appropriations. For example, a small park with high local but low national visibility might be an excellent competitor for donations from local citizens interested in the relevance of the site to local natural history, while simultaneously be a very poor competitor for a national funding source.

When viewing the competitive landscape, similar conclusions can be drawn about overall competitiveness. With potentially very high levels of natural capital, focused-service model parks may compete well for specialist visitation and funding, but poorly for long-term capital development from central offices.

Comparison of Models

The several models discussed above represent only a few potential directions that park managers can take in orienting park operations. Each park, with its uniquely determined establishment, must choose how best to serve the public interest. Models can be changed, adapted, set aside, and renewed. While the multi-service provider and visitor services provider models provide a framework for well-developed parks to consider a broad suite of services to be delivered to an equally diverse group of visitors, the focused-service, community development, and entrepreneurial models provide business frameworks for parks with a far narrower focus. The entrepreneurial and the capital preservation models, while not divergent from current (though unstated) management approaches at many national parks, represent an identification of a specific focus, not narrowed by the type of services as mentioned above, but rather by the time horizon: short for the entrepreneurial, long for the capital preservation model.

In Table 3, several parks are mapped according to business services and the resources protected using the IUCN classification of protected areas. This table is functionally a competitive landscape, a tool frequently used in the private sector to identify how and where a business should operate in relation to its competitors. By comparing the types of protected area—mission, objective, or management focus—to the types of services offered, the relationship to other protected areas can be identified. This could also be done using the set of U.S. park designations or other groupings. The goal is to better understand where the park can best succeed. Table 4, a comparison of the various business models offered here, was largely derived from examining Table 3 and Figure 1.

In Figure 1, the several business models are mapped according to natural and traditional capital (financial) assets. The location of models can be used to better understand the requirements of a type of park, as well as the best possible combination for success. Tracking along the development stage axis gives an indication of the level of organizational growth, and, to a certain extent, financial resources

Table 4. Description of business models for national parks.

Business Model (example)	**Mission Element**[i]	**Natural or Cultural Capital**	**Business Focus Value Proposition**	**Market Opportunities**	**Revenue Source**	**Budget**	**Visitation**
Visitor Services (Shenandoah NP)	Visitor services	Cultural	Offer visitor services and well-developed frontcountry infrastructure; alternatively provide destination tourism services	Ecotourism National / Int'l focus Family vacation Moderate growth	Base funding Fee revenue Concessions	$3M to $30M	Up to $3M
Multi-service Provider (Yosemite NP)	Both	Both	High profile, crown jewels; long-term protection and visitor services; high degree of infrastructure, significant pressure to preserve resources intact	National / Int'l focus Congressional committees Low growth	All	$10M to $30M	Up to $3M
Capital Preservation (Everglades NP)	Resource protection	Either or both	Protect resources from degradation, restore damaged resources, long-term research opportunities	National / Int'l focus Ecotourism Destination tourists Environmental NGOs Low to moderate growth	Base funding Project funding Donations Grants	$1M to $8M	Less than $500K
Focused-Services (Isle Royale NP)	Either	Cultural	Provide adequate, but limited visitor services to target market; protect specialized resources	Local, regional or national Limited to specialty groups Low growth	Base Funding Donations	<$2M	
Entrepreneurial (Marsh-Billings-Rockefeller NHP)	Either	Either	Immediate protection of resources; long-term development of visitor services	Local partnerships High growth	Base funding Project funding Donations	<$1M	Less than $100K
Community (Lowell NHP)	Both	Either or both	Sustainable development with high degree of integration within local community; administrative proving ground for NPS staff	Local & regional Moderate to high growth	All	$1M to $5M	$250K to $1M

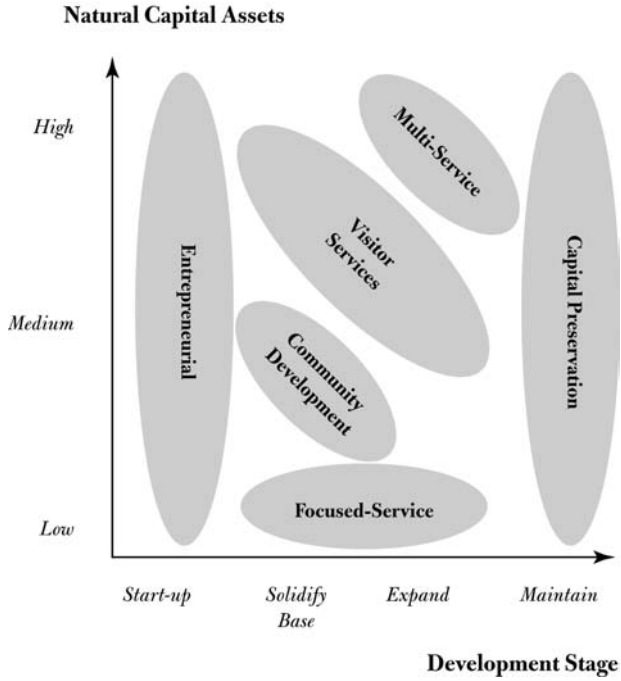

Figure 1. Graphical representation of six business models and the relationship to natural capital and stage of business development.

required for management. The natural capital assets—species, ecosystems, watersheds—vary among parks, and should be positively factored into management approaches. While some parks should be inviolate reserves, many can accommodate modest levels of infrastructure development. Openly addressing what level of "quality" the resources of a protected area should be at can be a healthy and necessary process for park managers.

Adopting Business Models

Choosing the right business model is a critical step towards effective park management. It should take place prior to major management decisions, though this may not be possible at all parks. The choice of business model should involve stakeholders from both inside and outside the park, including core staff, local community representatives, and others. However, it must be remembered that as a national park, the business model must fit the needs of the National Park Service and serve the interests of the nation.

There are many paths to take in order to choose the right business model. No single method is suggested here. However, there are many factors to consider, including enabling legislation, mission, visitor carrying capacity, infrastructure capabilities, revenue and funding expectations, and staff capacity. Carefully evaluating each of these, and deciding on a model will allow park managers to face difficult policy and management decisions with the support of a vision for the role of the park. Ultimately, this role is defined by the method by which managers feel they can be succeed, be it in terms of providing visitor services, ecological services, or community

services.

One important step to take before adopting a business model is the evaluation of both the customer base, or in this case a stakeholder analysis, and subsequently, a competitive landscape analysis. Finally, the park should evaluate its current and potential areas of strength—that is, what it is that the park does well.

Parks that would benefit from applying the visitor services provider business model include those with significant, consistent levels of visitation. The high levels of demand offer stability, particularly if funding were more intimately tied to fee receipts. This model is also appropriate for parks established with a particular focus on visitors. At the opposite end of the spectrum is the capital preservation model, focused more clearly on resource protection. In short, the choice between these two is a choice not between visitors and resources, but which has higher priority when conflict arises.

The multi-service provider model attempts to strike a balance between these two extremes. It is most appropriate for those parks with a wide variety of options for visitor services, as well as significant natural and cultural resources. These parks will need substantial funding, owing to infrastructure and the high cost of resource management. Yet fee revenues from visitor and gate receipts is often an option for supplementing basic funding. With a diversity of services, managers should attempt to exploit a range of revenue sources to enhance stability and long-term reliability. High visibility can aid competitiveness for these funding sources from both appropriated and non-appropriated sources. Parks adopting this model can also focus on enhanced visitor fee receipts through balanced and appropriate fee structures. Managers should, however, be cautioned against adopting this model as a "safe" choice; it is not safe, but rather the most difficult to implement. The focused-service provider, on the other hand, offers specific visitor services that, while not limited in scale, are limited in scope. Focused-service providers do only a few things for visitors, but do them very well. Some examples might be a park that offers only alpine mountaineering services. Management would focus on meeting the needs of this very specialized group.

Parks that might benefit from the entrepreneurial model include small, newly established parks that can exploit a wide variety of revenue models simultaneously, as well as leverage multiple skill sets from a limited number of employees. Those able to take chances and experiment with different approaches are able to adopt this model with success; however, this model demands flexibility in staff capabilities and attitude. Still, well-established parks can also benefit from this kind of approach if the leadership is able to motivate staff to take chances, and if the political environment is amenable to experimentation and a "non-traditional" style.

The community model might best be identified with the current trend towards community-based conservation. While more frequently implemented in developing nations, community-based conservation certainly has a place in developed nations' protected areas. Park managers most interested in extended relationships with community organizations and members would do well to bring them into the decision-making process as

soon as possible. Allowing external parties to gain buy-in can prevent larger problems down the road. Indeed, with the rising focus on collaboration in conservation, currently this model is perhaps the most popular. However, the community-based model is not without its limitations, and parks without the opportunity for innovative experimentation should approach it with caution, as is also the case with the entrepreneurial model. This is not to say that parks with sensitive resources or endangered species cannot embrace this model. Rather, by extending decision-making to non-park staff, managers must more fully balance priorities and interests outside park boundaries.

The capital preservation model's focus on preserving resources lends itself to implementation in remote wilderness areas, or those where visitor services would not be expected to be extensive. Those parks with very sensitive or irreplaceable resources might also benefit by clearly focusing on enhancing them through restoration or species recovery.

Summary

While there are many business models available to park managers, almost no parks are currently employing a model to help direct their operations. Instead, managers rely on singular adherence to the National Park Service's mission, which, while important and effective in guiding the agency as a whole, does not give managers enough guidance in prioritizing operations, policies, and activities on a daily basis. Aligning strategic park management to the business models outlined here, and perhaps using a business plan to do so, would aid managers in clarifying operational focus and achieving mission and strategic goals.

By choosing a model, a clear vision for the business services to be provided can be offered by managers to employees, the public, and other stakeholders. Still, adopting a business model for a national park or protected area does not preclude changing that model at a future time; many businesses do just that as they enter new phases of development. Figure 1 demonstrates that as protected areas develop their natural and capital assets, they may need to change their business model in order to better compete. Broader strategic planning incorporating local, regional, and national constituent groups could be used to periodically adjust park management in new directions.

The information presented here is useful to both developed and developing nations; however, developing nations would benefit from greater exploration of a national business strategy or a national system of protected areas (including identifying the mission and vision for the managing agency) before embarking on business management approaches for individual parks and protected areas. This would clarify the purpose of a national system of protected areas, preventing the piecemeal cobbling together of parks of disparate types and missions.

There are several elements of adapting business principles to national parks that were not explored in depth here, but an understanding of which is critical to the overall evolution of protected areas management. First, the models outlined here were developed primarily with national parks in mind. Other protected areas where more intensive consumptive activities are permitted might find

these models too limiting, and so more work on the development of additional business models for these types of protected areas may prove useful. Other models would have to consider the nature of the use of public goods by subsets the population (e.g., timber company salvage permits) as it relates to the balanced provision of services to a potential "market." In this regard, research on types of resource extraction on public lands would be useful to help guide the development of other business models for protected areas.

Second, a further exploration of partnership models could prove useful to some protected areas where joint management by a multi-agency organization exists, particularly in situations where management direction is provided both by government and nongovernmental actors. In addition, revenue models are generally limited in developed nations to in-country sources, but even so there are diverse funding outlets for national parks. The primary limitations for U.S. national parks are federal restrictions on soliciting donations from individuals or corporations. This simple fact makes a friends' group a virtual necessity. While the National Park Foundation serves to coordinate much of the interaction between park units and the philanthropic community, there are significant outlets for additional funding development locally and regionally.

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