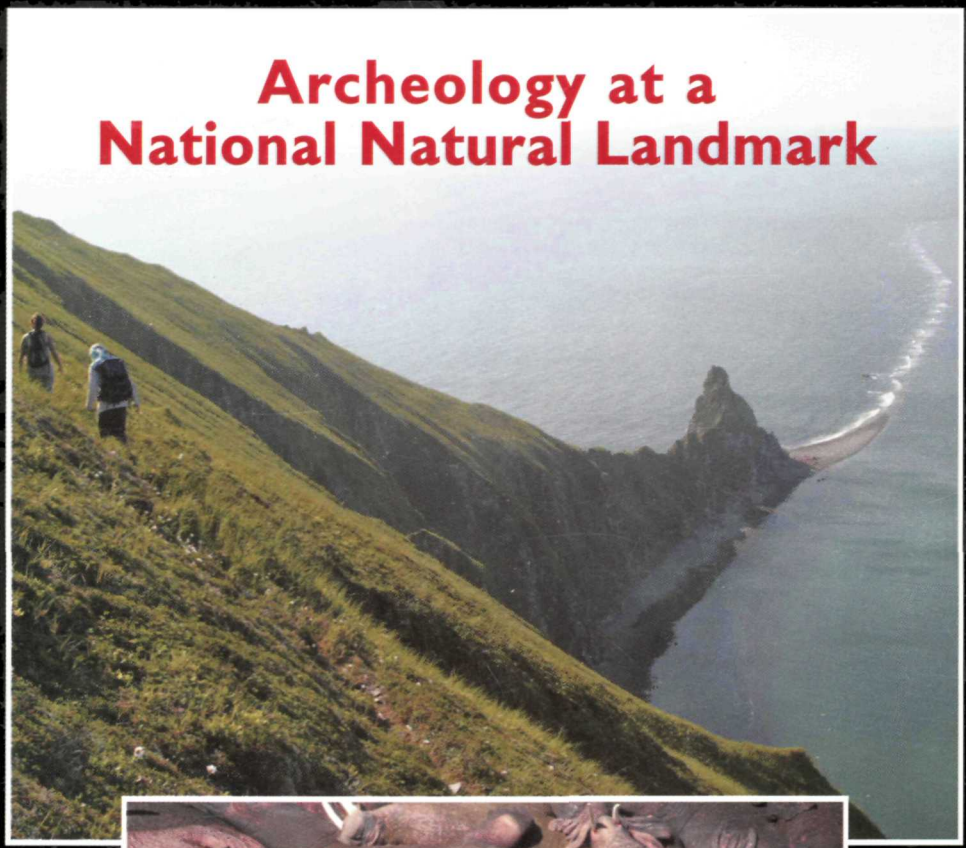
Archeology at a National Natural Landmark



The George Wright Forum

The GWS Journal of Parks, Protected Areas & Cultural Sites

volume 24 number 3 • 2007

GEORGE
WRIGHT
SOCIETY

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 encourages 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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On the cover:
The north tip of Round Island, Alaska, showing walrus haul-out beach below and long northwest trending spit. Part of Alaska's Walrus Islands State Game Sanctuary and National Natural Landmark, Round Island's archeology is discussed in the article by Schaaf and colleagues in this issue. Photo courtesy of the Alaska Department of Fish & Game. Inset: The Walrus Islands are aptly named: in this shot, dozens are relaxing in the sun (both males and females have tusks). Photo courtesy of Judy Alderson, National Park Service.

FOR OVER 25 YEARS,

the George Wright Society has been about one thing:

CARING FOR PROTECTED AREAS.

The heart of the GWS is our support for professions that promote science, scholarship, and understanding in parks, protected natural areas, historic places, and cultural sites. We bring it all together in ways nobody else does. If you care about parks, won't you please join the GWS community of professionals? Membership includes a subscription to *The George Wright Forum* and discounts at the biennial GWS Conference. Use this form or join on-line at **www.georgewright.org.**

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SOCIETY NEWS, NOTES & MAIL

Lots of new faces coming to the GWS Board

The year 2008 will see the biggest influx of new people to the GWS Board of Directors in recent memory. The results of the 2007 election, combined with several new appointments to the Board made at its annual meeting in October, add up to five new people joining the Board, including a new ex officio graduate student position.

In the election, Suzanne Lewis, superintendent of Yellowstone National Park, won a second three-year term on the Board. She will be joined by Robert Winfree, the Alaska regional science advisor for the National Park Service, who won an initial three-year term. Suzanne and Bob defeated Sharon Franklet and Bonnie Halda in the race.

At its annual meeting, the Board moved to fill several current and forthcoming vacancies in appointed positions by naming the following people to the Board:

- Brent A. Mitchell, the vice president for stewardship at the QLF/Atlantic Center for the Environment, a nonprofit conservation and education organization based in Massachusetts.
- John Waithaka, a conservation biologist with Parks Canada's headquarters in Quebec.
- Melia Lane-Kamahele, a cartographer and GIS coordinator with the National Park Service's Pacific Islands Support Office.

John was born into and grew up in a traditional Kikuyu community in central Kenya, and is a recent Canadian citizen. Melia is a Native Hawaiian. They will be the first indigenous people ever to serve on the GWS Board.

In addition, the Board decided to create a new ex officio, non-voting Board position for a graduate student. The idea here is to nurture a closer relationship between the Board and young people, especially those from minority backgrounds, who are committed to a career in parks and protected areas. This position will be for a two-year term and the holder will participate fully in all Board activities except for voting. The Board will make a selection by mid-December; we will share the results in the next Society News, Notes & Mail installment.

GWS2009 slated for "green hotel" in Portland

Ever see the movie "Sleepless in Seattle"? How about this for a sequel: "Car-Less in Portland"? Okay, okay, so it's not much of a title. Nonetheless, the venue for the 2009 GWS Conference on Parks, Protected Areas, and Cultural Sites will allow you to ditch your wheels and still have access to all the great attractions of Portland, Oregon—one of America's greenest cities. That's because we will be meeting at the Doubletree Hotel at Portland's Lloyd Center. The Doubletree is located right on Portland's award-winning MAX light-rail system, offering free rides to most downtown locations (the Lloyd Center is across the Willamette River from downtown) and a round trip fare of less than $5.00 to the Portland airport. On top of this, the Doubletree Lloyd Center is the city's leading practitioner of green meeting principles—something that was identified as a high priority by attendees at GWS2007. This is a no-styrofoam, comprehensive-composting, full-recycling, energy-aware hotel. We are looking to make GWS2009 our lowest-impact conference yet. So . . . save these dates: March

2–6, 2009. Plan to join us in the beautiful Pacific Northwest for another stimulating week of conversation about park issues of enduring importance.

Alternative spring break program to be offered in 2008

Thanks to generous support from the U.S. Geological Survey, this coming March the GWS will launch PARK BREAK, a learning-oriented alternative spring break program. PARK BREAK will provide graduate students (with preference going to minority students) with first-hand experience by giving them a week to interact with researchers and scientists in an actual park setting. The 2008 PARK BREAK seminars will be hosted by three different parks. Students will get a mix of opportunities in the office and in the field as they work alongside senior managers and researchers in these parks. The students will also have the opportunity to present their research and publish in *The George Wright Forum.*

Kilgore wins Haury Award

Bruce Kilgore, a GWS Life Member and former member of our Board of Directors, has been named the recipient of 2007 Emil W. Haury Award by the Western National Parks Association (formerly Southwest Parks and Monuments Association). The Haury Award recognizes persons who have made outstanding contributions in scientific research or other activities that advance the understanding and interpretation of the natural and cultural resources of western national parks. Kilgore was cited by the selection committee for his "innovative research regarding the role and impacts of fire in native ecosystems." (Kilgore's history of prescribed fire / wildland fire use in the U.S. national parks appears in this issue of *The George Wright Forum.*) The Haury Award is named for Emil Walter Haury, the prominent archeologist of the American Southwest. Kilgore received his award at a ceremony in WNPA headquarters in Tucson in early December.

George Wright's field notes now archived at Berkeley

Jerry Emory writes: Society members might recall that Pamela Wright Lloyd and I undertook a project years ago to collect, and read, all of the known field notes of George Wright. We are now proud to inform you that his entire collection of notes—from his days as a young ranger in Yosemite National Park to his wildlife survey years—are now permanently archived at the Museum of Vertebrate Zoology on the University of California–Berkeley campus (most originals, some copies). The museum also has field notes by Wright's colleagues, including Joseph Dixon and Ben Thompson, as well as correspondence files between Wright and Joseph Grinnell. The museum is in the process of scanning all of the field notes and putting them on-line for free use by scholars and the general public. After some three years they are about halfway through this project, and although they have yet to complete Wright's entire notes, you can use the museum's on-line search function and view a sampling. For more information, you can visit their website or contact Stephen M. Long:

- http://mvz.berkeley.edu/
- Stephen M. Long, Administrative Assistant to the Director, Museum of Vertebrate Zoology, 3101 Valley Life Sciences Building, University of California, Berkeley, CA 94720-3160; 510-642-8299.

Robin Winks on the Evolution and Meaning of the Organic Act

With an Afterword by Denis P. Galvin

Editor's note: The historian Robin W. Winks (1930–2003) distinguished himself in many areas of scholarship during a tenure of more than 45 years at Yale University. One of his passions was America's national parks. Few people, if any, were more knowledgeable about the parks—he "saw the historical importance of the national parks concept more clearly than almost anyone," according to one Yale colleague—and his knowledge did not come solely from books: he was one of only a handful of people to have visited every one of the units of the national park system. Aside from writing extensively about the national parks, Winks also served as chair of the National Park System Advisory Board. The National Parks Conservation Association's award for contributions to public education on behalf of America's national parks is named in his honor.

This Centennial Essay has been abridged from Winks' seminal analysis of the meaning of the Organic Act, "The National Park Service Act of 1916: 'A Contradictory Mandate'?", published in 1997 in the Denver University Law Review *and reproduced here with permission. The essay published here represents less than one-quarter of Winks' original article. Much rich detail has been omitted from the discussion remaining, as well as entire discussions of historic objects in parks, the relationship of the Hetch Hetchy controversy to the Organic Act, the effects of other environmental legislation, water rights, implications for activities outside of parks, and most of the discussion of later laws affecting the interpretation of the act. Selections are focused on retaining Winks' principal arguments and information pertaining to the intent of Congress in 1916. The extractions were made by Abigail Miller. To minimize the editorial apparatus, we have not marked those points where whole sentences or paragraphs have been excluded, and have extensively reformatted and renumbered the endnotes without editorial indications. However, in the main text ellipses are used wherever the internal structure of a sentence has been changed; square brackets, where an editorial emendation or addition has been made. The complete article in its original format may be viewed at www. nature.nps.gov/Winks/.*

Introduction

HISTORIANS CONCERNED WITH THE NATIONAL PARK SERVICE, managers in the Park Service, and critics and defenders of the Service frequently state that the Organic Act which brought the National Park Service into existence in 1916 contains a "contradictory mandate." That "contradictory mandate" is said to draw the Park Service in two quite opposite directions with respect to its primary mission; the contradiction is reflected in management policies; the inability to resolve the apparent contradiction is blamed for inconsistencies in those policies.

The apparent contradiction is contained in a single sentence of the preamble to the act. That sentence reads, in addressing the question of the intent of the Service to be established by the act, that the Service is

> to conserve the scenery and the natural and historic objects and the wild life therein [within the national parks] and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.[1]

This paper is an attempt to determine the intent of Congress with respect to the Act of 1916. It is the work of an historian, not a legal scholar. The historian recognizes that the intent of the whole of Congress in passing an act, and the intent of the individuals who framed that act, do not perfectly coincide; that intent must nonetheless be interpreted as individual; that intent changes; and that the law of unintended consequences looms large in any legislation.

Creating a National Park Service: The Act of 1916

The National Park Service was created by act of Congress in August 1916, and President Woodrow Wilson signed the Organic Act on August 25. The act was the result of some six years of discussion, intense lobbying by a variety of interest groups, and growing public concern. The leaders of the campaign to establish a Park Service were, in the House, Congressmen William Kent and John Raker, both of California, and in the Senate, Reed Smoot of Utah. Congressman Kent had the close advice of Frederick Law Olmsted, Jr., son of the founder of American landscape architecture and creator of Central Park. Stephen T. Mather, a wealthy borax industry executive (who later would become the first full-time director of the new National Park Service created by the act) was heavily involved, as were a number of recreational, outdoor, tourist, and automobile associations, of which the American Civic Association was the most important.

These advocates spoke of most of the thirty-seven parks that then existed, as well as the wide range of park proposals pending before Congress, in terms of scenic reserves, often invoking a comparison with Switzerland, which it was invariably argued had capitalized on its natural scenery more effectively than any other nation. Both railroad and automobile interests advocated more consistent administration of the existing parks in order to protect them more effectively, and also to make certain that accommodations and campgrounds were held to a consistent standard for the public's pleasure. While the railroads wished to bring spur lines to the borders of the parks,

they seldom argued for actual entry. Automobilists wished to see roads to and within the parks upgraded so that visitors could tour the parks in greater comfort. All spoke of "scenery" with respect to the principal natural parks, though with a variety of qualifiers, and all referred to the need for preservation of that scenery while also making the scenery accessible for the "enjoyment" of the public. Thus, any discussion of congressional intent in 1916 involves some understanding of what was meant at the time by "scenery," as well as the specific references to it in hearings, debate, legislation, and the correspondence of the key legislators.

Debate, and the [House Committee on Public Lands] members' papers, make it abundantly clear that the key members in the House, with respect both to the Organic Act and to specific national park bills during this time, were Congressmen Kent and Raker, Congressman Irvine Lenroot of Wisconsin, who was a watchdog preoccupied with scrutinizing all bills for their financial impact on government spending, and Congressman Edward T. Taylor of Colorado, who was an advocate of the bill that created Rocky Mountain National Park in 1915 and who saw the two acts as closely related.... [A]lmost never did any Congressman other than these four speak to general principles of preservation and protection or to matters concerning water. Thus, in the House one best focuses on Congressman Kent, whose bill, H.R. 8668, was ultimately enacted (with slight modifications) as H.R. 15522, and whose papers are voluminous.

The story is similar in the Senate. While several Senators spoke with respect to their final bill, S.9969, which was offered by Senator Smoot, almost no one took up broad questions of the language of the bill. The preamble, or "statement of fundamental purpose" for the act of 1916, was drafted by Frederick Law Olmsted, Jr., at the request of Congressman Kent. Thus Olmsted's views ... are also important to understanding Kent's intent. Fortunately, his papers survive at the Library of Congress (and, to a lesser extent, at the former Olmsted offices and studios in Brookline, Massachusetts).

The governing sentences of the National Park Service Act of 1916 read as follows:

> The service thus established shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations hereinafter specified by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.[2]

It is this language which requires explication, and it is the path to this language, beginning with the first suggestion that there should be a national park service or bureau, that requires tracing if we are to understand congressional intent.

Taft and Ballinger recommend a bureau

Beginning early in 1910 the American Civic Association had declared the need for a special bureau, most likely within the Department of the Interior, to administer

the nation's national parks.... In his annual report for 1910, the secretary of the interior, Richard Ballinger, recommended that Congress should create a "bureau of national parks and resorts" in order to assure future generations competent administration of the parks.[3] This statement was immediately taken up by the American Civic Association, though never again was there reference to "and resorts" in relation to a bureau's prospective title.

The lobbyists often referred to the parks as "the nation's playgrounds," as "havens of rest," as places where the public might enjoy solitude, recreation, and "a sense of good health." To some, however, "resort" carried a somewhat undemocratic connotation, while "playground"—which was universal, for the people—became the preferred term at the time. In all the lobbying, congressional hearings, and debates to follow, emphasis remained upon ways of bringing benefits "to the people."

[James] Penick[, Jr.] astutely observes that "[t]he same generation which would soon sanction immigration laws to protect the genetic purity of the American population and would support a National Park Service to protect the heritage of natural beauty awoke somewhat earlier to the revelation that the material wealth had been acquired by a few men who used their great economic power to exploit the farmer and laborer...."[4] "These people," largely middle class, wished to see the grand scenery of America preserved virtually as a patriotic act. They did not want any of the natural scenery within the national parks to be used to private ends....

On February 12, 1912, [President William Howard] Taft ... declared in "consideration of patriotism and the love of nature and of beauty and of art" [that] it was essential to spend the money needed to "bring all these natural wonders within easy reach of our people."[5] A bureau would improve the parks' "accessibility and usefulness," he concluded.[6] These were common themes at the time, for parks were likened to "nature's cathedrals" through which the United States, a raw young country, matched in splendor the great human-built cathedrals of Europe (a commonplace comparison, especially for Yosemite), and in which nature imitated the colors of art (usually said in reference to Yellowstone or the Grand Canyon). Such messages made clear that the president regarded, and believed that the American people regarded, the parks as symbols of the nation and thus of vital importance....

The hearings of 1912 and 1914: What is scenery?

The first substantive discussion of the purposes of a national park service or bureau occurred during the House hearings on H.R. 22995 on April 24 and 25, 1912.[7]

This hearing in 1912 was typical of discussion to follow. For the most part, both members of the House and witnesses from the executive branch restricted themselves to mid-level generalities. No one asked probing questions about precisely how scenic values were to be preserved or, indeed, what scenery was. Nonetheless, three generalizations emerged. Parks were to be held to a higher standard of preservation because of their grandeur and (with monuments) scientific values than were other federally-administered lands; this would best be achieved through a separate bureaucracy which would understand these different needs and values; and while roads, accommodations, and other man-made intrusions were necessary in order to enhance the

recreational purposes of the national parks, such physical objects were to be subordinate to the preservation of the "scenery." Never, however, was scenery defined, for clearly all believed they understood its meaning.

There is no doubt that Congress wished to protect the scenery of the national parks.... Though "scenery" is to some extent subjective, one should note that the word has certain agreed meanings which have not changed substantially. "Scenery" is "the aggregate of features that give character to a landscape"—a definition that allows for scenery to fall well short of "grandeur" and which thrusts a significant burden onto "landscape".... One may argue, then, that if one may assume those who used the term "scenery" in conjunction with "protection" knew the value of the words they chose, they intended that priority should be given to land that embraced several natural features (an aggregate) that were capable of being viewed from some point, whether road, trail, outlook, above or below, and that any alteration of timber cover, water course, rock face, or naturally occurring floral or faunal presence was to be avoided.

In 1911 the Century Company had issued a new *Dictionary and Cyclopedia* which had become the favored reference of Congress.... [T]his authoritative dictionary had added a definition of scenery which also included the notion of the "picturesque or pictorial point of view."[8] Thus, no matter which dictionary one might consult, "scenery" is tied to "a place," or "features"; involves more than one "object"; and derives special value from the "aggregate" or conjunction of those objects, as viewed from some undefined but nonetheless human vantage point.

The National Park Service bill was introduced again at the 63rd Congress, and as H.R. 104 it was the subject of another hearing before the Committee on the Public Lands on April 29, 1914.... [T]his hearing turned largely upon the practical question of whether a separate service would reduce expenses, be more efficient, and eliminate the need to use U.S. Army troops in some of the parks....

The hearings of 1916

The House hearings of April, 1916, dealt with two bills, H.R. 434 (Raker's bill) and H.R. 8668, a new bill introduced by Congressman Kent. H.R. 8668 differed from H.R. 434 in that it contained the significant preamble quoted at note 1 above.... What he wanted when he agreed to introduce a bill in place of Congressman Raker's was a document that was "as short and uncluttered as possible," knowing that this meant that language would not be provided to clarify all future areas of conflict and ambiguity. The resulting act was only two and a half pages long.[9]

In the hearings only two new points were made. For the first time the phrase "national park system" was used, involving the image of a systematic inventory of the nation's grandest scenic landscapes and natural and scientific curiosities, all to be combined (with the ultimate transfer of national monument properties then under the jurisdiction of the Department of Agriculture) within one efficient and consistent administration.[10] Secondly, for the first time the notion of the parks as great educational enterprises, places to which the public could come to learn about nature, geology, fossils or sedimentation, while also increasing their working efficiency, their health,

and their patriotism, was set out clearly, in this case by [the American Civic Association's Jay Horace] McFarland and by R.B. Marshall, the superintendent of the national parks, a newly-created position. . . .[11]

Olmsted's statement of "fundamental purpose"

Frederick Law Olmsted, Jr., is important to understanding the language of Kent's bill. The son of Frederick Law Olmsted, the great creator (with Calvert Vaux) of Central Park, the person who had been one of the first to promote the idea of a Yosemite National Park, and the "father of American landscape architecture," the younger Olmsted had by 1916 long emerged from his distinguished father's shadow and was both a famed designer of major parks in his own right and a member of the federal government's Commission of Fine Arts. Olmsted shaped his language in conjunction with Kent, Raker, and others. The key provision Olmsted originally wrote for H.R. 8668 read:

> The fundamental object of these aforesaid parks, monuments, and reservations is to conserve the scenery and the natural and historical objects therein and to provide for the enjoyment of said scenery and objects by the public in any manner and by any means that will leave them unimpaired for the enjoyment of future generations.[12]

This would be very slightly altered in its final form, to state (as we have seen) that the "fundamental purpose" of the parks was "to *conserve* the *scenery* and the *natural* and *historic* objects and the wild life therein and to provide for the *enjoyment* of the same in such manner and by such means as will *leave* them *unimpaired* for the enjoyment of future generations. . . ."[13] What may we reasonably believe Congress, and those who framed the legislation, meant by "unimpaired"? To stalk this question, one must turn to the papers, first, of Frederick Law Olmsted, Jr., and then to those of Congressman William Kent, for it was Olmsted who had insisted that there must be an overriding and succinct statement of purpose (today one would say "mission statement"). Since he expected and hoped for substantial public use of the parks, he was not content with leaving an area "unimpaired for future generations," but inserted the key words, "for the enjoyment of" those generations.

Herein lay an ambiguity and a potential source for future conflict. "Enjoyment" reasonably required access, and at the time roads, trails, hotels, campgrounds, and administrative facilities did not seem unduly invasive. The act cannot have meant that "unimpaired" was to be taken in its strictest sense, particularly since the act included specific approval for certain inevitably compromising actions: leasing for tourist accommodation was the most obvious example.

The Organic Act also contained a provision likely to affect natural resources in parks. By reaffirming an act of 1901 that authorized the secretary of the interior to permit rights of way in Yosemite, Sequoia, and General Grant national parks, for pipelines, canals, ditches, water plans, dams, and reservoirs "to promote irrigation or mining or quarrying, or the manufacturing or cutting of timber outside the parks," the act of 1916 showed that public use of the national parks might, when approved by the secretary, extend to consumption of some of

the park's resources. Did the statement of "fundamental purpose" temper this section of the bill?

One should not make too much of this provision. First, it applied by name to only three national parks, all in California, where water interests were powerful and historically entrenched within and around the three parks in question. That the act was silent on other parks may be taken to mean that the provision did not—or at least did not readily—apply to them, unless specific legislation with respect to a park mentioned such rights of way (the 1915 act creating Rocky Mountain National Park did contain such a provision). Second, to the degree that multiple use was peculiar to the mandate of the National Forest Service, other language in the Organic Act of 1916, and most particularly in subsequent amendments to that act in 1970 and 1978, clearly meant to provide national parks with a higher standard of protection than in national forests or, conversely, those acts were less permissive of the application of a policy of multiple use. Third, across time the conflict between any grant of authority to the secretary to provide for multiple use and the language relating to "unimpaired" and "for future generations" was interpreted by the courts to stricter and stricter (that is, more protective) meanings of "unimpaired."

What did Olmsted mean at the time? We have a commentary by him, written in 1937, in which he provides a gloss on his meaning. In the midst of debate in Colorado over the Colorado–Big Thompson Project, a water diversion plan that would bring water from the western slope of the Continental Divide to the parched agricultural lands on the eastern slope, in part by the use of a tunnel that would pass through, or under, Rocky Mountain National Park, Olmsted wrote of what he deemed the "common sense" approach to the question of impairment. . . .[14] [N]ot content with … [a] general … argument, he proposed actual criteria, in keeping with the original intentions of the Organic Act, that should be applied when issues of this nature arose.

Olmsted proposed five criteria. (1) The burden of proof—"and thoroughly well-considered and convincing proof"—must rest upon the advocates of "any enterprise for non-park purposes within the theoretical limits of jurisdiction of a National Park"; (2) the enterprise must be of "real social importance from a *national* [italics added by Winks] standpoint and is not to be practically attainable" elsewhere; (3) the enterprise must not "endanger the value of the park for its proper purposes to the slightest appreciable degree"; (4) the danger must be "so slight and of such a nature that the land if subject to it in advance would nevertheless have been wisely considered eminently suitable for selection and permanent maintenance as a National Park"; and (5) the non-park purpose must be "of so much more importance nationally than the purposes of the park" as to justify the lessening of the park. Olmsted concluded that, while he was open to reason, he did not find the arguments for the Colorado–Big Thompson Project complete or convincing.

Congressman Kent's views

What did the principal formal author of the National Park Act of 1916, Congressman William Kent, say about it himself? Kent often is singled out as the "father of the National Park System," and his views deserve some extended analysis.[15]

Kent was a Chicago businessman who had bought a home in Marin County, California, in 1899 and moved there in 1907.... He wished to see the nation's flooding rivers brought under control, advocated extensive irrigation projects,... strongly supported public water power projects,... and was an early proponent of the Tennessee Valley Authority. As he championed public power, he also opposed private power.... A second consistent strain in his thought was revealed in his persistent efforts to transfer to public ownership a large area of Mt. Tamalpais, [most of which he owned] in Marin County.... In 1908 he was successful in these endeavors, and his redwood grove became Muir Woods National Monument. From 1903 forward he spoke of the need for more national parks and the necessity to keep lands in or destined for parks out of local politics.

Thus Kent favored the development of water power through public means, the protection of watersheds, and the creation of national parks and monuments to preserve scenic and natural areas.... At Muir Woods, he wrote all was to be left natural, with no plants to be removed and no naturally downed trees to be cleaned up from the valley floor. As a member of Congress, Kent was not dogmatic on the water issue, save for his insistence on public power, and he was not invariably a supporter of undisturbed wilderness even in national parks. After all, he was among those who pressed for opening up Yosemite National Park to the Hetch Hetchy reservoir.... Kent's views on what a national park should be had been made clear, however, across several park proposals.... [I]n January, 1915, he had come out strongly in House debate for the Rocky Mountain National Park bill, declaring that the preservation of scenery is a "most valuable purpose." He drew a distinction between national forest, national monument, and national park land, asserting that a national park must be held "in a state of nature" and that animal life must be "forever free from molestation."[16] One may reasonably conclude that this was still his view only a year later, as sponsor of H.R. 8668.

Kent's position thus seems clear. He promoted his own park bill because he thought it, and not Raker's, would pass and also because it was the better bill. It contained Olmsted's preamble and Raker's had none.... [H]e intended to withdraw from the congressional race in the first district of California (though he postponed an official announcement until June to allow for an appropriate successor to test the waters) because of ill health. Thus, he also felt a sense of urgency in getting the bill to the president. For reasons of health, Kent's focus on his bill clearly declined after it was reported out of committee in May, but he could well feel he had made his position abundantly clear already, and he knew that Senator Smoot would carry the bill in the Senate.

Had Kent intended any emphasis on recreational purposes for the parks ... he surely would have said so, for at the time Kent was a vice president of the Playground and Recreation Association of America. Had he believed that he could leave interpretation of the bill to the secretary of the interior, Frederick K. Lane, he surely would not have written to Woodrow Wilson on July 24, when the bill was soon to be on the president's desk, advising him that Interior was abandoning sound policy. The assistant secretary, A.A. Jones, was not to be trusted, and Lane himself "had broken down to a

considerable extent in his conservation policies."[17]

Until his death William Kent tracked the national parks.... In 1925, when a Senate Subcommittee of the Committee on the Public Lands held hearings on the national forests, Arno B. Cammerer, assistant director of the National Park Service, appeared before it, and Kent noted his remarks with approval. Cammerer asserted that the parks "were established to be kept absolutely in their natural condition," except for roads and hotels: it was, he felt, preferable to lose land and change boundaries than to permit an incompatible act within a park.[18] Reservoirs, for example, were clearly incompatible, Cammerer noted, pointing out that Congress had, by amendment to the federal water power act of 1920, gone on record that before any ditches, reservoirs, etc., could go into any national park, they would have to be specifically authorized by an act of Congress. Kent appears to have felt that his basic principles had at last been clearly recognized.

A contradictory mandate?

Several commentators on the National Park Service Act of 1916 have concluded that the preamble, or statement of fundamental purpose, presented the Service with a contradictory mandate.... [I]f the new National Park Service was handed a contradictory mandate by Congress, the contradiction arose from the language of the bill, and in particular from its statement of "fundamental purpose." Whether such a contradiction exists or not now requires further examination.[19]

These recent commentators ask, in one form or another, how a management policy can both accommodate use and preserve a natural area. These commentators, often in very similar terms, conclude that the Park Service was presented by the act with a "fundamental dilemma," that the Service was asked to attempt "harmonizing the unharmonizable," and that the dilemma is not capable of either logical or historical resolution.[20] None of these authors appears to have examined the bills that led to the act of 1916, the hearings, the debates—that is to say, the legislative history—much less having sought out and explored the private papers of the members of the Committee on the Public Lands.

To accept the conclusion that the preamble presented the Park Service with an inherent contradiction, that it is illogical, is to conclude that Congress had no clear intent, that it either did not know what it was doing when it posed a dilemma, that it did not care, or that there is no inherent contradiction in the preamble. While congressional acts undeniably contain unclear language, and (when acted upon administratively) unresolved issues, it seems unreasonable to so summarily dismiss congressional intent when the act was the product of well-informed men, especially Raker and Kent, both of whom had studied the issue with care, one of whom declared the act to be his "pet" and the other, by evidence of his correspondence, having spent much time upon it; when the act was the last of a series, each of which had benefited from the clarification of hearings; when the co-sponsor in the senate, Reed Smoot, confided to his diary that this act was one of the most important of his accomplishments;[21] and when such careful and scholarly individuals as Frederick Law Olmsted and Robert B. Marshall had a hand in its language.... [W]e know that Raker (and Kent) met regularly in 1916 at the apartment of Robert Sterling Yard, a journalist working for the

United States Geological Survey in Washington, and that the final bill was drafted by these men, joined by [others who were "professional publicists, editors of travel and outdoors oriented magazines, or officers of similarly inclined organizations"]....

Once Kent agreed to sponsor a new parks bill, these men moved their meetings to his home on F Street in Washington, where they met "fairly regularly," according to the young Horace Albright,[22] who was Mather's assistant and a regular member of the group.... Thus there was reasonable continuity of attendance at these meetings. It seems unlikely that such a group, even though they wanted a simple and uncluttered bill and wished it in a hurry, would allow a glaring contradiction to be part of the statement of "fundamental purpose" over which Olmsted labored, producing at least three versions. One must presume that the language was deliberate and that it is worthy of the closest attention.

Not present at the F Street meetings was Stephen Mather himself.... Mather had taken pains to get to know the people who ran the national parks, by calling a national park conference for Berkeley, California, in March of 1915, and asking all park superintendents to attend. He also had invited most of the concessionaires from the parks and took with him from Washington several key players.... At Berkeley, Mather had spoken of the need for a park service and had shared with Albright his sense that many of the superintendents, being political appointees, were not up to their tasks, a deficiency a park service would remedy.

Mather also took the trouble to get to know the key members of the House and Senate committees.... He talked with them about the need for a service, shared with them his philosophy of what the parks should be, and urged them to move forward as quickly as possible with a new bill. Finally, it was Mather who orchestrated the presence of powerful journalists at the planning meetings on F Street.... Given this careful preparation, it is also unreasonable to assume that Mather would have allowed a "logical contradiction" to emerge from Olmsted's pen.[23]

[I]in 1918 [Mather] agreed with Secretary of the Interior Lane that the parks "must be maintained in absolutely unimpaired form." If he believed this in 1918, he surely believed it in 1916, and it seems reasonable to conclude that, given the care with which he orchestrated the shaping and passage of the Organic Act, he believed that the statement of "fundamental purpose" supported his view.[24]

We also have the commentary of two men who were consistently present at the meetings in Yard's and Kent's residences. One was Robert Sterling Yard himself. In [his book *National Parks Portfolio*] Yard wrote that "[o]riginally the motive in park-making had been unalloyed conservation"; indeed, he used the controversial language, that Congress had said it wished to "lock up" certain places.[25] Horace Albright, likewise present at the creation, is the only one of those who helped to talk out the proposed bill who would later explicitly confront the presumed contradiction in the act. In his memoirs, published in 1985, he noted that contrary to some scholars' accounts Olmsted did not write the full bill itself, though he was "responsible for the wording of the governing sentence," and that all present wanted the bill "to carry a clear definition of what the Park Service should be." They were aware of the "inherent conflicts between use and preservation," he wrote—he did not say "contradiction"—

but they were facing the political reality that this issue could not be resolved by the organic act alone.[26]

At McFarland's urging, Olmsted had submitted directly to the Department of the Interior his first attempt at a general statement to accompany the first draft bill. The statement in the draft read:

> That the parks, monuments, and reservations herein provided for shall not at any time be used in any way detrimental or contrary to the purpose for which dedicated or created by Congress.

Olmsted said this was not adequate and added to the bare bones section the additional proviso that the parks, etc., should not be used in any way contrary to "promoting public recreation and public health through the use and enjoyment by the people … of the natural scenery and objects of interest" in the parks. Olmsted was particularly concerned that the word "scenery" be inserted in connection with "natural" throughout the document. Olmsted sent copies of this correspondence to McFarland.[27]

There is, as a final approach to the "contradictory mandate," the logic of rhetoric. Many of those involved in framing the Organic Act, and certainly the former judges, school teachers, and present congressmen, were well accustomed to the use of rhetoric, or the study of the effective use of language. As rhetoricians, Senator Smoot and Congressmen Kent, [Scott] Ferris,[28] and Lenroot were highly regarded. The classical education of the time—and Olmsted and Raker had such an education—included rhetoric as a formal study. The principles of rhetoric held that, when listing two or more elements to an argument, the most important be stated first, and when speaking in public debate, a significant element of the argument which was not, however, the most significant, should be stated last in order to allow for an "Attic fall." If the principles of rhetoric were applied to the language of the preamble, then conserving "the scenery and the natural and historic objects and the wild life" within a park took precedence over providing for public "enjoyment," and there was no contradiction between two elements of equal weight for the elements were not, in fact, equal.

The Senate passed its bill on August 5. S. 9969, Reed Smoot's bill of 1911, was recycled in slightly altered form.… The need to reconcile the two bills meant further delay.… Then the chairman of the Senate public lands committee, Senator Henry L. Myers of Montana, and the House chairman, Congressman Ferris, agreed to allow grazing in all national parks with the explicit exception of Yellowstone. At the last minute a powerful Congressman from Wisconsin, William Stafford, who opposed new bureaus on principle, sought to bottle up the bill that had emerged from the conference committee, and Kent was able to persuade him to stand down.[29] Approval in the Senate quickly followed.[30]

National park acts of the 1970s and explication of text

While the crucial words from the preamble to the Organic Act of 1916 have traditionally been viewed as the statement of "fundamental purpose" already examined here, there is other language in the act that requires consideration. Let us read the preamble again:

> The service thus established shall *promote* and *regulate* the use of the Federal

> areas known as national parks, monuments, and reservations hereinafter specified . . . by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will *leave* them unimpaired for the enjoyment of future generations.[31]

Thus, the primary goal of the new service is to "leave" the parks and monuments unimpaired, placing clear priority on protection as opposed to restoration of landscapes and by implication arguing for a presumption of inaction in the face of any request for what may be viewed as "impairment." Arguably any action taken prior to passage of the Organic Act that might be viewed as impairment represented an action that could be, in so far as possible, undone, reversed, or nullified.

But what of "shall promote and regulate" in reference to the parks and monuments? Here arises the true source of the dichotomy of purpose, between preservation and use, conservation and enjoyment.[32] It may well be argued that the order in which these two objectives are set forth, as well as the sequence by which taken together they precede other terms in the statement, is significant, with "enjoyment" circumscribed by "unimpaired."[33] The legislative history of the act would appear to support this view, and successive directors of the National Park Service, and for the most part secretaries of the interior, as well as chairpersons of the relevant committees and subcommittees in Congress, have usually acted in such a manner as to suggest that the Park Service's first priority should be preservation.

In 1978, Congress reaffirmed the Organic Act and declared that parks must be protected "in light of the high public value and integrity" of the park system in a way to avoid "derogation of the values and purposes" for which the parks, collectively and individually, were created.[34] "High public value" is somewhat subjective and clearly changes over time; by the use of this criterion, Congress appears to have instructed the National Park Service to manage parks in relation to public sentiment and, in effect, sociological jurisprudence. By this standard in 1978 Congress gave a powerful mandate to the Park Service, a mandate which would prohibit actions that could have the effect of "derogation" of park values. Virtually all commentators at the time and since have concluded that the 1978 provision added to the Park Service's mandate to protect ecological values.

Conclusion

Arguably the intent of Congress with respect to any single act cannot be perfectly divined or proven. The intent of Congress across a number of related acts, and as adumbrated by other acts that bear upon the related group, may more nearly be understood. This paper has attempted to judge that intent. It has argued that the language contained in the preamble to the National Park Service Act of 1916 is not, in fact, contradictory and that Congress did not regard it as contradictory; that to the extent that a contradictory interpretation can be imputed to the sentence to the preamble quoted in the Introduction to this paper, that contradiction can be eliminated by reference to the printed record of

Congress at the time, to the private papers of those individuals most directly responsible for framing the language of the act, and to the prevailing canons of rhetoric in 1916. Further, it is argued that subsequent legislation, and numerous interpretations of related legislation by the courts (taking water as a resource by way of example) [the latter not included herein] sustain the view that there was and is no inherent contradiction in the preamble to the Act of 1916. The National Park Service was enjoined by that act, and the mission placed upon the Service was reinforced by subsequent acts, to conserve the scenic, natural, and historic resources, and the wild life found in conjunction with those resources, in the units of the National Park System in such a way as to leave them unimpaired; this mission had and has precedence over providing means of access, if those means impair the resources, however much access may add to the enjoyment of future generations.

Endnotes

1. 16 U.S.C. § 1 (1994).
2. Ibid.
3. Bills to Establish a National Park Service and for Other Purposes: Hearing on H.R. 434 and H.R. 8668 Before the House Committee on the Public Lands, 64th Cong., 1st Sess., 3 (1916). [Hereinafter "Hearing 1916."]
4. James Penick, Jr., *Progressive Politics and Conservation: The Ballinger–Pinchot Affair* (Chicago: University of Chicago Press, 1968), 24.
5. Taft's address on parks appears in A Bill to Establish a National Park Service and for Other Purposes: Hearing on H.R. 104 Before the House Committee on the Public Lands, 63rd Cong., 2nd Sess. 6 (1914) (introduced by Congressman Raker).
6. Ibid.
7. A Bill to Establish a National Park Service, and for Other Purposes: Hearing on H.R. 22995 Before the House Comm. on the Public Lands, 62nd Cong., 2nd Sess. (1912).
8. William Dwight Whitney, ed., *The Century Dictionary and Cyclopedia* (New York: Century Co., 1911), vol. VIII, 5385.
9. On the framing of the bill, see Horace M. Albright and Robert Cahn, *The Birth of the National Park Service: The Founding Years, 1913–33* (Salt Lake City, Utah: Howe Bros., 1985), 34–35. This is a primary source, being Albright's memoirs. He was present at the meetings in Kent's home. Albright appears to have been the first administrator to refer to a national park "system." See Dwight F. Rettie, *Our National Park System: Caring for America's Greatest National and Historic Treasures* (Urbana: University of Illinois Press, 1995), 13.
10. "Hearing 1916," 56.
11. Ibid., 54. [Ed. note: Marshall's position was a forerunner of the directorship of the National Park Service. See Richard West Sellars, *Preserving Nature in the National Parks: A History* (New Haven, Conn.: Yale University Press, 1997), 34.]
12. In 1911 Olmsted and McFarland had used this language:

    That the parks, monuments, and reservations shall not at any time be used in any way contrary to the purpose thereof as agencies for promoting public recreation and public health

through the use and enjoyment by the people of the said parks, monuments, and reservations, and of the natural scenery and objects of interest therein, or in any way detrimental to the value thereof for such purpose.

Letter from J. Horace McFarland, president of the American Civil Association, to Richard Ballinger, secretary of the interior, January 3, 1911; on file with the National Archives, Record Group 79, entry 6, box 783, 61st Cong.). Ballinger had promptly accepted this language. Letter from Ballinger to Frederick Law Olmsted, Jr., January 4, 1911; on file with the National Archives, Record Group 79, entry 6, box 783, 61st Cong.).

13. 16 U.S.C. § 1 (1994). [Emphasis added by Winks.]
14. Letter from Olmsted to Bradford Williams (October 22, 1937; on file with the Library of Congress, American Society of Landscape Architects).
15. The Kent Papers are in the Sterling Memorial Library at Yale University. I have also examined his correspondence with his son Sherman Kent, later director of the Office of National Estimates at the Central Intelligence Agency (these papers are under restricted access at the Yale University Library), and inquired of the family, through Mrs. Sherman Kent, and through a grandson, whether any papers remained at the family home in Kentfield, California, to which the answer was no.
16. William Kent Papers (on file with Yale University Library, Record Group 309, scrapbook B, microfilm reel 4, §§ 8–10).
17. Letter from Kent to Woodrow Wilson, president (July 24, 1916; William Kent Papers, box 25, folder 493; see also folder 500). Lane's views were, indeed, moving more toward commerce than conservation in 1916, but on the national park bill itself he remained supportive. The sparse Lane Papers at the Library of Congress do not help us here, nor does *The Letters of Franklin K. Lane: Personal and Political* (Anne Wintermute Lane and Louise Herrick Hall, eds., Boston: Houghton Mifflin, 1922). Having had a heart attack, Lane was not vigorous and would die in 1921. The only biography, Keith W. Olson, *Biography of a Progressive: Franklin K. Lane, 1864–1921* (Westport, Conn.: Greenwood, 1979), is silent on parks. An unpublished M.A. thesis that apparently shows access to additional materials—Henry W. Wiens, "The Career of Franklin K. Lane in California Politics" (1936; unpublished M.A. thesis, University of California)—has been reported lost by the Berkeley institution.
18. William Kent Papers (April 1925; pamphlet file, copy).
19. Many standard books on the National Park Service, or in conservation or environmental history, devote a paragraph or so to the act, usually in much the same language. When one pursues these paragraphs through the references supplied, one finds a nearly infinite regression, each leaning upon the previous secondary statement, most virtually devoid of any independent examination. For the most part these accounts pass over the actual framing of the bill and raise no questions about congressional intent, simply celebrating (in words attributed to Wallace Stegner) "the best idea America ever had." Perhaps half the secondary works conclude that the preamble to the act contains a "logical contradiction" (the words of Ronald A. Foresta in his *America's National Parks and*

Their Keepers (Washington, D.C.: Resources for the Future, 1984), 100), or appears to. However, not one of these books or articles is based on an examination of the Kent, Olmsted, or other relevant papers, and Donald Swain's 1966 article ("The Passage of the National Park Service Act of 1916," *Wisconsin Magazine of History* [Autumn]),on which most of the recent writings are based, is drawn almost wholly from the papers of Horace Albright, secondary accounts, and a limited survey of congressional hearings or other manuscript collections.

20. Upon examination more recently, this conclusion is often cited to an unpublished Master's thesis, Daniel McCool, "The National Park Service: The Politics of Appropriations" (University of Arizona, 1980), which is in fact about funding rather than purpose; or from political scientists and sociologists whose primary inquiry is into the theory of management. A check of five frequently quoted articles shows that not one of the authors went beyond what they construed to be the common sense meaning of the language, which they found on the face of it contradictory. However, if one is to construe, deconstruct, or (as an historian) explicate a text, one generally may not do so without going behind the text.
21. Diary of Reed Smoot (July 11 and August 6, 1916; Reed Smoot Papers, on file with Brigham Young University). See also his biographical sketch (which he himself wrote) in the *National Cyclopedia of American Biography* (New York: Macmillan, 1949), vol. 35, 63–64.
22. Albright and Cahn, 35.
23. Robert Shankland, *Steve Mather of the National Parks,* 2nd ed. (New York: Alfred A. Knopf, 1954), 83–99; Albright and Cahn, 24–26; Swain, "Passage of the National Park Service Act," 8–15; Donald C. Swain, *Wilderness Defender: Horace M. Albright and Conservation* (Chicago: University of Chicago Press, 1970), 41–60.
24. On this early period see also John C. Miles, *Guardians of the Parks: A History of the National Parks and Conservation Association* (Washington, D.C.: Taylor & Francis, 1995), 12–16.
25. Robert Sterling Yard, *The Book of the National Parks* (New York: C. Scribner's Sons, 1919), 24.
26. Albright and Cahn, 35. In particular, see Albright's exchanges with Huston Thompson, Horace Albright Papers (February 23 and 27, 1916; March 26, 1964; typescript interview on file with University of California–Los Angeles).
27. Letter from Olmsted to Frank Pierce, acting secretary of the interior (December 31, 1910; Olmsted Papers). This document, retyped, also appears in the Olmsted Portfolio (on file with the Bancroft Library, University of California–Berkeley), and in the National Archives (Record Group 79, entry 6, box 783).
28. Congressman Ferris was a lay preacher. See his use of rhetoric in his scant papers, held by the Museum of the Great Plains in Lawton, Oklahoma.
29. The papers of Clarence D. Clark, at the University of Wyoming, consist only of scrapbooks. On Clark, see Albert G. Anderson, Jr., "The Political Career of Senator Clarence D. Clark" (unpublished M.A. thesis, University of Wyoming, 1953). No Myers papers have survived save for fugitive letters in the papers of Montana Senators Thomas J.

Walsh and Burton K. Wheeler at the Montana Historical Society in Helena and his death certificate at the Western Heritage Center in Billings, Montana. There is a sketch of his career in the *Billings Gazette* of November 12, 1943. All efforts to locate the papers of [Congressman] William Stafford failed.

In addition to the major collection of Smoot papers at Brigham Young University, there are Smoot papers at the Library of Congress and at the Library of the University of West Virginia. An article, the title of which offers promise—Thomas G. Alexander, "Senator Reed Smoot and Western Land Policy, 1905–1920," *Arizona and the West* 13 (Autumn 1971), 245–264—proved to contain only passing references to the national park bill. The best biography is Milton R. Merrill, "Reed Smoot: Apostle in Politics" (unpublished Ph.D. dissertation, Columbia University, 1950). The other senators who served on the Committee on the Public Lands and Surveys, or who spoke on the floor of the Senate, were Colorado's John F. Shafroth and Charles S. Thomas, California's James D. Phelan and John D. Works, and Thomas J. Walsh of Montana.

The writer was unable to examine the papers of the Coloradoans, Edward T. Taylor, Charles B. Timberlake, John F. Shafroth, and Charles S. Thomas. The Taylor papers, at the Colorado State Historical Society and the University of Colorado, were examined for him and revealed nothing of relevance. Two collections might prove of value: the Thomas papers, which consist of 15,000 items, also at the Colorado State Historical Society, and the papers of Burton L. French, a Congressman from Idaho, who interested himself in the act though he did not attend the hearings. This last collection is at Miami University in Oxford, Ohio.

With respect to the NPS Act, the Papers of Woodrow Wilson, at Princeton University, are silent (Arthur Link to writer, telephonic communication).

30. William C. Everhart, *The National Park Service* (New York: Praeger, 1972), 19–20, states that before 1915 only a "scattered few members of Congress" could have spoken on the national parks for longer than five minutes. In 1916, debate in the Senate was almost nonexistent, but debate in the House showed that a number of members had formulated views on what parks should and should not be.
31. 16 U.S.C. § 1 (1994). [Emphasis added by Winks.]
32. On this point see Thomas J. Carolan, Jr., U.S. Department of State, "The Political Dynamics of the National Park Service" (1980–81), especially pp. 2–5.
33. The act refers to "enjoyment" by "future generations," not to "the people," which introduces an expectation of changing definitions of "enjoyment" by reference to the future. This makes legitimate an examination of changing perceptions relating to the signifying terms in the statement of purpose. Significantly, "the people" are acknowledged not to be static. Even were the term used in its customarily monolithic way, courts have interpreted "the people"—as in decisions involving the right to bear arms, for example—to mean the people as a group, not as individuals, thus opening the way to barring certain individuals. The same is true of use of grandfathered privileges within a park: they might apply to "the people" but not necessarily to any given person.
34. Act of March 27, 1978, Public Law 95-250, § 101(b), 92 Stat. 166 (codified as amended at 16 U.S.C. § 1a–1 (1994).

The Organic Act—A User's Guide: Further Thoughts on Winks' "A Contradictory Mandate?"

Denis P. Galvin

Robin Winks' article "The National Park Service Act of 1916: 'A Contradictory Mandate'?" *(Denver University Law Review,* Volume 74, No. 3, 1997, abridged above) is the most definitive statement on the origins and meaning of the Organic Act, but it has not ended the debate about its nuances.

In the recent arguments over the re-write of the National Park Service's 2001 *Management Policies,* four congressional hearings were held to examine the proposed changes. The subject that consumed the most time was the meaning of the Organic Act. The Winks article was read into the record and excerpted in testimony by those who shared his view. In the way of most hearings, there were witnesses and members of Congress who did not share that view. They charged his supporters with wanting to "lock up the parks." The appropriate "balance" between visitor use and enjoyment and the protection of resources was discussed for four hours at one of the House hearings.

The plain language of the act and the experience of the National Park Service in administering it provide some guidance to its everyday application. This article accepts Winks' view that there is no fundamental contradiction in its construction.

Consider some hypothetical situations. Imagine Yellowstone were still in its 1872 condition. A proposal is advanced to lay a cable on the ground from its boundary to Old Faithful. There, a camera would transmit images of the geyser to television sets across the nation. No other development would be permitted and no visitors would cross the park boundary. There would be enjoyment for those who watched at home and little impact. Since the enjoyment of future generations would be maintained, there would be no impairment.

Now consider a competing proposal to cap the geyser and use the thermal energy to heat the buildings presently at Old Faithful. Future generations would be denied any opportunity to "enjoy" the geyser. That's impairment.

Before analyzing other applications, let's pause and look at what the Organic Act authorized. Taken as a whole it did eleven things:

1. Created a National Park Service in the Department of the Interior and provided staff and salaries for the new bureau;
2. Directed the service to "promote and regulate the use of … national parks, monuments and reservations";
3. Specified the "fundamental purpose" by which the service is to promote and regulate the parks;
4. Gave the new director "supervision, management, and control" of areas then under the Department of the

Interior and areas created by future congressional action;
5. Authorized the publication of rules and regulations and provided penalties for their violation;
6. Permitted the secretary of the interior to destroy those animals and plants "detrimental to the use" of the parks;
7. Authorized the secretary to grant leases, etc., "for the use of land for the accommodation of visitors";
8. Allowed the secretary to permit grazing (except in Yellowstone) when it "is not detrimental to the primary purpose" of the parks;
9. Authorized leases, "without securing competitive bids";
10. Permitted the secretary to authorize permittees to issue bonds, etc., for "improving … and extending facilities for the accommodation of the public"; and
11. Recognized existing rights of way in some of the parks (Winks points out that there were three parks where this provision applied: Yosemite, Sequoia, and General Grant).

This article will not discuss all of these provisions, but the list does provide insight to the view that Congress held of national parks. There was to be development for visitors. It could be provided by non-governmental entities at the discretion of the secretary. These developments, while constrained by the "fundamental purpose," were not inconsistent with that purpose.

For ready reference I have inserted the key provisions of the act:

> [The National Park Service] shall promote and regulate the use of the federal areas known as national parks … by such means and measures as conform to the fundamental purpose of the said parks … which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.

Few discussions of the Organic Act concentrate on the word "promote." In 1916, as noted clearly in Winks' article, there was a desire to make the parks more popular; "it was essential to spend the money needed to 'bring all these natural wonders within easy reach of our people.' A bureau would improve the parks' 'accessibility and usefulness.'" Stephen Mather, the first director of the National Park Service, was known for his public relations skills. Given the significant popularity of the parks today, it is of some value to think about the word "promote" anew. There remains a need to promote the parks, not to bring people to them, but to promulgate the values they have come to represent. In over a century of existence, the things preserved in them are rarer and more valuable now than in 1872 or 1916. The actions that must be taken by all to continue that preservation have become actions that must be taken by all to maintain the planet. The last two sentences of the National Park System Advisory Board's 2001 report, *Rethinking the National Parks for the 21st Century,* said it well: "By caring for the parks and conveying the park ethic, we care for ourselves and act on behalf of the future. The larger purpose of this mission is to build a citizenry that is committed to conserving its heritage

and its home on earth." For "conveying the park ethic," read "promote."

The act enumerates what we are to conserve "the natural and historic objects and the wild life therein." This listing directs the Park Service to conserve *everything*, from bacteria to biomes, from middens to mansions. Parks are placed at the center of a set of concentric circles that form the conservation estate that Congress has created over time. Winks uses the term "higher standard" to place the parks in a geometry that has come to include many other forms of conservation and preservation, e.g., national forest acts, historic preservation, wild and scenic rivers, heritage areas, national trails, wilderness, federal land policy and management, and endangered species. While these acts encompass more than conservation, each of them provide for and permit some measure of protection. Taken together, they direct a multitude of approaches to save valuable parts of the nation. National park units are the "anchor store" of this construction.

The word "therein" is worth consideration. The duty to conserve applies even if there is an abundance of similar resources outside the parks.

Two forms of enjoyment are recognized in the act. The first, by implication, applies to us, the present generation. The second protects the enjoyment of future generations, explicitly directing us to manage so that future enjoyment is ensured. They must receive things "unimpaired." The "unimpaired" standard is a *duty* of the present generation to those who are the future. It's about an obligation to our children and grandchildren.

It's important to distinguish the application of the impairment standard from the duty to conserve. The 2006 *Management Policies* got it right: "This mandate is independent of the separate prohibition on impairment and applies all the time with respect to all park resources and values, even when there is no risk that any park resources or values may be impaired. NPS managers must always seek ways to avoid, or to minimize to the greatest extent practicable, adverse impacts on park resources and values."

Recognizing that this higher standard applies to all resources, all the time, inside of parks, it is the impairment standard that must give us pause. The hearings on the proposed re-write of the 2001 *Management Policies* stimulated much discussion about "balance" in park decision-making. Experienced park managers know that virtually all of their actions involve trade-offs, or "acceptable impacts" in the 2006 document. Balance does not apply in the case of impairment. Actions that impair are prohibited.

There is no "fundamental contradiction" in the Organic Act if one can define impairment. The complexity arises because one person's "impairment" is another's "acceptable impact." Nevertheless, the plain language of the statute provides some guidance.

There is a time factor—a generation—and so any action in a park that removes a particular resource that will not recover in twenty-five years or so, should give us pause. In the original draft of the 1988 edition of the *Management Policies,* officials in Interior put forth language that I characterized as "the broken leg theory of impairment": that is, if a resource would heal at some point in time, even though that point in time is left unspecified, then it wasn't impairment. The public comment on the draft soundly rejected that approach and

the final text was made consistent with earlier (and subsequent) policies.

Actions that remove *all* of any resource within a park raise the impairment question.

In addition to the text of the act, there is guidance in decisions that have caused courts to rule on the question. In the case *SUWA vs. Dabney* involving Canyonlands National Park, a district court ruled that an NPS decision to leave the only perennial stream in the park open to off-road motorized vehicles was inconsistent with the Organic Act. At Glacier National Park, a decision to remove old-growth trees to enlarge a parking lot was questioned by a court. There has been litigation on the conflict between nesting shore birds and off-road vehicles. If the accommodation of the vehicles results in the extirpation of the birds in the park, it is impairment.

There are also non-judicial examples. The removal of the development at Giant Forest in Sequoia National Park can be characterized as the avoidance of impairment. There the maintenance of an 80-year-old development was threatening the roots of 3,000-year-old trees. A decision on the collection of eaglets at Wupatki National Monument for Native American religious purposes has not been required because there have been no eaglets fledged there. If a decision has to be made in the future, there should be careful consideration of the impairment standard.

These examples do not provide a "bright line" to recognize impairment, but they do illustrate the kinds of decisions that should cause managers to think and analyze "impairment" as opposed to "balance."

The Organic Act is frequently cited as the mission of the National Park Service. The statement is incorrect because it is incomplete. Congress has given the National Park Service other duties, many of them outside the boundaries of the national park system. As many of the forces now threatening impairment come from outside the parks, these cooperative programs provide an opportunity for the agency to influence others to make decisions in favor of the parks. Collectively, the park and cooperative programs need to be seen as a single mission that can, in part, achieve the purposes of the Organic Act. But that's another discussion.

Denis P. Galvin retired from the National Park Service in 2001 after a 38-year career in which he served as park engineer, manager of the Denver Service Center, associate director, and deputy director.

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Do you have a comment on the ideas presented in this essay? Ideas of your own to share? Whether it be criticism, praise, or something in between, we want to hear your thoughts on the National Park Service, its centennial, and the future of America's national park system. Write us at nps2016@georgewright.org and we'll post your comments on our Centennial webpage (www.georgewright.org/nps2016.html) and include a selection in the next issue of *The George Wright Forum.*

Centennial Essay Feedback

a selection of comments received in response to recent Centennial Essays

Comments on Dwight T. Pitcaithley's "On the Brink of Greatness: National Parks and the Next Century" (volume 24, no. 2, summer 2007; on-line at www.georgewright.org/243pitcaithley.pdf):

I am disappointed that it appears that the Park Service is going to do nothing to rethink its mission, readjust its values, reexamine its governance, and review the current one-year funding cycle. Instead, the centennial is devolving into a giant grab bag of projects and programs, presumably to be funded by some kind of partnership between cooperators and as-of-yet unappropriated federal dollars. What a golden opportunity for the NPS to spend the next 9 years trying to reenergize itself for its second century of service to the American people. And, it doesn't look like the Service will seize the opportunity.

— Rick Smith

I wish to commend GWS to starting this Centennial Essay Series and taking the leadership role of creating thoughtful essays on the future of the parks. I think Dwight's lead-off essay could not have been better chosen to set the tone and the foundation for future essays. The Coalition of National Park Service Retirees has, for several years, formally called for just such an insightful and deep look into the future of our second century of parks. Dwight's essay was dead on target echoing many of the challenges CNPSR has also identified. If enough thoughtful and respected professionals and organizations can come together around a central thought it is entirely possible to create the synergy for a momentum of change to take place to re-form the landscape of park management for a second century.

— Rob Arnberger

Congratulations on drawing attention to the shameful underfunding and overpoliticization of the NPS with this hard-hitting article. It marshals all the facts and figures, the reports, studies and assessments, and draws conclusions that are unassailable. But some issues hardly seem to need debate. A fully-funded Park Service, regularly supplied with enough money to conserve resources, educate visitors, conduct research, and actually maintain structures and roads: should this even be a topic of discussion? Yes, it appears, if we want to see it happen. Taking the agency out of Interior and making it independent is a bold proposal, but makes excellent sense. The article provides persuasive precedents for this and the related idea of appointing the director for a 15-year term. I doubt that we as a

nation are even capable of thinking in 15-year cycles any more, but certainly something must be done to change the revolving door of Park Service leadership. The article properly emphasizes the role of the national parks in our democracy. Visitors to the parks approach them with a unique mixture of reverence, pride, and an openness for learning. So I remember, at any rate, from my days as a seasonal ranger at Mesa Verde in the 1970s. I felt honored in those days to be the person to whom park visitors directed their questions. They never seemed to doubt that the ranger would have the answers. Their faith that the Park Service knew what it was doing, and did it well, was apparent. We must make sure that faith continues, and is justified. Thank you for starting the conversation.

— Jane Scott

What a coup! I've been a park employee since 2003 and throughout this time I've learned to take a deep breath each time before reading anything on the Inside NPS web page. In my experience, Inside NPS functions primarily as a one-way rhetorical mouthpiece for the present administration's agenda to privatize our National Parks. What a pleasure to find the essay "On the Brink of Greatness: National Parks and the Next Century" referenced on Inside NPS. Your five "recommendations" reclaim the promise and unique character of the national park system and are diametrically opposed to the generic, amusement-park vision of the current administration. As a person who works for a park interpreting the Constitution, questioning decisions of the executive branch, and freedom of speech, your essay on and vision for the national parks offer the first rays of hope for the parks in a future darkened by an administration mandate to commercialize the parks. Keep up the fantastic work.

— K. Alden Peterson

You can read the full text of these and other comments on the NPS Centennial Essay webpage: www.georgewright.org/nps2016.html.

Accommodating Controversial Expressions of First Amendment Rights in National Parks: One Superintendent's Experience

John Howard

Ed. note: this paper is based on a talk the author gave at the 2007 GWS Conference.

ANTIETAM NATIONAL BATTLEFIELD IS A FEDERAL AREA located in Washington County, Maryland, about 70 miles northwest of Washington, D.C. The area is rural in nature, but due to a recent building boom there has been some development of farmland and open space into housing developments. The Battle of Antietam (or Sharpsburg) occurred on September 17, 1862, and was the largest battle of the first Confederate invasion of the Union. About 125,000 troops (88,000 Union, 37,000 Confederate) participated in the battle, which lasted 12 hours. At the end of the battle, over 23,000 troops were killed or wounded—the bloodiest one-day battle in American history. This was also the battle that allowed President Lincoln to issue the Emancipation Proclamation, which freed slaves held in rebellious states.

Antietam is a beautiful place, made up of rolling farm fields, woodlots, orchards, and, of course, Antietam Creek. It teems with wildlife, including white-tailed deer, turkey, fox, eagles, hawks, and the ever-present groundhog. Spring wildflowers bloom across meadows and fields, and this bucolic setting belies the carnage which took place here 145 years ago. It is considered to be, along with Shiloh, one of the best, most well-preserved battlefields in the world. By many it is considered sacred ground, and treated with great reverence by those who visit. It is a unique place which maintains its cultural and historic associations and allows nature to flourish as a part of the historic landscape.

I have served as the superintendent of Antietam for 12 years. During that time we have restored historic landscapes and buildings, and reconfigured farm fields to their 1862 appearance in compliance with our general management plan. Annual visitation at the national battlefield has grown from 121,000 in 1984 to 303,000 in 2006. Our permanent staff consists of 41 full-time employees, and during my tenure we have increased the size of our resource management staff from 3 to 9 permanent employees, of both natural and cultural disciplines. During this same 12-year period, we have issued over 635 special use permits, and 2 First Amendment permits. I am here today to speak to you about one of these First Amendment permits.

In March of 2006 I was approached by the then-Grand Wizard of the World Knights of the Ku Klux Klan to request that his group be allowed to conduct a demonstration at Antietam later in the year. The

Grand Wizard was familiar with his rights, and that previous demonstrations such as the one he was requesting had been held recently at Yorktown Battlefield and at Valley Forge. He was polite, listened well, and was well spoken. I explained to him the process of application and provided him with a copy of the appropriate form. He thanked me and left.

In previous duty assignments I had been exposed to demonstrations by groups such as the KKK and the National Socialists (Nazis), but somehow I had deluded myself into believing that it would never happen at Antietam. Today, I cannot tell you why I felt that way; I just did.

My discussion with the Grand Wizard had been polite, and he was appreciative of the assistance and explanations I provided. He left my office a happy "client."

I picked up the phone and called my chief ranger, who manages our public use and permit program, and arranged a meeting with him. I called my regional director and left a message that I needed to speak to him as soon as possible. I then printed out from my computer a copy of the U.S. Constitution and its amendments. During the next several months prior to the demonstration, and for months after, this was the first document I saw when I opened my incident binder to work on what became known as the June 10 Permit.

It served as a great reminder as to why I was doing what I was doing, and why I was putting my staff through this. Also I printed a copy of the same document for all my division chiefs and law enforcement officers.

Immediate contact was made with the Department of the Interior Office of the Solicitor and the United States Park Police. The contacts were most beneficial: they both deal with such demonstrations on a daily basis in Washington D.C., and soon became my subject-matter experts. My staff also began to contact parks where such events had recently occurred (Colonial and Valley Forge national historical parks) to obtain what information we could on how they managed the event. Both of these sites, along with the Northeast Regional Office, were more than helpful and offered all information and guidance that they thought would assist us.

Perhaps you have noticed that, at this point, I had not made the immediate response of "no"—that this event would not take place. From grade-school, high-school, and college-level civics and government classes, I realized the impact of the First Amendment. And after meeting and discussing the permit process with our solicitor, I realized that not only the Constitution required it, but the Supreme Court expected it. Realizing we had no choice in issuing the permit, we began the process of determining how we could best manage the event to protect our visitors and the resource. It was a long, time-consuming process for a park that had no previous experience in such matters. We relied greatly on what other parks had done before, and what guidance and expertise were brought to the table by the solicitor and U.S. Park Police.

This may sound odd, but one of the first things I did was begin an educational process with the entire staff concerning the U.S. Constitution and the First Amendment. This consisted of all-employee meetings, divisional-level meetings, and weekly meetings with my division chiefs and senior staff. If they did not understand why we were doing what we were doing, there is no way we could explain it to the public.

Ah, the public.... One of the most dis-

heartening things I found was the lack of knowledge that exists about the Constitution and the First Amendment. Through e-mail and letters, I was called everything but home to dinner. Many offered prayers for me and my family, while other offered places to have my white sheet cleaned, because they were sure I was part of this demonstration.

Some of the messages that most concerned me were from those who represented themselves as civics, history, or government teachers from middle school through the college level. These folks were sure that if I were a "sharp" government employee I could find a way around this and deny the permit. Over 900 e-mails commenting on the issue were received; of them, only 3 were in support of my actions. (An interesting fact was that the vast majority of comments were made by e-mail: we received only 81 phone calls and 2 paper letters.)

My job, along with my staff, was to find a place where this event could occur and have limited impact on our visitors and resources. In this, we were lucky that our compendium of closures had been revised only months before to identify areas off-limits to demonstrations and other activities regulated under special use permits that would impact resources (whether historic, archeological, and natural) and visitors. The development of this updated compendium was a joint effort, with critical input from all park divisions: natural and cultural resources, facility management, and interpretation.

Having this accurate resource information is essential in managing events such as these to provide the utmost protection for both resources and visitors. I cannot emphasize this enough: the total involvement of all park divisions is needed to get the point across that the compendium of closures is not just a law enforcement tool, it is a valuable resource management and protection tool.

In his permit application, the Grand Wizard of the Klan had stated that his group was in fear for their safety from counter-demonstrators. As a result of this statement, and because of the previous work done on the compendium, on-site resource and visitor safety assessments, and daily operational schedules, a record of decision was developed. In concert with the Department of the Interior Solicitor's Office and the U.S. Park Police, it was decided that, for reasons of safety and protection of the resource, a small portion of the battlefield would be closed to traffic and have controlled access for those wishing to participate in or view the demonstrations. The area closed to traffic would far less than 1% of the park (5 out of 3,288 acres).

Several options were available and were presented to the Grand Wizard; the location he chose was the Mumma Farm grounds. The Mumma Farm is a 91-acre tract of land that contains farm fields, woodlots, and a combination of contributing and non-contributing buildings. In 1999, the house and barn went through a restoration process and are now being used as the center point of our education program. They are located on a part of the battlefield tour route known as Mumma Lane, approximately 0.3 miles from the visitor center. Use was allowed of the outside area near the barn and house, made up of an area of managed grass, a gravel road, and a small corner of a corn field.

Counter-demonstrations were placed across the tour route, at a safe distance, in another corner of a corn field. For the period of the demonstration, Mumma Lane was

closed to traffic, and anyone who came to the demonstrations had to pass through two police checkpoints and a metal detector. To limit access to weapons or things that could be used as weapons, restrictions were placed on the KKK and counter-demonstrations as to what could be brought into the site. These restrictions included but were not limited to the type/size of wood used to support placards, signs, or banners.

On the day of the demonstration, other park operations went on as scheduled. That weekend was a special interpretive weekend—Artillery Weekend—a living history program. In addition, a walk-a-thon was completed early that morning for a local nonprofit. Over 9,000 attended Artillery Weekend on Saturday and some 450 participated in the walk-a-thon. Also, a special interpretive display was placed in the lobby of the visitor center on the U.S. Constitution and the First Amendment as it deals with free speech.

Prior to the June 10 event, I wrote an editorial piece for our local newspaper, and made myself available for all types of media—from local TV and newspapers to international media. Over 90 interviews were conducted and I did them all. Do I like being on TV that much? No! But as I said, we are a small park, I serve as the public information officer, and my staff was busy doing other work. Besides that, I was the face of the park and the person who made the decision to let this occur.

Numerous meetings were held with federal, state, and local law enforcement and emergency service agencies. In addition, meetings were held with representatives from the Department of Justice and the local U.S. Attorney's office. Incident plans were developed, reviewed, and approved. And on the morning of June 10th, 232 national park rangers, U.S. Park Police officers, and Maryland state troopers held their final briefing. Weather-wise it was a nice day, with warm temperatures in the 60s and a little windy.

Metal detectors were put in place, and, working with the Park Police tactical units, my cultural resource and maintenance staffers were able to figure out that we could mount the detectors on plywood sheets and not have to excavate to level the locations, thereby protecting archeological resources. This may be a little thing, but it's important.

The demonstration areas had been located in places that are managed either as mowed lawns or farm fields. These sites were identified using raised bike racks and police tape. Sound checks were made of speaker systems to ensure they would not affect the interpretive programs being offered near the visitor center. The demonstrators were briefed that during their demonstrations there would be one cycle of cannon fire from our Artillery Weekend demonstrations.

The groups involved were the World Knights of the Ku Klux Klan, who brought along members of the National Socialist Party, or Nazis, for support. These two groups were dressed in the familiar white sheets and hoods, Nazi storm troopers' uniforms, business suits, t-shirts, and jeans.

The counter-demonstrators included members of the Southern Washington County Council of Churches, Women for Peace, 37th Texas Confederate Living History Group, NAACP (National Association for the Advancement of Colored People), and FredPak, an "organized group of anarchists"—kind of an oxymoron there. They were dressed in everything from Confederate Civil War uniforms to one guy who was dressed like a pirate. The Southern Wash-

ington County Council of Churches also held a counter-demonstration about five miles from the battlefield to celebrate the unity of the people against hate.

On the battlefield, a total of about 40 Klansmen and Nazis attended, and approximately 35 counter-demonstrators participated. The permit lasted from 12 noon to 5 p.m. There were no arrests or incidents on the battlefield, although a few of the Nazis got into a fight with a few of the KKK at a local grocery store—go figure.

The total cost to NPS for this event $128,987. According to our Solicitor's Office, the Supreme Court has said we cannot charge for First Amendment permits. So no costs were recovered, not even the application fee. The incident was funded out of a WASO [NPS Washington Office] emergency law-and-order account, and there has been considerable discussion about whether the cost is too much. What I know is this: during the event, tensions were quite high—lots of shouting and screaming, lots of hate. If one visitor had been hurt or a historic structure or resource damaged, the cost would have been much, much more.

I was present during the entire demonstration, along with the regional solicitor and representatives from the Justice Department. It was not a pleasant experience; the words used and ideas presented were offensive, as was, in some cases, the reaction of the counter-demonstrators. It was a difficult day emotionally for the law enforcement officers involved, along with the facility management staff who provided support. Our interpretive division bore the brunt of the visitor questions as to "Why would you allow this to happen?" When it was over, I happily can share with you that we experienced no visitor injuries or resource impact—except some temporary damage to our image. But this too shall pass.

We could not have succeeded with the safe and effective management of this incident without the help and cooperation of Colonial National Historical Park and Valley Forge National Historical Park. The staff of these parks provided us with an overwhelming amount of information on what worked and what did not. In turn we passed along our plan and more information to Gettysburg National Military Park and Harpers Ferry National Historical Park, where additional demonstrations were held later in the summer. In this case, the "seamless" network of parks worked very well.

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Issues in Australian Protected Area Management

Graeme L. Worboys and Michael Lockwood

Background

THE NATIONAL RESERVE SYSTEM OF AUSTRALIA is one of the great land- and sea-use successes of this country. It is an inspiring story of dedicated and visionary individuals, community leaders, conservation organizations, bureaucrats, and outstanding politicians who, from the reservation of Australia's first national park, the Royal National Park near Sydney 128 years ago, have helped establish more than 7,700 protected areas up to 2007. As a concept, protected areas have stood the test of time despite diverse and pervasive human pressures from surrounding lands and seas. Australia has invested in the active care and management of these lands to achieve this outcome. The Royal, for example, originally established in bushland adjacent to early Sydney settlements, is now surrounded by suburbs. Thanks to sustained management, its coastal scenery, heathlands, rainforests, beaches, headlands, and native animals continue to provide enjoyment and inspiration, regional economic benefits, and protection of these natural systems for their own sake.

In the 1960s, grand parks such as Lamington, Wilson's Promontory, Kosciuszko, Cradle Mountain, Belair, Katherine Gorge (now Nitmiluk), and Rottnest Island were prominent, but there were relatively few others. Most of Australia's protected areas were established after the 1970s. Driven by community-based pro-conservation campaigns, and in some cases guided by land-use planning processes such as those adopted by Land Conservation Council in the state of Victoria, many protected areas have been established Australia-wide. From their beginnings as an obscure land and sea use, protected areas of various kinds have risen to become a major feature on the Australian landscape.

Protected area management is thus in the direct eye of the community. By the 1980s, every state and territory had established a professional protected management organization, but park staff often needed to play catch-up in dealing with a formidable array of threats, such as weeds, pest animals, inappropriate fire regimes, pollution, and illegal hunting, fishing, and taking of water and timber. This protection work and clean-up still continues in 2007, and many areas will require major investments for the long term. A lack of resources, inadequate knowledge and suboptimal systems are also hampering the achievement of effective management outcomes. Working with communities and building capacity through partnerships, participatory planning, and sharing successes, such as species conserved and tourism destinations opened, has been a wise investment. The system as a whole, as well as the professionalism and diligence of park staff, are generally valued and respected by the community. For example, a survey of Tasmanians showed that 70% agree that Tasmania has about the right amount of reserve area, while 27%

think that more areas need to be protected; 45% place "very high," and 33% "fairly high," value on Tasmania's protected areas; 80% were satisfied with the performance of Tasmania's Parks and Wildlife Service; and 98% think that having the parks and wildlife system in Tasmania is a valuable part of the Tasmanian community (Roy Morgan Research 2005).

The community has also expressed concern about the environment. A targeted 2007 Galaxy Research poll revealed that 95% of voters were concerned about climate change impacts on wildlife and natural areas (WWF Australia 2007). Commissioned by the national affiliate of the World Wide Fund for Nature for some marginal electorates in Australia, the survey also identified that voters were willing to invest higher-than-recommended funds in new protected areas to protect wildlife and natural areas (WWF Australia 2007). This conclusion is reinforced by a 2006 community survey which found that 88% of Australians believe that if we don't act now we will never control our environmental problems (Roy Morgan Research 2006). In a global context of significant climate change effects by 2100, a projected 9.3 billion people on Earth by 2050, and post-peak oil impacts by 2020, these concerns are very real.

Protected area managers need to be responsive to community issues and concerns. They need to build on the good work of those who have helped establish protected areas and the professional way in which they are managed. We have identified three key issues as being of particular significance as we move forward into the 21st century: (1) establishing an effective reserve system, (2) sustaining community support, and (3) targeting the effective management of protected areas.

Achieving an effective reserve system

Australia's national reserve system is unfinished, and there are two imperatives to complete this action. The first is an obligation to Australia's current and future generations that there are sufficient Royal National Park equivalents extant for the long term to help maintain a sample of natural Australia. A benefit of such action is the biodiversity and other heritage that is conserved, as well as the ecosystem services that are sustained. However, the rate of habitat change is very great in many locations, and this action is urgent. The second imperative is to be a responsible party to an international effort by the secretariat of the Convention on Biological Diversity for each nation to achieve a comprehensive and representative terrestrial reserve system by 2010. For marine environments, a similar international target has been established for 2012.

An effective national reserve system must embrace not only those reserves managed by government protected area organizations: indigenous, private, and areas managed by nongovernmental organizations are increasingly important. Securing and supporting such areas and their different governance modes are vital. The percentage of area reserved for each bioregion across all governance types is one method for determining the adequacy of the national reserve system. Other crucial factors are achieving an adequate balance between IUCN categories I–IV and categories V–VI, the strategic nature of some lands and seas (such as refugia and connectivity areas), and the biodiversity conservation quality of reserved terrestrial and marine environments.

Reinforcing the current system is another element of an effective national reserve system. Many existing protected areas

are surrounded by lands and seas that will never be part of the reserve system. A land management ethic guided by stewardship must be fostered by governments and the community. There is no longer any need or justification for the historic and perverse incentives that helped destroy or modify much of Australia's native habitats, particularly when these are increasingly valuable as water catchments and are vital to help buffer the forecasted impacts of climate change. Strategic investments such as the Alps to Atherton (A2A) connectivity conservation initiative are providing leadership for such work. Such initiatives are addressing the "adequacy" part of a comprehensive, adequate, and representative national reserve system. They require protected area managers to think and act at landscape and seascape scales. They demand that protected area managers work in partnership with local and regional communities. They are part of a new future for protected areas.

Sustaining community support for protected areas

Maintaining community support for the long term is critical to the future of protected areas. Building broader support, including from "non-traditional" constituencies in both rural and urban communities, is essential for "mainstreaming" protected areas and securing a higher level of political commitment. Key to this is a wider promulgation of the diverse economic, social, and environmental benefits that protected areas supply. The historical formula of being relevant, supportive, and responsive to community concerns is also important. New challenges and opportunities continue to emerge. Climate change is of course currently at the top of the agenda, and is likely to remain so. In this arena, as with other issues, protected areas need to be seen to be part of the solution, not part of a perceived problem. Some examples illustrate the point.

- For southern and eastern Australia, including Tasmania, fires are forecast to be more frequent and more intense. Working with communities to help mitigate the risks is imperative. This includes dealing with planning and zoning issues, such as amenity migration to bushland environments adjacent to reserves.
- With increased drying, water supply catchments become even more valuable, and the special efforts being taken to maintain the natural integrity of catchments by protected area organizations need to be known and widely supported.
- With tourism destinations such as the Great Barrier Reef and Snowy Mountains affected by climate change, alternative arrangements will need to be considered and introduced to assist the industry.

Such initiatives will mean new partnerships. Unexpected issues will also need to be dealt with, such as sudden changes in pest animal populations and increases in extreme weather events. Building an enhanced adaptive planning and management capacity, in partnership with governments, communities, and civil society institutions, is critical to ensure an effective response to such contingencies.

Targeting effective management of protected areas

Lack of funding for protected area management is the single greatest factor impacting effective Australian protected

area management in the 21st century. At an average investment of AUD$7.69 per hectare of protected area, Australia is spending only about 50% of the estimated AUD$14.20 per hectare that has been identified as the necessary investment for a country ranking highly in the United Nations Human Development Index (James et al. 1999; Worboys 2007). Adequate resourcing would positively transform pest animal, fire management, and weed control programs, and could secure improved resilience against threats to water supply catchments in the face of climate change. It would also underpin investment in tourism through upgraded maintenance of vehicle access, walking tracks, waste removal, and other visitor services. This would come at a time when Australian domestic tourism will become more important thanks to very high post-peak oil aviation fuel prices.

While enhanced government investment will be crucial—indeed, every effort must be made to ensure that governments place sufficient priority in meeting their public-good obligations related to protected areas—sustainable financing of an effective national reserve systems will also require more concerted efforts to broaden the funding base. Protected area managers need to get better at recovering the costs of service provision to particular user groups such as tourists, as well as more effectively accessing private-sector and philanthropic willingness to pay to secure nature conservation outcomes.

Improved funding will help investment in the critical research needed to support adaptive management, and therefore effectively managed parks. Additional finances for parks would increase investments made in regional (local) communities and boost local economies through employment and the purchase of local goods and services. Economic activity generated by protected areas can be a new source of long-term prosperity for areas affected by the declining profitability of agriculture.

A Master's degree in Protected Area Administration (MPAA) is needed by protected area professionals in senior managerial and executive positions. We envisage a time when such a qualification will have a similar stature to a Master's of Business Administration. Its curriculum would be driven by the need for capable professionals who can respond to the complexity, size, and sophistication of running the business of protected area management. This is big business, and we are long past the stage where base-level bachelor degrees are adequate. Protected area executives and senior managers must have content knowledge and experience—as well as the leadership, governance, business, and political skills—to be effective in what is a highly contested and competitive environment. Specialist training is an obvious path to this end.

Knowledge is critical for protected area management. Science, both natural and social, provides an essential base for decision-making. More than ever, knowledge-based decisions in support of new government initiatives, resourcing protected areas, and forecasting risks are needed. With climate change, an understanding of the variation in values from a known baseline is critical information, as is the nature of threats. New science–management partnerships with research organizations will be needed to generate the new knowledge to manage protected areas in the 21st century.

State of the parks reporting is emergent in Australia. This is a significant step, reflecting both the theoretical underpinning of protected area management (such as the

IUCN Management Effectiveness Evaluation Framework) and a degree of sophistication in planning, organizing, and reporting on management achievements by organizations. More of this work is needed, and a goal to create a state of the parks report for Australia is a minimum position. Achieving such a report provides a transparent statement about the condition and threats to our parks nationally, and provides a service to the community, for such information will also track what is happening to our country from threats such as climate change. Importantly, such reports are supporting evidence-based arguments to government treasury departments for increased funding. An Australian state of the parks reporting system will demand collaboration between organizations to establish data collection frameworks and protocols, determine ongoing monitoring regimes, and pursue new research into the core evaluation subjects required for protected areas assessments (Worboys 2007). Effective state of the parks reporting capacity will also require improved information management systems, new partnerships with research organizations, and new staff competencies to design and implement adaptive management regimes. Reporting must become a springboard for learning and improved management effectiveness. Systems that inspire a national state of the parks capacity will also facilitate cooperative management initiatives, such as A2A and the Australian Alps Memorandum of Understanding.

Conclusion

Australian protected area management in this century needs to focus on achieving an effective national reserve system. Managers need to work with the community by participating in a range of partnership and governance initiatives designed to deepen and broaden the support base and management capability for protected areas. A range of measures are needed to secure effective management, including establishing sufficient and sustainable finance, enhancing training for senior managers and policy-makers, and implementing new levels of national accountability and learning.

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Role of Managed Forestlands and Models for Sustainable Forest Management: Perspectives from North America

William S. Keeton

Introduction

FOR DECADES THE BEST WAY TO SUSTAIN FOREST ECOSYSTEMS, while also providing a broad range of ecosystem goods and services, has been the subject of debate. Conservationists favored the establishment of comprehensive protected area networks, arguing that this carried the least risk to species survival (Noss and Scott 1997). Other constituencies preferred active silvicultural management. Under this approach, sustained production of harvestable resources was the primary objective, with ecological objectives derived as a by-product of scientifically informed planning (Oliver 1992). More recently, ecosystem management models (see Yaffee 2002) bridged this ideological divide, viewing protected areas and actively managed forestlands as complementary approaches if coordinated at landscape or regional scales (Keeton and Aplet 1997; Poiani et al. 2000). Not every ecosystem good or service (ecological or commercial) can be provided on every hectare; this requires a mosaic of differently managed forest stands or patches. But the relative mix of protected areas versus managed forestlands necessary to achieve broad sustainability objectives remains contentious in many regions of the world. Arriving at a desirable mix will always involve trade-offs between different economic and ecological objectives, values, and interests.

How much of the landscape can be realistically and justifiably allocated to protected areas? And perhaps even more importantly, on the remaining actively managed landscape, what forest management practices should be employed and how can these be encouraged? Answers to these questions must be adaptive to evolving models of sustainable ecosystem management as well as geopolitical context and local community involvement. In this paper I discuss several evolving models intended to guide sustainable forestry on managed forestlands, with the assumption that these would be used in conjunction with protected areas. Examples and case studies from the United States and Canada are presented. These showcase several innovative ideas in sustainable forest management, with the explicit recognition that there is no universal "one size fits all" solution. However, recent developments in North America may provide a perspective relevant to efforts elsewhere in the world.

The role of sustainably managed forestlands in an uncertain future

If 19th- and 20th-century conservation models were concerned primarily with the establishment of protected areas, such as

national parks, wilderness areas, and biological reserves, what will conservation look like over the 21st century? Reserves will always be a critical element of sustainable ecosystem management (Noss and Scott 1997; Lindenmayer and Franklin 2002). But ecologically based stewardship of managed forestlands will assume a much greater role than it has in the past. The world's human population, currently 6.7 billion, is predicted to reach 9.2 billion by 2050 (UNPD 2007). Global demand for forest products, currently about 1.6 billion cubic meters per year, has been relatively constant over the last two decades, due to non-wood substitutes, recycling, and more efficient processing of raw wood. Demand is projected to increase moderately (e.g., 5–10%) over the next decade, due in large part to explosive economic growth and increased wood importation in China (White et al. 2006).

With these trends and increasing rates of per capita consumption, forested landscapes will face increasing pressures over the coming century. Sprawl and exurban development are now viewed as one of the greatest threats facing forest ecosystem integrity in the U.S. (Theobald 2005). In the 1990s, more than 80% of housing development was in rural areas (Heimlich and Anderson 2001); each year the U.S. loses almost 500,000 ha of forestland to the "direct footprint" of development and other land conversions, and there is a much larger "indirect footprint" that includes fragmentation effects (USFS 2004). These changes will be superimposed on the effects of other anthropogenic stressors, such as atmospheric pollution, spread of exotic species, and global climate change. Some effects likely will be experienced unevenly throughout the world, such as changes in forest productivity (Aber et al. 2001) and natural disturbance regimes (Keeton, Franklin, and Mote 2007) associated with global climate change. In this context—with human-caused stress in forest ecosystems felt ever more broadly and intensively—relying on protected areas alone to safeguard forest ecosystems will no longer be realistic or scientifically defensible, especially if these become islands in otherwise compromised landscapes. Careful, adaptive, scientifically based management of the unprotected landscape (i.e., those areas outside of core ecological reserves) will be essential to sustain forest ecosystems.

There are several reasons why this is likely. Perhaps foremost among these is the fact that managed forestlands will continue to comprise the majority of the forested landscape. About 11.5 to 12.5% of the world's major forest types are currently protected in formally established protected areas following international guidelines, such as IUCN's six-category classification system. And this number is not likely to surpass 15% for the foreseeable future. Moreover, only about 8% of forests worldwide are included in strictly protected areas (IUCN category I), and this number varies considerably region to region. For instance, only 1.7% of the forested area across 26 European countries is strictly protected (Parviainen et al. 2000). Consequently, the vast majority of terrestrial biodiversity will continue to depend, either in part or in full, on habitat provided by lands outside of core protected areas (Lindenmayer and Franklin 2002). We cannot count on core reserves alone to do the job. For example, the majority of species diversity in the U.S. is not sufficiently represented within existing federal protected areas to ensure long-term population viability (Grumbine 1990; Scott et al. 2001).

Current conservation goals advocated by international organizations (e.g., IUCN–The World Conservation Union, WWF–The World Wide Fund for Nature) may be inadequate to protect biodiversity. By one estimate, 50 % of tropical taxa are predicted to go extinct within several decades even with significant increases in tropical forest protection (Soulé and Sanjayan 1998). Half of the world's terrestrial species will remain at high risk of extinction even with 10–12% of every major ecosystem type protected (Soulé and Sanjayan 1998). Moreover, biodiversity is protected unevenly, with certain taxa and ecosystem types (e.g., low-elevation, biologically productive) left more susceptible to risk than others. For example, there is a consistent bias towards high elevations and the least productive soils found in protected area systems (Scott et al. 2001). Protection varies dramatically by forest type around the world. For example, whereas about 27% of broadleaf evergreen forests have some degree of protection (IUCN categories I–V), far less deciduous broadleaf (4%) or evergreen needleleaf (7%) forest is similarly protected (World Conservation Monitoring Centre 2007). IUCN category VI (managed resource protected areas) designations cover about 1–2% of the world's forests, but degree and type of protections varies considerably within this category.

Alternatives have been proposed to help address these problems. For instance, expanding protected area systems to include more comprehensive representation of ecosystem diversity is a frequently advocated approach (Noss and Scott 1997). This is the basic premise behind the U.S. Gap Analysis Program and similar efforts elsewhere; these have identified high-priority areas for inclusion within protected area systems. However, by one estimate core reserves would need to cover 30–75% of most geographic regions to encompass adequate representation of all ecosystem types (Solomon et al. 2004). Expanding protected area networks to this level is unlikely in many regions of the world. Thus, survival for many if not most species will continue to depend on unprotected landscapes.

Another alternative is to focus new protected areas establishment on so-called "hotspots of biological diversity," which are areas of exceptionally high species richness and endemism. Protecting hotspots is efficient in terms of biodiversity return per unit area protected because one-third of terrestrial plant and animal species are confined to less than 2% of the Earth's surface. Some 25 hotspots have been identified globally, representing 1.4% of the Earth's land surface (Myers et al. 2000). These areas alone contain 35% of vertebrate species within four major groups and 44% of the world's vascular plant species. Yet most hotspots currently have no formal protection.

Despite opportunities for improving protected areas' coverage, managed forestlands will continue to comprise the largest proportion of terrestrial biodiversity. Consider that forestlands today account for only 30% (or 3.9 billion ha) of the world's land area, yet they harbor close to 90% of known terrestrial species. Moreover, it is these lands that will sequester the majority of forest carbon (46% of carbon in the terrestrial biosphere is sequestered in forests), produce clean water, and provide the lion's share of the forest ecosystem services upon which life and humanity depend in many regions of the world. The challenge lies in developing sustainable forest management approaches that balance economic and ecological objectives on the unprotected (or

less fully protected) forest lands. In their 1997 book *Creating a Forestry for the 21st Century*, Kohm and Franklin described this problem as follows: "If 20th century forestry was about managing individual forest stands, simplifying stand structure, and providing timber, 21st century forestry will be defined by understanding and managing complexity, providing a wide range of ecological goods and services, and managing across broad landscapes."

In North America, past management approaches have not been adequate to sustain a full array of biodiversity and ecosystem functions (Committee of Scientists 1999). New approaches are needed, although it is important to recognize that management history, such as harvesting intensity, extent of scientifically based planning, and adequacy of biodiversity conservation, has been highly variable. It has varied dramatically depending on ownership, region, silvicultural systems employed, degree of conflict over ecological versus economic outputs, and other factors. For instance, past approaches on the federally owned national forest system in the United States were generally output driven, focusing on achieving a desired harvest level, intensity of recreational use, etc. (Yaffee 1994). Ecologically sustainable approaches, by contrast, would begin with an assessment of the capacity of the ecosystem to sustain a variety of uses over time within biological and ecological constraints. Only once sufficient attention is given to providing habitat for native organisms would it be possible to determine an acceptable level of timber harvest. In the late 1990s a committee of leading forest scientists and economists, charged with developing recommendations for sustainable forestry on federal lands, determined that a fundamental reversal in forest management was necessary, described as follows:

> Sustainability … has three aspects: ecological, economic, and social.… [T]he sustainability of ecological systems is a necessary prerequisite for strong productive economies, enduring human communities, and the values people seek from wildlands. We compromise human welfare if we fail to sustain vital, functioning ecological systems. It is also true that strong economies and communities are often a prerequisite to societies possessing the will and patience needed to sustain ecological systems (Committee of Scientists 1999).

The committee's recommendation, while still not fully adopted on federal forestlands, represented a revolutionary way of thinking. No longer would the federal government mandate an output level for each national forest (e.g., harvestable timber volume) based on a maximum sustained yield model. Instead, forest management would start with an understanding of the capacity of an ecosystem to produce a full range goods and services—including biodiversity. Only then, and within these constraints, could output targets be established. At the same time, however, it was recognized that commitment to ecosystem protection was a choice not likely to be made by peoples and communities, particularly in impoverished regions of the world, struggling to meet the basic necessities of life. Thus, sustainable economic development must occur concurrently with development of the social and economic capital necessary for investments in ecosystem protection.

Matrix management

As the dominant element of the landscape, managed forestlands will have a controlling influence on ecological processes, such as biological connectivity and watershed functioning. They will also be the primary source for production of ecosystem goods and services upon which society depends. Because this "patch" or dominant landscape element surrounds and occupies the critical intervening areas between protected areas and intensively developed areas, such as cities, rural residential, and agricultural land, forest scientists now describe this middle ground as the "matrix." It can include both private and publicly owned lands, of any parcel size, so long as these are allocated primarily to natural resource management, conservation, or open space of some kind. Lindenmayer and Franklin (2002) identified five critical roles for the matrix:

- Supporting populations of species;
- Regulating the movement of organisms;
- Buffering sensitive areas;
- Maintaining the integrity of aquatic ecosystems; and
- Providing for the production of commodities and services.

In the U.S., Canada, and other countries (e.g., Australia), recognition of the importance of the matrix has given rise to a new approach called "matrix management" (Figure 1). In my view, this approach goes beyond the "buffer zone" management model employed, for example, by biosphere reserves and integrated conservation and development projects. Unlike more limited buffer zones, the matrix approach recognizes that sustainable forestry practices are necessary across much larger landscapes, drainage basins, complexes of land ownerships, and geopolitical boundaries. Matrix management incorporates many concepts from the field of conservation biology. For instance, Lindenmayer and Franklin (2002) identify "maintenance of suitable habitat at multiple spatial scales" as an "overarching" goal of matrix management, stressing the importance of providing well-distributed habitats, including both large core habitats and smaller habitat islands within more intensively managed areas. Habitat is seen as an "emergent" property of ecosystems, with certain attributes (e.g., large trees, downed logs) provided at fine scales (e.g., within stands) and other attributes (e.g., large, unfragmented patches) provided at coarser scales (e.g., multiple stands, landscapes, watersheds, bioregions). According to Lindenmayer and Franklin's framework, five principles must be followed in order to achieve the overall goal:

- Maintenance of stand structural complexity;
- Maintenance of connectivity;
- Maintenance of landscape heterogeneity;
- Maintenance of aquatic ecosystem integrity; and
- "Risk-spreading," or the application of multiple conservation strategies.

The first principle recognizes that intensive and industrial forestry practices usually simplify stand structure, resulting in lesser vertical complexity in the forest canopy, less horizontal variation in stand density, and lower densities of key habitat elements like large dead trees and downed logs (Swanson and Franklin 1992; Franklin et al. 1997). Thus, an alternative is to promote greater structural complexity (e.g., vertically differentiated canopies, higher

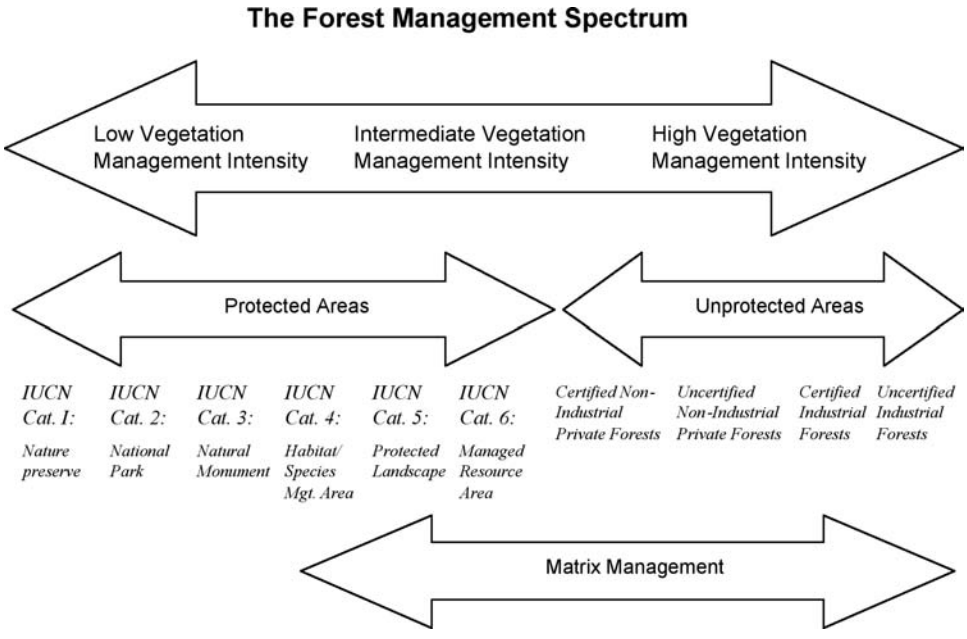

Figure 1. Forest management approaches arrayed along a spectrum defined by vegetation manipulation intensity. Matrix management principles are relevant to a wide range of forest management contexts, including both actively managed protected areas as well as forests managed primarily for timber. Matrix management's position space along the forest management spectrum is indicated at the bottom of the figure. Actual intensity of management on private, unprotected lands will vary considerably and not always be as shown (for illustrative purposes) here.

volumes of coarse woody debris) in actively managed stands (Hunter 1999; Keeton 2006), reflecting a broader diversity of stand development stages (as consistent with stand dynamics specific to individual forest types). This may benefit those organisms not well represented in simplified stands, as long as sufficient habitat is provided across multiple stands to support viable populations (McKenny et al. 2006).

Maintaining biological connectivity in managed forest systems is essential for the persistence of viable populations of organisms (FEMAT 1993). Thus, the second principle of matrix management involves strategies that allow organisms to disperse, migrate, access resources, and interact demographically, such as terrestrial and riparian corridors, retention of well-distributed habitat blocks and structures that provide "stepping stones" across harvested areas, and restoration of linkage habitats. Maintaining a diverse landscape (principle three) supports an array of ecological functions while also increasing ecosystem resilience to disturbance and stress (Perry and Amaranthus 1997).

Principle four relates to minimizing deleterious forest management effects on surface waters and watersheds. Scientists have documented important ecological interactions between riparian forests and aquatic ecosystems (Ward et al. 2002; Naiman et al. 2005; Keeton, Kraft, and Warren 2007). Thus, delineation of riparian buffers, riparian forest restoration, ecologi-

cally informed forest road management, and other best-management practices for watershed protection are essential elements of matrix management (Gregory et al. 1997; Stuart and Edwards 2006).

Finally, "risk-spreading" (principle five) deals directly with the scientific uncertainty associated with over-reliance on any one forest management approach. For instance, if we are uncertain how sensitive species will respond to silvicultural treatments, it would be prudent to employ reserves in conjunction with active management. If it is uncertain whether we can control the spread of exotic species or restore fire regimes using reserve-based approaches alone, then active manipulations may also be necessary. Actively managed reserves offer an intermediate option (Figure 1). In short, uncertainty and risk are reduced if we employ multiple management and conservation strategies, addressing different spatial scales and applied to different portions of the landscape (Lindenmayer and Franklin 2002).

Disturbance-based forestry

Matrix management principles are well grounded in the science, but will be challenging to implement when balancing competing objectives. Managers will face difficult questions, such as: How much is enough? How much of a particular type of habitat or ecosystem function should be provided by matrix management? Should this be static or a dynamic, ever-changing mix of habitats?

Some answers are provided by recent silvicultural developments in the U.S. and Canada, often referred to as "disturbance-based forestry" (Mitchell et al. 2002; Seymour et al. 2002). Disturbance-based forestry and matrix management are complementary; the former offers guidance on implementing the latter. The idea is that an understanding of natural disturbance dynamics can help us develop low-risk, ecologically friendly forestry practices. Keeton (2006) summarizes this as follows:

> Sustainable forestry practices across managed forest landscapes contribute to the maintenance of biological diversity and ecosystem functioning. The challenge lies in determining the mix of management approaches—including type, timing, intensity, and spatial configuration of silvicultural treatments—necessary to achieve sustainability objectives. One possibility is to focus on the architecture of individual forest stands and their spatial arrangement, with consideration given to the aggregate representation of multiple structural (or habitat) conditions at landscape scales. Patch and successional dynamics associated with natural disturbance regimes provide a useful guide for designing this type of structure or disturbance-based approach. A recommendation is to manage for currently under-represented structures and age classes on some portion of the landscape.

An implicit assumption in these approaches is that forest management will be ecologically sustainable—i.e., it has a greater likelihood of providing viable habitats for a full range of native species—if it maintains or approximates ecosystem patterns and processes associated with natural disturbance regimes and successional processes (Aplet and Keeton 1999). This bounded range within which attributes of ecosystem structure and function vary over time and space has been termed the "his-

toric range of variability" (HRV). According to this line of thinking, if HRV represents the conditions under which organisms evolved and have adapted, then species will have the greatest likelihood of survival if similar conditions are provided through management. There are examples of forest management plans based on reconstructions of HRV (e.g. Cissel et al. 1999; Moore et al. 1999). Yet HRV-based approaches are difficult to implement. To begin with, the feasibility of quantifying HRV for a given landscape varies greatly depending on data availability and modeling requirements (Parsons et al. 1999). There is the added difficulty of finding appropriate historical reference periods (Millar and Woolfenden 1999). Thirdly, forest managers must determine whether HRV offers a realistic target for management, considering the extent to which conditions within the HRV are compatible with contemporary management objectives, altered ecosystem conditions and dynamics attributable to land-use history, and changing climatic conditions. Despite these limitations, HRV provides an informative benchmark or reference for understanding landscape change (Aplet and Keeton 1999).

Disturbance-based forestry has largely developed along two lines of investigation in moist temperate and boreal regions of North America (Figure 2). The first is developing silvicultural practices that more closely approximate natural disturbance patterns, scales, and frequencies (Mladenoff and Pastor 1993; Seymour et al. 2002) and related regional stand age-class distributions (Lorimer and White 2003). Natural disturbance return intervals inform harvesting frequency (rotation or entry cycle) and disturbance sizes (or extent) guide the scale of individual harvest units. In the northeastern U.S., for instance, small-group selection methods (a form of uneven-aged silviculture), practiced on entry cycles of several decades or more, best approximate the fine-scale, high-frequency disturbance regime of the region's temperate deciduous and mixed hardwood–conifer forests. Seymour et al. (2002) developed a "comparability index" that depicts the correspondence between a range of silvicultural systems and natural disturbance scales and frequencies. Some of these disturbance-based methods are currently being experimentally tested (e.g., Seymour 2005; Keeton 2006).

The second focus of work in disturbance-based forestry is investigating ecosystem recovery following disturbances and long-term processes of stand development (Franklin et al. 2002). This has included a growing appreciation for the role of biological legacies in ecosystem recovery following disturbances (Keeton and Franklin 2005). Biological legacies are "the organisms, organic materials, and organically-generated patterns that persist through a disturbance and are incorporated into the recovering ecosystem" (Franklin et al. 2000:11). Disturbance-based silvicultural systems developed in the western U.S. and Canada are designed to provide ecological functions similar to those associated with biological legacies. Examples include the "variable retention harvest system" (Franklin et al. 1997) and other retention systems (Marshall and Curtis 2005; Beese et al. 2005); these retain biologically significant elements of stand structure (e.g., large live and dead trees) following regeneration harvest. Structures are retained in varying densities and volumes and in different spatial patterns (e.g., aggregated versus dispersed; Aubry et al. 1999). Retention schemes can mimic the landscape-level patterns created

Figure 2. Examples of disturbance-based silvicultural practices. A group selection cut with retention (both live and dead trees) within small (0.05-ha) harvested patches on the Mount Mansfield State Forest in Vermont (northeastern U.S.) is shown to the left. This system approximates the fine-scale canopy disturbances and spatially heterogeneous tree mortality patterns typical of the region's natural disturbance regime (see Keeton 2006). To the right are examples of both dispersed and aggregated retention in the U.S. Pacific Northwest. These practices provide functions similar to those associated with biological legacies left by natural disturbances (see Franklin et al. 2002). They differ from conventional even-aged systems (e.g., shelterwood) in that residual trees are retained either permanently or over multiple rotations. Photos courtesy of Jeremy Stovall (left) and Jerry F. Franklin (upper and lower right).

by natural disturbances, such as greater tree survivorship within riparian areas in areas burned by wildfire (Keeton and Franklin 2004).

An extension of this research has investigated effects of natural disturbances in mediating late-successional stand development (Abrams and Scott 1989; Lorimer and Frelich 1994). The objective is to develop silvicultural systems that provide a broader range of stand development stages, including old-growth forest habitats and associated functions (Franklin et al. 2002; Keeton 2006). These systems accelerate rates of stand development in young, mature, and riparian forests through underplanting, variable density thinning, crown release, and other methods (Berg 1995; Singer and Lorimer 1997; Harrington et al. 2005). Both these and retention forestry are prescribed as elements of the Northwest Forest Plan, a bioregional plan for federally owned forests in the U.S. Pacific Northwest (FEMAT 1993). As another example, an approach called "structural complexity enhancement" has been experimentally tested in northern hardwood–conifer forests in the northeastern United States. This system accelerates late-successional forest development through a variety of

unconventional silvicultural techniques, some of which approximate fine-scale natural disturbance effects (Keeton 2006).

Strategies for promoting sustainable forest management

Strategies for promoting ecologically based forest management, including matrix management and disturbance-based forestry, will vary by geographic region, land tenure context, and other factors. In the U.S., a variety of strategies are currently employed. These range from regulatory approaches on publicly owned lands to incentive-based approaches on landscapes dominated by private lands, such as in the eastern states. Innovative approaches to the latter are particularly important because 63% of U.S. forests are privately owned and increasingly subject to development pressure.

Forest management in the U.S. is conducted under a set of federal and state laws regulating many aspects of forest and environmental management on public (and sometimes on private) lands. These laws incorporate some elements of sustainable forest management, such as consideration of multiple resource values (i.e., "multiple use"), planning procedures, safeguards for threatened and endangered species, and watershed protections. However, the degree to which these laws have resulted in ecologically sustainable management has been the subject of considerable debate (see Grumbine 1990; Yaffee 1994; Davis et al. 2001). Laws such as the National Forest Management Act of 1976 are focused primarily on activities at the individual administrative unit level (e.g., a national forest). For this reason, more holistic, transboundary, landscape-level projects—those applying matrix management principles, for instance—have not occurred nationally in a consistent manner. Rather they have responded to regionally specific issues, such as the need for a comprehensive plan to conserve old-growth forest ecosystems in the U.S. Pacific Northwest. Thus, these projects are often implemented through regulatory development and administrative procedures under statutory authority.

Regulatory approaches in the U.S. Northwest have included creation of a bioregional reserve system and delineations of of 1.6 million ha of "matrix" lands where disturbance-based forestry methods, such as retention forestry, are required. In this case, such top-down approaches are possible because over two-thirds of the forest land is publicly owned. Large, federally controlled landscapes can be managed holistically under a unified plan. Application of matrix management principles has also occurred in a number of other regions with significant amounts of public land. These include the Sierra Nevada Range in California, the Greater Yellowstone Ecosystem in the northern Rocky Mountains, and the southern Appalachian Mountain region of the southeastern U.S.

In regions of the country dominated by privately owned lands and smaller forest parcel sizes, such as the northeastern U.S., other approaches are necessary, often on an individual owner-by-owner basis, to collectively achieve the same landscape-level objectives. Matrix management objectives are thus achieved (indirectly, not explicitly) through a combination of limited conservation land acquisition, land-use review and regulation (varying greatly by state and locale), and incentive-based programs. The latter include property tax relief for open space conservation and sustainable forest management. As an example, the Current

Use Value Appraisal Program in the state of Vermont assesses property tax rates based not on the residential or commercial development potential of a parcel of land—as is the case generally—but rather based on its "current use" as actively managed timberland. There are similar programs in other northeastern U.S. states. The federal Forest Legacy Program offers limited funding for private landowners who agree to keep forestlands in sustainable forest management or open space.

Conservation easements represent another tool frequently used to prevent forest lands from being split into smaller parcels and sold for real estate development. Easements transfer development rights to a willing third-party buyer, typically a public agency or a non-governmental organization (e.g., a land trust), while the original landowners retain other property rights (e.g., timber, minerals, access, etc.). In a few cases, lands sold under conservation agreements have included deed restrictions requiring sustainable forest management practices. Where lands are developed for housing, clustered developments that include habitat and open space protections can achieve limited conservation value and opportunities for forest stewardship if planned carefully (Pejchar et al. 2007). Growth (i.e., development) management planning around rapidly expanding suburban and exurban areas has become another indispensable tool to conserve forestland and manage forest fire threats.

Market-based mechanisms, such as "green labeling," are also used to promote sustainable forest management. In North America there is widespread interest in forest certification systems, including frameworks developed both by the Forest Stewardship Council (FSC, a non-governmental organization) and the Sustainable Forestry Initiative (an industry-sponsored program). According to Foster et al. (in press), "over 67 million hectares of forest land (approximately 16–22% of total commercial forest land) in North America have been certified to FSC standards, and the FSC certified area worldwide has tripled over the last six years." Initially it was hoped that certified wood products would earn a premium in the marketplace, but this has been slow in coming. However, certification has given producers special access to buyers (e.g., institutions, environmentally motivated corporations, etc.) looking for certified products, making certified forests, mills, and distributors more competitive in these cases.

Developing markets for environmental services and amenities, such as water and recreational use, have great potential in terms of providing financial incentives for sustainable forest management. These can create market value for ecosystem services that currently have none. Foremost among these at present are rapidly developing "cap and trade" carbon markets. While the U.S. is not currently a signatory to the Kyoto agreement on climate change, voluntary carbon credit trading, such as the Chicago Climate Exchange, is growing and includes several timber companies as participants.

A final promising trend in North America is the increasing interest in community-based forestry. These efforts take different forms, but generally share the objective of enhancing community participation in and benefits from local forests. Examples include establishment of town forests, forestry cooperatives involving multiple small ownerships, community sort yards, efforts to stimulate locally based value-added manufacturing, and others. Community-based initiatives accomplish

three primary things. First, they increase awareness of values provided by local forests, thereby stimulating public support for forest conservation and sustainable (often small-scale) forest management. Second, they help return more of the economic benefits derived from forests directly to the community. And third, they provide strength in numbers. Multiple landowners, in effect, pool their resources and, to some degree, coordinate management across a larger area. This gives participants access to market opportunities not readily available to individuals. If conducted under a set of agreed-upon standards, it also generally results in lower-impact forestry practices and better provision of ecological values. Hence there is an opportunity for matrix management and disturbance-based forestry through community forestry.

Globalization is reshaping the forest products industry, and with it the nature of sustainable forest management. In recent years there has been large-scale divestiture of industrial timberlands in North America and reallocation of investments and capital to the southern hemisphere, primarily for establishment of high-yield plantations, often utilizing exotic species (Franklin 2003). As industrial timberland is placed on the real estate market, or acquired by shareholder groups interested primarily in short-term profit-making (e.g., real estate investment trusts and timberland investment management organizations), the ability of unprotected forestlands to contribute to sustainable forest management objectives becomes increasingly uncertain. In this context, application of incentive-, market-, and community-based strategies will be even more vital for keeping forestland in open space, habitat, and sustainable productive use. Without expanded use of these conservation mechanisms, the option for sustainable management of the matrix will rapidly decline.

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Archeology, National Natural Landmarks, and State Game Sanctuaries: Combining Efforts for Science and Management

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The sanctuary and the National Natural Landmarks program

THE WALRUS ISLANDS STATE GAME SANCTUARY AND NATIONAL NATURAL LANDMARK (NNL) in Bristol Bay, Alaska, comprises a group of seven small islands about 63 miles southwest of Dillingham. During the 1950s, declining population numbers of the Pacific walrus *(Odobenus rosmarus)* caused a great deal of concern about the future of the species. As a result, the state game sanctuary was established in 1960 "to protect the walruses and other game on the Walrus Islands"; it is managed by the Alaska Department of Fish and Game (ADF&G). Eight years later, the Walrus Islands National Natural Landmark was established to add nationwide recognition of the importance of this area for its concentration of Pacific walrus, with Round Island in particular serving as a summer haul-out for male walruses (see cover photo, this issue). It is one of the most southern of the walrus haul-outs and, at the time of establishment of the sanctuary and the NNL, it was one of the few remaining annual haul-outs in Alaska (and perhaps the only one consistently in use). The Walrus Islands are open to public access, but visitors to Round Island must obtain an access permit prior to arriving.

The National Natural Landmarks Program recognizes and encourages the conservation of outstanding examples of our country's natural history. It is the only natural areas program of national scope that identifies and recognizes the best examples of ecological and geological features in both public and private ownership. The program was established by the secretary of the interior in 1962, under authority of the Historic Sites Act of 1935. NNLs are designated by the secretary of the interior, with the owner's concurrence. To date, fewer than 600 sites have been designated. The program aims to encourage and support voluntary preservation and to strengthen the public's appreciation of America's natural heritage. The National Park Service administers the NNL program, and, if requested, assists NNL owners and managers with the conservation of these important sites.

Project description

A recreational trail grant application for trail and access improvements for the ADF&G operations at Round Island prompted a National Historic Preservation Act Section 106 review by the Alaska Department of Natural Resources' Office of History and Archaeology (OHA). It was determined that the proposed improvements could have adverse impacts on the

Qayassiq ("Place to go in a kayak") archeological site (no. XNB-043), adding to damage that had already occurred during the past 35 years of operations. OHA recommended that work should be done to determine the site boundary, assess existing damage to the site, conduct clearance investigation for any planned ground disturbance, and map the site as accurately as possible so that future impacts would be minimized. OHA concurred that the NPS would provide archeological expertise through an existing cooperative agreement between ADF&G and the NPS NNL program. NPS agreed to provide a complete report of activities and results, including an assessment of site significance for National Register purposes, and to catalogue any collections following the established procedures of the state repository at the University of Alaska–Fairbanks.

The physical and historical setting of Round Island

Round Island is located in northern Bristol Bay, midway between Hagemeister Island and the Nushagak Peninsula (Figure 1). The southeastern-most island in the group, Round Island is shaped like a "D" with a 1.5-mile-long narrow spit extending northwest from its spine (see cover photo). Sheer-walled, granodiorite cliffs rising to an elevation of 1,400 feet encircle the island, except for a low bench along the northeast shore. Only 1.3 square miles (735 acres) in area, Round Island is seasonally home to as many as 14,000 walrus (the highest number counted in a single day, in 1977), hundreds of Steller sea lions, and 250,000 nesting seabirds. Grey, humpback, minke, and orca whales pass by in the spring on their migration north, sometimes feeding offshore.

Round Island is within one of Bristol Bay's principal spawning areas of herring and yellowfin sole; all five species of Pacific salmon are found here (Sinnott 1992). Over 100 species of birds have been documented on Round Island. The vegetation is a mosaic of wet and dry tundra, meadow, and herb communities. The site area is classified as a bluejoint grass meadow (Hasselbach and Neitlich 1996:11).

While the entire area that is now Bristol Bay was under glacial ice during the maximum extent of Pleistocene glaciations, ice during the last (late Wisconsin) glacial maximum 20,000 years ago was confined in this area to the Ahklun Mountains north of the Walrus Islands and to the Alaska Peninsula. The Walrus Islands were high ground, overlooking part of the vast southern Bering

Figure 1. Approaching Round Island from the east. Site XNB-043 is located to the right of the island shore center.

Land Bridge plain, exposed when sea level was 120 meters lower than it is today. As the plain flooded and the land rebounded from the weight of the ice, areas of high ground became increasingly smaller islands, reaching their present configuration by 2000 years ago when sea level was within one meter of modern levels (Manley 2002). Some terrestrial mammals important to early prehistoric hunters survived for a time on at least some of the islands after the land bridge flooded. Mammoth remains from the Pribilof Islands have been radiocarbon-dated to around 8000 years ago (Guthrie 2004) and to as late as 5700 years ago (D. Veltre, personal communication). The Walrus Islands were still connected to Hagemeister Island and the mainland 8000 years ago when sea levels were about 14 meters below modern levels. By 6000 years ago, the earliest known prehistoric occupation of Round Island, sea level was within 10 meters of today's level and Round Island became separated from the other islands and the mainland (NOAA 1988).

Round Island was named by Captain James Cook when he sailed across Bristol Bay, briefly stopping at Cape Newenham, in 1778 (Kowta 1963:11–12; Fall et al. 1991:7). Nearby Togiak Bay was bypassed by most early exploration, until 1818 when Fort Alexandrovsk (Novo-Aleksandrovskii) was established at Nushagak (Fall et al. 1991). The post was relocated to the west coast of Hagemeister Island for just a year in 1821 and then moved back to Nushagak (Bailey 1991:14). Petr Korsakovskiy visited Summit Island in 1818 and reported that the people of the Togiak River traveled to the Walrus Islands to pick berries and had temporary shelters on them (VanStone 1988:38, 48).

A. Schanz, traveling in 1890 by bidarka along the coast from the Kuskokwim River mouth to Nushagak, noted that the people of Togiak Bay were relatively primitive despite the commercial activities in the bay (Kowta 1963:17). The transition for Togiak residents from sea mammal hunting with skin boats and hand-held harpoons to guns, wooden boats, and outboard motors occurred during the 1930s and 1940s (Fall et al. 1991:8). Round Island was a primary walrus hunting site for them before and after the transition until it was closed to hunting in 1960. Walrus were shot from motorized skiffs and butchered at rocky haul-outs along the shore, with the meat returned to the village in one day, weather permitting (Fall et al. 1991: 9, 11–12). The other Walrus Islands and the coast from Togiak Bay to Cape Newenham are also traditional hunting areas for walrus and other sea mammals, used until the bay freezes and resuming on the sea ice in early spring (Chythlook 2006).

When established in 1960, the Walrus Islands were the first state game sanctuary to be designated and legislators were unaware of the importance of Round Island to local subsistence hunters (Sinnott 1992). After closure of the island to hunting, Togiak hunters began hunting from boats in open water, which resulted in the loss of many of the struck animals and in a corresponding loss of cultural tradition. The Togiak Traditional Council petitioned the Alaska Board of Game in 1991 for the right to hunt a limited number of walrus on Round Island. The ADF&G Subsistence Division prepared a comprehensive report on the history of walrus hunting by the Togiak community (Fall et al. 1991). In 1995, the Board of Game approved limited

access to Round Island for hunting, and the first hunt since 1960 was held.

Previous archeological research at Qayassiq and vicinity

A village site at Round Island, now known as Qayassiq, was first reported to the OHA by ADF&G because employees had encountered artifacts when constructing a cabin, outhouse, and garden in 1976 and later (Alaska Heritage Resources Survey file). The site was observed from an overflight of the island (Klingler 1983) and was visited briefly on the ground by the state archeologist in 1986. A large village site was surveyed and mapped at this time. No testing was done, but check- and linear-stamped pottery were noted in the sediments disturbed by the garden excavation (Bailey 1991:25). Artifacts were collected from the surface and fit with Norton-tradition assemblages found on Crooked and Summit islands (Shaw 1998:238). This investigation "found evidence of at least 2,200 years of intermittent occupation of a major village.... The site was occupied until at least late prehistoric times..." (Fall et al. 1991:6).

The only previous archeological work reported within the Walrus Islands group were surveys and testing done in 1982 and 1985 on Summit Island, located just off the mainland coast, about 19 miles north of Round Island (Shaw 1986). Five prehistoric sites were documented in the central portion of Summit Island with radiocarbon dates ranging from 2460 to 610 years BP (before present, with "present" being 1950 AD; Shaw 1986:5). The island was occupied intermittently beginning 2500 years ago, during a time when large village sites affiliated with the Norton tradition became widespread along the coast of western Alaska. Shaw proposed that this pattern resulted from "a major population increase associated with innovation in net fishing technology (and perhaps means of food storage) that resulted in a florescence of the Norton tradition (Shaw 1986:3)." The Norton tradition in this region spans about 1500 years. Its traits, among many others, include thin, well-made ceramics, with fiber or sand temper and often decorated with linear or check stamping; square or rectangular houses; notched stone net sinkers; stone lamps; small, bifacially flaked side and end blades; and some use of ground slate (Workman 1982:104–105). Later and smaller settlements documented on Summit Island were found to be affiliated with the Thule tradition and other late-prehistoric occupations. From all appearances, it was expected that a similar culture history would be represented at the large village site on Round Island.

Sites on several of the other islands in the sanctuary were identified from the air by keying in on visible surface depressions and the occurrence of bluejoint grass *(Calamagrostis canadensis),* which is known to commonly grow on archeological sites and disturbed areas. Widespread vandalism of the large villages on these islands was also reported. The Alaska state archeologist emphasized that the archeological sites in the Walrus Islands group and on the nearby mainland required protection and further investigation because they contained information vital to the understanding of Alaska's prehistory from the beginning of the Norton tradition (Shaw 1986).

The late prehistory and history of this immediate area is best told in the report (Kowta 1963) of the 1960 excavations at

Old Togiak, which lies about 35 miles north-northeast of Round Island (the modern village of Togiak now has a population of about 800, over 86% of whom are Alaska Natives). Kowta's analysis of the occupations and artifacts dating from 1000 AD to 1700 AD showed the following seasonal activities, with emphases on land and sea hunting, fishing, and shellfish collecting becoming increasingly important through time:

- Winter: ice fishing with spears and lures and probably also hook and line; fox trapping increasingly important through time; little evidence of netting seals under the ice; sea mammal hunting using harpoon dart and atlatl.
- Spring: ice-edge seal hunting with hand-held harpoons; bird snaring, hunting, and egg collection probably occurred but are not represented in the archeological record.
- Summer: fishing predominant, with bear hunting and sea mammal hunting using kayaks also occurring.
- Late Summer/Fall: caribou hunting; probably molting bird hunting and berry collecting (Kowta 1963:453–455).

Kowta wrote that the people of Old Togiak were

> able craftsmen and craftswomen working in a number of industrial media. They made pottery.... They worked stone, particularly slate, into a number of specialized blades for tools and points for projectiles. They wove grass into baskets, matting and bags. Under their practiced fingers hides were fashioned into articles of clothing and containers for liquids. Wood was fashioned into a wide variety of household furnishings, shafts of weapons, and frames of sleds and water crafts. For numerous small articles that required a material that was sturdy yet workable with blades of stone or the sharp incisors of animals, they turned to bone, to ivory, or to antler (Kowta 1963:472).

Survey and testing

ADF&G staff provided information about the history of operations at the site, including names of previous employees who may have information about artifacts found during the original ground-disturbing activities. They gave a thorough orientation to the area and identified and flagged areas of previous disturbance, such as infilled outhouses and garbage disposal areas, for mapping.

An initial survey of the established trails and the area from the boat landing to the cabin was conducted. All archeological surface features were then numbered and flagged prior to mapping with the GPS system described below. Two permanent site datum markers—18-inch rebar with 2-inch aluminum caps marked XNB-043 A and XNB-043 B—were set for future reference. Limited probing with an Oakfield soil probe was done along the trails where they crossed archeological features and at selected overlooks.

ADF&G wanted locations identified for two new outhouses that would not impact cultural resources, one by the cabin and the other near the existing outhouse in the campground. Reasoning that the garden, a 5.6x12-meter rectangular area, was a completely disturbed zone, ADF&G planned to build a new cabin there and to use the existing cabin as a storage shed. Therefore, Test 1, a 0.5x0.5-meter test unit,

was excavated adjacent to the garden disturbance in order to record the undisturbed stratigraphy and to characterize the cultural deposits destroyed by the garden excavation (Figure 2); Test 3, a 1.0x1.0-meter test unit, was placed in the garden about 4.0 meters north of the current outhouse in order to identify any undisturbed deposits below the garden and to clear a place for the replacement outhouse. Test 1 and the intact sediments below the garden disturbance in Test 3 were excavated by troweling and the sediments were not screened. Because of the uneven and sloping ground surface, depths were measured from a line level set at an arbitrary height above the ground surface and recorded as centimeters below datum (cmbd). No other tests were excavated.

Test 2, a 0.5x0.5-meter test unit located 10 meters north of Test 1, was opened but not excavated because lithic flakes were encountered within the sod layer, indicating substantial cultural deposits that could not be excavated in the short time available. The two grey chalcedony secondary flakes were photographed and left *in situ* and the sod was replaced. Test 4, a 0.9x0.9-meter test unit located about 4 meters south of the existing campground outhouse, was opened in order to clear a location for the replacement outhouse, but it was not excavated because of the dense concentration of artifacts occurring in the roots of the thick grass sod. The artifacts that were disturbed by the sod removal were collected then the sod was replaced. They are described in the following section. Sod was peeled back in three other locations in the cabin area but the tests were not excavated due to the presence of lithic flakes just beneath the sod for two of the locations and due to the presence of water just beneath the sod in the third location. No suitable alternative outhouse locations were identified because our limited exploration indicated that any well-drained area contained substantial cultural deposits located immediately below the vegetation in the cabin and campground areas.

The artifacts and other samples collected from archeological deposits were taken to the Lake Clark Katmai Studies Center and cleaned, accessioned, and catalogued. Unmodified flakes and bone from each excavation level were catalogued in lots rather than individually.

Figure 2. Test 1 is in the foreground at the edge of the garden disturbance area, marked by the green rectangular area. J. Alderson is standing at the location of Test 3 in the garden, north of the current outhouse.

Mapping

GPS data collection methods and processing. The locations of modern infrastructure, archeological features, and walking trail centerlines were collected using a Trimble Pathfinder ProXR GPS mapping-grade receiver. All data were post-processed and differentially corrected using the Cold Bay Continual Operated Reference Station (CORS), a U.S. Coast Guard real-time DGPS station located approximately 200 miles south of Round Island. The intent of mapping was to record any archeological features found in the area and provide base maps of current and historical features (e.g., cabins, outhouses, trails) to give a map context of the relationship of modern and prehistoric features.

Equipment used for mapping included one Trimble Pathfinder Pro XR beacon receiver with a TSC-1 datalogger and Asset Surveyor 5.27 datalogging software. A GPS antenna was mounted above head height and equipment was placed in a backpack for data acquisition while walking. Attributes were collected using a data dictionary after collaboration with field experts in both archeology and visitation to Round Island. Final data dictionary edits were conducted and the data dictionary file (roundis_v1.ddf) was transferred into the datalogger for use. GPS quality controls for PDOP mask, signal to noise ratio (SNR), and elevation mask were set to 6, 4, and 15 respectively. Line and area features were collected at a 5-second logging rate, while all point features were logged at 1-second intervals and averaged for a minimum of three positions.

Thirteen data files were collected between May 31 and June 1, 2004, stored on the TSC-1 datalogger, and later transferred as proprietary SSF files to Trimble Pathfinder Office version 2.9 software at the conclusion of the field trip. As noted above, data were differentially corrected against the CORS at Cold Bay. Over 85% of the datasets were corrected using the differential utility. Although no survey control was occupied during the field acquisition time, previous experience with this same equipment under open-sky conditions have revealed horizontal accuracy within a meter for point features occupied for at least 10 seconds. Heights from GPS were output to orthometric heights using the Alaska Geoid 1996, NAVD 88 fixed datum. Topographic quadrangle maps from the 1950s used the NGVD 29 fixed datum. Because the elevational relationships of NGVD29 and NAVD88 to local measurements of mean sea level (MSL) and to each other may not be consistent from one location to another, heights should be considered approximate.

GIS processing. Post-processing edits included checks for proper attributes and anomalous GPS error spikes. Once those were completed, the data were then exported to ESRI shapefile format in UTM Zone 3, NAD83 (CORS96) coordinate system. A total of 8,698 GPS positions were read and a total of 355 features created (169 point, 63 line, and 123 area features). Data were then defined in ArcGIS 9.0 and loaded into a personal geodatabase for optimum use. In addition, trail centerlines were snapped to anchor point features at trail junctions, and the locations of modern standing structures collected as lines in the field were converted to building footprints using field-entered building widths. Some features not represented in the original data dictionary include NNLs (a polygon area depicting the NNL boundary; NPS files), and the photos feature class, representing hyperlinked photos of features.

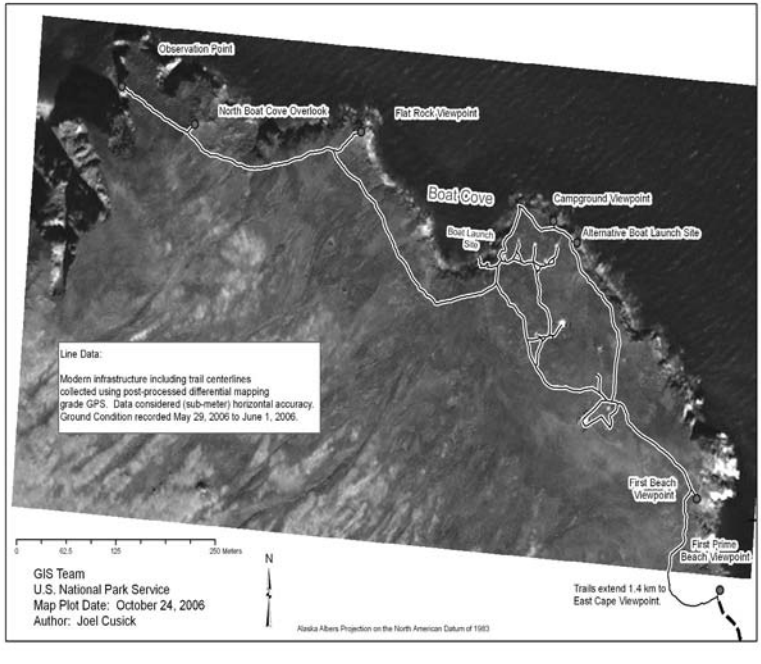
In June 2004, a compact disc containing images of Round Island from the U.S. Fish & Wildlife Service (USFWS) was obtained by NPS personnel. These screen shots were most likely from an IKONOS satellite image obtained on June 16, 2001, for purposes of a walrus haul-out study (Burns et al. 2001). One close-up image revealed an excellent depiction of trail and camp infrastructure. It was then determined to simply rectify another image covering most of the study area. This image was converted to TIFF format and simply rectified using ArcGIS into the Alaska Albers NAD27 projection using a first test set of trail and infrastructure GPS data. The image requires a datum transformation to allow for rendering with the final GIS projection of UTM Zone 4, NAD83. This image (Figure 3) was used to give broad-scale characterization of the site.

In addition to these data, on-ground digital cameras were used to document on-site locations. In some cases, digital photos were tagged with GPS positions or placed in the photos feature class for hyperlinking in ArcGIS. Federal Geospatial Data Clearinghouse (FGDC) metadata were created for all feature classes.

Results

The entire trail system (2.2 miles), the viewpoints, and all features identified by current personnel that are related to ADF&G operations since establishment of the camp in 1976 were mapped (Figures 4 and 5). A site area of 5.7 acres (2.3 hectares) was defined, containing 105 surface depressions thought to be prehistoric features (Figure 6). The area of maximum disturbance to the archeological site was determined to be 0.2 acres (0.075 hectares), or

Figure 3. GPS data from mapped trails and viewpoints overlain on imagery obtained from USFWS. IKONOS image acquisition date: June 16, 2001.



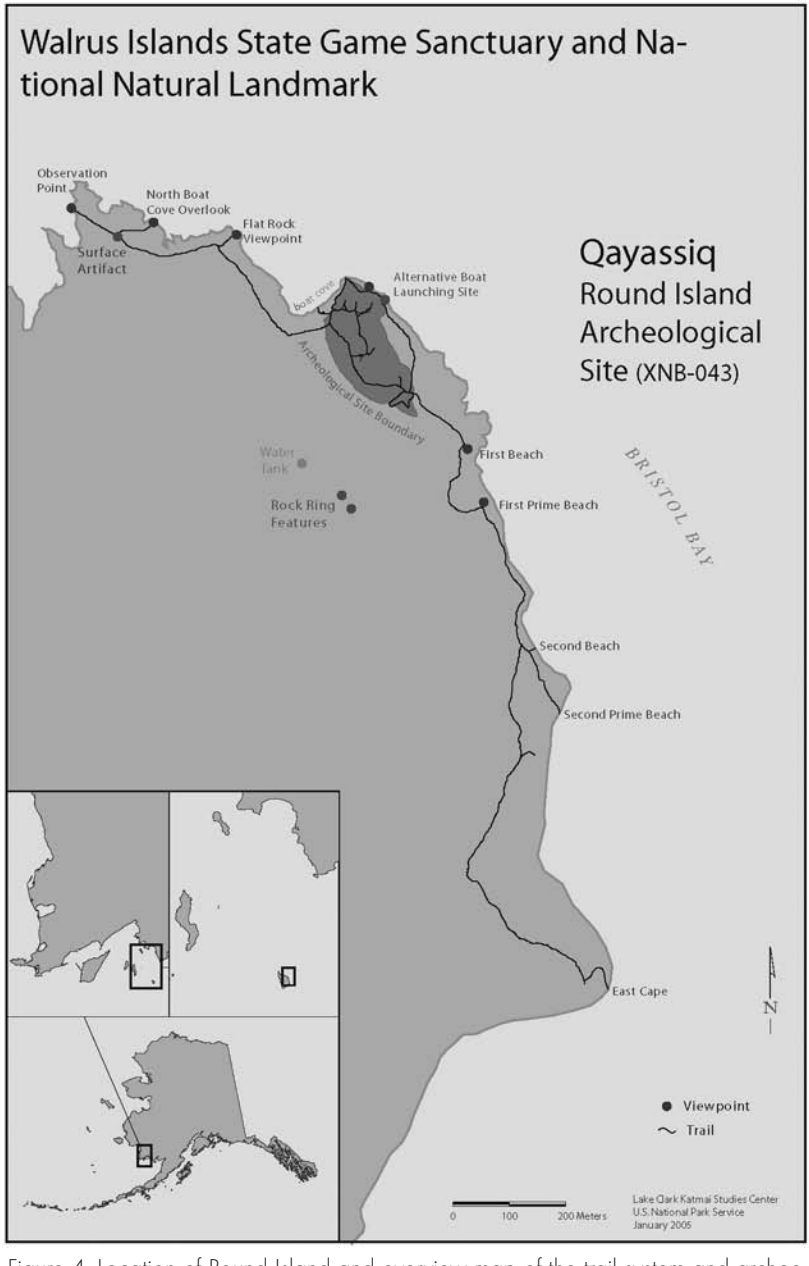


Figure 4. Location of Round Island and overview map of the trail system and archeological site, XNB-043. Map by Barbara Bundy, NPS.

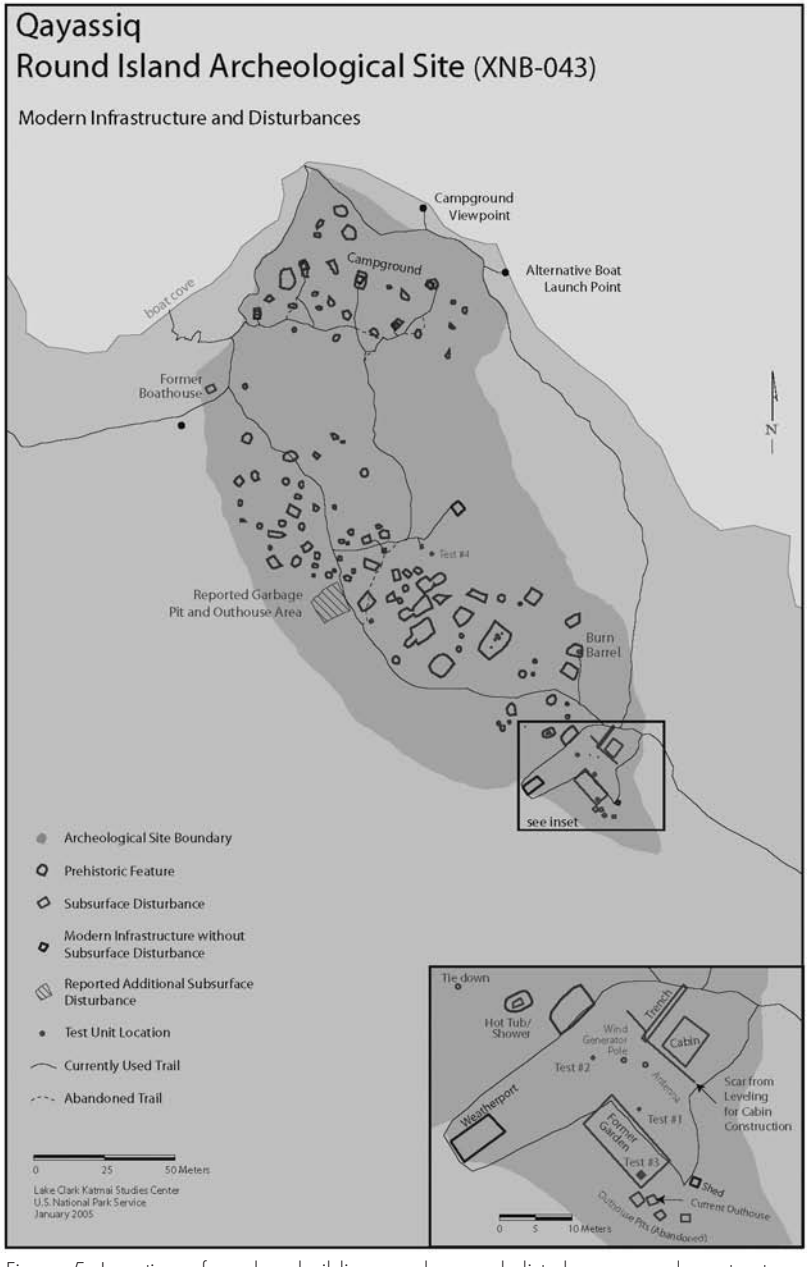


Figure 5. Location of modern buildings and ground disturbance, modern structures that are above ground, archeological features, trails, and archeological tests.

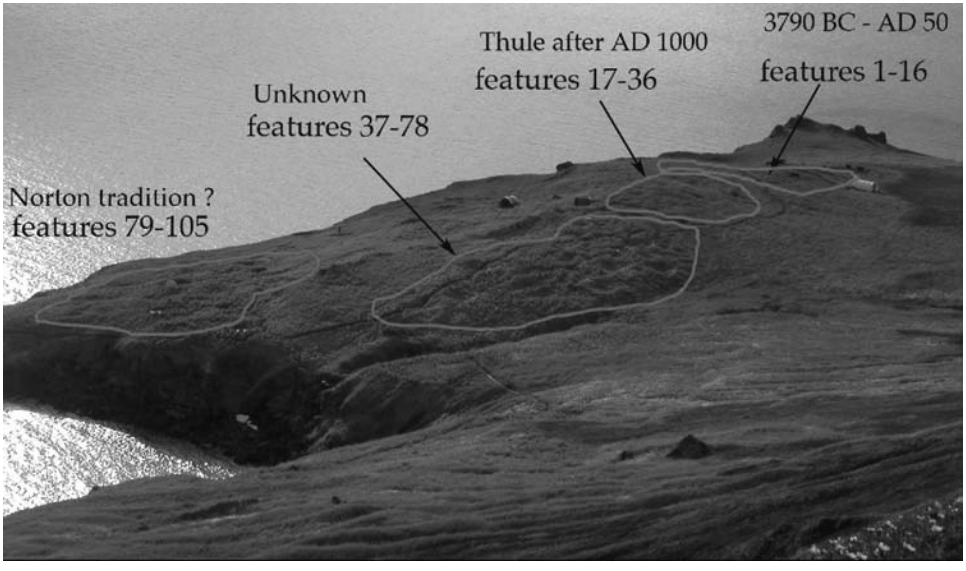


Figure 6. Qayassiq (XNB-043) surface features.

3.5% of the total site area. One isolated flake was found in the trail at the junction of the Observation Point and the North Boat Cove Overlook trails, indicating the potential for other sites to be present on the island. The mapped surface depressions represent semi-subterranean houses, cold-storage pits, and other features remaining from a series of occupations that date from 3900 BC (5900 BP). A small, finely worked side blade recovered from a test and dated to about 3300 years ago suggests an Arctic Small Tool tradition (ASTt) occupation. Distinct house forms clustered together in later settlements appear to represent Norton and the later Thule cultural traditions spanning the last 2500 years before contact in the late 18th century. Subsurface testing provided information about site depth and chronology, but was kept to a minimum due to the density of cultural deposits present. These deposits begin at the base of the current vegetation mat and extend up to a meter in depth. Thirteen hundred artifacts were recovered from a total of 1.08 cubic meters excavated. Two rock rings of unknown age with evidence of early 20th-century use are located in a boulder field at the base of a nearby slope (Figure 4). Isolated artifacts on outlying trails indicate that there is a high probability of finding additional sites on the island.

These datasets, provided to ADF&G in ArcGIS, are useful and accurate tools for future planning, trail maintenance, development of interpretive materials, and management decisions that are sensitive to site preservation.

Discussion

Qayassiq on Round Island is a noteworthy archeological site warranting further research for a number of reasons.

First, it has the oldest radiocarbon-dated occupation of any known site along the coast of Alaska north of the Alaska Peninsula. We now know that hunters came to this island at least seasonally nearly 6000

years ago to hunt walrus and probably other things. In ice-free seasons (when walrus haul out), the trip may not have required use of boats, as it may have been possible at this time to travel to Round Island by foot. The nearby Crooked and High islands were still joined, and at low tide would have been connected by exposed land to Hagemeister Island, which was itself still connected to Cape Newenham, at least at the island's north end near Tongue Point. The hunters could have been primarily terrestrial game hunters and they could have locally adapted their hunting methods to hunt walrus on land. The only other walrus haul-out in the area today that is not an incidental haul-out is located at Cape Pierce on Cape Newenham, relatively close to Security Cove. Elements of the small collection from this early occupation that align with Northern Archaic assemblages reported from sites in the Ahklun Mountains to the north, Security Cove to the west, and the Alaska Peninsula are large stemmed-point bases, a fragment of a stone vessel, a large bifacial point, and two radiocarbon dates with calibrated ages ranging from 5590 to 5900 BP. Side-notched points characteristic of these Northern Archaic sites have not yet been found at Qayassiq. Two probable blade fragments were found in the lowest levels of Qayassiq. This technology is not represented in the Northern Archaic sites to the north and west of Round Island; however, it is found in Northern Archaic contexts with side-notched points in the Ugashik Knoll phase (5055±70–4810±85 radiocarbon years BP) at Ugashik Narrows on the Alaska Peninsula (Henn 1978:12, 78–80).

Second, Qayassiq has the potential, through further excavation, to shed light on the development of the ASTt in this region and on its relation to the preceding Northern Archaic tradition and the following Norton tradition. This has implications for understanding the cultural history for coastal Alaska north of the Alaska Peninsula. At Qayassiq, the possible ASTt occupation (suggested only by a single radiocarbon date and a sideblade) is separated from the earliest component in Test 1 by 2100 radiocarbon years and by 30 cm of sediment containing scattered artifacts. It is separated from the later Norton occupation in the same test unit by 1600 radiocarbon years, 30 cm of sediment, and a handful of flakes. This small 0.5x0.5-meter test window suggests substantial breaks between these occupations in this area of the site on Round Island, yet the scattered artifacts in the sediments between these major occupations indicate at least intermittent use in the intervening years. Recovery of faunal remains associated with the occupation dated between 3470 and 3680 years ago may reveal seasonal use patterns with implications for the use of watercraft, not usually associated with ASTt.

Third, Qayassiq is significant to the people of Togiak, the descendants of the historic Tuyuryarmiut, who are probably directly descended from the Thule tradition people inhabiting Round Island at least intermittently beginning 1000 years ago. The site has the potential to add to our understanding of this time period and the significant changes in subsistence practices, seasonal activities, social structure, and political interactions, such as warfare, documented at Old Togiak.

Fourth, the interpretation of the cultural history of this region draws heavily from sites researched on the Alaska Peninsula. The demonstrated bone preservation at the lowest levels of Qayassiq, something the sites on the Alaska Peninsula lack, offers the

opportunity to better understand the prehistoric subsistence economies and their environments. The faunal remains can also be studied, perhaps through DNA if present, to help understand the natural history of important marine species from mid-Holocene times. There are few reported specimens of walrus in the Late Wisconsin and Holocene records for the North Pacific (Dyke et al. 1999). It may be possible to better understand the origin of both subspecies of walrus, the Atlantic *(O. rosmarus rosmarus)* as well as the Pacific.

Lastly, based on the finds at Qayassiq and other sites within the Walrus Islands Sanctuary, this National Natural Landmark district can add a rich prehistoric record to the list of world-class resources that are interpreted to the public via the agency's website, the webcam managed by ADF&G on Round Island, and through other media. Round Island should be evaluated along with the other islands in the sanctuary for National Historic Landmark (NHL) status as an archeological district. This would make the Walrus Islands Game Sanctuary one of only ten places in the nation with dual NNL and NHL status. NHL status may increase professional interest and public interest so that these sites will be better studied and preserved in this largely unexplored area.

Recommendations

Research. In partnership with the Togiak Traditional Council and the Bristol Bay Native Association, funding should be sought to conduct archeological excavations at Qayassiq. Federal and state agencies, such as the Bureau of Indian Affairs Office of Archeology, the National Park Service (the Lake Clark and Katmai Cultural Resources program), and the State Office of History and Archaeology, would be sources of archeological expertise. The research should be multidisciplinary, including ethnography (solicit participation of elders and collection of oral history), geology (identify lithic material sources), geomorphology (understand natural history of the island with regard to glacial, climate, and sea level histories, and surficial geology), and wildlife biology (sample prehistoric faunal remains for DNA). Block units should be excavated in the garden and cabin area to further define the earliest occupation of the island. Testing at the other components should also be done to characterize the nature of these occupations and to understand relationships among them.

Former ADG&F employees should be interviewed regarding any collections made or artifacts observed when they worked on Round Island. The interviews should also try to identify additional areas of past ground-disturbing activities, particularly in the garden area. If for example, sod and sediments were removed from the garden and placed along its perimeter, this would have important implications for future excavations in this area.

The significant cultural and natural resources of Round Island should be interpreted. Additionally, as noted above, a National Register nomination for the Walrus Islands Sanctuary should be done that seeks National Historic Landmark designation in recognition of the national significance of the cultural history represented on these islands.

Management. Although the current management infrastructure occupies basically the same area as the archeological site on Round Island, the actual impact to site features is limited to approximately 0.2

acres, or 3.5% of the total archeological site. There are a number of general recommendations to keep this impact from spreading:

- Maintain the staff presence on the island. The staff serves as an educational and enforcement component of the program, and their presence is a likely deterrent to site vandalism or looting.
- Improve management of human waste. Since no suitable locations for new outhouses were located outside the perimeters of the archeological site, research into the feasibility of a propane toilet or other technological means to prevent further subsurface disturbance from digging outhouse pits may provide a viable option.
- Continue use of tent platforms in the campground. The existing tent platforms are located prehistoric house depressions but are causing no disturbance to these features.
- Consult with a trails expert for further advice on trail drainage, tread, and sustainability on major trails.
- Foster a relationship with Togiak and other local communities and user groups to improve understanding of the historical use and significance of Round Island and to involve them in management discussions.
- Communicate to visitors the importance of the archeological site and emphasize education for proper behavior, including reporting any artifacts found, etc.
- Mapping-grade GPS systems provide resource managers with an ideal tool for mapping and assessing ground condition. These systems require an investment in hardware, software, and training to effectively use the equipment and enter data into a Geographic Information System. Having such a system would allow managers to update (1) trail centerlines, so that inventories of trail condition can assist managers in routing visitors through the site and around areas of concern; and (2) the potential locations for new infrastructure.

Conclusion

The Round Island archeological site is significant as the oldest dated coastal site, by over 3000 years, in Alaska north of the Alaska Peninsula. The site has clear evidence of island-based walrus hunting about 5700 years ago and again 3600 years ago. Over 100 mapped prehistoric surface depressions on Round Island represent semi-subterranean houses, cold storage pits, and other activity areas from settlements spanning the last 2500 years before contact in the late 18th century. Excellent bone preservation in the site's major occupations provides an important opportunity to better understand the prehistoric subsistence economies and their environments as well as the natural history of key marine species from mid-Holocene times. Close interagency and interdisciplinary collaboration, including GPS data collection and mapping support, made this significant archeological discovery possible.

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Environmental Justice and Sustainable Tourism: The Missing Cultural Link

Blanca Camargo, Katy Lane, and Tazim Jamal

Introduction

The San Francisco Peaks in Arizona are sacred to thirteen indigenous nations. These peaks provided a birthplace for many creation stories. They are also home to plants, soil, and pure water used for healing and ceremonies. A nearby facility, the Arizona Snowbowl Resort, also utilizes these same peaks for snow skiers. Due to global warming, the resort has experienced a decrease in revenue. As a result, resort management developed a plan to convert sewage water to 1.5 million gallons of snow per day, allowing the resort to stay open despite the warming weather. The Native Americans in this area are very opposed to contaminated snow being used on the peaks, as it would hinder their cultural practices and beliefs. The tribal nations also live off the land the resort is threatening to contaminate. This is one of countless examples where cultural justice is embedded in the issue of sustainable development. Tribal nations that have used the mountains for centuries have come into conflict with a local business using the mountains for financial gain (Vocal Nation 2007).

Unlike other examples that could be mentioned, this case has a good ending for the preservation of the tribal nations' cultures. After the U.S. District Court ruled in favor of the Arizona Snowbowl Resort in 2006, the Ninth Circuit Court of Appeals reversed the decision in March 2007 by ruling in favor of the "Save the Peaks Coalition." The Navajo nation's president, Joe Shirley, Jr., shared his sentiment on the final ruling: "This goes towards preserving our ways of life, preserving my prayer, my sacred song, my sacred sites, my mother: the San Francisco Peaks" (Arizona Native Scene 2007).

But what about the multitudes of other cultural issues that are important to cultural sustainability, a concept that appears to be poorly addressed in discussions of sustainable development and sustainable tourism? Although sustainable tourism calls for environmental conservation and socio-economic well-being (WTO 2004), it does not clearly address the issues and challenges related to the fair distribution of costs and benefits of development among stakeholders. For instance, with respect to the distribution of environmental costs and benefits, it says little about how to ensure that they are distributed equitably between social groups, particularly those that may be disadvantaged due to race, class, or gender. Environmental justice principles offer valuable guidance here, but the concept itself has received little attention in sustainable tourism discourse. Only a few studies have addressed issues of inequity across diverse groups when it comes to the distribution of environmental benefits or negative impacts due to tourism development (Akama 1999;

Geisler and Lesoalo 2000; Floyd and Johnson 2002). Lee and Jamal (in press) therefore argue for the inclusion of an environmental justice framework in tourism studies to better address environmental impacts of tourism development—for instance, equitable access to natural resources and environments among social groups and communities.

These efforts are laudable, but continue to miss a valuable dimension: culture. Culture is integral to many forms of tourism (e.g., cultural tourism, festival tourism, indigenous tourism, agri-tourism) and the study of cultural impacts is an important area that focuses on aspects such as commodification, authenticity, interpretation, cultural survival, and heritage issues. But the topics of cultural justice and cultural equity are insufficiently addressed by tourism researchers, and important issues revolving around the culture of nature (e.g., human–environmental relationships) are barely addressed in tourism studies. This paper argues for incorporating "cultural sustainability" (CS) into the environmental justice–sustainable tourism (EJ-ST) framework that was recently proposed by Lee and Jamal (in press). Rather than attempt to develop a fully fledged conceptualization of cultural sustainability, we focus this paper on developing an important dimension of it: cultural justice in relation to tourism in natural areas. The outline we lay out below may be especially helpful in situations where environmental conservation and sociocultural well-being need to be addressed. Our paper makes an important contribution by specifically addressing tangible and intangible human–environmental relationships as an important aspect of cultural sustainability and cultural justice in natural area destinations.

We start by discussing environmental justice in the context of sustainable tourism. This is followed by the integrated (EJ–ST–CS) framework that we propose. Examples of relationships between humans and their biophysical world are forwarded, which also help to illustrate the importance of incorporating "cultural justice," "cultural equity," "cultural discrimination," and "cultural racism" into the overall framework. Finally, we argue for the need to develop indicators that can serve as guidelines to protect or nurture these cultural relationships and offer related insights for policy and practice in ecotourism and management of natural/protected areas.

Environmental justice and sustainable tourism

In the context of tourism, increasing attention is being directed toward the sustainability of destinations and their resources as travel and tourism continues to grow in many domestic and international markets. The report of the World Commission on Environment and Development (WCED, also known as the Brundtland Commission), *Our Common Future* (WCED 1987), was a major force in directing governments and businesses to embrace the discourse of sustainable development. Although it attempted to reconcile ("balance") economic development with growing concerns over global environmental impacts, little reference was made in the WCED report to tourism and only a few token references acknowledged the needs of indigenous communities. In 1992, the United Nations Conference on Environment and Development (also known as the Earth Summit or the Rio Summit) focused on developing *Agenda 21*, a strategy to aid the public and private sector in the imple-

mentation of sustainable development. Subsequent initiatives, such as the *Globe 90* conference in Vancouver and *Agenda 21 for Travel and Tourism* (WTO 1997), drew on the WCED report and *Agenda 21* to introduce a new development paradigm for tourism: sustainable tourism. The World Tourism Organization (WTO) provides the following explanation:

> Sustainable tourism development meets the needs of present tourists and host regions while protecting and enhancing opportunity for the future. It is envisaged as leading to management of all resources in such a way that economic, social, and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity, and life support systems (WTO 1997:30).

Since the emergence of this new concept, sustainable tourism, research on the environmental and socioeconomic impacts of tourism on different types of destinations has increased. Yet even though equity is a grounding principle of sustainable development and sustainable tourism, very little research has been conducted to examine tourism-related impacts across different social groups within a destination area. Even in the environmental justice literature itself, little attention has been devoted to research on the distribution of environmental impacts among tourism stakeholders (residents) and between the social groups within them. Injustices commonly appear as economic issues that affect community labor and natural habits, the most powerful elements of social well-being (Ross 1998), but it is also important to note the effects of tourism development on other aspects of social well-being, particularly among diverse social and cultural groups in the communities. Lee and Jamal (in press) identified a small number of studies that relate to issues of environmental justice in the context of recreation and tourism, for example:

- Inequalities for certain socioeconomic and racial groups with respect to the distribution of federally managed tourism sites in the southern Appalachians region, USA (Floyd and Johnson 2002);
- Greater water usage by tourists than local residents in the Bay Islands, Hondruas (Stonich 1998);
- Exclusion of Maasai and other local residents from protected parks in Kenya (Akama 1999);
- State appropriation of indigenous and native lands and exclusion of relocated residents from enjoying the recreational benefits once available to them in conservation parks and reserves in South Africa (Geisler and Lesoalo, 2000).

Hence, Lee and Jamal argue that it is essential to incorporate an environmental justice framework into planning for sustainable tourism and ecotourism (Figure 1). Such a framework "provides important direction and guidance for addressing injustices related to human–environmental relationships, particularly with respect to disadvantaged, low-income, and minority communities" (Lee and Jamal in press). We summarize below some key concepts related to environmental justice that offer a valuable addition to sustainable tourism discourse. More importantly, we adapt these further below in our preliminary attempt to introduce the notion of "cultural justice" in relation to tourism in natural areas.

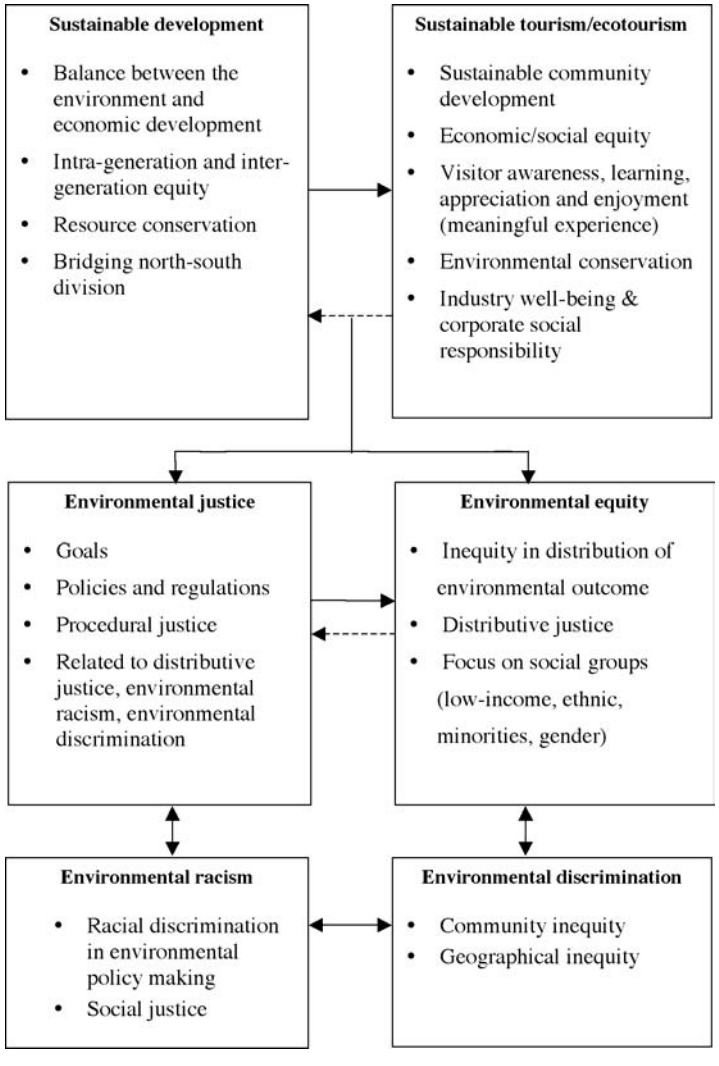

Figure 1. An environmental justice–sustainable tourism framework (source: Lee and Jamal, in press).

Environmental justice principles

The environmental justice movement gained momentum in the 1970s in the United States, driven by concerns about local health hazards brought on by toxic waste dumps, nuclear facilities, waste incinerators, and mining operations. Environmental justice is primarily concerned with the degree to which environmental risks and burdens fall on low-income people and ethnic minorities. In the literature, environmental justice sometimes tends to refer more narrowly to matters of procedural justice, or the process by which environmental decisions are made about the use and distribution of environmental goods among diverse groups and individuals who may be discriminated against due to factors such as

gender, ethnicity, or income level. Table 1 below shows key terms relating to environmental justice.

An environmental justice framework can help tourism destinations by identifying and monitoring potential environmental injustices or inequities, and ensuring equitable distribution of environmental costs and benefits as well as fair procedures and policies for decision-making and participation. Unfortunately, both environmental justice and sustainable tourism lack a well-developed concept of cultural sustainability (CS), in spite of several calls to integrate this into sustainable tourism discourses and into approaches for managing cultural conflicts emerging in natural/protected areas (Craik 1995; Robinson 1999; Weaver 2005; WTO 1995). We propose to rectify this long-standing omission by approaching cultural sustainability from the perspective of "cultural justice," which we argue below is a vital addition to the environmental justice (EJ) and sustainable tourism (ST) framework.

Applying a EJ–ST–CS approach to natural area destinations

Cultural sustainability has been described as the ability of people or a group of people to retain or adapt elements of their culture that distinguish them from other people (Mowforth and Munt 1998). This definition is also far from complete, lacking reference to the equitable distribution of cultural costs and benefits among different cultural groups as well as long-term sustainability and intra- and inter-generational cultural equity (to follow the Brundtland Commission's definition of "sustainable development" and the WTO adaptation of this concept to tourism). Cultural sustainability, among other things, needs to address the relationships between people and their biophysical world. This is especially pertinent in the context of natural/protected areas,

Table 1. Environmental justice for tourism (source: Lee & Jamal, in press).

Term	*Definition*
Environmental justice (EJ)	"Fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies" (U.S. Environmental Protection Agency).
Environmental equity (EE)	Equitable distribution of benefits and costs related to the environmental impacts of tourism development; it is strongly concerned with issues related to distributive justice (Lee and Jamal, in press).
Environmental racism (ER)	Unfair distribution of benefits and costs of tourism development among social groups as identified by race (Westra and Lawson 2001).
Environmental discrimination (ED)	Inequalities in the distribution of environmental impacts (Lee and Jamal, in press).

though clearly one cannot ignore this in urban settings (where urban parks, greenways, gardens, arboretums, and other green spaces offer opportunities for outdoor recreation and leisure). These relationships can be tangible (e.g., worship of fire, ritualistic journeys and practices at burial sites, ritualistic preparation of food gathered from the forest/sea), intangible (e.g., mystical, spiritual, identity, sense of belonging, collective memory), or both tangible *and* intangible ,such as myths and fables that become tangible when invoked in conversation (auditory) but remain intangible in collective memory until performative engagement occurs. As Jamal, Borges, and Stronza (2006) point out, human–environmental relationships constitute a phenomenological existentiality that contributes to a sense of cultural identity and personal as well as collective belonging. Figure 2 illustrates some types of human–environmental relationships that may be present in natural/protected areas. It is not meant to be a definitive list, but is a good reminder that people relate to their biophysical environment in ways that are not always easily identifiable or measurable in quantitative terms.

Inequities in the treatment of ecocultural goods and (human–environmental) relationships in natural/protected area destinations are noted in tourism studies. Examples include ecotourists being allowed to enjoy natural areas and obtain rich learning experiences while residents are restricted from accessing the areas and performing their cultural practices, tourism development taking place on sacred burial sites, or people being evicted from their ancestral lands to make way for national parks. Environmental justice principles are especially helpful to draw upon in order to address issues of cultural justice and cultural sustainability in natural area destinations. It means attending to cultural impacts on low-income, marginalized groups, and diverse populations (ethnic, gender, etc.) and communities within the natural area. It requires, among other things, two important actions: (1) factoring human–environmental relationships and other potential cultural changes into the overall framework, and (2) ensuring effective participatory processes at the destination so those who stand to be affected by the development can make an informed decision on development projects and proposals (Jamal et al. 2006:165). In other words, an important step to ensuring cultural sustainability in natural area destinations is active involvement in planning and decision-making by those whose ecological–cultural goods and relations are being affected by tourism initiatives. Adapting environmental justice principles towards cultural sustainability principles offers a useful start towards addressing issues of cultural justice and equity in natural area destinations. For the purpose of this paper, we have adapted these cultural dimensions to direct attention to the often-ignored aspect of the sustainability of ecocultural goods and human–environmental relationships. The prefix "eco" is added to the cultural dimensions below to emphasize the natural area context; they can be applied to ecotourism and tourism in protected areas, as well as other nature-based settings:

- Ecocultural justice, the active involvement of low-income and minority groups in decision-making related to their ecocultural goods and (their human–environmental) relationships.
- Ecocultural equity, the fair (equitable) distribution of tourism impacts on the

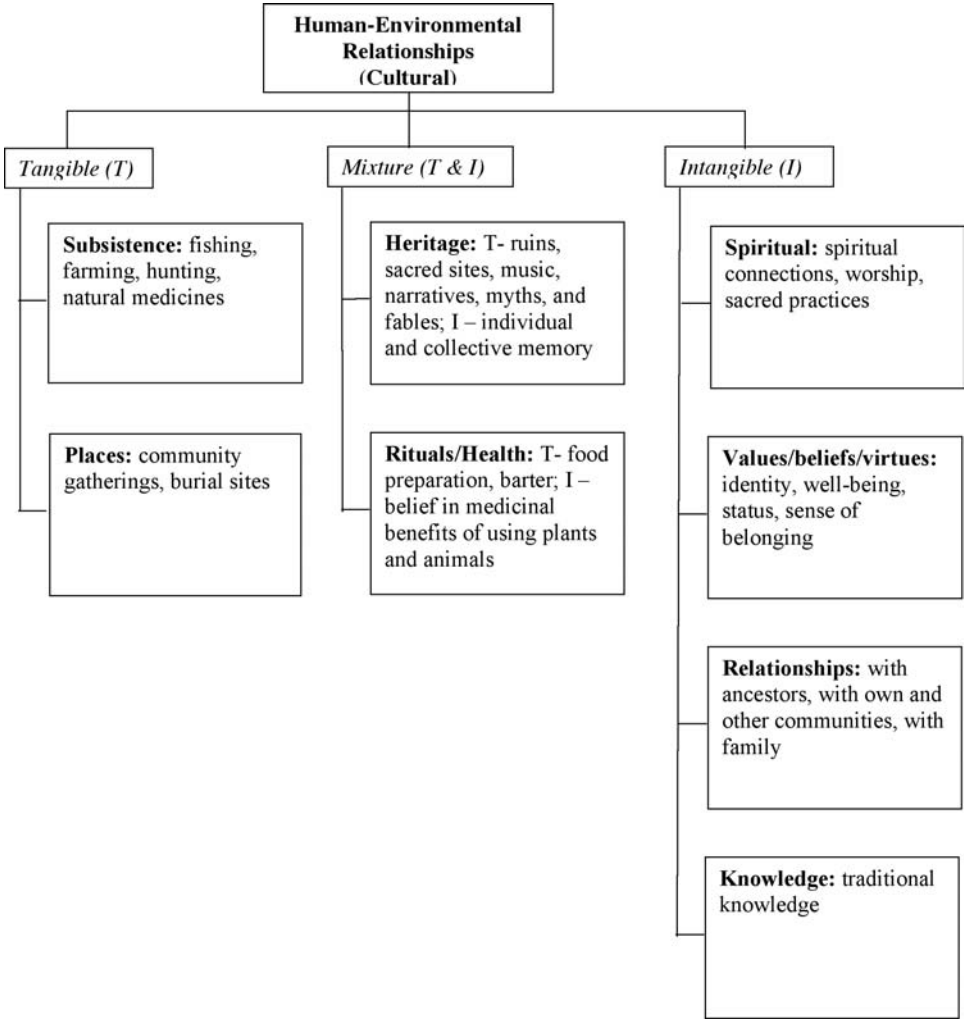

Figure 2. Human–environmental relationships (cultural).

ecocultural goods and relationships among different cultural groups.

- Ecocultural discrimination, disproportionate (adverse) impacts on ecocultural relationships and goods of minority groups.
- Ecocultural racism, the exclusion or prevention of minority and indigenous groups from conducting their traditional (ecocultural) practices by tourism initiatives, laws, policies, etc. (Specific discrimination due to race has to be shown.)

Clearly, much work is needed to develop a fully integrated EJ-ST-CS framework.

In addition, indicators are required to monitor key items related to environmental justice and its cultural sustainability counterparts (cultural justice, ecocultural justice). The World Tourism Organization (1995), for example, provided a set of core indicators of sustainable tourism, none of which included a cultural dimension. James (2004) encouraged the development of local sustainable tourism indicators, but only to address economic, environmental, and social impacts. Sustainable tourism indicators were also developed by Craik (1995), Choi and Sirakaya (2005, 2006), and Ko (2005). Like the World Tourism Organization's later (2004) set of indicators, the ones developed by such experts have addressed social issues such as prostitution, crime, health, etc., but have tended to equate social impact with cultural impacts. Hence, such cultural issues as changes in ethnic identity and place-belonging tend to get ignored. In almost every instance, researchers working on sustainable tourism indicators and ecotourism indicators fail to take into account intangible cultural dimensions or the cultural link between humans and their natural surroundings (as noted in Jamal et al. 2006). Their argument is supported by Font and Harris's (2004) review of five ecotourism programs in which only two (out of 12) social standard criteria had cultural significance: respect for customary/legal rights of access by locals to natural resources, and contribution to tourist education regarding cultural issues. Table 2 provides an account of cultural indicators for sustainable tourism that have been proposed by several sources.

Developing robust indicators to monitor culturally related changes in natural/protected areas is a crucial research agenda. A cultural justice approach as described above may assist in creating policies, laws, and regulations to protect diverse ethnic, low-income, and minority groups from inequitable treatment in development and conservation initiatives related to natural area destinations.

Implications for future research and practice

A more robust incorporation of cultural sustainability into an environmental justice–sustainable tourism framework for natural area destinations has important implications for the tourism industry. For tourism planners, this new framework can be applied toward developing codes of conduct, as well as certification and accreditation programs for ecotourism and sustainable tourism development. For policy-makers, an environmental justice-oriented framework that includes cultural justice as part of cultural sustainability can help to address matters of procedural justice (e.g., fair participation of cultural resource owners, protection of cultural rights, self-determination, participatory democracy, co-management) and issues of distributive justice (e.g., equitable distribution of costs and benefits from the use of cultural resources for tourism, access to sacred sites, etc.). For local residents, active participation in the development of the cultural sustainability framework and cultural indicators is crucial, as is their direct participation in development and conservation initiatives. It can help them to have control over which aspects of their culture and their ecocultural goods they would like to share, and how best to maintain those human–environmental relationships that they value (hence facil-

Craik (1995) Cultural indicators of tourism impacts	World Tourism Organization (2004) Cultural issues and indicators	Choi and Sirakaya (2006) Indicators for cultural dimension
Degree of economic dependence on tourism	Local satisfaction (% who agree that tourism is positive for the community)	Building/architecture (comparability of new constructions with local vernacular; types of building material and décor)
Distribution of economic benefits across a destination community	Maintaining cultural sites (% of tourist revenues which go to maintain or conserve key sites and structures)	Cultural site management (maintenance level; availability of site maintenance fund and resource; commodification; number of officially designated sites and its management)
Degree of public involvement and consultation in planning, policy-making, and management	Maintaining security (number of crimes affecting/involving tourists and locals)	Sociocultural fabric (retention of local customs and language; shift in level of pride in local cultural heritage; % satisfied with cultural integrity/sense of security; loss of authenticity and becoming impersonal)
Degree and forms of commercialization and commodification of the destination culture for tourists	Tourists well-being (% tourists who feel safe in the destination)	Cultural education (type and amount of information given to tourism employees; type of information given to visitors before and during site visits; level of sensitivity of interpretative materials and activities pursued)
Perceived environmental degradation, significant loss of amenity, or unacceptable modification of destination site	Health and security (% with waterborne diseases, % harassed)	
Sense of autonomy, self-confidence, and cultural identity of destination community	Sex tourism (level of response, organization for solution)	
Intrusiveness of tourism on destination community and/or its lifestyle		
Incompatibility of values and/or inability or unwillingness to accommodate the habits, lifestyles and attitudes of tourist groups		
Exacerbation of conflict and tensions within the destination community or between groups		

Table 2. Cultural indicators.

itating cultural survival as well). Awareness of, and support for, conservation may also increase.

Conceptualizing cultural sustainability, however, presents several challenges. First, as noted earlier, researchers frequently do not distinguish between cultural and social impacts, and tend to focus primarily on social issues (while sometimes calling them "cultural"). This makes it more difficult to call attention to ensuring that cultural sustainability is properly incorporated into sustainable tourism. Second, cultural impacts and relationships are difficult to identify or measure—many are intangible and changes occur over a long period of time. This contributes further to an already complex domain. Third, very little attention has been paid to systematically identifying and examining issues related to cultural justice in tourism. In the case of natural area destinations, future research should focus on developing robust quantitative and qualitative indicators and monitoring schemes that

can track changes in ecocultural goods and human–environmental relationships due to tourism. Land does not just represent a physical space, but rather the interconnected physical, symbolic, spiritual, and social identities of human cultures (Wilson 2003).

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"Who's Doing the Protecting in Protected Areas?" A Global Perspective on Protected Area Governance

Brent A. Mitchell

AROUND THE WORLD, NATIONAL PARKS AND OTHER PROTECTED AREAS go by a lot of different names, including "park," "reserve," "seashore," "site," "landmark," "nature park," "sanctuary," to give just a few examples in English. Or, even more to the point, many protected areas are different but go by the same name. (In the most common example, national parks in the U.K. are not publicly owned lands.) To quote the George Wright Society website, "Unless we can communicate with each other and with the rest of the world, protected areas will not be successful." To illustrate how difficult that communication can be internationally, here is an example from outside of conservation. If you walk into any Starbucks in America and ask for a *café grande*, they will give you their medium-sized cup of coffee. If you ask for a *café grande* in Mexico, they may give you a bowl of coffee and a quizzical look. Ask for *caffé grande* in Venice, and they will direct you to a shop on the Piazza Indipendenza. To understand parks and protected areas globally, we have to have a common language. A loon to us is a diver to others, but is internationally understood as *Gavia* spp., at least to those who have studied the classification system.

To address this problem, IUCN–The World Conservation Union (IUCN) created a classification system for protected areas in 1994 (Table 1). Without changing national or local names, the IUCN categories attempt to address the labels issue by identifying protected areas by their primary management objectives. Of course, every park is unique, but many share similar management objectives, while others have different objectives. The categories are currently under review, following an important meeting held in Spain in May 2007.

While reviewing management categories, the same global organization, IUCN, is also looking at governance of protected areas. Generally speaking, here in North America and elsewhere, governments have been viewed as the primary and dominant managers of parks and protected areas for about a century. The last World Parks Congress (2003 in South Africa) recognized that four general governance types exist today: government, co-managed, private, and community-conserved areas (Figure 1). This article focuses on private protected areas, as an example of how protected area management paradigms are expanding.

When is a protected area "officially" a protected area?

The foundation of the categories system is the 1994 IUCN definition of a "protected area":

> An area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of

Category IV	Habitat/Species Management Area: protected area managed mainly for conservation through management intervention
Category II	National Park: protected area managed mainly for ecosystem protection and recreation
Category V	Protected Landscape/Seascape: protected area managed mainly for landscape/seascape conservation and recreation
Category III	Natural Monument: protected area managed mainly for conservation of specific natural features
Category VI	Managed Resource Protected Area: protected area managed mainly for the sustainable use of natural ecosystems
Category Ia	Strict Nature Reserve: protected area managed mainly for science
Category Ib	Wilderness Area : protected area managed mainly for wilderness protection

Table 1. The IUCN protected area management categories. Adapted (in order of listing only) from IUCN 1994. (The category system is currently under review.)

> natural and associated cultural resources, and managed through legal or other effective means.

The categories system of IUCN (Table 1) has had some success in standardizing understanding of protected areas management, especially among more established park systems. However, there are a great many areas that are protected *de facto* or *de jure* (and often both) that meet the IUCN definition but have not been specifically recognized as protected areas and not listed in the World Database on Protected Areas. In the United States alone, there are thousands of private protected areas that satisfy the definition, yet only 23 are currently listed as private reserves in the database.

One of the purposes of the 1994 category guidelines was to alert governments to the importance of protected areas and encourage development of systems of protected areas, and in that they have had demonstrable impact since that time. Though extra-governmental protected areas were never specifically excluded from consideration, in practice most governments focused on those areas over which they exercised direct management authority, through public ownership or other means.

Protected areas are also owned and managed through private mechanisms in most of the world, and their number and extent are growing fast. Often the result of local initiative and conducted without the direct intervention of government, they are not yet fully integrated in national conservation planning or reporting in many countries. As we have seen, the international system of protected area management categories historically emphasized the role of

Figure 1. Protected area governance types.

governments. Reflecting this, private protected areas are not as well understood globally as their contributions warrant. The current review of the categories represents an opportunity to recognize the full spectrum of protected area governance (Mitchell 2007).

The history of protected areas in the U.S. is a good example. The U.S. system of national parks is well recognized around the world. But few people know that private protected areas have been established for nearly as long. Yellowstone National Park, often cited as the world's first national park, was created in 1872, but the second was not designated until 1890.[1] The Trustees of Reservations in Massachusetts, the first land trust, dates to 1891. Both the public and private protected area initiatives began as efforts to preserve special areas for the benefit of the public, and their purpose in land protection was likened to those museums and libraries: safeguarding great works of art and literature for the public to enjoy. Indeed, the original name of the first land trust was The Trustees of *Public* Reservations, though the legislative act creating it clearly indicates a private corporation:

> All personal property held by said corporation, and all lands which it may cause to be opened and kept open to the public, and all lands which it may acquire and hold with this object in view, shall be exempt from taxation, in the same manner and to the same extent as the property of literary, benevolent, charitable, educational, and scientific institutions incorporated within this Commonwealth is now exempt by law; but no lands so acquired and held and not open to the public shall be so exempt from taxation for a longer period than two years. Said corporation shall never make any division or dividend of or from its property or income among its members.

(Technically, of course, government does not own land, but holds it in the public trust. The word public was removed from

the name of The Trustees of Reservations in 1954 to avoid confusion.)

Land trusts and related private conservation initiatives developed in parallel with public efforts, starting in the East, where most land was privately owned, while national parks and reserves were first formed primarily in the West, where a majority of land was held by government. However, the rate of development of private reserves was much slower than public counterparts for the first 50 to 75 years (Brewer 2003), which partly explains why they are less well recognized. Today there are over 1,500 land trusts in the United States (Aldrich 2003). They operate in all 50 states, with distribution quickly equalizing across the country (Figure 2). Similarly, the land trust movement has been growing in Canada, with a new national network established, and the first national conference convened this year.

Privately run protected areas have been growing in extent and number in many parts of the world, particularly Latin America and the Caribbean, east and southern Africa, Australia, and Europe. An assumption underlying the recent growth in private protected areas is that management may be most effective when the managers have an interest in the land: a legal interest, an economic interest; interest as an individual, a group, or a corporation. But we must not be naïve. Though non-confrontational and (in most cases) apolitical, working willingly on a voluntary basis, not all landowners are motivated by altruistic intentions. As has been the experience with other conservation frameworks of great promise, realities have not always met expectations. Along

Figure 2. Land trust properties are perhaps the best-known examples of private protected areas in the United States. Wilson Salt Marsh, Essex County Community Greenbelt, Massachusetts. Photo by the author.

with great success there have been some disappointing outcomes and some abuses, and the international protected areas community should be prepared to respond appropriately.

A unique governance type

The 2003 World Parks Congress identified four main protected area governance types: (A) government-managed protected areas; (B) co-managed protected areas; (C) private protected areas; and (D) community-conserved areas. Embedded in the private protected area type description ("C" in the typology above) are four ownership models:

- **Individual**, areas in which ownership is held by a single person or family;
- **Cooperative,** perhaps the rarest form; examples include the Ahuenco Conservation Community in Chile;
- **Non-governmental organization (NGO),** private not-for-profit organizations operating to advance a specific mission and usually controlled by a board and specific regulations; and
- **Corporate,** a for-profit company or group of people authorized to act as a single entity, usually controlled by an executive, an oversight board, and, ultimately, individual shareholders.

Each of these general ownership models (and myriad variations on them) has particular implications for management. (For more on community-conserved areas, see Borrini-Feyerbend et al. 2004)

It is vitally important to avoid simplistic value judgments about which kinds of protected areas are more important, or what kind of governance model is better than another. We live in a complex world, and the fact that we have many different flavors of protected areas reflects that. Some management categories are more suited to some locations than others, and some governance models are more suitable—or attainable—in some places than others. Furthermore, sometimes it may be beneficial to have the flexibility to change management or governance over time; in other circumstances it is better to "lock in" strong protection in perpetuity.

Governance is a cross-cutting descriptor of protected areas; that is, although historically developed with government primarily in mind, the categories can be applied irrespective of ownership. Private protected areas can and do fall into all of the 1994 IUCN categories, and presumably will apply in any future amendments. It would be incorrect to assume that private protected areas are better represented under categories IV–VI; many fit the management objectives of I–III, perhaps especially those owned or managed by NGOs.

Special reference to geographic scale may be necessary when considering governance, though it is equally important to consider in management categories. The geographic definition used to describe a protected area may affect the governance type that best describes it. While certainly there are large areas under single ownership/management authority, simply put the larger the geographic area the more likely it is to contain multiple owners/managers and, depending on the country, the more likely to include different governance types. This could lead to a large proportion of protected areas being assigned as co-management protected areas ("B"), even though this may not best represent the dominant power relationship affecting management objectives. On the other hand, a picture of

otherwise coherent landscapes, where a matrix of ownership patterns has evolved over time, may be obscured by piecemeal application of the categories by government type. Should IUCN pursue options for integrating government types with management objectives, considerable planning and testing would be required to find and establish protocols for application to complex protected areas. The problem is similar to that of applying management categories to protected areas with multiple management zones, but adds a dimension. Though challenging, the higher the resolution in applying the categories the sharper a picture of the state of protected areas will appear (Mitchell 2007).

Use and misuse of protected area statistics

A full counting of the extent of private lands,[2] as well as community-conserved areas and co-managed protected areas, that satisfy the IUCN definition of a protected area would significantly expand the aggregate statistics for the area "protected" around the world. Broad statistics can be used inappropriately and, stripped of detail on the objectives and effectiveness of management designations, can give the impression that a very great deal of land and sea are already adequately conserved. Summary protected area totals can and have been used to argue against the designation of additional protected areas or commitment of resources for conservation work within them. To quote Andrew Land, there are those who would use "statistics as a drunken man uses lampposts—for support rather than for illumination." As IUCN reviews definitions of and guidelines for protected area management categories, it may also need to establish or review internal policies for the use of global protected area statistics.

But potential misuse of aggregate statistics should not restrict efforts to describe conservation work that is and has been done at local and national levels. The international system of protected area management categories was intended to provide a shared understanding of local and national protected areas at a global level, to reflect rather than direct national and local policies. A key point of contention about the categories system stems from a concern that recognizing the spectrum of management objectives and governance types that exist today might dilute the definition of a protected area and possibly divert attention from biodiversity conservation. Part of the issue derives from basic interpretations of what the "protected" in "protected area" means. In all three core languages of IUCN, the name implies a level of completeness—and a past tense—that belies the constant management and vigilance that true protection requires. Meeting the definition is not an endpoint, but only the beginning of management *to achieve specific conservation objectives*. (From the Convention on Biodiversity definition of a protected area as a *geographically defined area which is designated or regulated and managed to achieve specific conservation objectives.)*

"Effective means"

The important point, of course, is not how many protected areas there are, what category they are described under, nor even who owns them, but how well they are managed for ecological and other public benefits. Private protected areas are as susceptible as government areas to being "paper parks," designated or otherwise recognized as a protected area without having any sig-

nificant positive conservation impact. Or worse, having a *negative* impact.

All protected areas should be managed and understood according to their relationship to the IUCN protected area management categories. These universal guidelines apply without prejudice to size, geography, or ownership/governance status. Using universal categories is a first step to evaluating the effectiveness of park management across borders.

In the majority of cases, the creation of a private protected area—and management of the same for conservation objectives—is a voluntary act on the part of the landowners. A growing recognition of the opportunities for achieving conservation objectives on private land—and especially the proliferation of mechanisms and incentives for doing so—has resulted in a dramatic increase in the number and extent of private protected areas in the last century, and in some countries these increases have been logarithmic in scale in the past few decades.

Motivations and incentives

If creating private protected areas is a voluntary act, what factors motivate landowners? These are generally more complex than they might appear, and probably few private reserves owe their origin to a single motive. Profit—especially tourism—is often cited, but may be the primary motivation in fewer cases than might be imagined. (Unfortunately, there is not enough reliable quantitative data on private protected areas to venture even an informed opinion on this point.)

Voluntary acts to create private reserves can be divided into intrinsic motivations (impelled by the essential nature of the actor; in this case, the landowner) and extrinsic incentives (incited by something outside of the actor; Table 2). Of the four groups identified in the private protected area definition, NGOs are assumed to be motivated by their mission to preserve biodiversity, nature, or heritage, as the case may be—intrinsic by definition. But some

Table 2. Examples of mechanisms and incentives for private land protection.

- Systems of voluntary protected area designations, in which landowners agree to certain management objectives or restrictions in return for assistance or other incentives. (The private natural heritage reserves of Brazil—RPPNs, for Reserva Particular do Patrimônio Natural—are an excellent example.)
- Voluntary surrender of legal rights to land use on private property, sometimes to realize advantages conferred by the theoretical loss in value, or to secure protection in perpetuity. (Conservation easements and related covenants and servitudes.)
- Charitable contributions, in which NGOs raise funds privately or publicly for purchase of land for protection, or receive gifts of land directly from willing donors. (Large NGOs such as The Nature Conservancy, Conservation International, and World Wildlife Fund are familiar, but there are many national and local examples around the world.)
- Corporate set-aside, donation, or management of an area for conservation, often for public relations purposes, as a concession or off-set for other activities, stipulation of "green" certification, or an investment in the future.

NGOs derive profit from compatible activities in some reserves and apply the funds to conservation in less-visited reserves. Company protected areas are the least-well studied. According to Stolton and Dudley 2007, "It is clear that there is a wide range of quality in terms of company involvement in protected areas—some excellent examples exist but there are also cases where setting aside a reserve is little more than a publicity exercise." Corporations are assumed to be profit-motivated of course, but this incentive may not always be the most immediate. For example, the public relations value of acting as a good corporate citizen may be motivation enough in the case of multinationals, or local corporations for whom product image is important. It is of course valuable for communities to protect their immediate surroundings, but they also may respond to government subsidies or preferential revenue sharing (see Rambaldi et al. 2005).

The motivations of individual landowners may be the most complex of all. Certainly many are personally concerned about nature (intrinsic motivation) but may need help (extrinsic incentive) to act on that concern. Incentives take many forms, from tax relief, compensation, and payment for ecological services (see Chacon 2005). But incentives need not be financial. Creating a private protected area may entitle the landowner to preferential technical or other assistance. Again, Rambaldi et al. (2005) cite reserve creation to enable landowners to prohibit hunting on their property.

In areas of high development pressure, landowners often face negative incentives for conservation. Creating a private reserve, or granting an easement, gives a landowner an option out of perverse economic or regulatory conditions that might compel him or her to act in ways contrary to personal convictions. This is clear in the United States, where high property taxes have forced landowners to develop land against their preference, just to meet their tax obligations.

Private reserves take many forms, and they reflect the social and economic conditions in which they are found. Generally they are most developed in countries with secure land tenure systems that allow private ownership. Though historical precedents are ancient, especially among the wealthy and powerful, *systems* of private protected areas are a relatively recent phenomenon, and it is logical to assume that private reserves will increase in number and geographic reach if land tenure systems continue to formalize and liberalize around the world. As Peruvian economist Hernando de Soto writes, "Contrary to popular belief, property systems open to all citizens are a relatively recent phenomenon—no more than two hundred years old—and the full implications of the transition have yet to emerge."

A global trend

Private protected areas are many, diverse, and proliferating around the world. Land trusts in the U.S. will be familiar to GWS members and readers, but almost all countries in the western hemisphere now have some form of private reserve system, many of them originating in the last decade. Safari tourism, among other factors, has contributed to the rise of private game reserves in eastern and southern Africa. A century after the creation of the National Trust in England, private land protection is growing across Europe. And it can be effec-

tive. The Foundation for Territory and Landscape has become the largest private landowner in Catalonia, Spain, in its first eight years of existence (Rafa 2005). Private reserves in the Atlantic Coastal Forest of Brazil have—along with an intensive captive breeding program—increased populations of the golden lion tamarin *(Leontopithecus rosalia),* the only primate species ever to be shifted into a lower threat category on the IUCN Red List of Threatened Species (Rambaldi et al. 2005).

From a governmental perspective, private protected areas (as well as community conserved areas and co-managed areas) can represent an "effective means" to achieving conservation objectives. (At the most recent George Wright conference, I heard a park superintendent say that the National Park Service is "stretched thin." Stretched thin? The United States is one of the wealthiest countries in the world, with a premier protected area system, we think. If we are feeling stretched, where does that leave other countries?)

Private and community groups can sometimes be more efficient than government counterparts, and their contributions reduce the management burden on government authorities. Significantly, as protected area strategies grow in geographic scale, other governance types become necessary, as large landscape conservation projects overlay extensive areas of private lands or locally managed resources.

The category system holds the potential to assist governments in monitoring private conservation activities, evaluating both the management objectives of private protected areas and their effectiveness. There are, of course, local and national safeguards in place in some countries intended to ensure that private protected areas are managed according to designation, regulation, or proclamation. The practical significance and implementation of these safeguards varies widely among countries. (There are also examples of self-regulation of private protected areas, such as the developing land trust accreditation program in the United States.) A standardized and verifiable management category system operating at an international level could provide governments with a comparative basis for monitoring private protected areas within their national conservation strategies.

Conclusion

An understanding of the status of protected areas worldwide requires standards for describing their management objectives. The protected area management categories of IUCN provide a standard, but are currently under review. *The category system describes existing national and subnational management objectives but is not intended to dictate them.*

Private protected areas are a large and growing subset of the world's protected areas, but are under-represented in the body of areas recognized by IUCN and reported in the World Database of Protected Areas. Integrating governance types with management categories in the future will enhance an understanding of the state of protected areas worldwide, and a binomial system is suggested. IUCN's World Commission on Protected Areas could foster a science to measure effectiveness of protected areas globally, but only if criteria and guidelines are specific enough to allow objective application of the management categories.

Endnotes

1. Sequoia was created in September 1890, followed closely by General Grant (later incorporated into Kings Canyon) and Yosemite. Technically, the second U.S. national park was Mackinac Island in Michigan. In 1875, most of the island, including Fort Mackinac, was designated as Mackinac Island National Park by Congress. When the fort was decommissioned in 1895, all the federal land on the island was transferred to the state of Michigan and is today a state park.
2. Private ownership rarely applies to the marine environment, though obviously protection of the terrestrial side of the land/sea interface is often a high conservation priority.

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Origin and History of Wildland Fire Use in the U.S. National Park System

Bruce M. Kilgore

Introduction

FOR THOUSANDS OF YEARS, FIRE HAS BEEN AN ESSENTIAL PROCESS in the conifer, brush, and grassland ecosystems found in many national parks in the United States. By the 1800s, not only Native Americans, but also many frontiersmen considered fire as part of the forest—and a beneficial part at that (Rothman 2005). Pyne (1982) noted that "all classes share in this view, and all set fires: sheepmen and cattlemen on the open range, miners, lumbermen, ranchmen, sportsmen, and campers." Cattle and sheepmen firmly believed that forest fires helped rather than hurt the "Big Trees" (Landers 1894). Thus, from the earliest historic times, humans accepted and made use of fire in the forest.

Many of our present wildfire problems began when we attempted to ban all fires from the forest. Yet in the late 19th century, forest resources were being destroyed and people killed by careless logging and the catastrophic fires that followed (Kilgore 1976). These large, destructive fires started in logging slash where they gained momentum before moving into uncut forests (Davis 1959). These fires made the public aware of the potential for wildfire damage and set the stage for developing rigid fire-control policies. But neither government agencies nor the public understood the changes in natural fuel accumulation, forest structure, and wildfire potential that such an unnatural fire exclusion policy would bring about.

Yellowstone and beyond

For the first century following the 1872 establishment of Yellowstone as the world's first national park, attempts were made to suppress fire. Yet, from the beginning, many pointed out that there was a difference in how fires close at hand and those in the backcountry were handled. Starting in 1886 at Yellowstone and in 1891 in the newly created Yosemite, Sequoia, and General Grant national parks, the military fought the fires it saw. Rothman (2005) concluded that "when lightning ignited a powerful fire in a remote area, it required less reaction. Such fires simply burned until they consumed all available fuel or were extinguished by precipitation or blocked by geographic barriers." Response to fire varied from park to park, and "officials might selectively let fires burn, as much a result of the lack of funds for firefighting as for any ideological reason" (Rothman 2005).

The three Sierra Nevada parks, Yosemite, Sequoia, and General Grant, proved more difficult to manage than Yellowstone's monumental scenery and charismatic animals, because they shared the "Big Trees" (giant sequoia) and as such were

intimately connected to fire (Rothman 2007). In 1889, a year prior to the establishment of Yosemite as a national park, a fire swept through the famed Mariposa Grove of giant sequoias. This fire "played a catalytic role in the demise of the Yosemite [State] Park Commission and the arrival of federal troops to administer the park"; their administration included the suppression of fires (Rothman 2005).

The need for such early suppression efforts by the military was re-enforced by the extremely large and intense 1910 fires that burned large parts of Yellowstone and Glacier national parks as well as the rest of the inland Northwest. Even though it was lightning far from the main roads that ignited most of Yellowstone's fires and high winds that spread them, the 1910 fire season proved pivotal to the national parks as well as the country in general in accepting total fire suppression as basic policy for all public lands. After that summer, the National Park Service (NPS) followed the Forest Service (USFS) lead, and for most of the next fifty years, suppression dominated NPS fire strategy (Rothman 2007).

Despite this general fire suppression policy, a number of "light-burning" advocates supported fire use, particularly in California in the early 1900s (H.J. Ostrander, 1902; G.L. Hoxie, 1910; T.B. Walker, 1913; S.E. White, 1920). John R. White, an early superintendent of Sequoia National Park, became the Park Service's most vocal proponent of light burning (Figure 1). To reduce fuels in giant sequoia groves, White tried a number of controlled burns in Sequoia in the 1920s, at a time when suppression was the rule for both park and forest fires. He engaged in a vigorous debate with Horace Albright, an NPS founder and later its director, who was an unabashed proponent of suppression (Rothman 2007). In Yosemite, the Army and early park superintendents continued burning the meadows in Yosemite Valley until 1930, following the well-known Indian practice of light burning to maintain open forests and meadows for cultural reasons (Ernst 1943, 1949, 1961). But the NPS did not support these early attempts at fire use philosophically and continued to believe that all fires were evil. So in 1935, when the 10 a.m. suppression policy (whereby all fires were to be con-

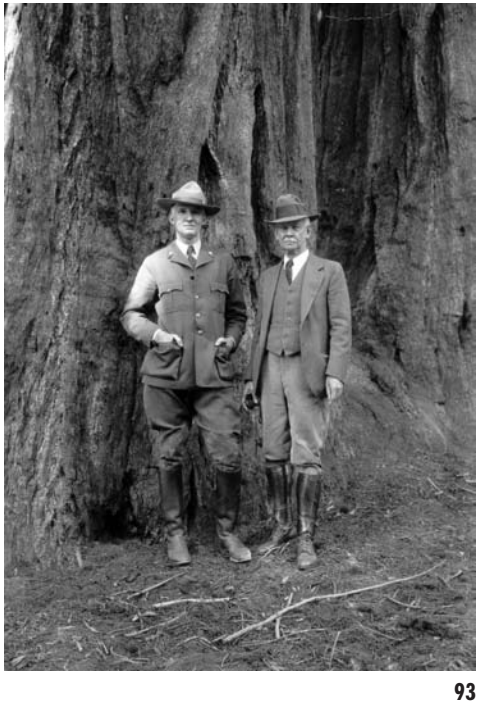

Figure 1. John R. White (left), superintendent of Sequoia National Park in the 1920s and '30s, was the National Park Service's most vocal proponent of light burning. He used a number of controlled burns to reduce fuels in sequoia groves and engaged in a vigorous debate with early directors of the NPS. He is pictured here with George W. Stewart, an early advocate for Sequoia National Park and editor of the Visalia (California) *Delta*. NPS photo.

tained by 10 a.m. the following day) was adopted by the USFS, it was accepted by NPS as well.

During the early 1900s, a more complete ecological understanding of the impact of fire on vegetation and wildlife was being documented in the scientific literature by university and government scientists (Chapman 1912; Stoddard 1931; Weaver 1943). H.H. Chapman of Yale University carried out extensive experiments in the South with fire in longleaf and slash pine and documented the role it played in the survival of those species. As early as 1912, Chapman published an article in *American Forests* which argued that "the attempt to keep fire entirely out of southern pine lands might finally result in complete destruction of the forests" (Chapman 1912; Carle 2005). While the 10 a.m. suppression policy continued for most of the country, the work of Chapman and other "Dixie Pioneers" led to an exception to the total suppression policy in the South in 1943 (Kilgore 1976). Schiff (1962) called this USFS policy change "The switch in time that saved the pine." It authorized an exception to the total fire exclusion policy, allowing controlled burning in national forests with longleaf and slash pine.

Another important contribution from the South began when Ed Komarek started work with Herb Stoddard's Cooperative Quail Organization in 1934 (Carle 2002). This led to a broad program of support for fire research and management, culminating in establishment of the Tall Timbers Research Station in Tallahassee in 1958 (Carle 2002). In 1962, the first of a series of Tall Timbers Fire Ecology Conferences became the center of innovation in fire ecology that often directly contradicted the USFS total suppression model (Rothman 2005). These conferences provided an "open, inviting climate (that) created healthy discussions about the role of fire in the natural world" (Rothman 2005). While not obvious at the time, the gradual transition from fire control to fire management—including wildland fire use—had begun.

The early years of the National Park Service

In a recent fire history of national parks, Rothman (2005) says, "National parks and fire have an intimate and unbreakable relationship." He points out that the mission of the NPS—unique among federal agencies—helped make its fire history different from that of its peers. Its mission, stated in the 1916 National Park Service Act (commonly called the Organic Act) is "to conserve the scenery and the natural and historic objects and the wildlife therein … in such manner and by such means as will leave them unimpaired for … future generations" (NPS 1968). Sellars (1997) notes that the Organic Act required the parks to be left "unimpaired," and he interprets this as "essentially synonymous with maintaining 'natural conditions.'" That mission statement gave the NPS "a latitude to experiment with fire that other agencies did not enjoy" (Rothman 2005).

The USFS mission relates to "wise use" of resources, while the NPS is devoted to the preservation of natural environments and cultural resources. Because of these differences, the orientation to total fire suppression found in the NPS was never quite as strong as in the USFS. Before the 1964 Wilderness Act, the NPS was "the only federal bureau with a mandate specifically encouraging the preservation of natural conditions on public lands" (Sellars 1997). Yet the NPS had to be "awakened to ecolog-

ical management principles by outside critics."

Much of the history of the NPS from the 1930s on involved a conflict between two idealistic factions, each committed to different perceptions of the basic purpose of national parks. By far the stronger group emphasized recreational tourism and public enjoyment of park scenery (Sellars 1997). This group was made up of many park superintendents, rangers, landscape architects, and engineers. This group was committed to total fire suppression and was initially led by Horace Albright.

The second group was represented by a few wildlife biologists who "focused on preserving ecological integrity in the parks, while permitting development for public use in carefully selected areas" (Sellars 1997). These biologists and researchers were led by George Wright, the chief of the first NPS Wildlife Division. They were committed to maintaining natural processes. Their point of view was clearly supported by Superintendent White of Sequoia and General Grant national parks (Rothman 2005). This group defined "unimpaired" in biological and ecological terms.

The traditional fire role: Albright and Coffman

Although Grinnell and Storer (1916) warned early on that "without a scientific investigation" of national park wildlife, "no thorough understanding of the conditions or … the practical problems [of managing national parks] … is possible," the NPS under its first director, Stephen T. Mather, ignored this advice (Sellars 1997). In its early years, the NPS did not develop any servicewide fire or resource management policies, and instead let actions on resource management and fire be determined locally by park superintendents. From a national perspective, with NPS's minimal funding and few employees, encouraging public use of the parks by developing roads, trails, hotels and campgrounds took precedence (Rothman 2005).

Beginning with the leadership of Mather, the NPS protected its forests from fire, insects, and disease; it generally followed the USFS lead in its fire suppression policy and depended largely on the USFS for assistance in fire suppression. Only after the large and intense fires in Glacier in 1926 did the NPS decide it needed a forester as well as in-house fire expertise. In 1928, it hired John Coffman from the Mendocino (California) National Forest to lead its fire control program (Sellars 1997; Rothman 2007). Coffman began by introducing fire planning to the NPS, beginning at Glacier, but following another major fire in 1929 at Glacier, it seemed to many that total "fire exclusion was fantasy" (Rothman 2007).

"Because the NPS could not suppress fire with the vigor it wanted, fire and the ecological benefits it brought persisted in many places in the national park system. The lack of resources to fight fire prevented an overzealous response" (Rothman 2005). Nevertheless, in terms of using fire for resource benefits, White at Sequoia and early Yosemite superintendents (in Yosemite Valley meadows) were alone in advocating controlled burning, and "suppression remained the order of the day."

Beginning in 1933, there was an infusion of Civilian Conservation Corps (CCC) personnel and funding that led to major implementation of a fire suppression strategy. By 1935, some 115 CCC camps had been established in national parks and 150,000 enrollees worked in NPS programs in the peak years. Roads, fire breaks,

fire trails, lookouts, telephone lines, and guard cabins all were part of this program. "The combination of the seemingly endless supply of federal resources, the fear of more major fires, and the dominance of the Forest Service in fire policy and planning created de facto NPS policy" (Rothman 2005).

Despite its increasing success, "the NPS's attempt to eliminate fire became a source of consternation for wildlife scientists within the Service.... Under Coffman, some charged, New Deal programs made some national park areas look more like national forests, managed landscapes rather than vestiges of a natural past" (Rothman 2007). In a meeting in 1935 in Glacier National Park, biologist Adolph Murie argued strongly against a proposal to cut and remove dead trees in a recently partially burned twelve-square-mile area on Glacier's west slope, north of McDonald Creek. Foresters argued that area was ripe for another fire that could spread to adjacent unburned forest (Sellars 1997). But Murie replied: "For what purposes do we deem it proper to destroy a natural state?... We have been asked to keep things natural; let us try to do so" (Sellars 1997).

On the other hand, the chief forester of the NPS, Larry Cook, felt that "nature goes to extremes if left alone," and that "the Service must modify conditions to retain as nearly a natural forest condition as possible for the enjoyment of future generations." Cook was very concerned that his staff had been accused of being "destroyers of the natural" (Sellars 1997). This contentious debate "reflected [the] sharp divergence between the wildlife biologists and the foresters on fire protection and overall national park policies."

Wright and his growing cadre of wildlife biologists "never agreed with Coffman's perspective; they liked his policies even less" (Figure 2). Wright "advocated preserving the forest as it was, letting natural processes drive any changes in ecology" (Rothman 2007). Coffman's forestry model, on the other hand, attempted to protect park forests not only against fire, but also insects, disease, and other threats. Wright's model suggested a dynamic forest, ever changing, while Coffman saw a forest frozen in ecological time (Rothman 2007).

Role of Wright and the biologists

A brief but significant turning point in NPS philosophy toward management of natural ecosystems—including fire—came when George Wright began his career with

Figure 2. George Wright, first chief of the NPS Wildlife Division, advocated preserving forest and letting natural processes–like fire–drive changes in ecology. A survey team, shown here, involving Wright (left), Ben Thompson, and Joseph Dixon, produced "Fauna No. 1" in 1933, a landmark report that not only recommended preservation of existing conditions, but also restoration of natural conditions in the parks. NPS photo.

the NPS as assistant park naturalist in Yosemite. Wright was a student of Joseph Grinnell, head of the Museum of Vertebrate Zoology at the University of California–Berkeley, and longtime proponent of scientifically based management of the national parks (Sellars 1997). In 1929, Wright initiated a survey of wildlife populations in the parks, funded from his personal fortune, marking the first sustained NPS "scientific research in support of natural resource management" (Sellars 2000). A wildlife survey team under Wright produced a landmark report, known as "Fauna No. 1," the first of its kind in NPS history (Wright, Dixon, and Thompson 1933). It recommended not only the preservation of existing conditions, but also "where feasible, the restoration of natural conditions in the parks." In 1934, NPS Director Arno Cammerer "declared the Fauna No. 1 recommendations to be official policy" (Sellars 2000).

Sellars (2000) pointed out that "George Wright's efforts thus began a new era in NPS history. In effect, the wildlife biologists under Wright's leadership reinterpreted the 1916 congressional mandate that the Park Service must leave the parks 'unimpaired.' In their view, the Park Service's mandate required not only preserving scenery and ensuring public enjoyment, but also applying scientific research to ensure that the parks were left as ecologically intact as possible, given public use of the areas" (Sellars 2000).

The biologists' ideas on natural resources provided new perspectives that challenged traditional assumptions and practices. In effect, they became a kind of "minority opposition party" within the NPS that raised questions about the utilitarian and recreational emphasis in park management (Sellars 2000). NPS foresters reacted with alarm to the new perspective on the role of fire in parks, because "the biologists accepted forest fire as a natural ecological element" and "even argued that, in a park maintained in a natural condition, a forest blackened by a naturally caused fire is just as valuable as a green forest" (Sellars 2000).

In terms of our interests today, George Wright was an NPS visionary, whose concepts of scientifically based resource management were far ahead of their time. "Fauna No. 1 was clearly the philosophical and policy forerunner to the 1963 reports on national park management and science by the Leopold Committee and the National Academy of Sciences" (Sellars 2000) and a forerunner to concepts of allowing lightning fires to burn in NPS areas.

But the emergence of such new ecological attitudes was short-lived. Wright was killed in an automobile accident in 1936, and the Wildlife Division staff that had grown to 27 in the Washington office dwindled to nine by the late 1930s. The NPS chose to hire foresters instead of biologists or scientists, and "wildlife biologists found themselves alone as advocates of ecological management as the foresters continued to follow USFS practices" (Rothman 2007). The few remaining biologists were transferred to another Interior agency, the Biological Survey, in 1940.

Despite the work of Wright and his colleagues in the early 1930s, fire suppression continued as the keystone of NPS policy in the '30s, '40s, and '50s. At the same time, it was clear that many wildlife biologists and other scientists, within and outside the NPS, held contrary views. A number of these scientists and academics at universities and within the agencies continued to

carry out studies on the ecological importance of fire in various ecosystems. In Everglades National Park, Bill Robertson began experimental burning in the 1950s, reminiscent of the earlier work of White in Sequoia (Robertson 1953).

In 1950, Sequoia Superintendent Eivind Scoyen supported the designation of the Kaweah Basin in the Upper Kern River drainage as a research reserve that would not be subjected to fire suppression. To that extent, the NPS "accepted the principle that (lightning) fire should not be instantly suppressed in some parts of the park system even before the controlled burn program at Everglades began" in 1953 (Rothman 2007). This was seen by Sumner (1950) as an important early step in the development of NPS policy on natural fires.

Weaver and Biswell

Two prominent western scientists who sought a better understanding of fire's natural role in the environment were Harold Weaver (Figure 3) and Harold Biswell. Weaver began with the Bureau of Indian Affairs (BIA) in 1928 and by 1943 had published a seminal paper in the *Journal of Forestry* on the role of fire in ponderosa pine that would be cited by many workers in the field (Weaver 1943; Carle 2002). In a letter to H.H. Chapman, Weaver acknowledged that Chapman's "work in longleaf pine of the south has made our path much easier," pointing out the continuity in fire ecology research from one part of the country to the other.

Biswell began work with the USFS in Berkeley, California, in 1930, transferred to the Southeast Forest Experiment Station in 1940, and transferred to the University of California–Berkeley in 1947. His early concept of fire as "the arch enemy of forests" changed with his work with controlled fire in the South (Carle 2002). Biswell had huge impacts on the fire management programs of both the NPS and USFS through his students at Berkeley and through agency personnel and academics trained or inspired by him and his work (Carle 2002). Both Biswell and Weaver supplied the long-term systematic research that had never been done during the early light-burning debates in California. Their work at last provided scientific support for the ranchers and timbermen who opposed fire exclusion policies (Carle 2002).

Figure 3. Harold Weaver of the Bureau of Indian Affairs carried out some of the earliest prescribed burning in ponderosa pine forests of the west. His breakthrough 1943 *Journal of Forestry* paper on such work was ahead of its time. Weaver at Rattlesnake Creek in the Middle Fork of the Kings River, Sequoia–Kings Canyon National Park, 1968. NPS photo by Bruce Kilgore.

The Leopold Report era

In the early 1960s, support for use of fire came from a totally different source. The NPS began feeling considerable pressure to accept sport-hunting (hunters deputized as park rangers) as one method to help reduce numbers of elk in Yellowstone's northern herd. Strong views against this policy were expressed at the time both by environmentalists and within the NPS itself (Sellars 1997). When NPS rangers killed 4,500 elk during the next winter, hunters' groups and state conservation officials reacted angrily because they were not included. This caused what the Department of Interior called a "crisis in public relations."

As a result, Secretary of the Interior Stewart Udall called for two studies to address concerns that, in effect, had been expressed 30 years earlier in Fauna No. 1 by George Wright and his biologists (Sellars 1997). In 1962, Udall asked the National Academy of Sciences (NAS) to undertake a review of the "natural history research needs and opportunities" in the national parks. He also asked A. Starker Leopold, professor of zoology at the University of California–Berkeley (and son of the ecologist Aldo Leopold), to chair a blue-ribbon panel of highly respected wildlife specialists to study the Park Service's wildlife management policies and practices (Figure 4). Never before had such prestigious committees from outside the NPS been called upon to undertake in-depth reviews of research and wildlife management policies. The earlier Fauna No. 1 lacked the political clout these panels brought to such a review (Sellars 1997).

"Appearing in 1963, the Leopold and NAS reports were threshold documents" (Sellars 1997). They pointed out facts and ecological principles at extremely high political levels, and "they compelled a new vision of NPS management" (Rothman 2007). Both reports pushed for a stronger ecological basis for park management, set a higher standard for science in the NPS, and influenced natural resource management policies. The Leopold Report panel transformed a report on the condition of wildlife in the national parks into a powerful argument for a new approach to management of park areas, including fire management.

Guided by such broad philosophical and ecological concepts, the Leopold

Figure 4. A. Starker Leopold chaired the blue ribbon panel of wildlife specialists appointed by Secretary of the Interior Udall in 1962 to study NPS wildlife management policies. The panel recommended a new vision of natural resources management, including major changes in NPS fire management policy. Photo of Leopold at Whitaker's Forest by N.H. (Dan) Cheatham.

Report (Leopold et al. 1963) (1) provided a new vision of "natural" resource management of national parks; (2) offered specific recommendations for a new NPS policy; and (3) challenged the validity of total fire suppression. Its comments on the shortcomings of past fire management actions were particularly significant to the development of wildland fire use policy in the NPS. Such comments included these often-quoted ideas:

- "…much of the west slope [of the Sierra] is a dog-hair thicket of young pines, white fir, incense-cedar, and mature brush—a direct function of overprotection from natural ground fires."
- "A reasonable illusion of primitive America could be recreated, using the utmost in skill, judgment, and ecologic sensitivity."
- "Above all other policies, the maintenance of naturalness should prevail."

And finally, both it and the NAS report urged an expanded program of research within the NPS and that every phase of resource management be under the jurisdiction of biologically trained personnel of the NPS.

These concepts had support at high levels of the NPS, and after Leopold presented his report at the North American Wildlife and Natural Resources Conference in March 1963, Secretary Udall added his support. The expertise of Biswell and the strong professional standing of each member of the five-person Leopold Report Committee were pivotal to staff members in the NPS who were developing and implementing the first wildland fire use and prescribed fire programs at Sequoia–Kings Canyon and Yosemite national parks despite entrenched anti-fire use attitudes among the professional fire control staff within the NPS and other cooperating state and federal agencies.

The close relationship between Leopold and Biswell "greatly contributed to both the ideas in the Leopold Report and the implementation of its goals" (Rothman 2007). Both men taught at the University of California–Berkeley, their labs "became crucibles for a new generation of fire scientists," and four of these "became NPS scientists who influenced fire policy during the subsequent generation." Rothman (2007) notes that Biswell's impact extended well beyond high-level discussions; it "created a generation of scholar/practitioners who carried his ideas forward."

Biswell played an instrumental role in the shift from theory to the practice of introducing fire. In 1964, he received permission to begin giant sequoia restoration studies at Whitaker's Forest, a 320-acre University of California experimental forest on the slopes of Redwood Mountain adjacent to Sequoia-Kings Canyon National Parks. From 1964 to 1975, Biswell and his students carried out fuel reduction (cut, pile, and prescribed burn) studies at Whitaker's Forest. While doing graduate work in fire ecology under Leopold from 1964–1967, I worked with Biswell and his students at Whitaker's (Kilgore 1971a, 1972). We also worked closely with Richard Hartesveldt, Tom Harvey, Howard Shellhammer, and Ron Stecker from San Jose State University as they carried out giant sequoia ecology and burn studies upslope in the Redwood Mountain portion of the park (Hartesveldt and Harvey 1967; Harvey et al. 1980).

During field days at Whitaker's Forest, Biswell would patiently explain (and demonstrate) how easily—and lightly—fire

burns in ponderosa pine needles and bear clover (Figure 5). His audience usually included skeptical fire suppression personnel from both state and federal agencies who had "done it a different way" for a lot of years. But Biswell had strong knowledge and personal experience in prescribed burning in the Southeast and in chaparral areas in northern California. His professional expertise, patience, and enthusiasm for use of prescribed fire in both the South and West was of tremendous importance to the NPS at Sequoia–Kings Canyon and Yosemite (van Wagtendonk 1995; Carle 2002; Rothman 2005).

Early wildland fire use policy for the NPS

Between 1963 and 1967, policy changes to put the recommendations of the NAS and Leopold reports into practice were slow in coming. A number of NPS Washington staff found ways to delay action and maintain the status quo despite what the Leopold Report said (Rothman 2005). When the key NPS fire staff man in Washington heard about the plans at Sequoia–Kings Canyon for allowing natural fires to burn, we understood he replied, "Over my dead body!" (Rothman 2005). But the fires of July 1967 in Glacier raised

Figure 5. Professor Harold Biswell conducts a demonstration burn in 1969 at Whitaker's Forest, a University of California experimental forest adjacent to Sequoia–Kings Canyon National Parks. Biswell played a major role in how the NPS implemented its new fire management policy in 1968. NPS photo by Bruce M. Kilgore.

the issue again. With the help of certain supportive NPS Washington staff—including Lyle McDowell and Eivind Scoyen (Rothman 2005)—by late 1967 the vision and ideas of the Leopold Report were finally incorporated into a total revision of the NPS Natural Resource Policy guidelines—including fire policy (National Park Service 1968).[1]

That first (1968) NPS policy supporting wildland fire use read as follows:

> The presence or absence of natural fire within a given habitat is recognized as one of the ecological factors contributing to the perpetuation of plants and animals native to that habitat.
>
> Fires in vegetation resulting from natural causes are recognized as natural phenomena and may be allowed to run their course when such burning can be contained within predetermined fire management units and when such burning will contribute to the accomplishment of approved vegetation and/or wildlife management objectives.
>
> Prescribed burning to achieve approved vegetation and/or wildlife management objectives may be employed as a substitute for natural fire.[2]

An interesting practical aspect was that the initial policy was only an objective; it was an "articulation of a larger ideal with little practical instruction for its execution." It included neither resources nor a support system to implement it, nor did it clearly describe parameters. So individual parks were on their own. "The use of fire as a management tool became a park-level prerogative that superintendents usually had to fund within their existing budgets … most parks continued to maintain an active suppression program even as they grappled with the implications of prescribed burning" (Rothman 2005). The parks that took the lead in implementing the new policy were Sequoia–Kings Canyon and Yosemite, parks influenced by Harold Biswell and his students.

In October 1967, while he was briefly chief scientist of the NPS, Leopold arranged a meeting in Berkeley between Sequoia Superintendent John McLaughlin and his staff and key USFS Experiment Station staff. Leopold was seeking help in developing a strategy for the first use of fire at Sequoia–Kings Canyon. (At this same time, I was personally becoming involved in the fire research program at Sequoia and Kings Canyon National Parks, and so I was able to observe firsthand the interactions involved at this and related planning meetings.)

As the meeting moved along, skepticism was expressed about whether the NPS staff at Sequoia–Kings Canyon had the facts needed to move ahead with burning. My recollections, as recorded in my notes, are that Leopold quietly interrupted the discussion and told the assembled foresters, "We came to this meeting to get ideas on where and how to go. We are *not* asking your opinion on *whether* we should go. We want to know what the best program is. In fact, we are *going to prescribe burn*."

The tone of the meeting turned around quickly. Good suggestions were made, and the NPS under Superintendent John McLaughlin moved ahead with plans for both prescribed burning and allowing lightning fires to burn the following year.

In early 1968, I officially joined Superintendent McLaughlin and his staff at

Sequoia–Kings Canyon, and that summer the park's rangers carried out the first prescribed burn (of 800 acres) just north of the Middle Fork of the Kings River. In an effort to restore fire to a more natural role, McLaughlin also allowed lightning fires to burn above 8,000 feet of elevation in the same drainage. So that summer, while we monitored impacts on burn plots and control plots on that 800-acre prescribed burn unit on the north rim (Kilgore 1971a), we were also able to look across the canyon at the Kennedy Ridge Fire—the first lightning-ignited fire purposely allowed to burn in any national park or wilderness in the country (Figure 6).

We later checked that site. It seemed to us it was behaving exactly like the ranger-ignited fire on the opposite canyon. We saw no reason to continue suppression of lightning-ignited fires in these high-elevation areas (Kilgore 1971a). Instead, we decided that such fires would just be monitored regularly.

In reviewing some historical documents, I found a 1970 paper of mine that reminded me of the NPS viewpoint at the time (Kilgore 1970). As I presented this paper to a primarily Forest Service audience in Missoula, Montana, I pointed out that I was a researcher with the National Park Service in Sequoia–Kings Canyon. I explained

Figure 6. This 1968 Kennedy Ridge fire was the first lightning-ignited fire allowed to burn in any national park in the country. NPS fire policy had been modified in 1967 to allow "fires from natural causes" to burn within predetermined fire management units. NPS photo by Bruce M. Kilgore.

that—as such—I looked at the role of fire in the forest in a different way from that of researchers working under other agency philosophies and policies. This was 37 years ago, and I said that I felt our 1970 NPS fire policy made the broad philosophical base of our program simpler than that of the USFS.

Specifically, at that time, the NPS was trying to restore fire to its natural role in forest ecosystems. And it seemed then that the simplest way would be to let lightning fires burn. In 1970, that was exactly what we had been doing for three years in Sequoia–Kings Canyon. We even called our early efforts at wildland fire use a "let-burn" program. And when George Briggs and I published our first description of that program in the *Journal of Forestry* in 1972, we included a map of our "let-burn zone" (Kilgore and Briggs 1972). The term "let-burn" was later interpreted as adopting a casual approach—with no careful monitoring programs or follow-up concerns; so it's clear why the terminology was changed to "prescribed natural fires" (PNFs) in 1986 (NPS 1986). The newer term, "wildland fire use" (WFU), is documented in a briefing paper by the National Fire and Aviation Executive Board (2005).

In those initial years, we thought of "allowing natural fires to burn" as a clear

Figure 7. In high-elevation forests at Yosemite, lightning-ignited fires are allowed to burn so long as they pose no threat to human life or property. This 8,000-acre Hoover Fire of 2001 burned at low-to-high severity for several weeks in the same basin as the Starr King fire 27 years earlier. Most burning was of low-to-moderate severity. Some 20 similar WFU fires have burned in this basin over the past 30 years. NPS photo by Ed Duncan.

concept (Figure 7). And so I concluded my thoughts in 1970 with somewhat poetic language, adapted from the Leopold Report: "… in national parks, our guiding principle is the maintenance of naturalness. And we are finding that whenever and wherever possible, the best way to restore a semblance of native America seems to be to let natural forces run their own course" (Kilgore 1970).

By the third year of the program (1970) at Sequoia–Kings Canyon, about 70% of the two parks were included in the natural fire zone. The management unit had been enlarged to include virtually all contiguous park lands above 9,000 feet of elevation from the Kern and Kaweah drainages in the south to the South Fork of the San Joaquin River drainage on the north, except where fuels were continuous across park boundaries (Kilgore and Briggs 1972). Within that zone, lightning-ignited fires were not ignored. Fire management personnel kept close watch for any smokes, using daily fixed-wing flights. But immediate suppression action was not taken if the fire was within the natural fire zone and believed to be caused by lightning. A detailed report was sent to the park wildfire committee, which could order the fire suppressed. Similar programs began in 1972 at Yosemite National Park (Parsons and van Wagtendonk 1996).

So, it was only in the late 1960s and early 1970s that the NPS began to accept the role of lightning-ignited fires and to manage them as PNFs. This change in policy—allowing lightning fires to burn in certain areas—was partly based on scientific facts from the South and West about fire's natural role. Much research and new thinking about fire came from outside the federal government and created "the important intellectual rationale that underpinned this radical policy shift" (Rothman 2005). But it was also based on solid ecological concepts and on a vision of what ought to be found in national parks—based on strong, deep concepts about what is "natural" that were endorsed by George Wright and his biologists (Rothman 2005).

Even so, in the 1960s and early 1970s, we worked closely with Bob Mutch, Dave Aldrich, Harry Schimke, Bud Heinselman, Bud Moore, Orville Daniels, and other fire research and management leaders in the Forest Service in developing our natural fire and prescribed fire programs. Their help was instrumental in reviewing plans and proposed publications that would help explain these new programs to the public in those early years, when smoke from lightning fires in the backcountry of Sequoia–Kings Canyon and Yosemite or from prescribed fires at Redwood Mountain, the Mariposa Grove, or Yosemite Valley could cause raised eyebrows—or worse!

In practice, a PNF program will always be a limited program. Only certain very large wilderness areas can be considered for such a program, and then only certain seasons and weather conditions will permit decisions to allow lightning fires to burn. So the overall objectives of NPS wildland fire management are best met by a three-part program:

- Allowing lightning-ignited fires (PNFs) to burn when they help reach management objectives and when they do not threaten human life and developed properties;
- Using human-ignited prescribed burning as the proper tool of forest management in ecosystems changed by prolonged exclusion of fire or to reduce

fuels along boundaries of management zones;
- Continuing fire suppression in developed areas and for all fires not meeting management objectives.

In those early years, Leopold, Biswell, and McLaughlin did not have our current extensive research to support the early wildland fire use programs (Kilgore and Briggs 1972) and prescribed burning programs (Kilgore 1971b; Kilgore and Biswell 1971; Kilgore 1972). But they did have vision and insight supported by early hypotheses and evidence of the importance of fire in many southern and western forest types (Chapman 1912, 1944; Stoddard, 1931, 1935, 1936; Greene, 1931; Weaver 1943). And they were bold enough to want to try to restore fire, based on the best evidence then available, and to make changes needed in prescriptions as they went along.

In summary, in 1968, Sequoia–Kings Canyon Superintendent John McLaughlin (Figure 8) was the first federal manager to allow natural lightning fires to burn in the backcountry of a national park or wilderness (Kilgore and Briggs 1972; McLaughlin 1972; Schuft 1972). He had the Leopold Report and the newly revised NPS policy to

Figure 8. In 1968, Superintendent John McLaughlin was the first federal land manager to allow natural lightning fires to burn in the backcountry of a national park or wilderness. He did not have the current extensive research to support such a program. But he had vision and insight supported by evidence of the importance of fire in many Southern and Western forest types. And he was bold enough to try to restore fire based on the best evidence then available. NPS photo by Bruce M. Kilgore.

support him, and he had one of Leopold's former graduate students on his staff as well as strong philosophical support from Leopold, Biswell, and their students. But he was the manager who signed off on that initial wildland fire use and prescribed burn program in 1968, while key remnants of the total-suppression-oriented fire staff still served in both the NPS Washington and Western regional offices. [3]

Wildland fire use in the NPS: 1968 to 2006

Starting with the origin of WFU in the NPS in the late 1960s and early 1970s, these programs have evolved and become more sophisticated during the nearly four decades since. A number of authors have described the policy, programming, planning, monitoring, and funding phases of the evolution of the NPS fire management program (Kilgore 1976; Bancroft et al. 1985; Ewell and Nichols 1985; Parsons et al. 1986; van Wagtendonk 1991; Kilgore and Nichols 1995; Botti and Nichols 1995; Keifer 1998; Parsons and Landres 1998; Parsons, Landres, and Miller 2003.) The NPS is now managing more than 38 million acres of national park wilderness in a way that allows fires to play a more natural role. Looking beyond the program's origin at Sequoia–Kings Canyon and Yosemite, a historical overview of the WFU Program in the NPS follows.

In an early fire management program at Saguaro National Monument, Arizona, Chief Ranger Les Gunzel coined the term "natural prescribed fire" for lightning-caused fires that were allowed to burn under specific prescribed conditions (Gunzel 1974; Kilgore 1976b). The first such fire burned in 1971, and more than 900 acres burned between 1971 and 1974.

By 1974, lightning-caused fires could be allowed to burn when ignited within more than 3 million acres of designated natural fire zones in nine NPS units (Table 1). In 1974 alone, 74 lightning fires were allowed to burn on 15,000 acres of park wildlands. At the same time, five park units ignited 46 prescribed burns covering another 11,000 acres of forest and grasslands (Figures 9 and 10). Between 1968 and 1974, a total of 274 lightning fires were

Table 1. Historical summary of growth of wildland fire use in the NPS.

Date	No. of NPS units with Natural Fire Zones	Total acreage of Natural Fire Zones	No. of fires	Total acreage of fires
1968	1	300,000	2	1
1974	9	3,000,000	274*	27,000*
1982	15	7,000,000	900**	130,000**
1988	26	—	—	—
1989	0	0	0	0
1996–2005	37	38,000,000	870+	650,000

* These figures are for the period 1968–1974.

** These figures are for the period 1968–1982.

Data for 1996–2005 are from NIFC (Steve Botti, personal communication).

Figure 9. In 1969 at Sequoia–Kings Canyon, compartments roughly 1,000 feet long by 300 feet wide were ignited by drip torches and allowed to burn with the goal of reducing fuels along the Redwood Mountain Grove boundary and gradually restoring fire to its natural role in the sequoia–mixed conifer ecosystem. NPS photo by Bruce M. Kilgore.

allowed to burn more than 27,000 acres, while park staff with drip torches ignited 266 fires that burned over 37,000 acres (Kilgore 1976b).

By 1982, lightning-caused fires could be allowed to burn if ignited within nearly 7 million acres of designated natural fire zones in 15 national park units. Since the beginning of those NPS programs in 1968, more than 900 lightning-caused fires had burned over 130,000 acres. In addition, more than 840 planned prescribed burns were ignited in 26 NPS areas and covered some 180,000 acres (Kilgore 1983).

By early 1988, some 26 NPS units were under PNF. But following the extensive Greater Yellowstone fires of that year—in the park and surrounding national forests—no PNFs were allowed in 1989, and there were major cutbacks for several years (Kilgore and Nichols 1995). Although the 1989 review of federal wildland fire policy supported the continuation of PNF policy, additional planning and risk management actions were required to reinstate these programs. The negative publicity surrounding the Yellowstone fires, most of which were never managed as PNFs, led

Figure 10. Only certain large wilderness areas can consider allowing lightning fires to burn in parks and wilderness. Human-ignited prescribed burning is needed in ecosystems changed by prolonged exclusion of fire. Resource Manager Bob Barbee (standing left), Harold Biswell, and NPS Scientist Jan van Wagtendonk (standing, fourth from left) led the early fire management program at Yosemite in the late 1960s and '70s. NPS photo.

many superintendents to adopt a cautious approach to reinstating PNF programs.

In the decade from 1996 to 2005, the trend turned around, with 37 NPS areas allowing PNFs (or WFU fires) to burn on 38 million acres of natural fire zones. There were 870 fires in this decade, burning 650,000 acres (Steve Botti, personal communication). Not unexpectedly, two-thirds of that acreage was found in four units in Alaska. And much of the Lower 48 acreage was found in six large national parks: Glacier, Grand Canyon, Yosemite, Yellowstone, Sequoia–Kings Canyon, and Everglades (see Table 1).

Major learning experiences

Between 1968 and 2006, there have been a number of major learning experiences that have benefited the WFU program of the NPS.

Waterfall Canyon and Starr King fires. During the first two decades of NPS PNF programs, four fires in particular provided learning opportunities for the agency. In 1974, both the Waterfall Canyon Fire in Grand Teton National Park, Wyoming, and the Starr King Fire in Yosemite attracted much attention to the concept of allowing such fires to burn in NPS areas. Both tested the program's validity, because they stimulated controversy about impacts of smoke on both NPS visitors and nearby communities.

Ignited in July, the Waterfall Canyon Fire covered about 3,700 acres before it was put out by late autumn snows. It was a slow-burning fire and highly visible across Jackson Lake; smoke at times obscured the view of the Grand Tetons. As a result, some permanent residents of Jackson, visitors, and parts of the tourist industry complained of air pollution and accused the NPS of a "scorched earth" policy (Kilgore 1975). Superintendent Gary Everhardt felt such public reaction was understandable, but he maintained strong support for the program.

A few years later, when he became NPS director, Everhardt sent out the first comprehensive press release describing in some detail the three-part NPS program of PNF (now WFU), prescribed burning, and suppression. "Everhardt's public support spoke volumes about the importance of the burn program and the backing it now enjoyed from the highest levels of the NPS" (Rothman 2005).

Ouzel Fire. In 1978, the Ouzel Fire at

Rocky Mountain National Park in Colorado presented the first serious problem for the NPS PNF program. It was the first PNF that threatened an adjacent community, and, as such, was a significant public relations and constituency problem for the NPS. It also highlighted the gap between intellectual concepts about fire management and realities on the ground (Rothman 2007).

Lightning had ignited the fire on August 9 above 10,000 feet of elevation in spruce–fir forest. For more than a month, NPS staff managed it as a PNF in accordance with their wildland fire management plan. The fire initially smoldered and crept along the surface, but by August 23, it began flaring up and intermittently crowning (Figure 11). This pattern continued until September 1 when high winds caused persistent crowning and spotting. After a brief suppression effort, the fire was considered stable and on September 11, rain and snow fell. But on September 15, winds again increased considerably and the fire made a substantial run outside the high-elevation fire management zone in the direction of the small community of Allenspark, just outside the park's boundary. A Type I Incident Management Team was called in, and with the help of natural topography, confined the fire within the park (NPS 1978; Laven 1980; Kilgore 1983).

Several learning points were stressed in the Ouzel Fire's evaluation report:

- Fire history, vegetation patterns, fuel loadings, aspect, and drainages where unusual fire behavior may be expected should be emphasized in a natural fire program plan. Fires similar to the

Figure 11. In 1978, the Ouzel Fire at Rocky Mountain National Park, Colorado, was the first PNF to threaten an adjacent community. At first, it crept along the surface, then intermittently crowned. After suppression and a brief stable period, it made a run toward the town of Allenspark. The fire review urged greater emphasis on fire history, adequate prescription criteria, and more consideration of human-ignited prescribed burns. Rocky Mountain National Park archive photo.

Ouzel Fire had burned through the basin in the past, and patterns of such fires did not conform to the 10,000-foot contour used in the plan (Laven 1980).

- The plan must provide enough prescription criteria to adequately guide the decision-maker in managing natural fires. These include burning indices, fire weather forecasts, prolonged periods of drought, season of the year, 1,000-hour time-lag fuel moistures, number of fires going in the central Rockies, and availability of suppression forces. The plan needs to be more specific about actions to be taken when the fire exceeds prescription parameters and about who is responsible for taking such actions. Then the plan needs to be followed.
- Human-ignited prescribed burns should be considered an additional management tool—particularly where a park borders private development.
- Finally, expecting to suppress a fire during a run, after allowing it to burn to a large size, seemed to be poor planning. At Ouzel, the NPS learned that "letting fire burn was not necessarily an ecological and political solution to fire management issues" (Rothman 2005).

Wildland fire use in Alaska. As the NPS was dealing with the Ouzel fire at Rocky Mountain, a whole new situation presented itself with the addition of 15 new national monuments in Alaska. The new Alaskan parks "presented an enormous challenge for fire managers" (Rothman 2007). Although the NPS remained focused on what it considered the crown jewels of the system—Yellowstone, Yosemite, and similar well-known parks—the burned areas in Alaska (as well as in Everglades National Park and Big Cypress National Preserve in Florida) "dwarfed the burned area in those premier parks.... Alaska reprised an earlier kind of fire landscape, one in which the nature of fire overwhelmed the human ability to respond" (Rothman 2007).

Complete suppression was a tactical impossibility. "This reality ... encouraged the practice of allowing prescribed natural fire" in a big way (Rothman 2007). With little funding of its own, the NPS had to rely on peer agencies—largely the Bureau of Land Management (BLM)—for protection of the new NPS lands, including fire suppression (BLM and NPS 1979). Before long, however, differences in agency missions relating to emphasis on fire suppression versus total fire management led to the determination that the NPS would need to pursue its own Alaska fire management program; the handling of PNFs on NPS land was a primary concern. Under a new interagency agreement worked out in 1982, BLM retained primary leadership in fire suppression, while the NPS provided leadership for the monitoring of PNFs on NPS lands. "Fire management in Alaska evolved into the most integrated and comprehensive interagency cooperation in federal land management" (Rothman 2007).

Greater Yellowstone fires of 1988. By the late 1980s, much progress had been made with fire management programs in the NPS, but there was a growing gap between the concepts of fire management and the ability of NPS to implement them. Some managers still felt that, "with enough resources and an ideal political climate, fire managers could remove the threat of conflagration from national park lands" (Rothman 2005). But state-of-the-art science and

sophisticated management planning concepts could not guarantee implementation of such plans nor assure the ability to control fire when strong winds and unfavorable geographic, climatic, and vegetation conditions came into play. So the third major learning experience came with the Greater Yellowstone fires of 1988. This was the first major test of the PNF concept (called "let-burn" by the press) and of both agency and interagency resolve to continue the commitment to the broad philosophy and concept of restoring fire to its natural role in parks and wilderness.

In 1972, Yellowstone National Park had prepared a relatively simple fire plan that reflected the broad goal and philosophy-driven concepts of that time. But it did not "take into account the unusual instance—the once-in-a-generation event that could not be planned for" (Rothman 2005). In 1988, after heavy rainfall in both April and May, practically no rain fell in June, July, and August—the driest summer on record. Lightning strikes early that summer yielded a number of natural fires in Yellowstone and its adjacent USFS units that were allowed to burn following the policy of their 1972 plan (Carle 2002). On July 15, the decision was made that no new natural fires would be allowed to burn. But, by then, the fires inside the park exceeded 8,600 acres in size. On July 21, the fires covered 17,000 acres and suppression became the single objective in Yellowstone. An extensive interagency suppression response began.

High winds caused widespread spotting, and "conventional firefighting techniques such as burning to create fuel breaks and backfiring proved ineffective" (Rothman 2007). For the next two months, "everything about the [Yellowstone] fires seemed designed to demonstrate that fire could exceed human control" (Figure 12).

Figure 12. The 1988 fires in Yellowstone provided the first major test of the PNF (WFU) concept and of agency and interagency resolve to support the philosophy of restoring fire to its natural role in parks. High winds caused widespread spotting. Conventional firefighting techniques proved ineffective. There was little public understanding at the time of such a massive fire event. NPS photo by Jim Peaco.

At that point a freeze was declared on all PNFs in the NPS. High winds brought the North Fork Fire to Old Faithful on September 7 and the fire was declared out only after rain and snow fell in late September. In total, the fires burned across 1.4 million acres in the Greater Yellowstone Area. Almost one-third of the acreage was inside adjacent national forests. The nearly one million acres that burned inside Yellowstone—out of its total of 2.2 million acres—represented "the most visible evidence of the fires' power and the fundamental ineffectiveness of all human countermeasures" (Rothman 2007).

There was great misunderstanding among the public about the Yellowstone fires. American citizens watching television or reading their local papers felt that "half of their beloved park had been devastated. And … that a perverse 'let it burn' policy was responsible" (Carle 2002). Very few understood that fires that had started outside the park and moved into the park "produced half of the burn totals in the Greater Yellowstone area" (Carle 2002). For example, the Storm Creek Fire began as a lightning strike in the Custer National Forest northeast of the park. When it threatened the Cooke City–Silver Gate area adjacent to Yellowstone, television coverage often reported it as resulting from "Yellowstone Park's natural fire program" (Carle 2002). The North Fork Fire, which burned more area inside Yellowstone than any other, was ignited by a woodcutter's chain saw on adjacent Targhee National Forest land and was managed under a suppression strategy from the beginning. There was little understanding of the long-term perspective—that such massive fire events "are impossible to control, but since they only come along every few centuries, the risk for people and their property is akin to the long-term risks of living near volcanoes or earthquake faults" (Carle 2002).

A few fire scholars took the opportunity following the 1988 fires to inject their particular critique of NPS fire policy into forestry journals or the press. Bonnicksen (1989) accused the NPS of relying on "Mother Nature and God" instead of science and scientific models to manage its lands. Appropriate responses were prepared by Yellowstone Superintendent Bob Barbee and fire scientists in the NPS (Barbee et al. 1990). Some people felt that public response to the Yellowstone fire events of 1988 represented a breakdown in public understanding of the natural role of fire in wildlands, and particularly a breakdown in our ability to communicate through television, radio, and the press about that role in Yellowstone and elsewhere (Kilgore 1991; Smith 1992).

By the end of 1988, a report by the ten-person Interagency Fire Management Policy Review Team concluded that the philosophy behind the current PNF policy in national parks and wilderness areas was fundamentally sound (USDA and USDI 1989). But it also called for 14 specific ways to strengthen and reaffirm existing fire management policies in parks and wilderness, including a number of changes in implementation of policy.

A second review panel was assembled by the Greater Yellowstone Coordinating Committee to assess the short- and long-term consequences of the fire and make recommendations on possible follow-up actions by the NPS. Chaired by Norman Christensen of Duke University, it was made up of ecologists with expertise in natural disturbances. This panel confirmed the historic basis for high-intensity crown fires

in Yellowstone, agreed on the central importance of maintaining such natural fire processes, and recommended against any short-term feeding of wildlife or seeding to avoid erosion. They concluded that "the only way to eliminate wildland fire is to eliminate wildlands." And they warned that "to extirpate fire completely from a wildland ecosystem is to remove an essential component of that wilderness" (Christensen et al. 1989; Christensen 2005). One lesson to be learned is that of "humility in the face of natural forces over which we often exert little control" (Kilgore in Carle 2002).

Changes since the 1988 fires

Summarizing the past 18 years since the 1988 Yellowstone fires, several positive changes seem to have occurred (Tom Nichols, personal communication):

- Better predictive service support has improved the decision-making abilities of fire managers, especially in smaller land-management units.
- There is better interagency communications and more agencies and units using WFU.
- With the assistance of fire use management teams, more WFUs are being allowed to start and grow, even under planning level 5, with review and approval of the appropriate fire director at the National Interagency Fire Center (NIFC).

On the other hand, many potential WFU fires are still being suppressed due to factors such as:

- Air quality regulations;
- Competition for fire resources and personnel, especially during higher planning levels;
- Risk aversion by land and fire managers; and
- Public concern about "letting fire burn."

As each lightning-ignited fire is suppressed because of one of these considerations, the vegetative ecosystems of the park continue to change—with natural increases in fuels, changes in structure, and increases in wildfire potential. Although more acres are being burned by more WFU fires in more parks than ever before, there is reason to doubt that many of these programs have yet reached a level of ecological significance in restoring a more natural role for fire within ecosystems. Both agency policy and its planning documents require us to "manage" WFU fires. Such management is affected by risk tolerance, with some units able to tolerate long-duration WFUs, while others may wish to limit them in size and duration.

Miller (2005) pointed out that there are several factors that work against WFU and in favor of suppression:

- **Incentives/disincentives.** The main reason that some managers choose to implement the current policy on WFU is "his/her personally held belief that 'it's the right thing to do.'" Instead, they need to have confidence "that they and their careers will be protected when they make a well-reasoned, but risky decision" to allow WFU.
- **Organizational culture.** A few regions and units are oriented toward fire use, rather than suppression (usually places with a history of successful WFU programs). We need to better understand this organizational culture and use that information "to foster cultures that are more accepting of fire use."

- **Language.** Our vocabulary reinforces the idea that fire is bad. We talk of "risks" from fire, but not "opportunities" and "benefits." We are concerned about "severity" and talk of "catastrophic fire." (We should think of fire as a "disturbance.")
- **Internal education.** There is a disconnect between resources planning and fire management planning: resource managers need to know more about fire behavior and operations, and fire managers need to know about fire effects on resource values.

Given the controversy surrounding the WFU policy at Yellowstone, it's amazing that the policy survived. With that perspective, the 1989 Interagency Team Report (USDA and USDI 1989) was actually a vote of confidence for the policy (Kilgore and Nichols 1995).

Since then, serious fire incidents led to additional policy reviews in 1995 and 2001 (USDI and USDA 1995; USDI et al. 2001). The revised 1995 federal fire policy recognized, for the first time, "the essential role of fire in maintaining natural ecosystems" (USDI et al. 2001). The 2001 review, in turn, said that:

- "The 1995 policy is generally sound and appropriate.... Wildland fire will be used to protect, maintain, and enhance resources and, as nearly as possible, be allowed to function in its natural role. Use of fire will be based on approved Fire Management Plans and will follow specific prescriptions contained in operational plans."
- "As a result of fire exclusion, the condition of fire-adapted ecosystems continues to deteriorate; the fire hazard situation in these areas is worse than previously understood."
- "The fire hazard situation in the Wildland Urban Interface is more complex and extensive than understood in 1995."
- "Changes and additions to the 1995 Federal Fire Policy are needed to address important issues of ecosystem sustainability, science, education, communication, and to provide for adequate program evaluation."
- "Implementation of the 1995 Federal Fire Policy has been incomplete, particularly in the quality of planning and in interagency and interdisciplinary matters."
- "Emphasis on program management, implementation, oversight, leadership, and evaluation at senior levels of all federal agencies is critical for successful implementation of the 2001 Federal Wildland Fire Management Policy."

In summary, the 2001 review recommended that "federal fire management activities and programs provide for firefighters and public safety, protect and enhance land management objectives and human welfare, integrate programs and disciplines, require interagency collaboration, emphasize the natural ecological role of fire, and contribute to ecosystem sustainability."

Based on these reviews, it is clear that NPS commitment to allowing fires to assume their natural role, wherever possible, is still there, but with a name change to WFU—"wildland fire use." The name change raises a point about the future of fire management in the NPS. Both "let-burn" and "prescribed natural fires" make some intuitive sense, while "wildland fire use" does not. This being the case, perhaps

WFU should be dropped in favor of a simpler concept: namely, that "fire is fire." In this case, each fire would be evaluated on its merits for (1) ecological values; (2) economic impacts; and—of top importance—(3) the safety of human life. Such an approach is explicit in the 1995 and 2001 federal wildland fire policy, but the bureaus have been slow to implement this concept.

Conclusions

Looking back on the origin and history of wildland fire use in the NPS, the agency has made considerable progress between 1968 and 2006 in allowing lightning-caused fires to burn as well as using prescribed burns and suppression as part of their management plans and actions. However, those managers willing to allow lightning fires to burn have also been severely criticized when high-intensity fires don't give the results expected.

One of the main lessons from the 1988 Yellowstone fires seems to be that "extensive, high-intensity fires are an infrequent, but ultimately unavoidable element in whatever fire management option we choose" for the lodgepole pine forest of the Greater Yellowstone Ecosystem (Despain and Romme 1989). A central lesson of the 1988 fire season was that stand-replacing, natural crown fire—when mixed with politics, the media, and public opinion—is a volatile issue. Those fires provided the most severe test for wildland fire use policy (Kilgore and Nichols 1995).

Fire is an important natural process in forests and other vegetation of the national park system. Its restoration is important, but doing so is not easy. We need continuing research, trial implementation of new concepts based on better understanding of national park ecosystems, and thoughtful evaluation of results. In our efforts to be cautious and reasonable in the aftermath of fires such as the 1988 fires at Yellowstone, we need to be careful not to suppress all ecologically significant fires in parks and wilderness (Kilgore 1991).

A wildland fire use program needs management commitment to make it work. To achieve the objective of restoring fire to its natural role in each park or wilderness, our nation's managers must take reasonable, calculated risks. As a society, we, in turn, must find ways to accept and support—and not just penalize—reasonable risk-taking by NPS superintendents and USFS supervisors and managers, while still giving priority to human life and property.

Acknowledgments

This paper started with an invitation from Carol Miller and Tom Zimmerman of the U.S. Forest Service to participate in a special session on "Wildland Fire Use in the United States: Building the Future from 35 Years of Learning" at the November 2006 Third International Congress on Fire Ecology and Management in San Diego, California. Lyle McDowell and Bob Barbee provided long-term managerial perspective on the development of the NPS fire management program, while papers by David Parsons and Jan van Wagtendonk summarized the long-term research perspective for fire management, particularly in the Sierra Nevada. Books and other articles by historians Richard Sellars, David Carle, and Hal Rothman were of major importance in this paper. Steve Botti and Tom Nichols provided valuable ideas on the current WFU program of the NPS, including data included in Table 1 and insights on program changes since 1988. In addition, Steve Botti, Tom Nichols, David

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Endnotes

1. Bob Barbee, the former NPS regional director and superintendent of Yellowstone National Park, and an early resource manager at Yosemite National Park, notes the important and little-acknowledged role that Lyle McDowell, chief of the Branch of Natural Resource Management in the Washington office of the NPS, played in Washington in embracing the new vision of fire's role in resource management (Rothman 2005). "He bought the Leopold Report philosophically and he was trying to translate it into practical action … his resource management plan was the first to conceptualize fire as a useful tool for management." Barbee himself played important roles in NPS acceptance of fire's natural role in Yosemite and later in Yellowstone as well. Eivind Scoyen, who served as superintendent of Sequoia and Glacier and later as deputy director in Washington, served as a counter to older views of fire in the Park Service's highest echelons. "He helped soften resistance to the new ideas" and helped counter skepticism at the top (Rothman 2005).
2. Lyle McDowell was the sole author of these three paragraphs, which constituted the NPS fire management policy in 1968. In late 1967, he and his supervisor attended a regional directors' meeting aimed at approving new NPS policy statements. As the several-day meeting ended, "Director Hartzog asked if anyone had any further policy to be considered. McDowell and his supervisor "popped up and said [they] had a statement for consideration." They passed out copies to the director, regional directors, and various staffers present. "Quiet filled the room for several minutes while the statement was read. One staffer suggested a one-word … change followed by unanimous approval. The policy statement which appeared in the 1968 Green Book was exactly as I had written it.… I consider this … the most significant accomplishment of my thirty years with the NPS" (McDowell, personal communication).
3. There were many people who played a key role in the origin and history of wildland fire use in the NPS. Those involved at Sequoia–Kings Canyon and Yosemite include A. Starker Leopold and Harold Biswell of the University of California–Berkeley; John McLaughlin, superintendent of Sequoia–Kings Canyon from 1967 through the early 1970s; several students of Biswell and Leopold, including Jim Agee, Jan van Wagtendonk, and David Graber; key NPS researchers, such as David Parsons; NPS resource managers, such as Dick Riegelhuth, George Briggs, Larry Bancroft, and Tom Nichols; superintendents, including Jack Davis, Stan Albright, Boyd Evison, Jack Morehead, Les Arnberger, Bob Binnewies, Mike Finley, and Bob Barbee at Sequoia–Kings Canyon,

Yosemite, and Yellowstone during the 1960s, '70s, and '80s; several NPS support staff in the Washington and regional offices during that same period, including Lyle McDowell and Merle Stitt; several key fire researchers, forest supervisors, and regional office support staff of the USFS at that time; and fire professionals stationed at the Boise (later National) Interagency Fire Center, such as Dave Butts, Steve Botti, and others.

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