The George Wright Forum

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On the cover: Because of its location, Statue of Liberty National Monument will always be vulnerable to the effects of climate change. See the series of articles titled "Cultural Resource Management and Planning for the Impacts of Climate Change" in this issue. Cover photo courtesy of the National Park Service.

SOCIETY NEWS, NOTES & MAIL

Over 700 attend GWS2015 Conference in Oakland

A large and appreciative group of park practitioners and supporters joined us in late March for "Engagement, Education & Expectations: The Future of Parks and Protected Areas," the first GWS conference to be held in the Bay Area. Three plenary sessions, over a hundred concurrent sessions, an extensive poster and exhibit session, and a full slate of special events made up the week. We are still compiling evaluation forms, but the initial response of attendees was very positive. It's apparent that there's a continuing demand and need for people to get together in-person at professional conferences. For those who couldn't make it, the first two plenary sessions (on parks as a tool for preventive healthcare, and on sliding ecological baselines) were live-streamed on the Web and recorded in their entirety. You can watch complete video recordings of these sessions on the GWS YouTube channel, as well as a short video address to the closing plenary session by US National Park Service Director Jon Jarvis. Just go to youtube.com and search for "George Wright Society." The Board is currently considering potential sites and dates for a 2017 conference. We'll let you know as soon as something is nailed down.

Five honored with GWS awards at conference

Alan Latourelle, the chief executive officer of Parks Canada, became the first Canadian to be awarded the Society's top honor when he received the George Melendez Wright Award for Excellence at ceremonies on the concluding evening of the 2015 GWS Conference in Oakland. Latourelle was appointed CEO in 2002 and since then Parks Canada has become an international leader in innovative conservation practices, methods for heritage presentation, and providing exceptional experiences. Under Latourelle's leadership, Parks Canada has increased the area of protection for sensitive ecozones by more than 30%. This includes the creation of six new national parks, a major expansion of two existing national parks, and two new national marine conservation areas. Additionally, in the past twelve years 105 places of national cultural significance to Canadians have been declared national historic sites.

At the same event, four other winners in the Society's "Imagine Excellence" Awards Program received their honors:

- Kurt Repanshek was honored with the 2015 GWS Communication award for creating and editing the National Parks Traveler website, which has become a leading source of information on the US national parks, including original reporting from Repanshek and others.
- Mark Michel, founder of The Archaeological Conservancy, was recognized with the 2015 GWS Cultural Resource Achievement Award for his career-long achievements in protecting endangered archaeological sites ,and for his role in the passage of the 1979 Archaeological Resources Protection Act.

- Karen Treviño was given the 2015 GWS Natural Resource Achievement Award for her leadership of the US National Park Service's Natural Sounds and Night Sky Division, which has become a major component of the agency's natural resource research and management efforts.
- James Gramann won the 2015 GWS Social Science Achievement Award for his numerous contributions to the USNPS social science program, including commissioning an external review that resulted in the program's becoming a permanent part of the agency.



2015 GWS awardees (I-r); Karen Treviño, Alan Latourelle, Gina Depper on behalf of the Clemson Student Chapter, Mark Michel, James Gramann, and Kurt Repanshek. Photo courtesy of David Graber.

In addition, the first student chapter of the GWS, at Clemson University, was recognized with a plaque presented to Gina Depper. And a special certificate was presented to Bruce Kilgore in appreciation of his mentoring role in the lives of many park scientists in the USNPS western region. Complete citations for all the awards can be found at http://www.george-wright.org/gws2015_awards.pdf.

Sherry Wright Brichetto, benefactor of the GWS, dies

Charmaine "Sherry" Wright Brichetto, the elder of the two daughters of George Melendez Wright and a major benefactor of the Society, died on January 28, 2015. She was born in 1932 to Wright and his wife, Bernice "Bee" Ray Wright. Sherry was very proud of her father's accomplishments and of the recognition brought to him by the creation of the George Wright Society. She and her husband, Richard "Dick" Brichetto, acted upon this in 1990 by making a substantial gift to the Society. The magnitude of the gift was such that the GWS was able to open a full-time office and hire its first paid staff. Dick predeceased Sherry in 1997. She is survived by a daughter, Kimberly Harrington, and her sister, Pamela Wright Lloyd.

1916 ESSAY SERIES 2016

Planning for Permanent Emergency: "Triage" as a Strategy for Managing Cultural Resources threatened by Climate Change

Michelle L. Berenfeld

ONE HUNDRED YEARS FROM NOW, THE WORLD WILL LOOK VERY DIFFERENT. The changes humans have made to the planet in the nearly 100 years since the establishment of the National Park Service (NPS) will seem minor in comparison to the changes to come. By the time the next NPS Centennial Essay series appears, the Earth will be 2–4 degrees Celsius (4–11 degrees Fahrenheit) warmer, with some 0.25m higher sea levels, fewer plant and animal species, and perhaps two billion more human beings.¹ The centennial of America's "best idea" is as good a time as any to think seriously about what the parks will look like at their *bi*centennial and what we can do now to assure that they have one.

It is perhaps surprising that those of us charged with protecting the past are rarely prepared to seriously consider the future beyond the next few years or, at best, our own lifetimes. This has always been a problem—cultural heritage management usually relies on limited and short-term funding and, particularly in the case of the national parks, the short time horizons of politics. Most cultural heritage interventions, when considered within the time-scale of historic sites and landscapes, are conceived of in woefully short terms. The impacts of climate change, however, make these tendencies even more dangerous, and, if they continue, will lead to catastrophic losses in an unacceptably short period of time. While not everything can or should be preserved for centuries or millennia, the NPS must consider how sites will fare in the next century and beyond.

NPS is part of an international community of cultural heritage organizations tasked with protecting, preserving, and presenting historic sites and landscapes for the future. Organiza-

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tions around the world—ranging from the global in scope, such as the World Heritage Centre, to national trusts and ministries of culture, to local organizations and non-governmental organizations (NGOs—form an international cultural heritage community that is grappling with the challenge of responding to the scope and scale of climate change.² Success will require radical shifts in perspective and methods—including prioritizing some sites over others, accepting and even advocating for loss, and planning for long-term, ongoing, radical change.

NPS faces all of these challenges, but it is also uniquely positioned to serve as a model for other organizations dealing with climate change impacts on cultural heritage. There are several reasons for this. First, NPS is in a position to manage cultural resources at the national scale, and, therefore, in theory at least, to establish priorities that reflect a national perspective. Second, NPS oversees both cultural and natural sites, which should allow the organization to take an integrated approach that considers how cultural resources—and the actions taken to preserve them—impact natural resources and vice versa. Finally, the National Park Service is a widely respected, even beloved, institution that speaks directly to millions of people each year and therefore could profoundly impact public opinion and understanding of climate change and its impacts.³

Nevertheless, NPS will still have to adapt its approach to the preservation of cultural heritage sites to respond to the significant challenges ahead as it begins its second century. Anyone who has tried to kick an unhealthy habit or build up their savings account knows that it is difficult for human beings to make wise decisions on behalf of the future—even their own or their children's—when it requires sacrifice in the present. Even more difficult is doing so when the best-case scenario for that future is to preserve a status quo. But NPS must plan and act on *at least* the "centennial" scale.

NPS is in charge of much of the physical history of the United States—both its ancient landscapes and the traces of the human cultures that have shaped and reshaped them for centuries. It is also a steward of the history that is contained within those places. As the protectors of these natural and cultural and intellectual resources, NPS must keep its collective eye on the long-term clock and think on a national scale. It must plan not just for the next decade or the next generation, but for the next century and the ones after that, and for the whole country.

One approach is a "triage" strategy for cultural heritage management, which requires difficult decisions about what to save and how, as well as recognition that some sites are more important to us than others. It requires some level of consensus on value and significance and how resources should be allocated. As difficult as it will be to reach such consensus, the advantage in this approach is that it does not rely on—despite the term's connotations in the medical world—quick responses to unpredictable events. A "triage" approach, as defined here, draws on the data we have about climate change impacts, however imperfect, to organize cultural resources and sites into three main categories and to plan accordingly. Those categories include (1) those sites that are, for lack of a better term, "goners"—that is, they are unlikely to survive beyond another generation without heroic measures to save them; (2) those sites that could survive for decades or perhaps centuries with thoughtful maintenance, and at a feasible expense; and (3) those sites that for whatever reason are deemed so im-

portant to our national heritage that we will save them at any cost, even in radically different contexts.

Letting go

One, albeit controversial, response to climate change threats to cultural resources is to do nothing. We could allow historic structures and cultural landscapes to be flooded by rising sea levels or be dragged away by eroding sands and increasingly severe storms. In some cases, this will be a reasonable or even unavoidable response-areas of Gateway National Recreation Area, for instance, which were damaged in Hurricane Sandy, may never be fully recovered.⁴ This only has to be true, however, in terms of the preservation of the *physical* site. There is far more to cultural resources than their physical remains. Historic buildings, cultural landscapes, and archaeological sites are all primary sources for human history as well as sites of cultural memory. While much of the power and poignancy of visiting a cultural heritage site comes from our ability to literally walk in the footsteps of our ancestors, we must accept and act on the reality that this will not always be possible. If we do not plan for that eventuality, then we will deprive future generations not only of the opportunity to experience those sites, but also to develop their own ideas about them and produce new knowledge about our past. This is an essential responsibility of any cultural heritage steward—to make it possible for new and different interpretations of the past to be developed in the future. This is why we try to be cognizant of our own historical perspectives and biases, and why we acknowledge that we can never totally escape them. We must give our successors the chance to write history for themselves.

Given, then, that we will not be able to preserve all sites in the forms that we have them, we must focus our energies on protecting the fullest record of the past that we can. With limited resources and limited time, this may mean allowing the physical remains of a site to deteriorate, while building up our capacity to preserve its value in other ways—such as through visual records and oral histories, scholarship, and maintenance of archives. Even if the fabric of a particular building, for example, is gone, its history need not—and should not—be allowed to disappear. NPS must get into the business of creating an *afterlife* for cultural resources, even as it may continue to preserve their physical lives for a while longer. This will be a challenge, as it is for many organizations: The mission of the NPS is grounded in the physical experience and integrity of the sites it protects; however, this can no longer be a primary goal for all the sites under its purview.

The afterlife of a site is not only a record of its existence at a certain moment, but a means for future generations to continue to discover and decide new things about it. As we all know, conservation is a historical process. What and how we decide to conserve and interpret at a site is a big part of writing its history. When 20th-century additions are removed from an 18th-century house so that visitors can experience life in the earlier colonial period, this is a decision that affects the future history of that place. As long as the site still exists, and while NPS continues to protect and interpret it, the public will have access to the site's complete history. But what if the house were entirely gone, what information would remain? What decisions would be preserved? What aspects of that history would be accessible to future generations? A "triage" approach would also affect how NPS distributes limited resources. Every dollar that goes into maintaining the foundations of a fort that sits, for now, at sea level is one more dollar that could be spent on archival research, analytical documentation, artistic interpretation, and scholarship about the history of that place before the site is permanently flooded and made inaccessible. Of course, such a direct correlation of resources is misleading, as such funds would not necessarily come from the same source, but NPS must get into the business of making arguments for these types of decisions. The budget will always be finite, and time and money spent shoring up things that will only need to be shored up again and again until they are, in fifty or a hundred years, unsalvageable, will be time and money that could have been—but was not—spent on creating a future history of that doomed place. Unfortunately, this means that at some point someone has to say, "Stop fixing this. Let it go." No one really wants to do that, and there will be many good reasons to put it off—safety, community support, and values of all kinds—but we must accept that we will lose sites, and focus our attention instead on trying to preserve their memory.

Maintenance and planning

Happily, a large proportion of the sites in the NPS domain are likely to survive to the next centennial and beyond with some thoughtful maintenance and planning, and NPS is well equipped to do this. New challenges, however, must be considered. NPS has begun to, and must, take into account predicted effects of climate change, which are notoriously difficult to pin down. In addition, the results of successful maintenance are often largely invisible and uncelebrated. Much of the work of NPS will be preventing detrimental things from happening and preparing for other things that might not happen the way it predicted. NPS will, therefore, have to effectively explain to the public (and to Congress) what they are doing and why, in order to continue to garner support for these efforts.

While maintenance and monitoring have always been a part of the work of NPS, so will the need to focus attention on the relationships between natural and cultural heritage in the parks as climate change impacts continue and grow. As an organization and a government agency, NPS is unusually well positioned to do this. Most cultural heritage organizations are focused on the built environment and lack the expertise, infrastructure, mission, or will to work on natural resources as well.⁵ The division between natural and cultural heritage stewardship is problematic, but long-standing, and while some organizations are working towards integrated approaches to cultural and natural heritage, few have found great success. The UNESCO World Heritage List, for instance, is organized into natural and cultural sites, originally with two separate lists of criteria for inclusion and still two separate professional advisory bodies in charge of their assessment.⁶ While the World Heritage Centre has taken steps towards resolving this division, this dichotomy continues to present challenges.⁷ While scholars, site managers, and funders, in particular, continue to view the natural world and cultural resources as largely separate spheres, for many decades NPS has contained and cared for both.

Cultural resources within the parks must be managed, monitored, and *interpreted* alongside, and as part of, the natural environment, which human beings not only occupy, but

shape. Management and interpretation strategies for cultural heritage sites in the parks must be integrated with natural resources. While this may be an overly broad, even pat, statement that we can all agree with on the surface, in fact its implementation will necessitate some difficult choices. Sometimes what is a reasonable or even optimal response to threats to natural resources will be detrimental to cultural resources (and vice versa), and NPS will sometimes have to sacrifice one for the other.

More specifically, benchmarks should be established for when sites that are being maintained and monitored will or could lose that status. For instance, NPS should try to determine and publicly acknowledge that some sites will be sustainable at reasonable expense and effort for, say, fifty years, but probably not for one hundred years, and plan for those scenarios. This would be part of both a management strategy and public education plan. Interpretation of cultural resources should situate sites on a timeline that includes a future at least as long as their past. Visitors should not only be able to learn about the history of a site—through which they can perceive changes and developments that have led up to their own time—but also to consider its future. With all due disclaimers about certainty, NPS should plot the future of these sites according to the best predictions possible about the impacts of climate change and talking about rising sea levels and temperatures, changes in biodiversity, and other factors that will affect the site and how NPS plans to respond. By placing cultural resources in a historical continuum, NPS can more effectively explain to the public the threats posed by climate change as well as the decision-making processes of the institution.

Save at any cost

Finally, there are some sites that NPS could decide must be saved at any cost. If this is a real category—and it may not be—then NPS will be charged with building, or at least accepting, a consensus about what aspects of the parks the world simply cannot live without and for which the country is willing to take heroic measures to save. It is hard to imagine that it will come to this, but it will. The Statue of Liberty, to choose one example, may well become such a resource.

Liberty Island was inundated during Hurricane Sandy, leaving mechanical infrastructure and other facilities heavily damaged.⁸ Sea level rise and increasingly severe storms will continue to threaten it in the coming century. When and how should NPS prepare for this? How might we respond differently to the next storm? Do we rebuild electrical systems and visitor centers again and again until it is impossible to continue doing so? Do we start thinking now about what will have to be done to preserve the Statue of Liberty in New York Harbor for the next two hundred years, and how people may experience it very differently then? Do we want to plan for the next generation or for centuries?

Once again, the international cultural heritage community provides an interesting example. In 1959, with the construction of the Aswan Dam in southern Egypt, UNESCO launched a campaign to save and relocate ancient monuments that would be flooded by the project.⁹ The world decided that it was worthwhile to literally move mountains to save the great temple of Abu Simbel, built by the pharaoh Ramses in the 13th century BCE. Abu Simbel was originally sited on a spot along the Nile meant to be seen by anyone approaching Egypt by boat—they would encounter this monumental statement of pharaonic power as they sailed along the river.¹⁰ With the threat of flooding by the Aswan Dam, the temple was moved to higher ground and a different location. The intended royal message to arriving boats was sacrificed, but Ramses and his temple were saved. Perhaps that original context is not so important millennia later, and the compromise was worth it—visitors still get a sense of the specific landscape of Egypt and an impression, even if altered, of what this temple looked like in antiquity. The alternative—as illustrated by the much smaller Temple of Dendur now housed in a glass pavilion in the Metropolitan Museum of Art in New York City—preserved the building and allows it to be widely visited, but its context is radically altered.

The Statue of Liberty was meant to be seen by those coming to the United States on a boat. Do we want it to always be visible in this way? Is that the most important thing? If so, what will we do to ensure that experience for another fifty or a hundred years, or, if we consider the Abu Simbel time-scale, over 3,000 years?

While it may seem unlikely now, the question of incurring massive public expense to radically alter a national park in order to preserve its most treasured monuments will arise before the century is out. If NPS is truly considering the long-term future of cultural heritage in the United States, and serving as an advocate for a political response to climate change, as it should be, NPS should bring these issues up now.

Conclusion

Although very broadly construed here, this outline of a "triage" strategy for managing cultural resources in response to climate change is intended to serve as a starting point for real considerations of the future of the national parks beyond the current political cycle or the scale of an individual lifetime. It is a call for NPS to work proactively, in its role as steward of, and advocate for, the parks. Repeated, reactive efforts to shore up, stabilize, move, or strengthen historic structures in the face of climate change will eventually fail. They will leave little for our successors to study or appreciate if they don't include plans for an "afterlife" of those places. While allowing for the disappearance of a site may seem to contradict the mission of the parks, eventually we will not have a choice. The afterlife we provide for, however, is what will be left to future historians, archaeologists, and school teachers. This is true for all sites, ultimately, but many cultural resources will survive for some time yet, if NPS can maintain them as part of a larger ecosystem that is changing, and will continue to change, in the next decades and centuries. Finally, NPS should be thinking about those sites that could justifiably be the focus of massive public attention and expense should they be seriously threatened by climate change, and what role NPS should play in response.

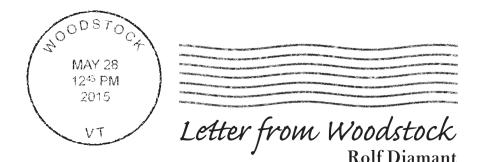
Perhaps most important, however, is that NPS has an opportunity to educate the public about the fact that the historic fabric of the parks is threatened by climate change, that some places will be lost or irrevocably altered as a result, and that we must prepare for this now. When another major city is lashed by a hurricane or a coastal town is washed out to sea, or thousands of people are displaced or a year's crops are wiped out, the fate of the national parks, and their cultural resources in particular, will not be at the top of everyone's list of things to worry about—but their existence will be essential to recovery and the resilience of our society as a whole and for our future. Our present actions may deny it, but a nation without history is not one that any of us will want to live in. It is our responsibility now to not only preserve and interpret how humans have shaped the landscape of the United States, but to explain how that landscape is responding.

Endnotes

- 1. For temperature and sea level predictions, IPCC 2014, especially pp. 178–179, 368–369; for biodiversity, IPCC 2002; for population, United Nations 2004.
- 2. As of August 15, 2014, there are 191 states parties to the World Heritage Convention: http://whc.unesco.org/en/statesparties/. World Heritage Centre and climate change: http://whc.unesco.org/en/climatechange/. Among the many cultural heritage organizations considering climate change as part of their work, see especially: National Trust for Historic Preservation (US): http://www.preservationnation.org/ (with numerous posts and articles on the subject of climate change); English Heritage: http:// www.english-heritage.org.uk/professional/advice/advice-by-topic/climate-change/; World Monuments Fund: http://www.mf.org/field/special-initiatives. For a report on climate change impacts on sites outside the U.S., see Sabbioni et al. 2012.
- 3. See Cafaro 2012.
- 4. A stark and commonly cited example from Canada is Herschel Island-Qikiqtaruk Territorial Park in the Yukon, where warming temperatures have caused coastal erosion and rising seas, damaging historic structures and exposing archaeological remains. Climate change was recognized in the site management plan as one of the "top stressors" on the park: http://www.env.gov.yk.ca/publications-maps/documents/herschel_management_plan.pdf (section 2.5.2 and passim).
- 5. See Barthel-Bouchier 2013.
- 6. These are the International Union for Conservation of Nature (IUCN) and International Council on Monuments and Sites (ICOMOS), who assess natural and cultural (or "mixed") sites, respectively. See http://whc.unesco.org/en/advisorybodies/.
- 7. Another challenge is that convention traditionally responded to threats to World Heritage sites by placing them on the List of World Heritage in Danger. This has served as a way of prodding a state party to respond to these dangers, with the main motivation being the threat of the removal of the site from the World Heritage List. This is not an effective remedy for dealing with climate change, of course, as no one country can be held responsible for it, nor is such a punishment likely to lead to increased protection of the site. Furthermore, the presence of many sites on this list now as a result of intractable political or military conflicts has also shifted the meaning of the list. The list: http://whc. unesco.org/en/danger/.
- 8. The NPS website's account of the damage and recovery: http://www.nps.gov/stli/afterhurricane-sandy.htm.
- 9. This campaign, which raised \$80 million, launched the effort to draft the World Heritage Convention: http://whc.unesco.org/en/convention/.
- 10. For an overview of this project and the significance of the temples at Abu Simbel, see Kadry 1983.

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Preserved and Enlarged Forever

AFTER A RATHER SOMNOLENT PERIOD OF GROWTH DURING FIRST DECADE OF THE 21ST CENTURY, the national park system in the United States is showing distinct signs of new life. In the waning days of 2014, Congress authorized seven new national parks: Blackstone River Valley National Historical Park, Valles Caldera National Preserve, World War I Memorial, Tule Springs Fossil Beds National Monument, Coltsville National Historical Park, Harriet Tubman Underground Railroad National Historical Park, and Manhattan Project National Historical Park. For his part, President Obama quickly made two more additions to the system in early 2015, using the Antiquities Act to proclaim Pullman and Honouliuli national monuments. So in less than three months, the total number of parks added to the national park system during the Obama Administration nearly doubled; and it is likely that more additions, thanks to the Antiquities Act, may be in the wings.

This Letter from Woodstock is the second in a three-part series focused on what it means to be part of a system of parks and protected areas. In part one of the series, which appeared in the last issue of *The George Wright Forum*, I explored the inherent advantages derived from collaboration and shared identity. In this tenth Letter from Woodstock, I will focus on the past, present, and future growth of the US national park system and make a few observations about the seemingly never-ending debate over the system's expansion. I will conclude the series in the next issue of the Forum revisiting a handful of proposed national parks that were tantalizingly close calls, but for one reason or another never quite made the cut. While it is always intriguing to speculate about an alternative reality—the "what if" scenarios—per-

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haps we can learn from failure as much as from success about a society's aspirations and limitations when it comes to creating a national system of parks.

The new parks that were established last December reflect the ever-increasing diversity of the US national system. Tule Springs Fossil Beds National Monument is a paleontological park in the Nevada desert. Harriet Tubman Underground Railroad National Historical Park in New York and Maryland interprets the prodigious work of this remarkable African-American abolitionist. I have written about Manhattan Project National Historical Park in a previous Letter From Woodstock,¹ suggesting that this opportunity for an atomic-era national park shouldn't be passed up, as it might not come around again.

The addition of these new parks was welcomed by many conservation organizations including the National Parks Conservation Association, Coalition of National Park Service Retirees, and National Trust for Historic Preservation. There were a few people, including supporters of national parks, who dissented. One was Harry Butowsky, a former NPS historian, who wrote a guest blog on the website *National Parks Traveler*. Butowsky, upset that the new parks had been included in a defense authorization bill rather than stand-alone park legislation, argued for these parks to be established "in a rational manner ... not through large and unfunded omnibus bills."²

I am more than a little surprised to hear this coming from a person who has spent as much of his career in Washington as Harry Butowsky has. One has to be an awfully patient person, waiting for Congress to conduct business "in a rational manner." Any close reading of the history of national parks underscores how much their creation, if not survival, depends on politics—the dedication and unflagging perseverance of park advocates, careful coalition building, and a good nose for opportunity. In other words, the ability to engage in the workings of a democracy. There is also, in my opinion, something to be said for a park-making process that is not exclusively controlled by either the legislative or executive branch, mired in bureaucracy, or wholly the domain of a privy council of like-minded "experts." Our system, however imperfect as it may be, has somehow managed to allow enough political space for new parks to emerge from the bottom up, to occasionally test new models and ideas, and to provide just enough flexibility to adapt to changing times and changing values.

In his commentary entitled "Traveler's View: Senate Should Either Fund New Parks In Defense Bill, Or Strip Them Out," National Parks Traveler Editor-in-Chief Kurt Repanshek, echoing Butowsky, argued that adding these parks "will not enhance, but rather degrade the overall system," and contended that the new parks were unaffordable.³ On the issue of affordability, I think you could ask the question: When in its 100-year history has the National Park Service ever been sufficiently funded for all its responsibilities? In his National Park Service Centennial Essay on George Melendez Wright, writer and filmmaker Dayton Duncan points out that "the single-most recurring refrain in our narrative is a reluctant Congress finally being persuaded, after years of struggle on the grassroots level, to create a new park—and then not appropriating adequate money for its management and protection."⁴ Duncan reminds us that the "habit of inadequate funding began in 1872 with the creation of the world's first national park at Yellowstone, with no provisions whatsoever for taking care of it."

Rather than hunker down and patiently wait for appropriations to appear, the National Park Service for most of its history has realized that a larger of portfolio of parks would not only protect more of the nation's irreplaceable heritage and serve more of its people, but would also strengthen the agency's public constituencies and build essential political support. The agency has also understood that occasionally stretching itself to be more broadly "useful" to the nation, whether through partnering with the Department of Education and schools across the country or demonstrating sustainable design and climate resiliency, might be a wise investment from many perspectives. This has indeed been the case; as the national park system has grown, so have the agency's visitation, visibility, and budget.

As for Repanshek's concern that the new parks will degrade the system, this argument has been heard many times before. Adding historic sites; running the Civilian Conservation Corps; building parkways, recreation areas, and long-distance trails; creating seashores, lake-shores, urban national parks, and national heritage areas—assuming all of these additional responsibilities and many more on behalf of the nation has always had its share of critics who predicted the changes would result in inevitable degradation, erosion of standards, and "thinning the blood." Dire warnings about the expansion of the national park system are about as old as the National Park Service itself. In the 1920s, Robert Sterling Yard, a former national park publicist and subsequent founder of the National Park Association, alarmed by the prospect of a Shenandoah National Park, warned against "the fatal belief that different standards can be maintained in the same system without the destruction of all standards." In the later part of the 20th century, former NPS Director Jim Ridenour, who, quite fond of metaphors, repeatedly referred to "thinning the blood" and "blurring the lines," in his memoir *The National Parks Compromised.*⁵

By contrast, Dayton Duncan describes how George Melendez Wright, as far back as the 1930s, intrinsically understood how essential it was for the national park system never to become finite or static:

At a moment in history when some of the park idea's biggest supporters were opposing an expansion of the system, on the grounds that too many proposed additions were not up to 'national park standards,' Wright saw the danger of doing nothing. Adding a 'substandard area ... would not be calamitous,' he warned. 'The failure to save Mount Olympus' forests, the Kings River Canyon ... and a host of others just as valuable would be the real calamity.... The logical answer is more not less park area.'

I've always found the expression "thinning the blood," besides being rather ghoulish, to be an arbitrary way of dismissing and devaluing ideas that are new or unfamiliar. In a *George Wright Forum* article almost 15 years ago, I wrote on the "making and re-making" of the national park system, I agreed that the system needed its gatekeepers, but gatekeepers with imagination and an open mind. Standards were also useful but require frequent reassessment. "The challenge now, as it always has been," I concluded, "is to take the national park system in new directions relevant and responsive to our social and environmental condition and, in doing so, build ever-greater support and appreciation for the system as a whole."⁶

I remember when I had joined the fledgling staff of Golden Gate National Recreation Area in the mid-1970s, a senior Department of Interior official came out to San Francisco and announced in a speech that the national park system had been finally and for all time "rounded out"-or in other words completed! In retrospect, I'm sure this had less to do with any comprehensive system planning or analysis than with a burst of budget-cutting zeal in Washington. My colleagues and I were in the process of setting up Golden Gate and we believed we were on the cusp of an exciting new era of urban national parks that would bring the many benefits of the national park system directly to city populations. Several of us were also looking forward to working on proposed new parks in Alaska-so you can imagine how dumbfounded we were by this sudden announcement that the national park system had added its last park. Of course this was not to be-not by a long shot. Far from being "rounded out," since that day in San Francsico almost 40 years ago, by my rough count, there have been more than 100 additions to national park system. Included in this great expansion were the magnificent protected lands of Alaska that doubled the size of national park and refuge systems and tripled the amount of land previously designated as wilderness. During the breadth of my NPS career, first as a park planner, later as a superintendent, I would work with many of these additions to the system: Santa Monica Mountains, Frederick Law Olmsted, Boston African American, Lowell, Blackstone, Weir Farm, and Marsh-Billings-Rockefeller.

Describing New Mexico's Valles Caldera, one of the newly authorized national parks, Roger Kennedy, former NPS director, wrote that "the centerpiece of the Jemez Massif, is worthy of national park status for its astonishing natural beauty, for its geological and archaeological wonders, for its wildlife, for the history that was played out upon it or near it, and for the military and geopolitical saga inherent in its title deeds."7 He went on to urge that Valles Caldera "be revalued as a national asset, which, like all national parks, cannot be expected to pay for itself. The Preserve can be as 'self-supporting' as Independence Hall or Yellowstone Park, with their money costs balanced by their educational benefits." That is indeed the cost/benefit calculation at the heart of the social compact the American people struck when they began, almost 150 years ago, building themselves a system of national parks-that "their money costs" are "balanced by their educational benefits."

My father, Lincoln Diamant, a stamp collector in his youth and historian in his later years, wrote



Courtesy of Charles Davidson

a series of short essays paired with notable American postage stamps for the book *Stamping Our History: The Story of the United States Portrayed on its Postage Stamps.*⁸ Opposite a full-page engraving of Yosemite's El Capitan, part of a 1934 series of national park stamps, he concluded his essay on America's national park system, with the simple but prescient words: "May it be preserved and enlarged forever."



Endnotes

- 1. Rolf Diamant, "Letter From Woodstock: Keeping on the Path," *The George Wright Forum*, vol. 29, no. 2, 2012, pp. 201–203.
- Harry Butowsky, "The National Park System: Some Thoughts in 2015," National Parks Traveler, January 5, 2015. Online at www.nartionalparkstraveler.com.
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- 5. James Ridenour, *The National Parks Compromised: Pork Barrel Politics and America's Treasures* (Merrillville, IN: ICS Books, 1994).
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- Charles Davidson and Lincoln Diamant, Stamping Our History: The Story of the United States Portrayed on its Postage Stamps (New York, NY: Carol Publishing Group, 1990), p. 2.

Dual Management of Wildlife in Alaska: Making Federal Practice Align with Federal Mandates

Kyle Joly, Sanford P. Rabinowitch, and Julie Lurman Joly

THE YEAR 2014 MARKED THE 25TH ANNIVERSARY of the 1989 landmark decision by the Alaska Supreme Court, *McDowell v. State of Alaska*, and provides a milestone at which to reflect upon its impact. In short, the court ruling stated that Article VIII of the Alaska state constitution grants equal access to wildlife resources to all of its residents (both urban and rural) and that a rural preference or priority was impermissible. However, in 1980, Congress passed the Alaska National Interest Lands Conservation Act (ANILCA), which required a rural preference for use of subsistence resources on federal lands in Alaska (see ANILCA §804). Thus the *McDowell* decision exposed a conflict between state and federal law that led to dual management of wildlife (excluding migratory birds and marine mammals) in Alaska, so that there is now federal management of subsistence hunting on federal lands and state of Alaska management elsewhere (see Norris 2002 for a detailed accounting).

For many years, there were repeated efforts to bridge the gap and unify management, but these efforts fell short and currently we see little chance of the dual management paradigm disappearing in the foreseeable future. It was with the early hope for reconciliation that the secretaries of the interior and agriculture created the Federal Subsistence Board (FSB; 50 CFR 100), which mirrors the function of the state's Board of Game. Federal subsistence hunting regulations were first promulgated as temporary regulations in 1990 and made permanent in 1992 (Norris 2002). Given the commonly held belief that a quick reversal back to single management was expected, federal regulations were, initially, virtually a copy of the existing state hunting regulations (Norris 2002). The FSB was never envisioned by the AN-ILCA (i.e., it is not explicitly mentioned or even alluded to in the law nor mentioned in its legislative history) and its regulations do not always adhere to corresponding land management agency regulations (see specific examples below). Indeed, the FSB regulations state that they do not supersede agency-specific regulations (50 CFR 100.3)

Here, we argue that the stop-gap measures to "temporarily" assume control over wildlife management on federal lands, which are now 25 years old, do not fully address the legal

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mandates of the land management agencies that comprise the FSB (the Department of the Interior's Bureau of Land Management, National Park Service, US Fish and Wildlife Service, and Bureau of Indian Affairs, and the Department of Agriculture's US Forest Service). Below, we provide recommendations to alter the FSB and its regulations so that it is compatible with its constituent agencies' mandates for the next 25 years.

Recommendations

(1) Assess every extant federal subsistence wildlife hunting regulation (as well as those covering trapping and fishing) to determine their compatibility with the existing legal framework of the respective land management agencies and whether they reflect differences between traditional subsistence hunting and the sport hunting ethos. This lens should also be used to assess all new proposed regulations the FSB receives.

There are conflicts between existing FSB regulations and agency law and regulations, as well as between subsistence and sport hunting norms. For example, trophy hunting is an acceptable practice in the sport hunting, but not the subsistence, community. Trophy hunting has the potential to alter the behavior, genetics, age structure, body size, sex ratios, timing of mating, and antler and horn sizes of wildlife (Coltman et al. 2003; Milner et al. 2007; Allendorf et. al. 2008; Allendorf and Hard 2009; Darimont et al. 2009; Mysterud and Bischof 2010; Schmidt and Gorn 2013; Monteith et al. 2013). By selectively harvesting the largest, and possibly the strongest, males, antler and horn sizes and body sizes have decreased in ungulates in some areas (Coltman et al. 2003; Milner et al. 2007; Darimont et al. 2009; Monteith et al. 2013). Further, the largest and strongest individuals will obviously no longer be able to reproduce and pass along these traits, which can impact the genetics of a population (Milner et al. 2007; Allendorf et al. 2008; Allendorf and Hard 2009; Darimont et al. 2009; Monteith et al. 2013). It can also alter the behavior of groups. For example, the largest male muskox (Ovibos moshchatus) in a herd control and defend small bands. Not only do they defend against other muskox males but also against predators such as grizzly bears (Ursus arctos). By removing the largest male who facilitates group cohesion and defense, the entire band of muskox may become more prone to run from predators, rather than form their iconic defensive circle, and thereby actually increase the vulnerability of the entire band to predation (Schimdt and Gorn 2013). By having harvests that focus on or are completely limited to males, male-to-female sex ratios can be dramatically skewed, which can result in altered timing of mating, younger/smaller males reproducing, and lower pregnancy rates (see Milner et al. 2007; Darimont et al. 2009; Mysterud and Bischof 2010). Therefore the more dramatic impacts of trophy, or selective, hunting can affect the health of wildlife populations, as well as their natural condition. The recovery time of over-harvested populations severely impacted by selective harvest may be longer than those not impacted by it (Allendorf and Hard 2009).

"Healthy" and/or "natural" are management criteria mandated by Title VIII of the AN-ILCA for federal agencies in Alaska while providing the federal subsistence priority. The evolutionary pressures brought on by trophy and selective harvest has been termed "unnatural selection" (Allendorf and Hard 2009) and likely violate these mandates. As outlined by Hilderbrand and others (2013), the ANILCA is just one law relating to land and wildlife stewardship that must be adhered to, but there are numerous other laws, regulations, and policies that must also be followed, including the National Park Service Organic of 1916, National Park Service Management Policies 2006, Federal Land Policy and Management Act (FLP-MA) of 1976, National Wildlife Refuge System Administration Act of 1966, and National Wildlife Refuge System Improvement Act of 1997, among others. Like the ANILCA, some of these other laws also discourage or curtail selective harvest. Therefore, we recommend that federal subsistence regulations that promote trophy hunting be replaced with regulations that allow for a greater range of open seasons, sizes, and ages, as well as the hunting of female ungulates. This change, if properly implemented, could offset the impacts of limited trophy hunting (Mysterud and Bischof 2010). Trophy hunting may not be sustainable without "evolutionarily enlightened" management (Allendorf and Hard 2009; Mysterud and Bischof 2010). "Minimizing the impact of sport hunting on the evolution of hunted species should be a major preoccupation of wildlife managers" (Festa-Bianchet 2003).

Similar arguments can be made with regard to harvest (bag) limits, seasons, and methods and means: the three components that support wildlife harvest management. "Harvest limits" are the number of individuals of a particular species that a hunter may kill over a specified period. "Seasons" are the time and duration that a hunt occurs during the year. "Methods and means" are the acceptable practices that are allowed in order to harvest wildlife. All three of these components were retained when the state hunting regulations were copied over into federal subsistence regulations in 1992. Twenty-five years ago, harvest limits for many predatory species, such as covotes (Canis latrans), wolverine (Gulo gulo), grizzly bears, black bears (Ursus americanus) but especially wolves (Canis lupus), still largely reflected the misguided concept that they are pests: inherently evil or at least not critical to natural ecosystem function. Exaggerated harvest limits, such as in Alaska's Game Management Unit (GMU) 22 where there is no limit on the numbers of wolves that can be taken by any individual subsistence hunter, or in GMU 19D, where the limit is 10 wolves/day (Office of Subsistence Management 2012), are easily construed as being designed to reduce predator numbers because predators are still viewed negatively or could reduce the amount of available ungulate harvest for humans. Setting high harvest limits for predators, such as 10 wolves per day per hunter, that are intentionally designed to or unintentionally could manipulate naturally functioning ecosystems is, in the parlance of the state of Alaska, considered "Intensive Management." Intensive Management is the purposeful manipulation of the ecosystem, by humankind, with the express intent of inducing larger populations of ungulate species using techniques such as predator control. This is the explicit goal for Alaska state wildlife management, and Intensive Management is the preferred tool to reach that goal (see Alaska Statute 16.05.255 e-g and k 1-5). Predator control, as an Intensive Management tool, is prohibited on many federal lands in Alaska (e.g., national parks, monuments, and preserves, and national wildlife refuges) and must undergo an ANILCA Section 810 analysis on other lands, such as those managed by BLM (Lurman 2006; Lurman and Rabinowitch 2007; Joly 2010). However, other Intensive Management actions, such as excessively high harvest limits, have occurred on federal lands and should be corrected to a reduced level. Harvest limits of predators should not exceed what is reasonably likely to be utilized by subsistence users for the legislated purposes of consumption for things such as food, shelter, fuel, clothing, tools, transportation and for the making and selling of handicrafts. Furthermore, such harvests should not disrupt natural or healthy ecosystem function. Moreover, there is no universal quota system, so even under reduced limits enough hunters could be harvesting so as to impact predatory species. While difficult to implement, eventually a quota system should be developed and deployed and periodically adjusted on a regional basis.

Sport hunting seasons for some predatory species are too long in many places, running through the end of May or even June in some areas (State of Alaska 2013). There is pressure to align sport and subsistence hunting regulations, to reduce complexity for hunters. Hunting seasons for those predatory species, which are furbearers, should be in alignment with trapping seasons so that they are limited to when their pelts have high value (typically fall through spring).

One large disparity between subsistence and sport hunting is in means and methods. The most obvious difference is that "fair chase" is a tenet central to the sport hunting ethos, but not in the world of subsistence hunting. The regulations do acknowledge some of these differences, such as allowing subsistence hunters to harvest caribou while swimming in some areas (Office of Subsistence Management 2012) but more could be done to codify these cultural differences.

(2) Provide veto authority to the land management agencies (i.e., Bureau of Land Management, National Park Service, US Fish and Wildlife Service, Bureau of Indian Affairs, and US Forest Service) that comprise the FSB over any new proposed regulation that may impact the lands and wildlife that they manage.

A carefully crafted veto authority with high standards for federal land management agencies would efficiently and effectively streamline and clarify the regulatory process. Proposals that an agency can demonstrate to be antithetical to the pertinent laws governing their lands could be vetoed, for their lands, before they became regulation. As it now stands, the possibility exists that an agency could get overruled in the FSB process and have proposals become regulation that are not legally implementable on the lands that they manage. While FSB regulations state that agency-specific regulations are not superseded by FSB regulations, implementation of this detail is difficult and not transparent to the public. Our experience has shown that an agency finding itself in this position must repeatedly bring up this detail to ensure the public is not misinformed. An initial veto authority would be more streamlined, intelligible, timely, and transparent.

The veto authority would likely be only rarely employed if our first recommendation, to assess the compatibility of new proposed regulations with the existing regulatory paradigm, is adopted.¹

(3) Re-write regulations as to who can serve on FSB's 10 Regional Advisory Councils (RACs) and the FSB itself.

The purpose of RACs is to advise the FSB on subsistence taking and uses of wildlife and fish resources on federal lands. Subsistence hunting under federal regulations is limited to qualified rural residents; currently, non-rural residents can and do serve on RACs. We recommend that a super-majority of each council be made up of rural residents to ensure that the voices of rural subsistence users, who are most impacted by these regulations, are heard. This is consistent with the ANILCA's §801 (5), which states that "rural residents who have personal knowledge of local conditions and requirements" should "have a meaningful role in the management of fish and wildlife and of subsistence use on the public lands in Alaska."

The FSB and its processes underwent an official review relatively recently (2010) during the term of Secretary of the Interior Ken Salazar. The review was long in coming and its few significant recommendations have been implemented rather slowly. One recommendation that was implemented was the creation of two additional seats on the FSB that were filled by "public members." While they provided a welcome broadening of perspective and improved the resulting discussions, the makeup of the new board has the potential to substantively alter the dynamics of the FSB process. Each individual land management agency now has less influence over the outcome of proposed subsistence regulations affecting the lands and wildlife that they manage. This diminished influence over FSB regulations makes a discussion about the need for a veto authority by individual agencies, as described in our second recommendation above, all the more urgent.

Finally, these "public members", including the chair of the FSB, need not be residents of Alaska. We recommend that this be changed and that only residents of Alaska, and preferably federally qualified rural residents, be appointed to the FSB.

Conclusion

The 25-year-old stop-gap regulations to ensure that the federal subsistence priority is provided were written with the expectation that they would be temporary and used only until the state of Alaska came into compliance. After 25 years, it is obvious a solution resolving the issue of dual management is not at hand and the time to discuss recommendations suggested in this paper, as well as other ideas, is now. Federal subsistence regulations need to be revised to account for agency mandates, differences between traditional subsistence and sport hunting, and the reality that they are likely to be around for another 25 years. Additional changes need to be made to increase the efficiency of the regulatory process so that land management agencies and the FSB work more compatibly for the next 25 years. We believe that it will be up to the individual land management agencies, through FSB processes, to move our recommendations forward.

Given that subsistence hunting regulations were copied from sport hunting regulations (Norris 2002), the nexus between the two types of hunting is obvious. Our arguments about trophy hunting, excessive harvest limits, and long seasons have implications for federal land management agencies that have sport hunting regulations that affect them (e.g., national park preserves, national forests, national wildlife refuges, and BLM-managed lands) as well. Initial attempts to rectify these regulations should be run through the sport hunting regulatory process (i.e., the state of Alaska's Board of Game). If these attempts prove futile, federal land managers have the legal tools, authority, and responsibility to preempt the state regulations so that the regulations comply with their mandates.

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Endnote

1. While this article was under review, the FSB reviewed and accepted a new regulation allowing for the hunting of brown bear over bait within GMU 25D, which includes US Fish and Wildlife Service-administered national wildlife refuge lands. This allowance marks the first time hunting of brown bears over bait was permitted by the federal system, following a similarly first-of-its-kind 2012 allowance by the state of Alaska. The new FSB regulation occurred despite the US Fish and Wildlife Service speaking out strongly and voting against the proposal.

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Preserving a Natural Wolf Population in Yellowstone National Park, USA

Tony Povilitis

There is no question, though, that wolves living in Yellowstone National Park are the largest assemblage of protected packs living in the northern Rockies of Idaho, Montana, and Wyoming. This is as it should be and, because it is national park policy, we take this responsibility seriously.

— Smith et al. 2013

Introduction

A FUNDAMENTAL GOAL OF NATIONAL PARKS IN THE UNITED STATES is conservation of wildlife in a natural, unimpaired state for the benefit of people (NPS 2006; Ross 2013). "Naturalness," the avoidance of artificiality, should be the rule (Robbins et al. 1963). However, the no-impairment standard can be violated by external threats to park wildlife and by management actions to abate conflicts between wildlife and people in parks.

In this paper I examine how trophy hunting of wolves near Yellowstone National Park (YNP) and wolf habituation management within the park (YNP 2003) threaten a unique assemblage of naturally occurring wolves (*Canis lupus*). I suggest ways to address these threats.

The gray wolf was re-introduced to YNP in 1995–1996 as part of a recovery program for this species in the US (Smith et al. 2012). The number of park wolves peaked at 174 individuals in 2003 and then decreased and stabilized at 96–98 wolves from 2009–2011, indicating rapid growth in response to abundant prey and a subsequent decline suggesting interaction between predator and prey abundance (Sinclair et al. 2006). In 2012, wolf trophy hunting occurred for the first time in all three states surrounding YNP (Idaho, Montana, and Wyoming). In preceding years, state wolf hunts were limited and constrained by legal challenges (Mech 2013). Efforts within the park to deter wolves from being near people began soon after re-introduction (YNP 2003).

Study area and methods

YNP became the world's first national park in 1872 and one of the first international biosphere reserves in 1976 (UNESCO 2014). It is located mainly in the US state of Wyoming (44°08' to 45°07'N; 109°10' to 111°10'W) and includes 8,983 km² (3,468 mi²).

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(No copyright is claimed for previously published material reprinted herein.) ISSN 0732-4715. Please direct all permissions requests to info@georgewright.org. More than 90% of the land surrounding YNP is federally owned and managed, largely by the US Forest Service (Corn and Gorte 1986). YNP is at the core of the greater Yellowstone area, which, at 72,520 km² (28,000 mi²), is considered the largest relatively undisturbed ecosystem in the coterminous US.

Data on park wolf mortality and aversive conditioning were obtained from YNP through a Freedom of Information Act (FOIA) request (November 7, 2013) and from Yellowstone Wolf Project annual reports (2007–2012). Records provided on human-caused mortality of wolves appeared on a spreadsheet that included a wolf identification number, specific cause of death, date, and location. A second spreadsheet on wolf habituation and aversive conditioning included date and location of encounter, a description of the wolves and people involved, and actions taken. To compare human-caused and natural wolf mortality, I drew upon annual report tabulations for radio-collared animals for which cause-of-death documentation was complete.

Wolves are routinely fitted with radio collars by park biologists to obtain information on their travel, behavior, habitat use, demography, physical condition, and other aspects of wolf biology (Smith et al. 2003). Attempts are made to radio-collar at least one wolf from each pack to facilitate overall wolf population monitoring. Wolves with pack territories primarily within YNP are considered to be park wolves.

Information from the US Forest Service on interagency communications on wolf management near YNP (2009–2013) was also solicited through a FOIA request. Quotas for wolf hunting units adjacent to YNP were obtained from state fish and game agency websites.

As used in this paper, the term "wolf hunting" includes both hunting and trapping as legally permitted. State-authorized hunting of wildlife does not apply to national parks but has been traditionally allowed on most other federal lands, including national forests.

Results

Hunting. At least 23 wolves of YNP were legally harvested during the period 2008–2012, with 14 of these removed in 2012 (Table 1). Legal hunting losses accounted for 55% of total human-caused mortality of collared park wolves during the period. Other causes included control actions (11 instances), vehicle strikes (4), and poaching (2).

In 2012, hunting mortality of wolves matched that from natural causes, based on data for radio-collared animals (Table 2). Hunting mortality appeared additive to natural wolf mortality because the latter in 2012 was comparable with that of the three previous years (Table 2). By year's end, the park wolf population was 83, or about 14 animals fewer than in previous years. Seven of 11 packs living primarily in YNP had lost wolves (Smith et al. 2013).

For 2009–2012, at least five YNP wolf packs lost two or more individuals to trophy hunting (Smith et al. 2010, 2013) (the number of wolf packs varied from 10–14 annually, with some turnover between years). Three wolf groups—Cottonwood Creek, Lamar Canyon, and "642F"—were significantly disrupted or eliminated by the hunts. The Cottonwood Creek pack formed in 2008 with five wolves, producing six pups in 2009. Four members were killed during the fall 2009 hunt, including both the alpha male and alpha female and both

Table 1. Records of human-caused mortality of Yellowstone National Park wolves, 2008-2012.						
Cause of death	2008	2009	2010	2011	2012	Total
Legal hunting	1	4	2	2	14	23
Control actions	5	3	1	2	0	11
Other	2	1	0	4	1	8
Total	8	8	3	8	15	42

 Table 2. A comparison of human and natural causes of death in radio-collared wolves of Yellowstone National Park, 2008–2012.

Year	2008	2009	2010	2011	2012	Total
Legal hunting	1	4	0	1	8	14
Other human-caused	4	2	1	4	1	12
Natural or unknown	16	7	9	7	8	47
Total	21	13	10	12	17	73

radio-collared wolves. What remained of the Cottonwood Creek group apparently moved to the north of YNP (Smith et al. 2011).

The Lamar Canyon pack formed in YNP's Lamar Valley after the long-lived Druid pack (1997–2009) naturally disbanded. It included 13 wolves in 2012 before hunting eliminated the alpha female and beta male (Smith et al. 2013), and caused the alpha male to disperse (Lynch 2014). The group's leadership was reformed by a male from outside the park who paired with a surviving two-year-old daughter of the alpha female. Other members of the pack dispersed or perished, leaving only two Lamar Canyon wolves (Lynch 2014).

The newly formed "642F" group consisted of five adults and a number of pups in 2011. Hunting removed two females. Conflict with another wolf group and hunting losses evidently eliminated the group (Smith et al. 2012).

Aversive conditioning. To instill a fear of humans in them, YNP wolves are subject to intentional harassment ("habituation management") mainly by park personnel (YNP 2003). There were 72 reported attempts (an average of 12 per year) by people to chase away or aversively condition wolves between 2007 and 2012 (Table 3), with most (58%) occurring during 2011–2012.

Fifty-six (78%) of incidents occurred on or near a park road, ten (14%) in the backcountry, and six (8%) in developed areas. In 26 cases (36%), a wolf was reported to approach or move in the direction of people prior to treatment.

Non-lethal shotgun-fired munitions (rubber bullets, cracker shells, bean bags) were used on 21 occasions (29% of total) (Table 3). On 31 (43%) other occasions, wolves were hazed using vehicles or horses, by paint balls being fired at them, or by humans chasing them or throwing objects at them. Fifteen instances (21%) involved vehicle noise or human gestures only, such as shouting and arm waving. Pepper spray was used in five cases (7%), all in the backcountry and all involving wolves that approached people.

parentheses indicate cases where wolves moved in the direction of people prior to treatment.				
Method	On or near road	Developed areas	Backcountry	Total
Munitions (non-lethal)	16 (4)	5 (0)	0 (0)	21 (4)
Vehicle or horse hazing	7 (1)	0 (0)	1 (1)	8 (2)
Paint balls	6 (3)	1 (1)	0 (0)	7 (4)
Pepper spray	0 (0)	0 (0)	5 (5)	5 (5)
Human chasing or object throwing	12 (3)	0 (0)	4 (4)	16 (7)
Vehicle noise (horn, siren, etc.)	8 (1)	0 (0)	0 (0)	8 (1)
Human gestures or noise	7 (3)	0 (0)	0 (0)	7 (3)
Totals	56 (15)	6 (1)	10 (10)	72 (26)

Table 3. Characterization of "habituation management" of wolves in YNP, 2007–2012. Where multiple methods were used, incidents are tallied by the most assertive (forceful) method. Figures in parentheses indicate cases where wolves moved in the direction of people prior to treatment.

Wolves commonly (86%) responded to aversive treatment by running, loping, or walking away. However, "recidivism" appeared high, as 42% of wolves identified during the incidents were considered "repeat offenders."

Aversive treatment typically involved wolves that ignored people (or showed limited interest or curiosity) but did not flee from them, as exemplified by the Lamar Canyon and Canyon wolf packs, both popular with park visitors. Available records indicated that no members of the Lamar group were aggressive toward or directly engaged humans. Yet during 2011–2012, this group accounted for 56% (18 of 32) of instances of aversive conditioning on or near roads. Likewise, the Canyon pack (2009–2010) never actively approached people (Smith et al. 2011) but was hazed (at least seven instances), in part to deter denning near a developed area. Upon harassment, the group moved its denning site in 2009 but reared only one pup that was later lost.

Relatively few park wolves have threatened people or appropriated human objects. From reintroduction to 2012, two wolves showed blatant aggression, one defending a den site, by approaching a person at close range and vocalizing, and the other chasing a bicycle and motorcycles. The latter and another wolf that repeatedly approached people for food where the only wolves destroyed by park authorities. Park wolves fed or likely fed on human food items on six reported occasions. These included a wolf examining a garbage can, chewing a plastic wrapper, shredding tote bags, and consuming a hot dog bun tossed by a park visitor.

Discussion

Natural wolves. National park policy recommendations emphasize preserving ecological integrity in our changing world, including self-sustaining and self-regulating ecosystems, native wildlife populations and life cycles, and naturally functioning ecological processes such as predation (NPS 2012). National park resources, including wolves, should be maintained in "a natural wild state" (Dilsaver 1994), absent of artificiality (Robbins et al. 1963) and creating the mood, a "vignette," of primitive America (Leopold et al. 1963). Prevention of both internal and external impairment of park resources and their attendant values has been central to park policy (NPS 1992, 2006).

To park wolves unaffected by artificial stimuli (be they tossed hot dog buns or rubber bullets), people may more closely resemble neutral objects than natural predators or primitive wolf hunters. "Natural" wolf behavior is for the most part neither avoidance nor attraction to park visitors, accounting for some variation in individual wolves such as innate wariness or curiosity (Haber and Holleman 2013).

Current YNP policy sees normal wolf behavior differently (YNP 2003). Wolves are considered innately shy and generally afraid of people, and as such they are "wild." A wolf is considered "habituated" and a candidate for aversive conditioning if it does not exhibit fear of people. Yet wolves with little negative experience with people often do not fear people (Fritts et al. 2003).

The late Gordon Haber, noted Denali National Park wolf biologist, addressed the misconception that wolves should inherently fear people (Haber and Holleman 2013):

Free-ranging adult wolves generally show little fear of other nonhuman species. They typically approach other creatures in markedly bold, inquisitive, investigative way.... [T]here is little reason to assume that, absent some highly unusual, unnatural, and powerful incentive, such as persecution, they should behave in an entirely different way around people. It is also apparent from historical literature and accounts from frontier areas, at least where open terrain predominates, that wolves generally show little fear or wariness of people at initial contact, unless and until there is persecution or harassment.

Hunting consequences. The biological costs of wolf hunting near national parks can extend beyond seasonal reductions in the number of park wolves and disruption or elimination of family groups. Continued hunts risk reducing overall wolf population size (Creel and Rotella 2010), longevity of family lineages, and intergenerational transfer of adaptive genetic and cultural information (Haber 1996; Haber and Holleman 2013).

Losses of park wolves to hunting also have recreational, social, ethical, scientific, and potentially economic costs (Table 4). Wolf watching in YNP and Denali National Park and Preserve in Alaska has reportedly become more difficult in recent years, coinciding with increased nearby wolf hunting (Downey and Landis 2014; DNP 2014; Lynch 2014). With reduced wolf viewing opportunity, communities surrounding these parks and park concessioners risk losing tourist-related revenues and employment opportunities. The loss of the Cottonwood and Lamar Canyon wolves to hunting drew widespread public concern and consternation (for example, Murphy 2009 and Schweber 2012).

While urging state game agencies to limit nearby wolf hunting, YNP officials have indicated that a "modest harvest" would not undermine efforts to preserve a natural wolf population (YNP 2013). Opposition to nearby hunting might jeopardize whatever influence the park has with state authorities on wolf management, and even risk non-related cooperation

Table 4. Impacts of trophy hunting of wolves near Yellowstone National Park.				
Impact	Mortality level required	Degree of certainty		
Fewer wolves — short term	Any amount. Wolves killed during fall/ winter hunts cannot be replaced by reproduction and recruitment at least until the following summer	Absolute, barring replacement through immigration into the park		
Fewer wolves — long term	A level that reproduction cannot replace over time (non- compensatory)	Possible, unknown (professional opin- ions differ)		
Disrupted pack structure and demography	Removal of high-ranking, experienced wolves	Absolute, with possible long-term effects on wolf biology		
Altered wolf behavior	None required. Fight distances for wolves that are shot at but not killed will likely increase	Absolute short-term, probable long- term		
Effect on wolf viewing public	Removal of any wolf likely to be seen by park visitors, especially those in prime viewing areas	Absolute. Emotional response can vary greatly		
Economic	A level reducing wolf viewing oppor- tunities	Possible to probable, depending on changes in wolf numbers and behavior, and on public perception of whether wolf hunting is undermining the park experience		
Ethical	Any amount. A benign coexistence between people and wolves is abruptly terminated at the park boundary	Absolute		
Scientific	Loss of radio-collared wolves compro- mising or constraining research	Probable, given that 6 park wolves with collars were killed in 2012–2013		

(D. Hallac, P.J. White, D. Wenk, pers. comm.). Nevertheless, National Park Service (NPS) acceptance of wolf hunting next to YNP lends validity to the practice as the appropriate policy norm.

The public interest. In 2012, YNP had over 3.4 million recreational visits involving \$400 million in local spending by park visitors (Cullinane Thomas et al. 2014). Based on a 2005 study, a large share of visitors (44%) listed wolves as a species they would most like to see (second only to grizzly bears), and stated that they personally benefit from seeing or hearing wolves (41%) (Duffield et al. 2006). Visitor spending due exclusively to wolf presence in YNP was estimated at \$35.5 million. Wolves are among those park assets most likely to offer visitors a transformative experience, a recommended primary goal for national parks (NPSAB 2012).

By comparison, hunting of wolves near YNP benefits a relatively small number of people seeking a trophy. For the 2012 hunting season, 6% (23 of 396) of wolves taken in Idaho and Wyoming came from hunting areas immediately adjacent to YNP (based on IDFG and Nez Perce Tribe 2013 and WGFD 2013). In Montana, 8% (18 of 225) of hunted wolves were located within 20 miles of the park (MFWP 2013). Beyond the YNP area, hunters have ample opportunity to harvest wolves across large areas of Idaho, Montana, and Wyoming. On the other hand, the wolf viewing public has primarily YNP in the US (outside of Alaska), with

its unique open vistas and accessibility. Nonetheless, for state wildlife agencies, hunting is of primary interest, while wolf watching is of secondary concern (Wuerthner 2013).

Wildlife in the US is publicly owned and held in trust for all citizens with both federal and state governments sharing management responsibility (Bean and Rowland 1997). Fair application of the public trust doctrine favors wolf protection on national lands surrounding YNP, given broad public interest in park wolves, the no-impairment standard for national parks, and consequences of undermining that standard.

Some people find hope in the fact that, in response to public pressure, Montana authorities had restricted the number of wolves to be hunted in the immediate vicinity of the park's northern boundary to seven (GYC 2014), while Wyoming limited its wolf harvest quota in a trophy zone west of the park to ten (in both cases, for 2013–2014 hunting seasons). More broadly, however, a total take of 47 wolves had been authorized for hunting units adjacent to YNP in Idaho, Montana, and Wyoming (with one additional Montana unit, on the park's west side, having no quota). State quotas may provide some limited protection for park wolves. On the other hand, protective measures entirely dependent on state game authorities can rapidly be undone (Medred 2013).

Wolf hunting near YNP will likely continue indefinitely without a re-balancing of wolf policy on national lands by the federal government. Elected officials and political appointees of states surrounding YNP have shown little tolerance, and sometimes open hostility, toward wolves (Bruskotter 2013). For example, Idaho has begun lethal wolf control projects on public lands, Wyoming has a virtual wolf free zone across much of the state, and Montana has legislated against a no-hunting zone for wolves near YNP.

Protecting park wolves. NPS is the authorized lead agency to address external threats to national parks (NPS 1992, 2006). In the case of YNP, its essential partner is the US Forest Service (USFS) which manages the vast acreage surrounding the park.

Park wolves may be protected by establishing wolf sanctuaries or buffer zones around national parks (Mech 2013). For YNP, the effort could be undertaken through the Greater Yellowstone Coordinating Committee (2011), with an advisory group representing all Americans as "co-stewards" of the national parks (NPSAB 2012). The committee was created to facilitate coordination between USFS, NPS, and other federal agencies in the greater Yellowstone area.

Memoranda of understanding between USFS, state game agencies, and NPS highlight the need for collaboration on important management issues near YNP. However, USFS records (2009–2013) indicate an absence of dialogue with state authorities and with NPS on the matter of wolf trophy hunting. USFS has authority to recommend hunting and trapping regulations to state game agencies while recognizing the traditional authority of the latter to manage wildlife populations on national forest lands (USFS 1995). Ultimately, federal law allows USFS to designate areas of the national forest system where, and for established periods, no hunting will be permitted (FLPMA 1976).

Within YNP, the Park Service should enforce the no-impairment standard by limiting aversive conditioning of wolves to individual animals that threaten people, and by strictly enforcing or reducing speed limits to lower risk of vehicle collisions with wolves and other wildlife. Both measures would require heightened education, supervision, and management of park visitors.

Distinguished from other park wildlife, wolves exhibit a remarkable blend of social cooperation, emotional depth, and physical prowess (Haber 1996), making them exceptionally endearing to park visitors. At the same time, they are, among wildlife, uniquely hated by elements of society (Gibson 2013) and vulnerable to extraordinary abuse (Lopez 1978). Wolf preservation is a challenging test of America's resolve to safeguard the integrity of its national parks, holding them to the highest standard as the "crown jewels" of our outdoor heritage, "worthy of rigorous self-imposed restraints," and defense against "stultifying mediocrity" (Penfold et al. 1972). For generations to come, YNP could be among those few places in America with a wholly unexploited wolf population.

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Cultural Resource Management and Planning for the Impacts of Climate Change

Shaun Eyring and Brian Goeken, guest editors

Foreword

Stephanie Toothman

ACROSS THE NATIONAL PARK SYSTEM, from War in the Pacific National Historical Park in Guam and American Memorial Park in Saipan to the National Mall in Washington, DC, from Sitka National Historical Park in Alaska to Death Valley National Park in California and Nevada, from Saint-Gaudens National Historic Site in New Hampshire to Everglades and Dry Tortugas national parks in Florida, we are seeing the effects of climate change on the natural and cultural resources we are charged with protecting. The threats—melting permafrost, retreating glaciers, increasing intensity of storm surges, rising sea levels, changes in precipitation patterns, migrating pests—are as diverse as the resources we manage.

These impacts are also being felt in communities across the nation, posing threats to the natural and cultural resources that represent the fabric of these special places and our shared heritage. Whether inside our parks, or beyond them in the cities, towns, and rural areas that the National Park Service also serves through a variety of programs, we face common challenges of planning for the preservation of the country's heritage resources.

Since the mid-2000s the National Park Service, as one of the leaders of the national historic preservation program working with many partners, has undertaken an aggressive interdisciplinary program to develop a Climate Change Response Strategy that addresses both our responsibilities for stewardship of park resources as well as for providing guidance and support for the nation's cultural resources.

I want to emphasize the word interdisciplinary. Much of the research we hear and read about is focused on the impacts of climate change on natural resources—for example, the development of migration corridors for plant and animal species reacting to a changing climate. Our intention is to expand this focus. We want to ensure that we not only plan for the protection or sometimes unavoidable loss of assets due to changing climates, but also that

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we understand the historic and prehistoric information that may be lost and the community values and practices that will be adversely impacted. We want to learn from the study of past cultures who have responded to climate change, to understand what makes a culture resilient, and what increases its susceptibility to a changing environment.

Our strategic planning efforts are focused on the basic tenets of resource management: knowing what our resources are (significance, materials, and condition), the vulnerability of those resources to different threats, the options available for addressing those threats, the feasibility of those options, and, finally, the options for dealing with loss.

As the impacts of a changing climate become more evident and complex, we are facing many tough decisions, the difficulties of which are compounded by the multiplicity of decision-makers. Thus, in developing our management strategies and our guidance, we are focused on providing park and program managers with the policy framework and the questions that must be addressed in order to make informed and often difficult decisions. In addition, we have embarked on an aggressive interpretation and education strategy to use park experiences to educate visitors about climate change.

The essays that follow represent only part of this larger initiative of the National Park Service to address climate change and its impact on the nation's cultural resources—an effort in which we all must be engaged for it to be successful. I thank the George Wright Society for dedicating this issue of *The George Wright Forum* to this important topic.

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An NPS Framework for Addressing Climate Change with Cultural Resources

Marcy Rockman

CLIMATE CHANGE PRESENTS MANY CHALLENGES to the stewardship of both cultural and natural resources. These include a wide range of environmental impacts on the resources, as well as the attendant effects on social systems, food security, and public health, among other sectors, now projected to continue long into the future (Pachauri et al. 2014). Addressing environmental impacts and social changes in resource management is not new, and existing tools of cultural and natural resource management remain relevant as we focus on climate change and its interactions with other existing challenges. Nonetheless, the uncertainty of how environmental impacts will vary in time, space, and intensity, as well as interact with each other and social trends, requires managers to use a broader range of information in decision-making. What follows is a framework for beginning to identify such information to inform cultural resources management and to support coordination between cultural, natural, and facilities management in the places, resources, and stewardship responsibilities they share.

The US National Park Service (NPS) released its *Climate Change Response Strategy* in 2010, and is now developing a companion strategy document for cultural resources, which will provide additional guidance to assist with the interdisciplinary work and specific needs of cultural resource managers and historic preservation partners across the nation. This article outlines the principle framework of the cultural resources strategy under development.

Cultural resources have a two-fold relationship to climate change: impacts and information. While environmental forces have always affected cultural resources, the impacts of climate change are already being felt and will continue to accelerate, intensify, recombine, and present new stresses—this is the "impacts" component of climate change on cultural resources. Additionally, cultural resources provide useful information about and profound connection to the history of human interaction with climatic and environmental variability through time—this is the "information" component. In the face of climate change, many managers are already focusing on impacts on cultural resources, but the information to be gained from cultural resources is equally important in informing adaptation choices. The

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National Park Service director's policy memo 14-02, "Climate Change and the Stewardship of Cultural Resources," charges managers with addressing both aspects of cultural resources in an era of climate change.

A dual approach to responding to climate change

Climate change impacts on cultural resources. While some impacts of climate change on cultural heritage may seem apparent, such as the very visible effects of storm surges on coastal cities, there is still much to be learned about effects that range from deterioration of historic materials and erosion of archaeological sites to disruption or cessation of traditional lifeways. The UNESCO World Heritage Centre publication *Climate Change and World Heritage* lists a diversity of impacts, with an emphasis on buildings and traditional cultures (Colette 2007: Table 1). The European Union expanded on this information in an atlas of climate impacts on cultural heritage in Europe (Sabbioni et al. 2012). A scenario planning exercise by NPS at Catoctin Mountain Park in 2012 (North Wind, Inc. 2013) identified the need for detailed threshold information on the effects of projected climate trends on specific local historic materials.

For instance, understanding how wood cabins with stone chimneys may respond to different precipitation regimes will assist managers and inform plans in preparation for the range of potential conditions that may occur. Table 1 is a one-page synthesis of the diversity of climate change impacts across the five categories of cultural resources managed by NPS: archaeological sites, historic buildings and structures, cultural landscapes, ethnographic resources, and museum collections (NPS 2006). Works is close to completion on a larger cultural resources climate change impacts table, which links climate trends to sample impacts across the five categories of cultural resources with greater detail, including links between each listed impact and published references or field observations from across NPS. This larger impacts table is designed to provide better support to resource managers across NPS in preparing vulnerability assessments and resource management plans than the one-page synthesis in Table 1. As well, the 14-02 director's policy memo emphasizes the importance of continuing to look for impacts beyond well-publicized situations of coastal erosion and sea-level rise, as it is likely that many impacts on cultural heritage are already underway but are not yet recognized.

Learning from cultural resources. Recognition of the capacity to learn from cultural resources has been part of cultural resources management for a long time. Under Criterion D of National Register of Historic Places, cultural resources with integrity of location, design, setting, materials, workmanship, feeling, and association may be eligible for listing on the register if they are resources "that have yielded or may be likely to yield, information important in history or prehistory."

We are, however, in the infancy of learning about adapting to modern climate change. One of the challenges climate change presents is how we can integrate the capacity to learn about history and prehistory from cultural resources into management decisions that address the diverse future uncertainties of climate change. The role of national parks as laboratories takes on added importance in this capacity, as NPS Director Jon Jarvis noted in his October Table 1. Climate change impacts on cultural resources. This table incorporates data from theUNESCO World Heritage Centre (Colette 2007) and NPS field observations.

Impact	Environmental Forces	CR Affected	Rate
Submersion	SLR	AS, B/S, CL, E	Trend
Erosion	SLR, Storm surges	AS, B/S, CL, E	Event, Trend
Inundation	SLR, Storm surges, Flooding	All	Event
Saturation	SLR (rising water tables)	1st: AS, B/S, CL, E 2nd: MC	Trend
Deterioration	Precipitation variation Temperature variation Wind variation	AS, B/S, CL, E AS, B/S, CL, E AS, B/S, CL, E?	Trend/event Trend/event Event/trend
Dissolution	Temperature increase (permafrost) Ocean acidification	AS, B/S, CL, E AS (terrest, underw.?)	Trend Trend
Destruction	Flooding Storm (rain/wind)	All All	Event Event
Oxidation	Increase atmospheric moisture	B/S	Trend
Depletion	Ecosystem changes due to human development	AS, B/S, CL, E	Event, Trend
Conflagration	Fire (Drought) (Temperature extremes +/- Insect effects)	All	Event
Dessication	Temperature extremes Drought	AS, B/S, CL, E AS, B/S, CL, E	Event (trend?) Long event
Invasion	Invasive species Mold	AS, BS, CL, E, MC BS, MC	Trend Event
Disruption	Loss of species Loss of access Looting	E E AS	Trend/event Event/trend Event

ethnographic resources, MC = museum collections.

23, 2009, testimony before Congress: "One of the most precious values of the national parks is their ability to teach us about ourselves and how we relate to the natural world. This important role may prove invaluable in the near future as we strive to understand and adapt to a changing climate."

The framework of the companion Cultural Resource Climate Change Strategy provides a context for bringing together management responses to environmental impacts on cultural resources and the information and stories they hold.

An organizing framework for impacts and information. The NPS *Climate Change Response Strategy* (2010) set out four components, or pillars, for climate change response: science, adaptation, mitigation, and communication. For the new companion Cultural Resources Climate Change Strategy, each of these pillars is "doubled" to recognize the two approaches to cultural resources and climate change: impacts and information. For example, while the science component overall addresses climate change data, modeling, and trends, there are science techniques and practices to address impacts of climate change on cultural resources, and there are science techniques and approaches that can incorporate information from cultural resources. While adaptation is about what to *do*, or how to make decisions, regarding climate change, there are specific issues and approaches to address climate change impacts, and there are inherent ways of learning from cultural resources that can assist with adaptation, and so forth. A table of concepts organized by pillar is included in Table 2.

Table 2. Draft US National Park Service concept framework for cultural resources and climate change.This framework applies needs of resource managers to address the impacts of climate change on cultural resources (impacts) and the capacity to learn about long-term human interactions with environmental and climatic change (information) across the four pillars of NPS climate change response: science, adaptation, mitigation, and communication (NPS 2010). A detailed Cultural Resources Climate Change Strategy document further developing this approach is currently in preparation.

	, , , , ,	
Scn	ENCE	
Impacts	Information	
 Climate science at culturally relevant scales Cultural resource (CR) vulnerability assessments CR inventory/monitoring techniques and protocols CR integrated databases/GIS Preservation science Documentation science 	 Paleoclimate/social climatic thresholds Shifting baselines Past land use and human impacts on environments Paleogenetics 	
Мино	GATION	
Impacts	Information	
 Integration of historic buildings into energy efficiency plans Resource conservation through historic or native land- scapes Reduce C footprint of management practices 	 Past architectural and landscape techniques suited to local environments Cultural heritage to conserve/re-establish sense of place and community stewardship 	
Adap	TATION	
Impacts	Information	
 Adaptation options Decision frameworks Contexts/studies to support decision frameworks Policies and standards Scenario planning 	 Identifying examples of past social adaptability per environmental change Relating past adaptability to current issues, methods, and decisions 	
Сомми	NICATION	
 Cultural resources climate change (CR-CC) literacy Dialogue between impacts and information in all pillars CR-CC links between managers (local-international) CR-CC links to public 	Every place has a climate story: • Climate impacts to CR • Past human interaction with climate variability • Origins of modern climate situation • Traditional ecological knowledge	

The organization of concepts shown in Table 2 is part of the NPS vision for a national approach to cultural heritage and climate change. As noted in the 14-02 Director's policy memo,

The NPS leads the Nation in the care and management of our country's cultural resources through the national park system and our programs. On behalf of the Secretary of the Interior, we manage preservation programs that extend to nearly every American community. The National Register of Historic Places and National Historic Landmark Programs, the Federal Historic Preservation Tax Incentives Program, Technical Preservation Services, National Heritage Areas, National Scenic and National Historic Trails, certification of local governments, and our partnerships—including collaborations through the Landscape Conservation Cooperatives, and with tribal governments, States, universities, and other Federal agencies—form a framework for historic preservation inside parks and around the country. Our leadership role in cultural resources now requires engaging this framework to set priorities, to share techniques for protecting significant resources, and to help guide our collective actions with respect to climate change.

The organization of concepts in Table 2, hereafter termed the "concept framework," is a starting point for guiding our collective action. For the broadest level of collective action, encompassing NPS and its partners, once work is underway in at least a majority of topics within the framework (both on the impact side and the information side of each pillar), then the range of effort will begin to encompass that which will be necessary to address the needs of cultural heritage in relation to climate change. The concept framework is also designed to support resource management decision-making across cultural and natural resources management as well as facilities management, by setting out the diversity of cultural resource impacts and information topics, many of which overlap with natural resource science and facilities management topics.

The concepts listed in the framework in Table 2 are not expected to be exhaustive certainly topics will arise in climate change that we can't yet foresee—but this framework is, we hope, sufficiently comprehensive to be useful. Currently, as the following discussion will show, more work has already begun on the impacts side of science and adaptation than in mitigation and communication, and more work on impacts overall than on the information side. Nonetheless, having the information side "on the map" is an important step forward.

The balance of this article expands on the topics shown in the concept framework (Table 2), linking them to research in parks and recent work in climate change response.

The science pillar. The science pillar of climate change response addresses climate data, models, and related data gathering and analysis techniques. Concepts within science for climate impacts on cultural resources follow this organization. For instance, climate science at culturally relevant scales refers to the spatial scales of data needed to assess potential future climate change impacts on a given cultural resource or set of resources. When addressing impacts on natural resources, it can be appropriate to assess impacts on a watershed or ecologically defined unit. These units also may be appropriate for assessing the effects of climate

changes on cultural resources, but this has not yet been clearly demonstrated. In some cases, finer-scale data likely would be more useful (for example, timing of rainfall intensity per adobe stress, such as analyzed in Moss 2010). Vulnerability assessments are analyses of the sensitivity and exposure of resources to projected impacts and their capacity to adapt to changing circumstances. For cultural resources, which derive significance from place and are in large part non-living, capacity to adapt may be limited, particularly without affecting integrity of the resource. An integrated vulnerability assessment—addressing vulnerabilities of both cultural and natural resources in the same park—was conducted for Badlands National Park (Amberg et al. 2012), although this may not be appropriate in all places. Monitoring techniques track climate impacts, and ideally are related to vulnerability. As noted in policy memo 14-02, there is potential to collaborate on monitoring across natural and cultural resources, although it is not yet clear in which situations a given monitoring system can provide data at spatial and temporal scales needed by multiple, different types of resources. For example, increased heat will stress both furry pikas and wooden buildings, but magnitude and scale of stress on each are different.

Inventorying, also discussed in policy memo 14-02, should prioritize areas that are most at risk from broad geographic climate impacts. Integral to such efforts is the capacity to link resource data bases with each other and GIS. Spatial data transfer standards, which have been established by the NPS Cultural Resources GIS Program, will be useful in this regard. The standards will help insure spatial data consistency, quality, and accuracy by using location to link existing descriptive databases and will allow users to explore many facets of a cultural resource in ways that are not currently possible (McCarthy 2014).

Preservation science, including such things as materials conservation and the study of materials and the performance of buildings and structures as well as building systems, refers to the many tools already developed by the historic preservation community. In the US, this includes work conducted by the NPS National Center for Preservation Technology and Training. Similarly, documentation science refers to the array of tools and techniques developed by programs such as the Historic American Building Survey (HABS), Historic American Engineering Record (HAER), and the Historic American Landscape Survey (HALS). Additional tools in both preservation and documentation science will be needed going forward, but there is already a broad established knowledge base.

On the information side of the science pillar is the fundamental record of human interaction with the natural world over millennia. Specific examples of cultural resource science information include both direct environmental information as well as indications of how humans have affected and responded to changes in natural systems through time. For example, isotopic analysis of shells from shell mound sites in the western Everglades provides a record of changes in sea surface temperatures during the Medieval Warm Period (ca. AD 900–1300; Lamb 1965; Crowley and Lowery 2000), while analysis of settlement patterns and other indications of occupation history show human abandonment of the area ca. AD 1300 (Schwadron 2010).

Archaeological deposits also have the capacity to offset the limits of human memory by illustrating how animal and plant communities have changed over time, and that which appears "natural" may not have been so in the past, a process known as "shifting baselines" or "shifting baseline syndrome" (Pauly 1995, 2001; Bunce et al. 2008; Pinnegar and Engelhard 2008; Papworth et al. 2009). An example in and adjacent to national parks is ongoing work in archaeological sites in the Channel Islands which demonstrates changes in the size and composition of Guadalupe fur seal and elephant seal populations over the past 7,000 years (Erlandson and Rick 2010: 174). Similarly, combinations of archaeological, historical, and landscape analyses can outline the range of impacts humans have had over the course of millennia. The use of fire by Native Americans and the adaptation of ecosystems to frequent burning, as well as recognition over the past several decades of the ecosystem consequences of nearly a century of fire suppression, is one of the best known examples in the US (van Wagtendonk 2007).

Indeed, the capacity of humans to modify the global environment has recently been recognized in the effort to define a new geological era : the Anthropocene. Delineation of the beginning of Anthropocene currently appears likely to be set somewhere in the mid-twentieth century, with recent proposals citing the first nuclear fallout and dramatic rise in the use of plastics (Revkin 2015). Debate over the appropriate demarcation line has brought out many examples of human modification of the environment over approximately the past 10,000 years, including domestication of plants and animals, spread of agriculture, and initiation of the Industrial Revolution (Smith and Zeder 2013). An appropriate balance has not yet been found between this record of human impact, practices of ecosystem restoration, and current cultural values of wilderness and natural areas distinct from culture (Cronon 1995; see also Marris 2013).

The contribution of the cultural resources climate change framework is that cultural resources have important information to add to the science of identifying and understanding the impacts and directions of climate change.

The adaptation pillar. Adaptation addresses the issues of what to do about, and with, the impacts and lessons developed in the science pillar. The impacts side of the pillar is a series of interlinking approaches to addressing management of climate change impacts on cultural resources. For example, adaptation options is a process of identifying the universe of possible management actions for a resource identified as vulnerable to, or threatened by, climate change impacts. Decision frameworks are processes for deciding among one or more adaptation options. Policies and standards support decision frameworks by setting out priorities and principles. And scenario planning is a method that supports the decision-making process by framing multiple possible futures, and assessing different courses of action against those futures. These futures incorporate different potential climatic developments and possible social situations, including political, technological, economic, and cultural developments. Detailed guidance on conducting scenario planning for NPS climate change response is presented in the NPS handbook *Using Scenarios to Explore Climate Change: A Handbook for Practitioners* (Rose and Star 2013).

The process of scenario planning and the interlinking of the connected options and decision-making are key for turning this set of practices into *adaptation*. "Adaptation" has been defined by the Intergovernmental Panel on Climate Change (IPCC) as "an adjustment in natural or human systems that moderates harm or exploits beneficial opportunities in response to change." This definition has been adopted by NPS (NPS 2010). In this sense, adaptation consists of creating and using a flexible system that takes climate change and other uncertainties into account when reaching the decision to follow a particular option.

Developing adaptation options is a key interaction point for cultural and natural resources. Many of the options themselves are not substantially different from management actions that may be taken now for resources that have deteriorated or otherwise been affected by ongoing environmental processes. Although the options are not new, a fundamental difference is the deliberate consideration of climate projections and plausible future scenarios prior to selecting actions as part of adaptation strategies. Designating them as adaptation options provides a means for describing how the options may function under future variable conditions, and a basis for developing a common language for adaptation options and related decision frameworks are included in the Preserving Coastal Heritage Workshop report (NPS 2014) and forthcoming in the NPS Cultural Resource Climate Change Strategy and other future publications.

Setting adaptation as adjustments to a system provides a close parallel to how we can learn from cultural resources for the purposes of adaptation, drawing from their information side. Collectively, cultural resources—archaeological resources, built environment, cultural landscapes, archives and museum collections, and the practices and knowledge gathered together under the heading of ethnographic resources—provide the means to assess the pasts of civilizations, societies, social groups, and communities and to ask: What does it mean to adapt? What do resilience and sustainability look like?

No past society is a direct stand-in for the present. However, these pasts allow us to challenge our assumptions about what change and adjustment of systems can look like. For example, the Chumash of the central Californian coast, including the islands now encompassed within Channel Islands National Park, lived through the Medieval Warm Period, the same climatic interval during which major droughts affected the Four Corners area of the American Southwest and, possibly, the western Everglades. Paleoclimatic research shows that central California also was affected by drought (Kennett and Kennett 2000). While communities in the Four Corners area and in the Everglades left the places in which they had lived for centuries, the Chumash remained in place. Archaeological and linguistic work shows that they reorganized trade between the Central Valley to the coast, and evidence from multiple village sites suggests a change in power structures from areas of production to in-between areas for management of trade (Johnson 2000). The Chumash have remained themselves from prior to the Medieval Warm Period to present day. Does this fit our current definition of resilience? Physical anthropological research also shows, however, a decrease in disease and in violent injuries following the end of droughts (Walker 1986, 1989; Lambert and Walker 1991; Lambert 1993; Raab and Larson 1997). Where does social stress fit into our concepts of resilience (Rockman 2012)? More recent ethnography research records the tradition of yearly battle between the coyote and the sun; if the coyote wins, it will be a good year, while

if sun wins, it will be a drought year (Blackburn 1975; Johnson 2000). How well really do we incorporate uncertainty into our plans and understanding of how the world works?

The mitigation pillar. Mitigation addresses reduction of greenhouse gas emissions and our environmental footprint. On the impacts side, cultural resources contribute to these efforts by reducing overall energy needs and usage. This is particularly the case for the built environment and cultural landscapes, as they tend to be more energy intensive than other cultural resources.

Recent research by the National Trust Green Lab has demonstrated that, in most cases, the "greenest" building is a building that already exists, based on embodied energy (National Trust 2012). Older buildings, particularly those built prior to 1920, also tend to have many energy-conserving architectural features that developed in response to the surrounding environment and local climate. The design of these older buildings also reflect the higher labor and financial costs of energy at the time they were built, as well as incorporating unpowered, or passive, heating, cooling, lighting, and ventilation features (Burns 1982).

Related to this, NPS has developed *The Secretary of the Interior's Standards for Rehabilitation and Illustrated Guidelines on Sustainability for Rehabilitating Historic Buildings* for improving energy efficiency while preserving and maintaining historical character (Grimmer et al. 2011). It is also possible in some instances to reduce the carbon footprint of cultural resources management activities. For instance, work by the NPS Cultural Landscapes program has begun to identify and implement techniques for landscape maintenance that require less mowing and conserve water across many parks (NPS, Cultural Landscapes Program, n.d.).

The information side of mitigation draws on the energy-saving features and practices to inspire alternative lower-energy ways of constructing, renovating, or using existing buildings, and interacting with landscapes and other aspects of the surrounding environment. As noted throughout the diverse examples illustrated by Burns (1982), many energy-saving features of older buildings may no longer be recognized as such, and so current use may not be using them effectively, or they may have been covered over with more recent renovations.

Cultural resources also relate to mitigation through the opportunities they provide to engage with buildings, landscapes and materials, and how and why we have come to use them in the ways that we do. While most visitors to Marsh–Billings–Rockefeller National Historical Park don't have the opportunity to build a home on the scale of the Rockefellers, the orientation of the main house with respect to landforms and prevailing winds is a contrast to how most homes are sited today. What have we gained in the current system? What has been lost, including but not limited to energy used for heating and cooling?

The communication pillar. Communication incorporates the goals of connecting all of the pillars of climate change response and being able to share climate change information effectively within NPS, and outward to NPS partners and the public. While there are strong connections between the impacts and information sides of all the cultural resource climate change pillars, these connections are particularly strong for communication. In fact, for communication the impacts side of the pillar might also be seen as establishing the pathways for communication, while the information side helps with content for the communication.

While there are several topics within communication impacts, the scope of this side of the pillar is perhaps best illustrated with the example of climate change training for park interpretive staff. NPS interpreters do not work from scripts. Rather, following the vision of Stephen T. Mather and others (Ward and Wilkinson 2006), they are trained in techniques for understanding their different audiences and engaging those audiences with the places they are visiting to create a meaningful experience.

Climate change presents several challenges in this regard. Among them, climate change science presents a range of uncertainties for the future, and many of the most widely publicized anticipated impacts will affect areas distant from units of the national park system. Among other tools, NPS has developed a training course in climate change for interpreters. Cultural resources relationships to climate change (impact and information) are less well documented and discussed than environmental impacts such as melting glaciers, which presents an additional training challenge. One approach to address these challenges within the NPS Cultural Resources Partnerships and Science Directorate, in collaboration with the NPS Climate Change Response Program, is the "Every Place has a Climate Story" initiative, which is a key example on the information side of communication.

Every Place has a Climate Story is based on the idea that in every place for which the NPS is a steward, it is possible to talk about at least one of the following (likely, more than one can apply):

- 1. How we see change happening in material cultural heritage;
- 2. How traditional, indigenous, and affiliated communities are experiencing change in their lifeways and in relation to traditional knowledge;
- How communities in past societies responded to past climatic and environmental variability; and
- 4. How the modern climate situation has come to be.

How we see change happening in material culture is a profound opportunity to bring climate change into a human scale that can be seen, touched, and felt. Research into park records at Saint-Gaudens National Historic Site, for example, shows that flowers in the garden that have been planted with the same plantings since the 1930s, and in the same arrangements since 1902, are blooming close to a week and a half earlier now than they did approximately a century ago. Bricks along the edges of those gardens are flaking at a faster rate, as northern New Hampshire experiences more freeze-thaw cycles each winter than it did previously.

In another example, surveyors along the edges of ice patches in multiple mountain parks are recovering artifacts left or dropped by hunters long ago that were covered by snow and ice, and are now melting back out, such as bows and fletched arrows and leather hunting pouches. The organic parts of the artifacts can be dated, and some go as far back as 8000– 9000 years (Dixon et al. 2005; Lee 2012). Organic artifacts tend to be quite fragile, and so would not survive multiple episodes of exposure and refreezing. Their reappearance now is hand-sized evidence that environmental change is happening.

Changes in traditional lifeways trace personal and community experiences in environmental change across recent generations. At Apostle Islands National Lakeshore, the Ojibwe describe difficulties in harvesting wild rice due to falling lake levels. At Pipestone National Monument, increases in flooding are making it difficult for members of the Yankton to quarry stone needed for pipes and perform associated rituals. And near Saint-Gaudens, the community lilac festival which was held over Memorial Day weekend for much of the 20th century must recognize that lilacs are now usually fully done blooming by that time (Superintendent Rick Kendall, personal communication 2012).

Examples of past human response to past climatic and environmental variability in the United States are best known from places in the American Southwest. These include parks such as Chaco Culture National Historical Park and Mesa Verde National Park, from which the Anasazi people left during the droughts of the Medieval Warm Period. The people of the western Everglades shell mounds (Schwadron 2010) is another example, as well as the previously discussed story of the Chumash, who inhabited the area that is now within Channel Islands National Park. But really, this approach to connection can be developed anywhere there have been people.

The origins of the modern climate situation story asks us to consider, How did we get here? Why are we now addressing climate change? Industrial sites such as Harpers Ferry and Lowell national historical parks, and westward emigration sites such as Golden Spike National Historic Site, make it possible to talk about the decisions and priorities of many different peoples at different times that were part of the development of our modern world. The history of Jamestown at Colonial National Historical Park includes the climatic expectations of the early colonial investors (Kupperman 1982; Rockman 2010), and places such as Independence National Historical Park are a reminder that many of the political and economic institutions existing now have deep historical and philosophical roots.

The origins of the modern climate story also remain an uncomfortable topic in many places. The NPS policy memo 14-02 states that

Building on the communication goals of the NPS Climate Change Response Strategy, each park and program should engage its staff, including facilities and maintenance staff, rangers, resource managers, scientists, and superintendent, and its surrounding communities to begin to identify and share their climate stories. It is important to do this—even when doing so is uncomfortable—so that they can spark discussion and inform choices.

Including the origins of the modern climate situation in the climate stories initiative follows this directive. The current goals of the Every Place has a Climate Story initiative is to complete guidance on researching and writing a climate story (in development, as part of the National Climate Change Interpretive Plan), and an initial set of case examples prepared in collaboration with parks, to be used in interpretation preparation and other types of communication. Climate stories also were the focus of an NPS–led session on cultural World Heritage at the 2014 World Parks Congress, as part of the NPS co-led "Responding to Climate Change" program stream.

Conclusion

There is already a great deal of work done that addresses cultural resources in relation to climate change, and there is much still to do. The vision for the concept framework described here is for it to serve as a reference for NPS to engage its local, state, federal, tribal, and heritage partners, in the US and around the world, on the broad scope of climate change impacts on cultural resources. As noted in Policy memo 14-02:

The process of adaptation will not return us to the way things have been done before, but it will assist us in making choices in the face of uncertainty and change. Cultural resources remind us of who we are and where we have come from. They offer clues on past climate variability and speak to the many different ways humans have adapted to changing environments over time, in our parks and across the country. We need their information and their inspiration.

This framework is a start in bringing that information and inspiration together with management and preservation.

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Fulfilling the Promise of "Parks to People" in a Changing Environment: The Gateway National Recreation Area Experience

Helen Mahan

Introduction

CLIMATE CHANGE WILL TEST THE ABILITY OF THE NATIONAL PARK SERVICE (NPS) to fulfill the legislative purpose of many of its coastal parks. In parks that serve primarily urban populations, these changes will impact efforts to connect to diverse audiences and a new generation of visitors and stewards. Gateway National Recreation Area (Gateway) faced this challenge during a multi-year process to complete a general management plan (GMP) that set priorities for cultural resource management while addressing climate change and also enhancing this coastal park as a recreation destination. The plan established a process for evaluating and managing hundreds of historic structures, including "letting go" of some historic resources, and provided opportunities for other agencies and the public to comment on the results. The park's new vision and decisions on preserving resources and improving facilities were tested by Hurricane Sandy, which caused widespread flooding and destruction throughout Gateway, and raised questions on how recovery should proceed in the face of new federal policies. This essay describes how the planning process evolved as climate change tools were being developed to address the decades-long deterioration of fundamental cultural resources due to the lack of maintenance.

A national park experience in the country's largest metropolitan area

Gateway is a complex mosaic of natural and cultural resources and recreational facilities interwoven with New York City neighborhoods and small New Jersey towns. Split into three different areas in Monmouth County, New Jersey, and the New York City boroughs of Brooklyn, Queens, and Staten Island, the park manages approximately 21,680 acres of land and waters. The park's coastal and estuarine environments include open bays, ocean, marsh islands, shoreline, dunes, and maritime and successional forests. The beaches, coastline, and adjacent waters are the park's primary recreation destination for millions of people each year.

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The historic landscapes, buildings, collections, and archaeological sites reflect more than two centuries of military coastal defense, aviation, and maritime history, including the oldest continuously operating lighthouse in the United States.

Created in 1972, Gateway was a reflection of an ongoing evolution of the national park concept, from a system of parks preserving the natural wonders and scenic masterpieces in relatively remote and secluded areas, to a system that also included urban-edge parks that balance natural and cultural resources with recreational opportunities. Envisioned as a ring of green space and shoreline around the New York Outer Harbor, this new national recreation area was established to provide public access to shorelines for water-based recreation, and to preserve Jamaica Bay, coastal defense history, and the Sandy Hook maritime resources. Gateway inherited highly developed and manipulated landscapes that brought hundreds of buildings and structures into the national park system, many in deteriorated condition, from city and state parks and a transfer of management from other federal agencies, including United States Army and United States Navy installations.

In 2007, Gateway began a planning process to update its 1979 GMP. The overarching guidance for each unit of the national park system is provided in its GMP, which identifies the desired resource conditions and visitor experiences to be achieved in that park. A multidisciplinary team consisting of 45 NPS staff covering a variety of professional disciplines was assembled to inform and guide the planning process. Interested citizens, partner organiza-



Figure 1. Gateway National Recreation Area overview.

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tions, and public agencies also played an important role in contributing ideas and comments throughout the planning effort.

Critical issues to be addressed in the GMP were identified following dozens of meetings with NPS staff, partners, and the public. Specific topics were explored with NPS scientists and resource experts and academic partners at Columbia, Pennsylvania State, and Rutgers universities to further define issues around climate change, historic preservation, visitor use, and shifting shorelines. The planning team tackled solutions for 22 key questions, including: "What are the best approaches for managing the potential impacts of sea-level rise and other climate-related changes, including loss of habitats, wetlands, shorelines, historic buildings, and infrastructure?"; "What are the best ways to manage the park's cultural resources and landscapes to ensure their preservation?"; "How can Gateway identify priorities for addressing the deferred maintenance of cultural resources?"; and "How should NPS shape a 'national park experience' at Gateway in the midst of the country's largest metropolitan area that engages local, national, and global audiences?"

Planning for climate change

At the onset of the GMP, insufficient guidance was available to planners on addressing cultural resource management in the context of climate change. To better understand resource issues and how park management would need to adapt in the future, Gateway staff worked with Columbia University to identify climate change impacts that may significantly affect Gateway, such as how potential impacts such as sea-level rise, precipitation changes, temperature changes, and changes in the frequency or intensity of extreme weather events would contribute to secondary effects including coastal erosion, damage to park assets, and cultural resource damage and loss. Recreational infrastructure damage resulting from these combined effects would also diminish Gateway's ability to fulfill its mandate to preserve and protect its resources (Kirchoff and Stokes 2009).

Gateway had been experiencing changes due to frequency and intensity of storm events, including increases in storm flooding associated with a nor'easter in 2010, Hurricane Irene in 2011, and Hurricane Sandy in 2012. Early efforts by the park to predict future threats from storm and sea-level rise resulted in a series of maps that charted potential flooding of the park's historic buildings over 30-year periods under a variety of scenarios. Most of the park's well-known and significant historic buildings, such as the Jacob Riis Park Bath House in Jamaica Bay, Officers' Row at Sandy Hook, and Battery Weed at Fort Wadsworth, are increasingly threatened by sea-level rise and coastal storms.

Ensuring a sustainable future for cultural resources

According to Gateway's Park asset management plan, there are nearly 1,300 assets such as roads, utilities, treatment systems, and buildings that the park should maintain in acceptable condition and sustain over time. Currently, the deferred maintenance backlog totals more than \$300 million, over ten times the park's annual operating budget. The majority of the park's historic buildings and landscapes are divided into nine historic districts listed on the National Register of Historic Places: Sandy Hook Light National Historic Landmark; Fort



Figure 2. Battery Arrowsmith.

Hancock and Sandy Hook Proving Ground National Historic Landmark District; Fort Tilden, Fort Wadsworth, Floyd Bennett Field, Jacob Riis Park, and Miller Army Airfield National Register Historic Districts; and three National Register-eligible districts: Silver Gull Beach Club, Breezy Point Surf Club, and Far Rockaway Coast Guard Station.

With more than 800 historic buildings, structures, landscapes, and archaeological sites, Gateway has been challenged to maintain and preserve these resources with competing funding and staffing priorities. The long-term use and preservation of these resources has been the focus of various planning initiatives over the last 30 years and, as funding was available, repairs and preventative maintenance were completed where possible. Many of the resources remained vacant, in deteriorated condition, and in need of major capital repairs since the funding necessary to preserve them far exceeded that which was available. Unsustainable maintenance funding combined with future climate change impacts prompted the GMP team to consider a different approach.

Beginning in 2010, condition assessments were conducted by a team of cultural resource subject-matter experts to inform the treatment of historic structure and landscape conditions, safety, and interpretive experiences. The information derived from these assessments greatly contributed to formulating desired conditions and visitor experiences for the draft management alternatives. This information also led to the awareness that some of resources were in such poor condition that they could no longer be preserved, and that conclusion was clearly stated in the GMP.

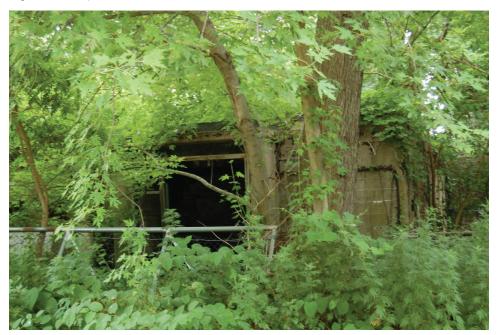
New vision, new focus

NPS and multiple city of New York (NYC) agencies began a collaborative effort in 2011 to create a seamless network of parks and open spaces encompassing Gateway and NYC parklands. NPS and NYC had been independently managing thousands of acres of open spaces, natural resources and community recreation areas, with many of these spaces adjacent to each other and without a common vision for these areas. A new vision developed for the Jamaica Bay parklands that focused on creating a multi-day recreation destination with expanded visitor services, including lodging, camping, and tours. In this vision, rehabilitated historic buildings and landscapes would form the foundation for new programs and activities tailored to attracting a diversity of new park visitors.

As this new vision was forming, an on-site meeting was held with the New Jersey and New York State Historic Preservation Offices (SHPOs), briefing them on the scope of the draft management alternatives and the park's intention to create a special management zone in the GMP that identified certain historic structures as "ruins." Those resources identified as ruins were already in deteriorated condition, and the complexity and cost of stabilizing or preserving them far exceeded NPS or partnership financial capabilities. These resources would be documented and access to them restricted to protect the public as they returned to their component elements through the forces of nature.

In order to guide the GMP management alternatives, NPS staff evaluated and prioritized the 330 structures and associated landscapes that are contributing resources to the park's nine National Register districts. A numerical score was assigned to each resource based on

Figure 3. Battery Richmond, Staten Island Unit.



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the following eight criteria: fundamental resource; National Register status and level of significance; condition; uniqueness; visibility; potential use; and vulnerability to future storm events. Based on these scores, resources were placed in one of three bands: preserve, stabilize, or ruin, defined as:

- **Preserve:** Actions will be taken to maintain and preserve these structures. Efforts will be made to maintain these structures in their current condition or improve their condition through preservation or rehabilitation by NPS or partners. These structures will be used to support visitor programs, interpretation, operations, and appropriate commercial uses.
- **Stabilize:** Structures where actions will be taken to stabilize unsafe, damaged, or deteriorated properties while retaining their present form. Minimal efforts will be made to maintain the structure in its current condition; unless a use and/or funding is found, the structure may fall into disrepair.
- **Ruin:** Structures in poor condition, where one or more of the basic structural elements have been lost, and which are without viable re-use options due to this condition. Resources may be removed or fenced off to keep them from being safety hazards; no work will be done to better their condition.

The banding exercise concluded that more than 25% of the contributing resources should be identified as "ruins." NPS staff acknowledged that the evaluation process was a first step and anticipated that, as new data or condition information became available, the scoring would be updated.

The Hurricane Sandy test

In October 2012, Hurricane Sandy came ashore and caused significant damage to many coastal areas of Gateway. The hurricane produced heavy winds, tidal surge, and rain that resulted in severe flooding and extensive damage at popular park areas such as Jacob Riis Park, Fort Tilden, Jamaica Bay Wildlife Refuge, Great Kills Park, and Sandy Hook. Hurricane Sandy tidal surges were the highest in almost 200 years and consistent with Columbia University's projections of coastal storm damage for the next century. Park infrastructure elements were destroyed and historic structures and recreation sites were severely damaged. Two months after the hurricane event, immense pressure mounted on the planning team to finalize the vision and guidance of the GMP to set the framework for Hurricane Sandy recovery. Would the vision still hold? How would incorporating new climate change guidance change the options for cultural resource management, visitor experience and facilities?

To guide hurricane recovery decisions, new elevation maps were developed that applied the Federal Emergency Management Agency (FEMA) guidance, including the advisory base flood elevation for the NYC area. In addition, NPS staff began collecting first-floor elevation data for all buildings at Gateway, the first initiative of its kind in the national park system. These data have been used in hurricane recovery resource management initiatives and facility planning. Following months of recovery efforts and initial damage assessment, the planning team, in conjunction with NPS senior leadership, evaluated the alternatives to determine



Figure 4. Erosion at the Sandy Hook Nike Missile Launch site caused by Hurricane Sandy storm surge.

whether changes were necessary. The group concluded that the broad vision for each alternative remained intact. Using the updated resource and facility condition data as well as new agency guidance and requirements, the planning team revised the scope of recreation facility development. In most cases, the recreation and community uses in historic buildings and landscapes were scaled back, reflecting a revised approach from permanent structures and hardened surfaces to smaller, flexible and more resilient areas. As the GMP continues to be implemented, creative design solutions to protect the natural and cultural environments will determine whether the complete vision outlined in the GMP is still attainable.

Consultation and public involvement

Throughout the GMP process, the issues of climate change and how the future management of cultural resources would be prioritized were communicated to the public, and their input and comments sought and considered. After thousands of comments were received on the draft GMP, only a small fraction expressed concerns about climate change impacts, surprising to the planning team considering the damage caused to the park and community from Hurricane Sandy. The public has continued to support preservation efforts and recreational uses in the park.

In October 2013 NPS invited the New Jersey and New York SHPOs, the Advisory Council on Historic Preservation, the Delaware Nation, the Delaware Tribe of Indians, and the Stockbridge-Munsee Community to participate in consultation on the development of a Section 106 programmatic agreement that outlined how compliance with Section 106 of the National Historic Preservation Act would proceed as the GMP is implemented. This new programmatic agreement would guide the Section 106 process as the decisions regarding management of historic properties designated to be treated as "ruins" are made. A copy of the signed programmatic agreement was included in the GMP record of decision.

Conclusion

Throughout the GMP process, the planning team had to continuously adapt to changes brought on by internal, political, community, or environmental influences. The original motivations for undertaking the GMP process—responding to future climate change impacts, ensuring a sustainable future for cultural resources, and engaging new park visitors—remained consistent despite both internal and external pressures. A broad representation of park staff, including maintenance, business services, and interpretation, was involved in determining solutions to cultural resource management issues. Expert guidance from a team of historians, preservation specialists, and historical landscape architects offered new opportunities and creative approaches to future resource stewardship. The consultative process among the park's many stakeholders, including the public and state and local partners, was critical to informing the ultimate decision-making process. The New Jersey and New York SHPOs are currently working with park staff on implementing GMP projects as outlined in the programmatic agreement. Today, Gateway has a framework for the future that provides both an exciting vision and a practical approach to fulfilling the "parks to the people" legacy of its original establishment.

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Cultural Landscape Preservation in Context: Responding to a Changing Environment

Bob Page

Introduction

AMERICAN HISTORY IS WELL REPRESENTED IN THE NATIONAL PARK SYSTEM. The cultural landscapes associated with this heritage offer a powerful format to tell the story of our nation, whether they be associated with important events, activities, and persons; reveal specific trends in landscape architecture or gardening; reflect vernacular patterns of early settlement and land use; or retain important ties to contemporary people. To ensure that these landscapes are preserved, we need to understand how to address landscape systems, and the dynamic qualities inherent in landscapes, within the construct of historic preservation practice.

There is a common perception that the primary goal of cultural resource management is to "freeze" a place in time. It is true that the basic tenants of historic preservation focus on retaining surviving resources and a high degree of authenticity. Replicating historic conditions is always the first consideration in stewardship because it minimizes change and provides the most authentic representation. However, the reality of cultural resource management is far more complex, and there are a variety of factors that will result in some level of change to a historic property. For that reason, in preservation practice "rehabilitation" is the most commonly used of the four approaches to the treatment of historic properties. This approach clearly recognizes the need to accommodate change, and changes are considered in the context of the cumulative effect on a property's historic character.¹

Considering that almost all cultural landscapes are composed of natural systems, managing change is a core function of preservation and stewardship and involves assessing how change contributes to, or detracts from, the character that allows a landscape to reveal its history. Everyone involved in preservation work draws upon a similar body of science, but landscape preservation involves far more interpretation given the need to intervene in natural processes to retain or shape character.

In order to be effective stewards of our national park cultural landscapes, changes in response to current environmental conditions, sustainability, and continued use must be con-

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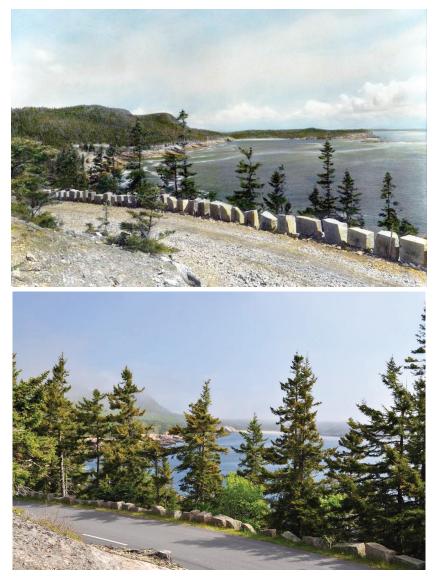


Figure 1. Views from the Otter Cliffs area of Ocean Drive, Acadia National Park, Maine, 1920s (upper) and 2014 (lower). View and vista management is a great example of the need to actively intervene in natural processes to retain or shape character. Without intervention, views will be lost.

sidered. Adaptive strategies are often necessary to protect resources, meet natural resource objectives, accommodate visitor access and interpretation, and conform to site conditions that differ significantly from the historic period. As recent extreme weather events have highlighted, landscape stewardship strategies also need to consider climate vulnerability and adaptation.

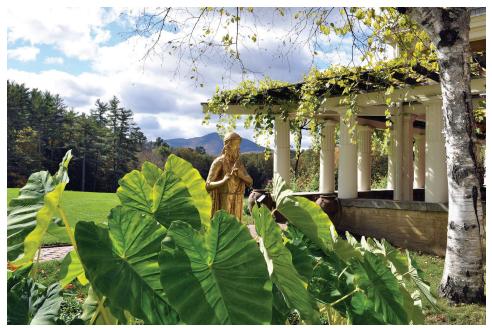
The National Park Service Olmsted Center for Landscape Preservation assists national parks in preserving cultural landscapes through a variety of services. The center's work guides short- and long-term preservation and responds to a full spectrum of site management goals.. This article draws upon this work to highlight cultural landscape stewardship strategies that strive to balance the preservation of historic character with adaptation to changing environmental conditions and long-term sustainability.

Management of historic character

Cultural landscape stewardship requires a foundation for decision-making based on knowledge of a landscape's significance, physical evolution, and existing conditions. A critical component of this foundation is an understanding of a landscape's characteristics and features, and how they individually and collectively shape a landscape's historic character and aid in understanding its cultural value. What are the essential elements that, if lost, would significantly impact the ability of the landscape to reflect a sense of time and place in history? Based on this knowledge, an appropriate treatment strategy can be developed to guide stewardship activities, set priorities for preservation, and define parameters for altering historic conditions in response to a variety of contemporary issues.

At Saint-Gaudens National Historic Site, in Cornish, New Hampshire, the treatment strategy recognizes the importance of the sweeping westward views of Mount Ascutney and Juniper Hill; the role of the hemlock and white pine hedges in creating outdoor rooms for sculpture; and the form, color, and texture of the perennial garden. The strategy articulates

Figure 2. View of Pan Statue, Little Studio to right and views of Mount Ascutney in the background at Saint-Gaudens National Historic Site, New Hampshire.



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the qualities and extent of the historic views; size and composition of the hedges, along with replacement scenarios; and importance of perpetuating the tradition of garden craft and horticultural workmanship rather than a static planting plan. Changes based on maturing vegetation, pests and diseases, and maintenance are considered and incorporated as appropriate in the overall character management of the landscape.

During the past fifteen years, based on the 1999 general management plan, Gettysburg National Military Park has been implementing an ambitious landscape rehabilitation to reinstate the historic character of 1863. The rehabilitation is focused on the spatial organization, patterns of circulation, and small-scale features that were significant to the outcome of the battle. One of the rehabilitation tasks calls for replanting 160 acres of orchards to reflect conditions at the time of the battle. The treatment strategy developed to guide the rehabilitation to the spatial organization of a farm, and thus to its use in battle, is. The historic limits and height of an orchard are the primary concern, as these qualities affected the cover and concealment, obstacle, or avenue of approach during the battle.²

To achieve the desired character, trees are planted on 40-foot centers using standard size apple or pear trees. Several varieties of modern disease and pest-resistant root stock are used, which yield trees that remain healthy with less intensive maintenance. Young trees are pruned using 19th-century pruning techniques, so that the resulting orchard has the general appearance, size, and height of the orchards at the time of the battle. The use of pesticides and herbicides is limited, as the orchards are not managed for fruit production but for their general appearance on the landscape. To date, approximately 3,100 trees have been planted throughout the park, re-establishing this important landscape feature and enhancing the ability of the landscape to convey its historic character.

A very different landscape character conveys the significance of the Dune Shacks Historic District in Cape Cod National Seashore in Massachusetts. This 1,500-acre vernacular landscape is composed of 19 wooden shacks nestled within the dunes along the seashore. The landscape is significant for its association with various prominent artists and writers in the early 1900s, such as playwrights Eugene O'Neill and Tennessee Williams. These shacks and their associated outbuildings have been moved, taken down by storms, and rebuilt many times during the past 90 years, and the landscape continues to evolve in response to both natural conditions and the continued use by present-day artists. Based on this character, the treatment strategy is focused on perpetuating use of the shacks as a remote inspirational retreat. Buildings will be preserved as close as possible to their historic character, but modern materials will be allowed, buildings may end up in different locations, and more environmentally efficient utilities will be installed. The goal is to retain the vernacular character and overall sense of place that has defined this landscape for almost a century.

Adaptation

Given the diverse array of cultural landscapes throughout the national park system, understanding a landscape's historic character provides a frame of reference for management decisions. This knowledge is essential for determining the best strategies for long-term preservation to retain or shape character and respond to changes based on continued use and current environmental conditions.

Cultural landscape management practices are often modified in response to conflicting resource management goals and to incorporate best management practices and sound environmental principles. Dramatic change in environmental conditions may require compromises between historic accuracy and the realities of maintaining or recreating historic conditions. Adaptive strategies may be necessary to conform to site conditions that differ significantly from the historic period, meet natural resource objectives, accommodate visitor access and interpretation, and protect resources from fire, flood, and other threats.

Balancing multiple resource management goals. Historic conditions may be modified in response to vulnerable natural systems and for long-term sustainability. For example, historic plant palettes contain a wide variety of native and introduced species, and some of the introduced species can be highly invasive. Historic vegetation at Vanderbilt Mansion National Historic Site in New York includes barberry and English ivy. Given the invasive nature of these species, treatment recommendations specify non-invasive substitutions to perpetuate historic character while protecting the natural systems by eliminating the potential spread of invasive species into nearby forests.

The 45-mile historic carriage road system at Acadia National Park provides visitors with the opportunity to explore the mountains and valleys of the park. In response to extensive erosion after heavy rainfalls and during spring runoff, the existing drainage system was re-evaluated. One site adjacent to Eagle Lake was identified as a high priority for treatment because the existing culvert was undersized, causing washouts and pulling road sediment into nearby streams. In addition, the historic configuration of the culvert was causing harm to the fish populations, including native brook trout, due to their inability to migrate through the culverts. To ensure adequate drainage along the historic carriage road, protect nearby streams from sedimentation, and enhance the passage of aquatic organisms, the existing 24-inch, corrugated round metal culvert was replaced with a 6-foot-wide and 3-foot-high, galvanized steel open-bottom culvert. The new configuration required replacing the culvert's historic feature was evaluated in the broader context of enhancing protection of the culvert's field of the passage replaced with a feature in character. Modification of this historic feature was evaluated in the broader context of enhancing protection of the carriage road through improved drainage and allowing migration of native fish populations.

Incorporating sustainable management practices. The National Park Service Green Parks Plan (2013) defines a collective vision and a long-term strategic plan for sustainable management of park operations. As part of that vision, landscape management practices are being evaluated with respect to how we can conserve energy and increase our reliance on renewable energy, improve water use efficiency, limit the waste we generate, and mitigate the effects of climate change. This has resulted in multiple efforts to incorporate environmentally friendly practices in landscape maintenance, reduce the level of maintenance required, and build healthier, more self-sufficient systems.

Across the national park system, mowing turf grass is a significant source of greenhouse

gas emissions, as well as water usage, fertilizer, and herbicides. A reduction of mowing can help parks move toward a lower carbon footprint. In addition, organic turf and weed management practices can build a healthy soil community for long-term sustainability.

At Glenmont, Thomas Edison's home in New Jersey, a large portion of what is today maintained as mowed turf grass was historically a meadow maintained by grazing livestock. Conversion of this section of lawn to meadow will result in an increase in meadow species and a significant reduction in the frequency of mowing. This is an ideal situation that results in enhancing historic character and lowering the carbon footprint of maintenance practices.

In areas of the country with limited availability of water, including some recently plagued by severe droughts, alternative solutions to turf management are being considered. Historic Fort Baker in Golden Gate National Recreation Area in San Francisco was extensively rehabilitated in 2008 and is now home to Cavallo Point Lodge, which markets itself a sustainable luxury hotel, and the Institute at Golden Gate, a new environmental institute with a mission to advance the health, sustainability, and protection of our environment.³ The rehabilitation of the property included the historic parade ground. The park and the lodge operator wanted a parade ground that reflected its historic character and was also a model of sustainability.

The goals for the parade ground turf included use of native grass, reduction of water usage (with the eventual goal of eliminating irrigation altogether), and a limited need for mowing. Based on a number of test plots to evaluate the cover, growth, and color of different seed mixes (of particular concern was the color of the turf during the dry summer months), a turf cover of native and non-native grass was installed. Mowing is only necessary a few times a year, and the grass will be allowed to turn "golden" during the summer months. This approach presents a landscape character that is in keeping with the historic period, but is slightly modified, especially during the summer months, to address contemporary management goals.

Across the San Francisco Bay, a recent landscape treatment plan for Fort Mason proposed managing turf to reflect the historic landscape conditions under United States Army stewardship within the historic core of the district. However, recommendations were made to modify management practices on the perimeter of the district to increase the use of native species, reduce the use of irrigation, and enhance the capacity for rainwater to perme-

Figure 3. View of Historic Fort Baker parade ground with turf test plots installed to evaluate the cover, growth, and color of different seed mixes. The park and the lodge operator wanted a parade ground that reflected its historic character and also was a model of sustainability. Golden Gate National Recreation Area, California.



ate planted areas. In the 13-acre, non-historic portion of the landscape, known as the Great Meadow, the plan recommended a 32% reduction in the irrigated and mown lawn area by replanting turf areas along the perimeter with drought-tolerant native grasses.

Responding to diseases and pests. One of the major causes of change and loss of historic character is the damage to vegetation due to an increasing number of diseases and pests. As a result, an increasing number of cultural landscape treatment plans address the selection of substitute plant materials. The process used for selecting substitute plant species involves the application of objective weighting factors associated with a landscape's historic character, including design intent, adaptability to site conditions, establishment, maintenance requirements, and sustainability.

The development of a landscape management strategy for Rapidan Camp, President Herbert Hoover's summer retreat in Shenandoah National Park, Virginia, followed the death of nearly all of the eastern hemlock trees (*Tsuga canadensis*) from the hemlock wooly adelgid in the late 1990s. Rapidan Camp lies deep in a natural area, surrounded by hardwood forest, mountain streams, and critical habitat for native plants and animals. During the historic period, towering hemlock trees were a major character-defining feature, creating a high overhead canopy and providing deep shade beneath. The loss of the hemlock trees dramatically altered the character of the camp, opening the forest floor to sunlight and encouraging dense shrub and sapling growth.

While re-establishment of the hemlock canopy would reinstate the historic character of the camp, it would require a lengthy propagation program to generate seedlings from existing specimens. In addition, hemlocks continue to be vulnerable to the hemlock woolly adelgid, and replacement in-kind would require ongoing treatment with systemic pesticide to control the infestation. Given the environmental context of the camp and the feasibility of sustaining such an investment, the treatment strategy calls for a replacing the hemlocks with a substitute species. The surviving hemlock trees will be protected with pesticide treatment and propagated, preserving the possibility of re-establishing the hemlock grove at a future date if conditions become more favorable.

In consultation with park staff, and with technical assistance provided by the University of Tennessee Institute of Agriculture, Department of Forestry, Wildlife, and Fisheries, alternative management strategies were considered, including both native evergreen and deciduous species.⁴ Based on an analysis of soils, canopy cover, forest density, seedling regeneration, and predominate plant species, the final recommendation was to manage the landscape to allow the native tulip poplar trees (*Lirodendron tulipifera*) to grow into a canopy. Although tulip poplars would likely have represented a small component of the overall tree canopy during the historic period, the trees exhibit a number of desirable characteristics that make them a preferred species for canopy reestablishment. They are a pioneering species that is colonizing many of the areas opened to sunlight by the hemlock loss, grow quickly, and are long-lived. While the character of the deciduous tulip poplars will be quite different from the historic hemlock glen, management of existing trees will create the desired shaded character with minimal intervention and need for ongoing maintenance.

At Jefferson National Expansion Memorial in downtown St. Louis, a proactive response was taken to address the threat of the emerald ash borer to the memorial's historic designed landscape. The emerald ash borer is an exotic beetle that was discovered in southeastern Michigan near Detroit in the summer of 2002. The adult beetles nibble on ash foliage but causes little damage. The larvae (the immature stage) feed on the inner bark of ash trees, disrupting the tree's ability to transport water and nutrients, causing tree decline and mortality.

The grounds of Jefferson National Expansion Memorial are a critical component of this National Historic Landmark property. This significant contemporary landscape reflects the design collaboration between architect Eero Saarinen and landscape architect Dan Kiley. One of the most significant features of Kiley's landscape design is the white ash-lined walk-ways leading to Saarinen's 630-foot stainless-steel Gateway Arch. These allees are part of a monoculture composed of approximately 1,200 white ash "Rosehill" trees planted throughout the grounds.⁵ The monoculture planting defines the pedestrian experience and complements the simplicity of the Gateway Arch. According to the 2010 cultural landscape report:

The allées are a contributing landscape feature that defines the character of the Memorial landscape. They should be retained and maintained, including the location and spacing of trees, and the use of a uniform, single-species planting of tall, relatively straight-trunked, deciduous trees, creating a continuous canopy and sense of enclosure over the walks. Maintaining the Rosehill ash cultivar (*Fraxinus americana* 'Rosehill') in particular is not as important as maintaining these formal characteristics.⁶

In 2009, in response to the location of the emerald ash borer in Wayne County, Missouri, approximately 150 miles south of St. Louis, the park prepared an emerald ash borer management plan. The plan reaffirmed the preservation goal stated in the 2010 cultural landscape report of preserving the monoculture allee landscape feature, outlined a process for selecting substitute plant species for the Rosehill ash, and recommended an action plan for managing the existing Rosehill ash planting based on proximity of the insect to the park: the current 150-mile, a 50-mile, and a 15-or-fewer-mile confirmation.

A short list of trees was identified that had an appropriate height (50–70 feet) and habit, ability to tolerate alkaline soils, resistant to diseases and pests, and maintenance. After further consideration, the London plane tree (*Platanus acerifolia*) was selected as the preferred replacement species. In order to build in resilience from anthracnose and other problems with this monoculture planting, the plan recommended using diverse cultivars. As with many treatment strategies, there was no silver bullet for a substitute tree at the Gateway Arch. Instead, the final tree selection was based on several factors for how best to adapt the historic conditions in response to the environmental changes based on historic character, soil conditions, and maintenance.⁷

In 2010, the City Arch River 2015 Competition was awarded to landscape architect Michael Van Valkenburgh Associates, Inc. This project was initiated to celebrate the 50th anniversary of completion of the Gateway Arch, reimagine and enliven the grounds of the park, and enhance connections to the city and the Mississippi riverfront. In light of the pend-



Figure 4. View of the white ash-lined walkways leading to the 630-foot stainless steel Gateway Arch. Based on the threat of emerald ash borer, the trees are being removed and replaced with London plane trees. Jefferson National Expansion Memorial, Missouri.

ing loss of the ash trees, tree replacement was folded into the project and implementation is underway. To increase the viability of the new plantings, the project will also include re-engineering the soil composition and a new irrigation system.

It is important to note that, while Kiley's design included more than 1,200 ash trees throughout the Gateway Arch grounds, a decision was made to limit the monoculture planting to the sidewalk allees. Beyond the allees, proposed tree planting will conform to contemporary best management practices and include a diverse plant palate and greater use of native plants.

Preserving coastal heritage resources. Recent storms have demonstrated just how vulnerable some of our national park cultural landscapes are to damage and loss, especially those located along the coast. These landscapes present some of the greatest challenges to balancing the preservation of historic character with changes needed for climate adaptation and increased landscape resiliency.

The National Park Service is still in the process of repairing the damage caused by Hurricane Sandy in 2012 and recognizes the inevitability of another storm event. So what is the best strategy for protecting resources and minimizing future damages?

Given the location of the Statue of Liberty, the landscape at Liberty Island will always remain extremely vulnerable to storm damage. At the Arrival Mall of Liberty Island are evenly-spaced London plane trees which frame the promenade leading to the Statue of Liberty



Figure 5. View of storm damage caused by Hurricane Sandy in 2012. Given the location, the landscape at Liberty Island will always be vulnerable to storm damage. Statue of Liberty National Monument, New York.

and provide a green canopy. As a result of the storm, most of the trees are dead or dying. As part of the repair work underway, recommendations have been made to replace the damaged London plane trees with salt-tolerant shade trees that are similar in character, such as white oak, in order to increase landscape resiliency. To preserve the historic character, the recommendations specify that trees along the promenade be single-trunk specimen trees, planted in the same location with the same spacing as the existing plane trees. In addition, soil conditions should be improved to allow for greater soil flushing, reducing the impact of salt when overwash occurs.

Striking a balance between preserving historic character and the changes needed for climate adaptation should always be the first priority. However, there are certain cultural landscapes that may require an entirely new design and management approach to respond to the increase in threats and damage as a result of climate changes.

The damage Hurricane Sandy caused to Jacob Riis Park in Gateway National Recreation Area in New York has raised a number of questions regarding the best approach for its long-term management. Built by Robert Moses in the 1930s, the landscape provides a wonderful recreational resource for New York City. The site has always been vulnerable to storm damage; however, the recent impacts are much greater. Five years ago a landscape rehabilitation plan was prepared for the park. Part of that plan called for the replacement of a historic cast-steel railing along the boardwalk adjacent to the beach. As a result, the railing was replaced with cast aluminum railing that replicated the historic design, at quite an expense. This approach could easily be considered a model of good preservation practice. Unfortunately, in 2013, Hurricane Sandy seriously damaged most of the new railing. The question the park is now facing is, in this context, should we be considering a new design for the entire landscape that is more resilient to storm damage, and where the investment of precious dollars is not wasted?

Need for strategic planning

Recent storms have clearly demonstrated the damage that can result from a single event. Changes based on rising temperatures or diseases and pests may occur over a much longer time period, yet the impacts can be as devastating as a single storm. Both scenarios have the potential to radically alter the historic character of the landscape that we are trying to preserve.

In the context of this changing environment, we need to be more proactive in identifying potential threats, planning for anticipated changes or events, and defining appropriate mitigation measures. To do so, a solid information base is essential to guide decisions about long-term preservation. Baseline inventory efforts should be prioritized to focus on vulnerable cultural landscape resources. For the most vulnerable, such as coastal landscapes, a documentation initiative should be launched to ensure that these resources are fully recorded if lost.

To guide investments in resource management, treatment planning must fully consider climate adaptation, sustainability, and resilience. These factors need to be seen within the construct of rehabilitation and balancing contemporary site issues with preservation of historic character. In addition, it is important to recognize the role of preservation maintenance in landscape resiliency. We have seen the extent of the damage to cultural resources caused by events such as Hurricane Isabel in 2003 or Hurricane Isaac in 2012 and, most recently, Hurricane Sandy. But we have also seen that landscapes in good condition are far more resilient and the damage caused by storms is less extensive. So, a large part of the strategy to increase landscape resilience lies in basic care-taking.

Conclusion

The examples shared in this article highlight the critical role of managing change in cultural landscape stewardship, along with a variety of approaches to respond to current environmental conditions, sustainability, and continued use. We need to be able to clearly articulate the values and character that are most important to ensure that, if at all possible, proposed changes do not alter the inherent value and character we are charged with preserving. Armed with an understanding of a landscape's significance, existing conditions, and historic character, we can play a critical role as problem solvers within a larger context of resource management.

Today, we are just beginning to explore how we can successfully incorporate climate adaptation and landscape resilience in preservation goals and strategies. While climate adaptation and landscape resilience historically have not been part of cultural resource management terminology, these are not foreign concepts in preservation practice, especially in cultural landscape stewardship. In preservation terms, the majority of our stewardship activity involves rehabilitation—and rehabilitation is adaptation based on a variety of circumstances, such as contemporary use, accessibility, natural resource values, and sustainability.

As we look toward the future, cultural landscape stewardship will continue to approach treatment with the goal of attaining the highest degree of integrity and authenticity possible. However, we can anticipate that the management issues that need to be addressed will increase and be more complex, and will likely require a greater degree of flexibility and a consideration of many more options to achieve preservation goals.

In considering adaptation strategies for a property, we need to take a holistic view and involve expertise in multiple areas of resource and facility management. In addition, we need to collaborate across park and agency boundaries to share expertise and knowledge. Landscape preservation practice is well versed in managing change and adapting to a variety of circumstances in a manner that ensures preservation of a landscape's essential qualities. I believe this will serve us well as we explore how to address climate adaptation and landscape resilience in preservation goals and strategies.

Endnotes

- 1. National Park Service, *The Secretary of the Interior's Standards for the Treatment of Historic Properties* (Washington, DC: NPS, 1995).
- 2. The exception to this understanding is named orchards that are now commemorative in nature, such as the Peach Orchard; Eric Campbell, *Treatment Philosophy: The 1863 Landscape* (Gettysburg, PA: Gettysburg National Military Park, 2004).
- 3. Cavallo Point is LEED Gold Certified.
- 4. Jennifer Franklin, "Rapidan Camp Cultural Landscape Technical Assistance" (unpublished report, Department of Forestry, Wildlife, and Fisheries, University of Tennessee, 2012).
- 5. Kiley's original design called for tulip poplars based on their scale, stature, and fast growth. Prior to implementation, local nurserymen, political leaders, and citizens voiced a public debate regarding the use of tulip poplars. As a result, a substitute, the Rosehill ash, was chosen to replace the tulip poplar.
- 6. AECOM, Inc., Cultural Landscape Report, Jefferson National Expansion Memorial, St. Louis, Missouri (St. Louis: National Park Service, 2010).
- At the time of purchase, the lack of varieties available in the market resulted in a single variety being selected, the 'Bloodgood' London plane tree. Anticipating some mortality, the plan is to diversify over time as other varieties become available.
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Every Place has a Climate Story: Interpreting Climate Change at Historic Sites

Angela M. Richman

FOUR YEARS AGO, AT A NATIONAL PARK SERVICE (NPS) CONFERENCE, a senior scientist stunned me with the following declaration: "Climate change is a topic for natural resource parks, not cultural parks." Speechless for a moment, I soon retorted, "Climate change is an issue that affects all humans, so it is a topic that every park can embrace." "Oh yeah, what about Thomas Edison National Historical Park? How do you talk about climate change there?" he replied.

My mind raced, and then I realized a very clear connection. "As humans struggled to create better living conditions in the 1800s, inventions like Edison's light bulb steadily crept into every household in America. If we are to succeed in finding solutions to the impacts of climate change, we will need to rely on American ingenuity and new technology once again." After I finished fumbling through this explanation, my colleague shrugged and ended the conversation with, "Well, you got me with this park example, but surely there are other cultural parks that don't have a connection."

Could that possibly be true? I don't think so. I remembered when just a few months before this conference NPS Director Jon Jarvis declared that "climate change is fundamentally the greatest threat to the integrity of our national parks that we have ever experienced." He did not say "the greatest threat for natural parks." He meant the whole national park system.

Every park in the national park system has a climate change connection and a story to tell. While climate impacts may be more obvious or tangible in natural parks, I have also experienced that human stories in cultural parks can be more thought-provoking and change-inspiring. Yet, I do not think the scientist's perspective is that unusual in the NPS mainstream. In my experience as the NPS climate change communications specialist, it was common to hear my peers talk about the effects of climate change in our national parks and other protected areas mostly in terms of natural resource issues, such as melting glaciers, sea level rise, invasive species, more severe storms, and increased forest fires.

But climate change is also affecting America's great cultural and historic resources that are protected by NPS. These resources include historic and prehistoric physical structures,

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such as buildings and monuments that commemorate people and events; archaeological ruins and artifacts that record a 15,000-year history of human occupation on our continent; cultural landscapes, such as subsistence areas; ethnographic resources that pass knowledge down through the generations; vast museum collections, many of which are irreplaceable; and iconic sites that record our nation's history.

These cultural sites have much to teach us about the values we place on climate change and our role in it, how past human societies and groups responded to climate change, and how humanity has arrived at this juncture where we are living in a rapidly changing climate and have a growing concern about it.

Climate change cannot be fully understood or communicated without an understanding of its human dimensions. It is very much a human story. And that's where the cultural parks can have the most impact.

In addition to developing and communicating knowledge about the scientific process and climate science, park staff should develop an understanding of historical events, timelines, cultural influences, and attitudes that provide the *human* context for understanding and communicating climate change.

This is important for a number of reasons. First, climate change is, in fact, a major driver of the character of parks today, natural and cultural. Second, by communicating the full set of impacts we tell the whole story of a park. Third, by doing so, we raise the potential for our visitors to embrace a preservation mission. And, lastly, our public expects this kind of leadership on these kinds of topics in the second century of our national parks.

Climate has shaped the rise and fall of cultures throughout history. Today, the reverse is also occurring—the climate that affects humans is itself affected *by* humans.

Researchers predominantly agree that the significant human impacts on global climate began with the Industrial Revolution. Just like Thomas Edison National Historical Park, NPS preserves many historical sites that illustrate how human advancements that have created a better, more comfortable way of living for Americans have also contributed to the current changes in climate. When Thomas Edison invented the light bulb or when F.C. Lowell built the factories in Lowell, Massachusetts, those steps were taken for the benefit of human progress. But like many advancements in that era, people had little awareness or concern for the potential long-term consequences to the climate and atmosphere.

Even the very establishment of our national park system was couched in the consumption of resources contributing to our culture of carbon. First it was the implicit message to Americans to jump in their Model A Fords to drive across the country to a national park. Now our visitors come by car, train, bus, and both domestic and international airplane flights—all adding to the world's carbon footprint. That fact alone offers a climate change message to visitors at any national park: consider your climate impacts, large and small.

For much of the first 100 years of NPS—and to a large extent today—the raw visitation numbers measured the success of the national parks. For the vast majority of our visitors, their national park experiences are still defined by how they move through them. Therefore, as public servants, we have a responsibility to communicate about climate change. There are many different approaches we can take to get our messages across, relating climate change to each individual park's enabling legislation.

Each NPS site is probably connected in one or more ways to the human story of climate change, and these human connections can be important avenues for helping the public relate to and care about this issue. Obvious connections exist in parks where cultural resources are at risk from a changing climate (including sea-level rise, increased frequency and severity of storms, increased wildfires, drought, and widely fluctuating temperatures).

In other cases, the ability to see our cultural landscapes as places to discuss climate change may require looking beyond the typical "traditional" narrative, and into side-paths in the historical record. This could lead to some fascinating and compelling connections and open whole new realms of relevancy related to park resources.

A good place to begin when developing climate change interpretative programs or messages at a cultural park is to create site-specific climate change connections and themes. In the curriculum for *Interpreting Climate Change*, a virtual course for front-line interpreters, a series of questions are posed to help staff identify their park's climate change theme when developing programs at a historical or cultural site. These questions include:

- How has climate affected different groups of people throughout history?
- What are the human implications of a changing climate for the future?
- How have people responded to a changing climate in the past—and how are we responding today?
- How have human activities and choices impacted climate?
- What aspects of human nature and human events can be linked to climate change?
- What are lessons from the past that help us understand the risks and opportunities of climate change?
- How does climate change connect to other humanist topics, including psychology, economics, anthropology, law, philosophy, political science, sociology, business, religion, and environmental studies?

From these questions, park staff can build their site's climate change themes.

What follows are a few examples of how interpreters at sites across the country have connected climate change to their site in the last few years:

Montezuma Castle National Monument, Camp Verde, Arizona. Changing climates have had consequences for cultures and civilizations of the past, and archaeologists have postulated that ancient cultures may have abandoned this site because of an increasingly harsh climate and competition for scarce water and food. Do we view the fate of past cultures as simply "ancient history," or does their experience link to our own, in this case specifically around a message about changing climates and human fate?

Fort Point National Historic Site, San Francisco, California. The experience of soldiers stationed here during the Civil War can help inspire and teach us today how to effectively address the psychological and emotional impacts of climate change. The challenging environment in San Francisco—it was dreary, damp, and uncomfortable—forced the soldiers to

Figure 1. Interpretive Ranger Paul Ollig gives a climate change presentation at Fort Point in San Francisco. Rather than talk about sea-level rise, he compared the day-to-day struggles during the Civil War with the present struggles to deal with climate change. Photo courtesy of National Park Service.

find innovative ways to improve morale. Additionally, upon hearing of the onset of the Civil War, these soldiers undoubtedly faced an emotional crisis as they were asked to prepare to defend against an enemy that would most likely never come, while their friends and family fought and died 3,000 miles away.

Many people struggle with feelings of hopelessness and futility around climate change. Can we draw insights from the experience of the soldiers of Fort Point to find within us



the strength and hope to continue to fight the battle against climate change?

Antietam National Battlefield, Sharpsburg, Maryland. The carbon footprint of the Army of the Potomac can help us grasp the scale of the carbon footprint of modern society. The burning of coal and other fossil fuels has long been the engine of modern economies, and these resources were essential to the Civil War effort, and were often fought over. A comparison of the amount of greenhouse gases released into the atmosphere for one day of battle at Antietam to the amount released in a single day by a coal-fired power plant today produces startling numbers, and begins to illustrate the rapid rate of increase in the contributors to climate change.

Yosemite National Park, California. Yosemite recently lost one of its few remaining glaciers when park scientists declassified it. Back in 1872, John Muir conducted a series of experiments on Lyell Glacier using sticks to determine how fast the glacier was moving. These sticks are still in the park's archive collection. Inspired by Muir's simple experiment, in 2012 park scientists recreated the same experiment and determined the glacier was no longer moving at all.

My last example is of a cultural park that does not often interpret its natural resources but has a very dramatic natural connection to climate change that could be shared with the visiting public and local community.

Sitka National Historical Park, Sitka, Alaska. This is one of the few parks in the system where the apparent sea level is not rising, but appears to be falling as a result of isostatic re-



Figure 2. Student Conservation Association Intern Emily Noyd greets visitors in Sitka National Historical Park and shares a climate change message. She talks about the climate impacts on the local salmon and how that changes the cultural landscape the park lies within. Photo courtesy of National Park Service.

bound from the Little Ice Age. Sitka offers a contrast to the usual climate change story, and makes possible a discussion of climate change impacts at other parks in the system. But it also sits in the heart of the Tongass National Forest in Southeast Alaska, where climate change is negatively impacting the health of old-growth forests of hemlock, Sitka spruce and yellow cedar, each of which is an important element in the Tlingit and Haida cultures, specifically for the carving of iconic totem poles.

These are just a few examples of how park interpretation and programming might connect park cultural resources to climate change. There are many other possibilities for climate change themes, stories and strategies at each of these sites, and throughout the national park system.

In addition to identifying the park climate change connections and themes, I would like to suggest a series of best practices for communicating climate change in cultural sites:

- Resource specialists, cultural specialists, and interpreters should meet to share knowledge, understanding, and ideas about climate change;
- Interpreters and other staff should become familiar with the climate science or studies that the park is already engaged in, and share that information with the public;
- Staff should identify new science or research that ought to be conducted to help cultural sites address climate change;
- Staff should collaborate with other local or regional experts in other protected areas, universities, or public institutions to ensure a holistic understanding of and approach to communicating climate change at cultural sites;

- The interpretive staff should meet to establish park themes and appropriate programs and venues for incorporating a climate change message;
- Park staff should strive to create a safe environment for the public to share knowledge, ideas, concerns and feelings about this topic;
- Interpretive staff should be willing to try new approaches and adapt interpretive products and messages as new understanding becomes available; and
- Interpreters should help move this topic forward in a productive way by including messages of hope and action: What concrete steps might the visitor take?

The National Park Service has come a long way from that conversation I had with a colleague four years ago to address climate change at cultural sites. However, we still have work to do.

If you are currently working at a cultural site, and not communicating about climate change, consider the following. As climate change becomes a more tangible and constant force in our lives, the resources that parks protect will benefit from immediate engagement on this topic. We have an opportunity and responsibility to start the conversations that are meaningful, full of hope, and focused on a better future, and to move people toward action. The time for cultural sites to embrace and engage on this topic is now.

Acknowledgments

Some of the content in this article first appeared in the *Interpreting Climate Change* curriculum modules but have been modified for purposes here. Original content was written with the assistance of Becky Lacome, Paul Ollig and John Rudy.

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A Decision Framework for Managing Cultural Landscapes Impacted by Climate Change: A Preliminary Report

Robert Z. Melnick, Olivia Burry-Trice, and Veronica Malinay

Introduction

This article presents a summary of preliminary findings from a project underway to provide resource managers at all levels with a suite of potential strategies through which to develop landscape-specific action plans for responding to, and when possible mitigating, the impacts of climate change on cultural landscapes.

The project, sponsored through a grant from the National Park Service (NPS) National Center for Preservation Technology and Training (NCPTT), uses six cultural landscapes in national parks in the eastern United States to assist the research team to explore climate change impacts on the ground. The team queried the case study resource managers¹ and many other NPS staff² to better understand management challenges in each of the parks and related cultural landscapes.

This project does not provide exact or definitive solutions to the multitude of questions that arise regularly in this realm. The intent, rather, is to outline a broad framework for discussion; a framework that explores ways of approaching these problems for any specific cultural landscape.

As the impacts of climate change become more evident, the effects of these phenomena on NPS cultural resources require a concerted effort to understand the changes underway and develop appropriate management responses.³ We need to fulfill our societal value of historic preservation, legislative and regulatory requirements, and expectations as well. For cultural landscapes, this may be especially difficult to achieve. Cultural landscapes, through their inherent dynamic nature, present particular problems when faced with the impacts of climate change. Whether through a sudden event or a long-term trend, these impacts may range from subtle to obvious, and present the resource manager with myriad preservation challenges. In the era of climate change in which we now find ourselves, it is valuable to un-

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derstand those challenges, yet recognize that climate change does not pre-empt established and tested policies, strategies, and techniques.

Background

The project described in this article is founded on well-defined cultural landscape practices, and both established and evolving NPS policies, as well as recent events, particularly the 2014 NPS-organized workshop on Preserving Coastal Heritage in response to Hurricane Sandy.⁴We were especially mindful of the NPS Policy Memo 14-02:⁵

Climate change poses an especially acute problem for managing cultural resources because they are unique and irreplaceable—once lost, they are lost forever.... [and] the decisions we make and the priorities we set today will determine the effectiveness of NPS stewardship of cultural resources in the coming decades.

In addition there were numerous NPS publications about specific cultural landscapes, especially cultural landscape reports developed at the Olmsted Center for Landscape Preservation.⁶ The project benefits from the ongoing work of the NPS climate change response teams both published⁷ and in process. By the very nature of the work, the project relies on emerging climate science information, data, and insights into a realm of landscape change that can be at times both clear and challenging.

The established NPS policies and procedures regarding cultural landscapes are the foundation for the process described in this work. This includes sections 106 and 110 of the 1966 National Historic Preservation Act and all amendments,⁸ park foundational documents, and other legislative and regulatory requirements.

The core of the NPS response to climate change is based on four pillars: science, adaptation, mitigation, and communication.⁹ According to the NPS Climate Change Response Program, the adaptation strategy for cultural resources, including cultural landscapes, involves conducting vulnerability assessments, monitoring the condition of cultural resources as they are stressed by a changing climate, and identifying appropriate actions for at risk resources before the threat from climate change becomes acute.¹⁰

These are complex challenges that will benefit from knowledge, data, and expertise from a multitude of disciplines and professions. Robust teams likely will include planners, climate scientists, cultural landscape specialists, ecologists, biologists, botanists, civil engineers, architects, and other professionals as appropriate.

Although outside the realm of this project, the work builds, in part, on the recognition that established historic preservation guidance and codified procedure for cultural landscapes does not recognize the changing nature of climate. Specifically, the *Secretary's Guidelines for the Treatment of Cultural Landscapes*¹¹ assumes a predictable set of climate conditions, even though they may change from season to season or through yearly cycles. This is not meant as a criticism of those standards, but rather a recognition that we may need to think more deeply about our ways of approaching landscape preservation than presented here.

Additionally, as our climate changes and presents our society with increased pressures and stresses, the values that reinforce historic preservation efforts may also need to evolve.

This may be especially true in environments that face severe weather anomalies, such as droughts in California or the dramatic increase of snowfall in New England this year. Understanding the larger changes occurring in our climate and the impacts on cultural landscapes, however, helps us develop tools to respond to them.

Decision framework

Climate change science reveals that impacts, while systemically global, affect different ecoregions in specific ways, at both the macro and micro scales.¹² This includes the most recognizable impacts, such as sea-level rise at Portsmouth Village, at Cape Lookout National Seashore in North Carolina,¹³ to the more subtle ones, such as the changing bloom cycles due to rising temperatures and precipitation patterns at Saint-Gaudens National Historic Site in New Hampshire.¹⁴

Cultural landscapes will be threatened by specific climate change phenomena and impacts, requiring management decisions and actions that respond to those phenomena—whether a trend or an event—as well as a park's legislative mandate, management strategy, resource priorities, budget realities, and staff expertise.

This work provides a framework of options for managers to develop action plans in order to make informed decisions into the future about specific cultural landscapes. The proposed decision framework is based on three broad foundations and trajectories. First, the framework relies on the premise that cultural landscapes can only be protected or man-

Figure 1. The integrity of the spatial arrangement at Portsmouth Village, Cape Lookout National Seashore on the Outer Banks in North Carolina, is threatened by the continued inundation and ponding caused by sea-level rise. Photo by Olivia Burry-Trice, 2014.



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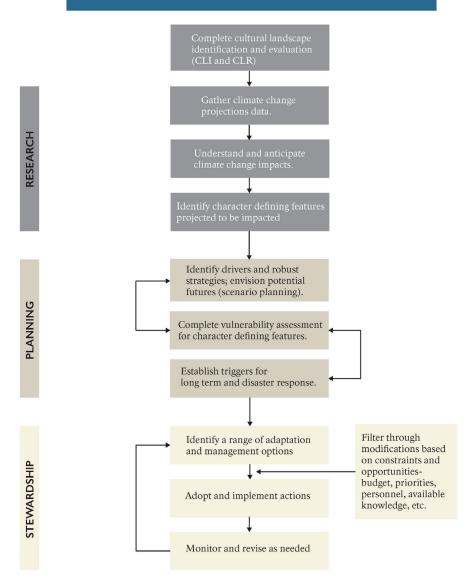


Figure 2. The cultural landscape and climate change decision framework that provides action plan options for park managers has three phases: research, planning, and stewardship.

aged if they are researched, documented, described, and evaluated. While this will most often mean the completion of a cultural landscape inventory (CLI) or a cultural landscape report (CLR) this may not always be feasible. Second, the framework recognizes that this work is in a nascent stage and will need to be tested, refined, and revised. Third, the framework understands that climate science is an evolving and developing field, providing updated data and analysis. Any refinement of the framework will require close attention to current climate science techniques, findings, and data, both globally and locally.

Although the three stages of this framework—research, planning, and stewardship—are presented in sequence, the practical implementation of this framework may mean reconsidering the conclusions reached at any stage in this process.

Research

In-depth research is a vital component of any project of this nature. The decision framework organizes the research agenda around two detailed categories: cultural landscapes, and climate projections and impacts.

Cultural landscape research is most often accomplished through a CLI or a CLR. In some cases, this may not be feasible, and a preliminary CLI or possibly limited documentation through a historic American landscape survey (HALS)¹⁵ may be adequate. Regardless of the documentation method, it is critical that the cultural landscape, and especially its

Figure 3. Changes in historic forest conditions, including a decrease in overstory density and an increase in vegetation density within the understory, can be seen at Rapidan Camp, Shenandoah National Park, Virginia. Photo by Robert Z. Melnick, 2014.



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character-defining features, are recorded and evaluated. This is a first step leading to future decisions regarding actions to mitigate climate change impacts.

Parallel to the cultural landscape documentation, it is essential to understand climate projections for a cultural landscape's region and the known or projected impacts on the landscape's character-defining features. Since climate change is known or anticipated to affect different regions and locales in varying degrees, it is important to collect as specific data as available for each cultural landscape. This may range from sea-level rise to temperature and precipitation variations over short or long periods, to storm occurrence and intensity. For example, a region may have a gradual increase in average temperature and a gradual reduction in precipitation.¹⁶ The impact of these projections on a given agricultural cultural landscape, for example, might be increasing drought conditions and stress on native plant communities as well as traditional crops.

Planning

The proposed planning phase requires identifying the climate drivers, potential robust response strategies, spatial and resources vulnerability assessment, and climate event triggers for both disaster response and long-term trends.

During this phase, management options may be developed and evaluated, including a range or suite of options, as well as balancing them through other considerations, such as budget, personnel, legislative mandates, research capacity, and knowledge base, prior to testing acceptable options.

The development of adaptation options cannot be done in isolation from other park circumstances. It is important that the responses to climate change be incorporated into existing policies and procedures. Although a newly recognized phenomenon, climate change should be considered with other concerns, including a level of flexibility that needs to be incorporated into plans to address climate change impacts.

There are a number of treatment options that are not mutually exclusive. They all require careful monitoring, evaluation, and documentation.

These broad approaches, in ascending order of intervention:

- Determine that the cultural landscape is not in immediate danger of negative impact and take no action.
- Attempt to mitigate the climate change stresses through action off-site from the cultural landscape, thereby offsetting the direct impact on the landscape.
- Improve cultural landscape resilience by making compatible alterations and additions that meet the *Secretary of the Interior's Standards for the Treatment of Historic Landscapes*. Resilience can be generally defined as the capacity to: absorb stresses and maintain landscape function in the face of external stresses imposed by climate change, and to adapt and evolve in order to improve the sustainability of the cultural landscape, leaving it better prepared for future climate change impacts.
- Allow change to occur in the cultural landscape, attempting to limit the impact to some character-defining features that are high priority and have higher feasibility for preservation.

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• Allow the resource to evolve—even deteriorate—without intervention, and take no adaptation action. Undertake extensive and detailed landscape documentation and data recovery.

Under this preliminary framework, the climate change projections and impacts are then aligned with the CLI and/or CLR to complete a vulnerability assessment, identifying, to the best extent possible, those character-defining resources that are most likely to be seriously impacted by climate change variables. The purpose of the vulnerability assessment is to anticipate, if possible, the broad impact of the climate change projections on the cultural landscape. It is critical at this step of the process, therefore, that the vulnerability assessment addresses those cultural landscape character-defining features previously identified through the established NPS CLI/CLR process.

It is also important to identify specific planning needs and impact triggers that will result in management actions. The triggers may be at the planning scale, such as longitudinal data that describes temperature variations over a number of years, or at the disaster response scale, such as the dramatic impact of a hurricane or tornado. In either case it will be important to identify the triggers that will put into play specific responses and actions, or at least their consideration.

Stewardship

Stewardship is the long-term care of a cultural landscape by implementing ongoing preservation maintenance activities. Physical interventions include routine maintenance on a monthly, yearly, or multi-year cycle, as well as repair and replacement in-kind of severely deteriorated character-defining features.

Cultural landscape stewardship builds on the identification of climate change impacts, and involves the analysis of the specific changes that can be anticipated based upon the previous steps of research and climate projections. Clearly identifying the known and anticipated impacts, whether they affect the entire cultural landscape or specific character-defining features, is an essential step before adaptation options can be developed and implemented.

The goal of stewardship is to physically preserve and protect a cultural landscape by managing change without attempting to arrest it.

Adaptation describes the parameters of acceptable change more broadly, allowing change in order to preserve landscape characteristics and character-defining features to the greatest extent possible, while making substitutions or alterations to increase the resiliency or durability of the landscape.

This results in the adoption and implementation of management options, followed by monitoring of the appropriateness and success of these actions over time, and subsequent revisions as needed. This may also include the development of a new range of adaptations, depending upon the success of mitigation measures.

This is a dynamic process that may also require making difficult system-wide decisions, based on cultural landscape significance, budget personnel, and management priorities.

Climate change adaptation options for cultural landscapes

Climate change adaptation options are a range of alternative management approaches to mitigate impacts on cultural resources. These options were developed by NPS,¹⁷ and are adapted here for their application to cultural landscapes. It is important, however, to evaluate other impacts of these actions, as it may be possible to cause further damage in the interest of protecting the cultural landscape. In the above example, for instance, what impact might that additional shoreline have on the larger landscape, and is that desirable?

• *Take no active intervention.* Taking no action is a legitimate planning decision. This includes monitoring the rate and degree of landscape dynamics, to assess whether or not it is within the historic range. In the northeastern US, for example, projected changing temperatures are likely to negatively affect the health of several tree types.¹⁸ As the rate of occurrence is still being studied and the unknowns can be addressed with time, a decision to take no action is a valid and often necessary decision.

Figure 4. The allee of birch trees and the hemlock hedges at Saint-Gaudens National Historic Site, New Hampshire, are contributing features to the landscape that act as visual screens, objects of interest, and enclosures. Potential loss of these resources, due to a shift in their growing region and other problems, will disturb the integrity of the resource. Photo by Robert Z. Melnick, 2014.



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- *Offset stress(es).* Removing or deflecting a stress can reduce or remove the environmental or other force(s) acting on the resource. The goal of this option is to enhance survival of a cultural landscape while minimizing changes to the physical materials and setting. Importantly, this includes consideration at a "landscape" scale, to ensure that the effort to deflect or remove a stress does not result in negative impact to the larger ecosystem. This may include both temporary and long-term measures. An example would be to design and construct an additional shoreline that attenuates wave destruction on the coast of a cultural landscape.
- *Improve resilience*. Improving resilience includes actions that change the nature and/ or setting and are designed to make the landscape more resistant or durable to environmental or other forces. The goal of this option is survival of the landscape, despite possible impacts of actions on its historic integrity. Special attention should be given to plant communities, soil structure, and natural systems. For example, in an environment with increased temperatures and more arid climates, aerating the soil to increase permeability may be an appropriate adaptation to enhance soil structure and reduce root compaction.¹⁹
- *Manage change*. This option requires a broader acceptance of change as an essential process and itself often character-defining. The goal is to maintain character-defining fea-

Figure 5. The remnant dike structures at Dyke Marsh Wildlife Preserve, George Washington Memorial Parkway, Virginia, are significant cultural resources threatened by water level rises and increased storm events. Photo by Veronica Malinay, 2014.



tures of a landscape, even if original specific materials or individual species are no longer present. In historic nut orchards, for example, as part of a normal agricultural practice, trees reaching the end of their productive cycles are regularly removed and replaced.²⁰ This may require the addition of species that are resilient to changes in climate patterns.

- *Relocate/facilitate movement.* In the NPS climate change strategy, relocating or facilitating movement includes two types of actions: (a) moving a resource, and (b) allowing movement to happen. For cultural landscapes, this is an unusual or rare instance and movement is obviously not feasible for a whole landscape. This option may be an appropriate choice for character-defining features of a landscape once it is determined that the whole cannot be saved; for example, allowing for the migration of character-defining vegetation that is threatened by saturation or inundation to a more upland location that is better drained.
- Document, observe, and release. Document, observe, and release records a landscape • and then subsequently allows it to undergo full effects of environmental or other forces that are likely to destroy or remove all or portions it. Documentation may be exhaustive, but may also be done at a less-than-exhaustive level. This approach may be appropriate when exhaustive approaches are not feasible (due to limitations in access, or time, human capacity, or financial constraints), not warranted (due to the nature and scale of impacts), or there is merit in not recovering or preserving the whole of the resource (such as an archaeological site that may become inaccessible due to submergence, but is not anticipated to be fully destroyed). Other examples of documentation techniques that may be used in either approach include collection of pollen and seeds or plant cuttings, and oral histories and video. For cultural landscapes, it may also be especially valuable to include video recording, to ensure that the three-dimensional aspects of the landscape are documented to the best extent possible. Additionally, tools and techniques such as infrared aerial photography should be considered to record those features, such as abandoned roadbeds, that are no longer visible to the naked eye. It is necessary to document the cultural landscape during different seasons, as conditions will change throughout the yearly cycle.
- Interpret the change. Interpreting the change engages people in the future with the effects of climate change on a resource. It is an educational activity, and may be used on its own or in combination with any of the other options. A dramatic example would be preservation of a coastal resource such that its location and form remains either intact or otherwise visible from the coast once it is offshore or partially submerged (e.g., construction of an off-site structure to attenuate wave-induced erosion). Other examples include interpretation signage of changing ecosystems, or photo series of changes in garden phenology or vegetation across a landscape.

Interpretation in this context addresses not only preservation and history of the landscape, but also climate change itself, and seeks to tell the story of the place and climate change and how they are interacting. This also includes interpreting landscape change during and since the period of significance, to better demonstrate the impact of climate change within the context of landscape dynamics. Landscape interpretation also provides an educational opportunity, telling the ongoing story of the integration of natural and cultural systems.

Project limitations and future work

As is evident in this report, fieldwork for this project was limited to six cultural landscapes in six parks in the eastern United States. Future phases must expand the study to include sites in the western United States, for example, with special attention to landscape types that were not represented in the original six. This may include, for example, arid landscapes, Pacific islands, high-mountain landscapes, and Pacific Northwest coastal zones.

The intention is to conclude the project with a manual of proposed actions for resource managers, building on the work briefly described in this article.

There are no easy answers or responses to these difficult challenges, but we can be creative, imaginative, and practical. Adhering to our standard or established historic preservation practices, however, is no longer a viable option in a world in which drastic change seems inevitable, if not always predictable.

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"Far-Reaching Effects:" The United States Military and the National Parks during World War II

Janet A. McDonnell

WHEN THE UNITED STATES ENTERED WORLD WAR II, the national park system included 164 units with a combined area of more than 21 million acres. The National Park Service (NPS) found itself with two major responsibilities: to protect and preserve that system for present and future generations and to support the war effort to the greatest extent possible. These two missions and responsibilities at times came into conflict, but, NPS officials claimed, a "fine spirit of cooperation" developed between NPS and the Navy and Army departments, which enabled them to avoid serious damage to irreplaceable park features.¹ Throughout the war, the Park Service struggled to balance its commitment to preserving park natural and cultural resources with requirements to support the war effort. Recognizing the need to compromise, it issued permits to the Army, Navy, and other war agencies to use park lands and facilities and provided soldiers and sailors with sites for rest and relaxation as well as training and maneuvers.

The relationship between the parks and the military went back to the establishment of Yellowstone National Park in 1872, well before NPS was created, but had grown closer since the 1930s when the historic military sites were transferred from the War Department to NPS. Indeed, some of the sites that the military would use during the war had been part of that original transfer. While the Park Service emphasized its patriotic contributions to the war effort, its response to military requests and requirements proved to be both patriotic and pragmatic. Officials had three primary reasons for cooperating with the military in its use of the national parks and accommodating the requirements of the military as much as possible: military use of park units would help NPS ensure that the parks remained, help park

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concessionaires survive the wartime economic impact, and demonstrate that it was actively supporting the war effort and thus minimize threats to the national park system. The military effectively used the parks for rest and recreation, training and maneuvers, and occasionally as locations for warning stations and observation posts. Opening the parks to military uses had both positive and negative effects. On the positive side, a number of the soldiers who experienced the parks would return after the war, often with their families, and interest in the national park system would grow. Yet military use also left some parks in poor condition and ill-prepared to handle the post-war surge in civilian visitation.

NPS was quick to highlight its support to the military. It issued nearly 2,000 permits and authorizations for use of NPS areas, facilities, and resources for war-related purposes. More than half were for minor short-term uses, such as field exercises or overnight bivouacking. Most of the military uses that NPS authorized were for facilities and areas formerly open to the public and simply involved changing the type of use, such as opening roads in Yellowstone National Park, Blue Ridge Parkway, and George Washington Memorial Parkway to trucking on a temporary basis.²

The military used nearly all of the national parks and monuments located along the Pacific, Atlantic, and Gulf coasts for defense installations, aircraft warning service posts, or training. They also used some historic and military sites for the study of military maneuvers. In addition, NPS turned over much of its heavy equipment to the Army for clearing airfields. NPS Director Newton Drury, who had come to his position in 1940 with impressive conservationist credentials, proudly reported, "There is hardly an area of the National Park System that has not made some direct contribution to aid in winning the war."³ He understood that his agency had to come up with alternatives to proposals that would be made for certain uses of park units for defense purposes.⁴

Secretary of the Interior Harold Ickes, also a strong conservationist, shared Drury's concerns. In a letter to President Roosevelt just before the attack on Pearl Harbor he warned that the department's jurisdiction over public lands, including national parks and monuments and wildlife refuges, was "rapidly being restricted to a futile ex post facto protest as far as the Army is concerned." The Army had invaded public lands without considering the use to which they were devoted and without consulting the department. While his department had tried to accommodate the Army's wishes and agreed to the use of lands where the military clearly demonstrated the need, he insisted, some areas taken for bombing ranges and other purposes did not serve the purpose of the Army any better than adjacent lands. "It is utterly discouraging," Ickes concluded, "to have a body of men who don't care about the sort of thing that this Department is charged with fostering and protecting march in and take possession just as Hitler marched in and took possession of the small democracies of Europe."⁵

Meanwhile, concern about the impact of military use on park resources continued to grow. In 1941 NPS Supervisor of Interpretation Carl P. Russell requested information on proposed military projects that might negatively affect wildlife in the national parks and monuments. The manager of the national park wildlife section responded that the Army was developing a list of potential areas for training and artillery ranges, to include roughly 30,000 acres at Henry's Lake within Yellowstone, where military use would have a detrimental effect on the migration route of trumpeter swans. The War Department also had proposed the establishment of an airport near West Yellowstone, which would have harmed elk, moose, and other wildlife.⁶

Military use and park operations/concessions

As Park Service leaders took steps to cooperate with and support the military, they were motivated in part by a desire to help park hotel operators and concessionaires stay in business. Faced with a severe decline in civilian visitors during the war, park hotel operators and concessionaires increasingly relied on business from military and defense workers. NPS worked closely with park operators to accommodate the varied and rapidly expanding needs of the military. On December 1, 1942, representatives of the Western Park Operators' Conference met in Chicago with Navy Commander John L. Reynolds, Director of the Bureau of Naval Personnel's Welfare Division, and Army Major William G. Hyde from the Welfare Section in the Army's Special Services Division. The park operators represented the Glacier Park Hotel Company, Rocky Mountain Motor Company, and Mesa Verde Company, as well as Sequoia and Kings Canyon, Lassen Volcanic , Yellowstone, and Yosemite national parks. Perhaps an indicator of the meeting's importance, Drury represented NPS, along with his senior staff, two regional directors, and several park superintendents.

Drury opened by reminding attendees that NPS policy was to aid the military in any way possible. Reynolds then provided background on the Navy's efforts to provide rest centers for its personnel. Soon after the war broke out, he explained, it became clear that naval personnel on strenuous sea duty needed periods of rest. Congress had enacted Public Law 528 on April 28, 1942, which directed that funds appropriated under the heading "Welfare and Recreation" be available for the rental and use of buildings, grounds, services, facilities, and for subsistence for rehabilitation and recuperation of naval personnel returning from duty beyond the continental United States, including Alaska, the Canal Zone, and insular possessions. This gave Navy officials authority to order their personnel to take a rest. The Navy then surveyed the available facilities in the US, looking primarily for isolated areas to discourage the families of the naval personnel from joining them. Its program was centralized in Washington, DC; however, contract negotiations required the approval of the commandant of the naval district concerned. Reynolds invited the operators interested in renting their facilities to submit proposals through NPS to the Navy's Bureau of Yards and Docks in Washington and encouraged them to negotiate with the local commandant.

While civilians faced severe transportation shortages and restrictions on rubber and gas that often prevented them from visiting the parks, Reynolds pointed out that Office of Defense Transportation (ODT) regulations permitted the Navy and Army to use "automotive equipment" to take organized groups on special tours. This broad authorization would allow the military to bring groups to national parks (Figure 1), though it was up to senior officials to decide if they would actively encourage the use of these parks. Reynolds had no clear answer for park operators who wanted to know when the Navy might be calling on them for their facilities. The Army planned to handle its still evolving rehabilitation program largely through the various Army commands.



Figure 1. 273rd Field Artillery Battalion at the Wawona Tunnel Tree, with park ranger and deer, Yosemite National Park, 1943. National Park Service Historic Photograph Collection/photographer Ansel Adams.

Regarding military access and use, the attendees tentatively agreed that regional directors and park superintendents would be authorized to approach the local Army and Navy representatives in the company of park operators to discuss the possibilities of bringing organized groups to parks on a regular schedule, and encouraging others to visit parks independently. Park operators reiterated their concern that without enough visits by servicemen and civilian war workers, they would go out of business. Drury closed by saying, "So far as possible the Service will keep the parks open to the public and it is hoped that there will be sufficient business to keep at least the minimum facilities of the park operators in operation."⁷

Later, in his report on this meeting, Drury re-emphasized that above all the national parks and monuments should be held intact and that NPS should continue to administer and interpret these areas. The Army and Navy, he said, should use these sites for rehabilitation rather than as cantonments, thus making a clear distinction between short-term use of parks for rest and relaxation, much like civilian visitors, and the establishment of military camps. The department was making an inventory of properties the military had taken over, he added, but some of those areas might never be returned to NPS.⁸

Rest and recreation

Nearly all of the parks with significant concentrations of servicemen and -women nearby

served as rest areas for them. Two million of the seven million park visitors during 1943 were military, and many of these came for recreation, relaxation, and recuperation. This had benefits for both the military and NPS. As noted, with civilian visitation in sharp decline, military use of the parks helped the concessionaires stay in business. Through NPS's relationship with the War Department and at the request of the Army Adjutant General, it supplied the US Army's morale and recreation division with a portfolio of maps of every state with the location of federal and state parks and other recreation areas. Along with the maps it provided the names of NPS officials at the parks, regional, and headquarters level. The plan was for the heads of the morale and recreation divisions to establish relationships with the agencies in charge of these areas and develop a plan for the military to visit nearby parks.⁹

Early on the Army requested information from NPS about available recreational facilities. At a July 1941 meeting of morale officers for the Army 4th Corps Area (Southeast), NPS Assistant Regional Director H.K. Roberts emphasized that Congress had established NPS to protect those federal areas considered outstanding and only authorized development that would make those areas available for public use while preserving their outstanding value. He then briefly traced the history of NPS involvement in recreation. In the 1930s NPS had been directed to co-operate with the various states in developing state parks and state recreational areas through the use of the Civilian Conservation Corps (CCC) and developing as recreational demonstration projects some of the submarginal land acquired by the Resettlement Administration, in part to demonstrate how this land could benefit the states and communities for outdoor recreation. NPS also had responsibility for making a nationwide recreation study and identifying where additional recreational facilities were needed. Later, the agency set up what was known as the Branch of Recreation and State Cooperation to handle this work. It was therefore natural that when the Army had to arrange to concentrate large numbers of troops, Roberts explained, especially in the 4th Corps Area, military officials would seek information about available recreational facilities. At the Army Adjutant General's request, NPS had designated a representative for each Army corps area to consult with the morale officer on recreation problems.

Meanwhile, the Army Chief of Staff designated Assistant Adjutant General James A. Ulio (later Adjutant General of the Army) to survey the Gulf Coast of Florida, Alabama, Mississippi, and Louisiana. Recognizing the value of the coastal area as a recreation center for soldiers and the limited overnight accommodations currently available, the War Department authorized the establishment of the Gulf Coast Recreation Areas. Since an NPS representative had assisted Ulio with the original survey and because of NPS experience in constructing group camps, it was designated to construct the necessary facilities in cooperation with the CCC. The group camps consisted of floored, framed, and screened tents and other facilities. Camps were authorized and under construction in nearly all Army corps areas. Roberts described the "cheerful cooperation" of all the agencies involved and noted that the CCC enrollees had "accomplished excellent results in short periods." He expressed hope that NPS representatives could continue to cooperate with corps area morale officers in order to take full advantage of the facilities that could be used to provide recreation and improve soldier morale.

Roberts explained how each morale officer could in turn assist NPS. Drury, he noted, had clearly outlined the participation in the defense program expected of NPS field representatives and had waived park admission charges for the military. Park officials had cordially welcomed convoys of soldiers, provided them with information, and allowed them to use the facilities. Yet Roberts also recognized that use of these areas for tactical maneuvers, or as overnight campgrounds for large forces and heavy motor vehicles, was harmful, and the type of road construction required could cause severe damage. Morale officers could help explain to their commanding officers the different types of uses and encourage the use of less scenic and valuable areas for tactical maneuvers.¹⁰

NPS officials worked closely with the War Department to select appropriate sites for rest camps for soldiers on leave, and the Army enlisted NPS field technicians to help plan and direct CCC workers in construction of those camps. Often NPS personnel were the only sources of reliable information, and government-owned lands, buildings, facilities, and equipment were the only ones readily available. In 1941 NPS reported that CCC workers had established 16 camps. A year later, the number of Army rest camps constructed in 23 states and the District of Columbia jumped to 33 with a capacity to house 20,000 men.¹¹

NPS emphasized the opportunities to find inspiration and "healthful" exercise in the parks. "For soldiers and civilians who need respite from grueling war service," noted one article, "the National Park Service can offer spiritual and physical rehabilitation."12 Between October 1, 1941, and September 30, 1942, approximately 900,000 of the ten million visitors to NPS units (nearly 10 percent) were members of the armed forces. Officers at Army camps and naval stations near parks encouraged their men to visit these areas. In some instances, they organized visits to parks as part of the military's morale-building program. Hobbs Air Field, located 100 miles from Carlsbad Caverns National Park, for example, sent 1,000 soldiers each month to the caverns. Whether servicemen came in small groups or as organized units, one official explained, NPS welcomed them to the parks without collecting fees and did everything possible to help them better understand and appreciate the natural and historic treasures contained in the areas. Civilian war workers benefited as well. Defense plants in California organized vacation tours to the national parks in the Sierra Nevada Mountains. The Lockheed Plant and Consolidated Aircraft sent groups of employees to Yosemite for two-week rests. "This use of national parks and monuments by the armed forces and war workers may seem incompatible with the nation's ban on pleasure travel," one NPS official concluded, "but, certainly, it is in harmony with the recreational needs of the military and the war production program." Gettysburg National Military Park, Castillo de San Marcos and Santa Rosa Island national monuments in Florida, Mammoth Cave National Park in Kentucky, and Joshua Tree National Monument in California reported roughly 200,000 soldiers and sailors visiting in May 1943.13

In June 1943, the US Navy took over administration of the picturesque and luxurious Ahwahnee Hotel in Yosemite and until December 1945 operated it as a convalescent center for recuperating sailors, particularly those returning from operations in the South Pacific (Figure 2). The military treated nearly 7,000 patients there. The lodge's grand lounge, solarium, and mezzanine reportedly held bunk beds for naval personnel, with the antique rugs,



Figure 2. Sailors from the U.S. Naval Convalescent Hospital (Ahwahnee Hotel) in Yosemite National Park, 1944. National Park Service Historic Photograph Collection/photographer Ralph H. Anderson.

deluxe furniture, and equipment safely stored away. The Navy believed that in the beautiful Yosemite Valley, servicemen would gradually regain their strength. Army detachments also used the park for military purposes and recreation. Drury portrayed the military takeover of Ahwahnee in the best possible light, reporting that the hotel was "serving its highest purpose in wartime by furnishing an ideal environment in which members of our naval forces may regain their health."¹⁴

The Navy wanted to establish a similar rehabilitation unit inside Grand Canyon National Park, but Drury resisted turning over any more park hotels. "While, of course, we will do whatever is required of us to help in the war, or post war rehabilitation," he explained, "I hope we can avoid taking on any more enterprises of this sort." While acknowledging that operations at Ahwahnee Hotel had been "satisfactory" for the most part, he noted that the burdens on an already diminished park staff had increased because of new administrative problems caused by "the character of the patients and of some of the employees of the Navy" not under NPS control. A senior naval official had told him that the training center inside Grand Canyon would likely be used instead for rehabilitation. There were nearly 50,000 men there and excellent facilities "for that type of work," including assembly halls, social centers, and swimming pools. While the director had serious reservations about housing soldiers and sailors in park facilities, he did not hesitate to emphasize this activity when it was beneficial. He cited the efforts to accommodate armed forces at Grand Canyon and other NPS areas "to good effect" before the US Bureau of the Budget and to members of Congress.¹⁵ Grand Canyon hosted thousands of troops each month as they broke up their convoy training trips for a few days of rest and relaxation. Roughly a third of the park's visitors were military. Several Army units used the recently abandoned CCC complex in the park as a recreational camp. Later, troops rotated from the Kingman Army Air Group for periods of recreation. One Army colonel who commanded an anti-aircraft artillery battalion no doubt spoke for many when he wrote, "The trip to the Grand Canyon proved to be beneficial far beyond our expectations in recreational and educational values."¹⁶

The military used parks in Alaska for rest and recreation as well. The Japanese assault on Alaska came in June 1942 with air attacks on Dutch Harbor at the east end of the Aleutian Islands and the occupation of the far western islands. Resulting restrictions on civilian travel to Alaska meant almost no tourism, and Mount McKinley National Park cut its operations to a bare minimum. Meanwhile, military reinforcements and civil construction crews poured into Alaska by the thousands. Emergency airfields and coastal defense installations sprang up across Alaska. Army engineers began constructing the Alaska-Canadian Highway (AL-CAN). Soldiers on leave or recuperating from the Aleutian campaign needed the retreat. After negotiations involving Territorial Governor Ernest Gruening, Commanding General of the Alaska Defense Command Major General Simon B. Buckner, and Department of the Interior and NPS officials, an agreement was reached to turn Mount McKinley into an Army recreation camp. Although Buckner called for the construction of camp facilities, road extensions, and other improvements that would have significantly altered the park, Drury successfully squashed these plans. NPS units would support the war effort in every way consistent with their status as national parks, but he opposed any alterations that would jeopardize that status.17

The Army ultimately leased McKinley Park Hotel, converting it into a recreation center for soldiers fighting in the Aleutians and using it until March 1945. At one point the hotel housed 150 to 200 soldiers at a time on seven-day furloughs for rest and relaxation. NPS also leased camps that the Army staffed and operated. During the peak year of 1943, 6,000–8,000 soldiers a month arrived at the park, where they enjoyed fishing, hiking, and horseback riding in summer and skiing and skating in winter. Many soldiers thus received their first opportunity to experience the scenic beauty of the national parks. Elsewhere in Alaska, the US Air Corps established two recreation camps in Katmai National Monument for personnel from Naknek Air Base. In Washington state, soldiers from Fort Lewis and other camps in the area who had completed their training and were awaiting transfer to war zones received free trips to Mount Rainier and Olympic national parks.¹⁸

In addition to the large scenic parks, a number of historical parks welcomed soldiers and sailors seeking rest and relaxation. Civil War battlefield parks in the East, such as Chickamauga and Chattanooga National Military Park in Georgia and Tennessee, became popular sites for rest and recreation, and as temporary encampments for military convoys traveling across the country. Parks near main highways sometimes became popular bivouac sites for transient troops.¹⁹

Maneuvers and training

In addition to providing servicemen and -women with a favorable environment and facilities for relaxation and recreation, parks became sites for military training and maneuvers. Soldiers from Fort Lewis used Mount Rainier National Park for training in alpine warfare. The vertical zones that made Mount Rainier flora and fauna so diverse and beautiful also made the area a good place to find terrain and weather conditions which could simulate winter fighting conditions in the European Alps (Figure 3). At higher elevations the military could test clothing and equipment under the most severe conditions. Soldiers tested sleeping bags and snow suits on the summit of the mountain.

Use of the park for mountain infantry exercises developed fairly suddenly. In November 1940 a platoon of the 41st Infantry Division, calling itself the Military Ski Patrol, arrived for an exercise. Twenty-four soldiers of the 15th Infantry Regiment, 3rd Infantry Division, from Fort Lewis arrived later for a full winter of ski training and maneuvers. The two military ski units were somewhat experimental, the Army combining for the first time soldiering and skiing. At the time, there was a growing possibility that US troops would be fighting in central Europe and facing similar conditions. The Army constituted the 87th Infantry Regiment at Fort Lewis on November 15, 1941. This elite regiment was made up of expert skiers from other units, volunteers from New England ski clubs and Ivy League ski teams,

Figure 3. Military ski unit training at Mount Rainier National Park. Courtesy of the NPS Historic Photos Collection.



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a large contingent of qualified European immigrants and exiles, and more than a score of NPS and Forest Service rangers. The 1,000-man regiment wintered at Fort Lewis during the winter of 1941–1942. Under a cooperative agreement with NPS, the Army used Paradise Inn for training ski troops and testing motorized snow equipment. In a compromise with NPS, the ski troops used tow ropes above Paradise Inn on weekdays and park visitors used it on weekends. In spring 1942, the regiment was reorganized as the 87th Mountain Infantry Regiment and transferred to the Army's new Camp Hale in Colorado where it formed part of the 10th Mountain Infantry Division and would later participate in campaigns in the Aleutians and Italy. Military leaders had asked NPS to give groups there for ski training an eight-week course in certain aspects of mountaineering, which included classes on the park, meteorology, glaciers, snow slides, avalanches, glacial travel, and rescue, topography, and geology of mountain areas, mountain climbing, rescue, and forest fires. They occupied all the facilities for the winter.²⁰

At Mount McKinley, the Army tested various types of equipment for Arctic warfare because this was the only reasonably accessible place in North America that offered Arctic conditions in summer. The Army held small-scale maneuvers at the park and conducted cold-weather tests of food, clothes, and equipment. In February and March 1944 more than 500 troops used the eastern portion of the park to hold winter maneuvers, operating with dog teams and ski and snowshoes. An Army cold-weather test party from Wright Field used the park from October to December 1944, spending 87 days in the wilderness of the Alaska Range testing food and clothing for the Air Force. A similar party visited the range again in mid-May 1945.²¹

While Mount Rainier and Mount McKinley provided a suitable environment for training in alpine and Arctic warfare, other parks provided a climate and training environment closer to what soldiers would experience in North Africa. Desert warfare training camps in Arizona and southern California, for example, organized maneuver-recreation trips to Grand Canyon.²²

At Shenandoah National Park, the 711th Chemical Maintenance Company, Air Corps, Langley Field camped for a week near Panorama in 1943, Army groups conducted mapping during summer 1943, and the same month a contingent of 1,000 soldiers from Fort Belvoir entered the park with another 1,000 coming every two weeks. Over 3,000 soldiers entered the park for training during April 1944. The Army tested several types of military clothing in the park and various military techniques. The Army Corps of Engineers assembled water lines, built bridges on fire roads, and performed trail work.²³

Meanwhile, national historical parks, military parks, and historic sites became what Drury called "laboratories for the study of military activities."²⁴ Park Service officials emphasized that the Civil War battlefields were well suited for tactical maneuvers. Military groups, mostly from Camp Lee, Virginia, visited Petersburg National Military Park (later redesignated a national battlefield) throughout the war. The quartermaster school at Camp Lee sent its classes to the park for lectures during its standard thirteen-week training period. Park staff participated in the instruction program. The military found the problem of supply in the wilderness areas of Africa and in the South Pacific Islands to be much like that encountered during the Civil War. Constructing wharves and building railways, bridges, and roads were still integral parts of bringing supplies to the front. The park historical technician complained that with regimental commanders sending their classes of officer candidates to the park regularly for lectures, park staff could only perform 50 percent of their required work.²⁵

The impact on Petersburg increased in November 1940 when the quartermaster requested permits to widen certain roads, erect temporary power lines, and construct water works, reservoirs, and facilities within the park boundaries. In December 1940, Ickes granted the War Department a permit to use 100 acres of park property for a hospital. Despite the objections of the superintendent who preferred a different site, a June 1941 permit provided 500 acres to establish a quartermaster training school. The heavy concentration of activity on the section of the park adjacent to Camp Lee took a toll on the roads. The Army agreed to assume responsibility for maintaining the roads in that section. In October 1943, the superintendent reported that, with the Army's help, the park was in the best shape it had ever been.²⁶

The situation at nearby Manassas National Battlefield was similar. As part of their training, student engineer officers from Fort Belvoir as well as marines from Quantico routinely visited the battlefield where the acting superintendent lectured them on the events of the first and second battles of Manassas and they toured the museum. More than 1,000 marines visited the area each month.²⁷ Meanwhile, not far away, Major General William R. Schmidt, commander of the 76th Infantry Division, wrote to Edward A. Hummell at Fredericksburg battlefield to express appreciation for the service that the park provided to his officers during the previous two months. Through illustrated lectures and guided battlefield tours, he wrote, "you have enabled us to gain a clearer and more concise picture of the War Between the States." Hummell had given the officers "an invaluable lesson" in logistics and the tactics of the Civil War.²⁸

In 1940 NPS launched a special interpretive program at Chickamauga and Chattanooga National Military Park to instruct draftees from Fort Oglethorpe about Civil War battles while instilling in them patriotic values. During 1940 and 1941, 30,000 troops, mostly national guardsmen, bivouacked in the park, while the 6th Cavalry conducted extensive training operations using horses, motorcycles, trucks, and trailers. In August 1942, the 3rd Cavalry transferred from Fort Oglethorpe and was replaced by the 16th Cavalry (a mechanized armor unit). The regiment continued using the park for drill and maneuvers and various tactical exercises. The Army began constructing a group of buildings in one park area for use as a provost marshal general's school center and later erected more school buildings, warehouses, and a motor pool. In early 1943, the Army began using park facilities for the Women's Army Auxiliary Corps (WAAC) Training Center. The center, which could house more than 9,000, attracted much local and national attention. Looking toward the future, Superintendent Charles S. Dunn noted, "No doubt after the war is over many of the veteran WAACs will want to come back to the park and bring their relatives and friends." In June 1945 the War Department announced its plans to close the WAAC training center, and military activity in the park ended the following year.²⁹

Washington, DC area

The impact of the military was also felt in the nation's capital as temporary war buildings sprang up in areas administered by NPS: the National Mall, West Potomac Park, President's Park, the grounds of the Washington Monument, and along the George Washington Memorial Parkway, a scenic parkway in Virginia running along the Potomac River (Figure 4). Officials withdrew 30% of the major recreational facilities of National Capital Parks for war use. National Capital Parks, including East Potomac Park Golf Course, provided sites for defense installations and buildings to house thousands of war workers. NPS officials were quick to point out that the land involved was valued at \$24.3 million, and it would cost the government much more if it had to purchase alternate sites. While NPS saved the government money, withdrawal of these lands curtailed the open spaces in downtown Washington, and Drury looked forward to the removal of these structures at the end of the war.³⁰

In 1942, Superintendent of National Capital Parks Irving C. Root reported that NPS had issued 33 permits to the War and Navy departments and the Public Buildings Administration for use of park properties in Washington. The Adjutant General's Training School received a permit to use Fort Washington, Maryland, just outside the city overlooking the Potomac, with the understanding that the historic fort would not be damaged or used in any

Figure 4. The National Mall as it appeared during World War II with Memorial Bridge, Lincoln Memorial, Reflecting Pool, Navy Annex and Barracks, 1943. National Park Service Historic Photograph Collection/ photographer George A. Grant.



way that might impair its historical interest. The War Department also took over a section of the Chesapeake and Ohio Canal National Historical Park, closing it to visitors to protect Washington's water supply.³¹

On May 15, 1942, the secretary of the interior granted the War Department permission to use all facilities at Fort Hunt (south of Washington off the George Washington Memorial Parkway), except those used by the National Archives (remote latrines and powder magazines used for storing nitrate films). In 1942, the military transformed Fort Hunt from an inviting picnic area to a major military installation with more than 100 buildings, guard towers, and electric fences. The military housed and interrogated Third Reich scientists, submariners, and soldiers there. Initially, most of the prisoners housed at Fort Hunt were German U-boat crew members who had survived the sinking of their submarines. As the war progressed, the focus shifted to some of the most prominent German scientists who had surrendered. Prisoners stayed at the installation from two weeks to nine months, and were held incommunicado. After their interrogation was complete, they were transferred to regular prisoner-of-war camps. The Army remained at Fort Hunt until November 1946.³²

Further south, soldiers from Fort Belvoir and marines from Quantico had been conducting military maneuvers in Prince William Forest Park since 1938. In May 1942 the War Department secured a special use permit for exclusive use of the park's five cabin camps. The Office of Strategic Services (OSS) occupied the park from 1942 to 1945. Park Superintendent Ira B. Lykes, who entered the military as a first lieutenant in the US Marine Corps stationed at Quantico, directed the base forestry program, leaving him only weekends to focus on his duties as park superintendent. Lykes observed the changes the OSS made in the park as he drove to work at Quantico. The military erected barbed wire fences, and armed soldiers patrolled with guard dogs. The OSS was training spies in the park and training officers to penetrate enemy lines and gather intelligence. They booby-trapped and destroyed old buildings, and built a "little Tokyo" in the woods, where they regularly staged assaults. Lykes persuaded the military tenants to help cover some of the costs. By November 1941, the park had acquired 14,446 acres. Lykes initially hoped the military would build at a system of internal roads connecting the five cabin camps, but that never happened. Yet, by 1945, the Army maintained some roads, built barrier gates on roads into the park, and winterized the cabin camps.33

Transfer of park equipment, land, and facilities

NPS not only allowed the military to use its parks for training and for rest and recreation, it also contributed other resources. Early in 1942, federal officials called for a survey to determine the amount of surplus equipment and supplies that could be released for use by war agencies and other federal departments. In 1943, NPS reported that it had turned over thousands of dollars' worth of equipment to the military, including the loan of heavy snow removal equipment valued at \$150,000.³⁴ In addition to the Ahwahnee and Mount McKinley hotels, NPS transferred a number of other park facilities to various branches of the military and to war work. The War Department purchased the Eastman Hotel and Bathhouse at Hot Springs National Park for use as a hospital. Military officials leased Frijoles Canyon Lodge

in Bandelier National Monument for housing soldiers stationed nearby and their families, and took over Summit Tavern (Acadia National Park) for defense purposes. The Army used Frozen Niagara Hotel at Mammoth Cave National Park for training.³⁵

During the war, NPS permanently transferred six parcels of land (9,580 acres) to the War and Navy departments. The transfers included 16 acres of Colonial National Historical Park to the Navy for a housing project, 3,052 acres in Hawaii National Park to the War Department for a bombing range, 1,072 acres at Otter Creek Recreational Demonstration Area to the War Department for training, 739 acres at Petersburg to the War Department for a training school, and 4,000 acres at Santa Rosa Island National Monument to the War Department. The Navy took over Fort Jefferson National Monument for radar operations, and the monument joined Cabrillo and Fort Pulaski national monuments in being devoted exclusively to war work.³⁶

Cabrillo had always been located on land surrounded by Fort Rosecrans. Having the Army control access to the park's main road provided greater security and aided in traffic control. Still, balancing the requirements of a military base gearing up for war and a heavily visited tourist attraction proved difficult. The park superintendent expressed concern that War Department work would seriously restrict the public's access and enjoyment of the monument. Once again, however, national defense took precedence over NPS concerns, and in February 1941, the Army and Navy Joint Defense Board requested the transfer of the monument to the War Department for administration by the Army as part of Fort Rosecrans. Drury told Colonel John White, now director of the Army's Western Region, that although national defense was paramount, the Park Service had to make every effort to keep Cabrillo as it was. An uneasy cooperation between the two agencies continued for several more months. Visiting hours were curtailed, and an FBI representative and two guards were posted at the entrance gate.

On May 12, 1941, the Secretary of War formally requested Ickes's permission to occupy and use Cabrillo for the duration of the war. Ickes issued a special use permit to the War Department on May 17, making it possible for NPS to reclaim its property after the war. His action was not surprising since there was a great need for a new coastal defense system centered in San Diego. Some of the nation's largest aircraft carriers were based there, and San Diego Naval Air Station was in the process of being enlarged to provide a base for the air arm of the Pacific fleet. Also, a Navy supply depot, the Naval Training Station, a Marine base, the Naval Fuel Depot, and many small installations were all located in San Diego. Defenses for these activities were woefully inadequate, with virtually no protection from air attack. Fear of enemy attacks on the Pacific Coast increased after the December 1941 attack on Pearl Harbor, and implementation of the Harbor Defense Plan intensified. Still, NPS was not willing to abandon the property permanently. When White visited in 1943, the damage alarmed him. He found the Old Spanish Lighthouse occupied by a US Naval Signaling Station. Part of the main highway to the monument had been torn up. Batteries and observation posts had been constructed near the monument, and the grounds had been altered beyond recognition.³⁷

Fort Pulaski near Savannah, Georgia, faced a similar situation. The military had been interested in the strategic location of the park's Cockspur Island since the eighteenth cen-

tury. In 1940 Army and Navy officers came to evaluate the possible use of docking facilities at Cockspur Island. When the War Department later requested use of the wharf there to unload guns and supplies for transport to Fort Screven, the park superintendent expressed concern about the handling of ammunition and hazardous materials. Despite those concerns, in December 1940 Interior officials gave the War Department permission to use the wharf provided that it handled no hazardous materials. By August 1941, the Navy had selected Cockspur Island as a location for a naval station. Its deep-water access and docking facilities, its old CCC buildings, available utilities, and proximity to a nearby highway made the site desirable. A few months later, Navy and NPS representatives met to negotiate the Navy's use of the park's administration buildings, living quarters, entrance, road, and a portion of the historic landscape. Navy officials planned to use land west of the entrance road and leave the utility buildings and four living quarters to the park. The superintendent put the best face on this, emphasizing the potential benefits of Navy occupancy such as improved security. In November 1941, Interior officials issued a special use permit to the secretary of the navy to construct and maintain a section base at Cockspur Island for inshore patrol.

The Pearl Harbor attack a month later intensified the focus on defense. On March 18, 1942, Secretary Ickes notified NPS that the entire Cockspur Island would be turned over to the Navy Department. The next day the park closed its doors to the public and transferred occupancy to the Navy. By July 1942, the naval section base was in full operation with 200 men stationed at Cockspur Island. The completed section base consisted of barracks accommodating 400 men, an administrative office, movie auditorium, club room, cooking facilities, officer's club, gym, athletic field, tennis courts, and several ammunition magazines. The Navy used only one-fifth of the island, the western part, and an inspection by NPS in 1942 did not reveal any impact on historic resources. Fort Pulaski officially reopened to visitors on August 1, 1947, after the Navy halted operations at Cockspur Island.³⁸

In another instance, NPS withdrew more than 3,000 acres from Hawaii National Park to provide an Army bombing range. In late 1938 the Army Air Corps decided it needed a bombing range in Hawaii and selected a location on the park's Ka'u coast as the only one that met all its needs. NPS officials resisted, arguing that this would establish a dangerous precedent for the entire park system. Undeterred, the Army applied for nine square miles of Ka'u seacoast the following April. On May 29, 1939, Ickes informed the secretary of war that if the secretary insisted that it was the only suitable site, he would not object. But under the 1916 act establishing the park, which specified that the park be preserved with its natural features unimpaired for public use, this use of the area would require congressional action to remove it from NPS jurisdiction. A bill was introduced transferring nine square miles (approximately 6,450 acres)—later amended to 3,052 acres. The withdrawal was made effective on July 16, 1940. Except for a brief period in 1943 when the Navy did some practice bombing, the military never used the withdrawn area. In spring 1946 the acting superintendent tried to reopen the Ka'u issue. He argued that if the War Department was not using it, it should revert to NPS, but the order of withdrawal would not be revoked until 1950.³⁹

NPS faced a unique situation with Bandelier where the Manhattan Project and growth of Los Alamos would have a profound, permanent impact. The US Army Corps of Engineers

planned to develop a road through the detached Otowi section of the monument. The custodian became outraged when the military began dynamiting cliffs to widen the road. He later spotted Army engineers clearing a power line right of way through the northern tip of the Otowi section without NPS approval. Development at the old Los Alamos Ranch proved a serious threat to Bandelier, but NPS managers faced a secret wartime effort about which they knew nothing. The military pressed ahead, ignoring NPS protests. NPS Region II Director M.R. Tillotson refused to back down. Experimental detonation near Otowi, he wrote Drury, might irreparably damage the ruins, but he also acknowledged that because of the project's importance, NPS opposition might carry little weight. Between October 1944 and mid-July 1945, NPS issued permits to house personnel working on the Los Alamos atomic bomb project and their families at Bandelier. It issued other permits for patrolling restricted areas within the monument and erecting guardhouses and guard shelters.⁴⁰

NPS also received defense-related requests involving its coastal areas, for installing protection apparatus, searchlight batteries, and gun batteries. Often these requests were temporary—for the duration of the war plus six months. The military operated numerous aircraft warning stations in NPS areas along the Atlantic and Pacific coasts. The War Department paid the operating costs except where NPS personnel voluntarily cooperated in conjunction with their regular duties. For example, some NPS employees took over aircraft observation duties at aircraft warning stations during their regular shifts. On the Atlantic Coast, Acadia and the Statue of Liberty National Monument participated in the program. Along the Pacific Coast, Mount McKinley, Olympic, Mount Rainier, Lassen, Yosemite, and Joshua Tree were involved. At Kill Devil Hill in Wright Brothers National Memorial, the military installed an "ultra-high frequency monitoring system" at the top of the monument, presumably to monitor and locate enemy submarines patrolling the shipping lanes off shore.⁴¹

Impact of military use

It is important to recognize that military use was not uniform throughout the national park system, and the impact of that use varied. In some instances, military use of national parks, monuments, and related areas caused significant damage and even changed the character of these lands. Drury remained concerned about the negative impact of military use of park facilities and resources but tried to present the effects in the most favorable light. In 1943, he reported that military authorities had demonstrated "a spirit of cooperation." Even though most of the coastal parks and monuments were being used for defense installations, he further stated that "no important park values are being destroyed, and in many cases military needs are being served in conjunction with park protection activities."42 Similarly, John E. Doerr, chief of the Naturalist Division, reported to the NPS Advisory Board that no park values had been permanently impaired by the military's recreational use of the parks. Yet he worried that this could happen if rest and recreation camps were opened in the parks. Once established, he warned, the military departments might want to retain them. Rest and recreation camps, temporary or permanent, he said, seemed to necessitate formal landscape treatment, styles of architecture not in keeping with park landscapes, entertainment facilities, and other things foreign to parks. These camps required the extension of existing road system, water lines,

sewage disposal plants, garbage disposal, and power lines. "In brief," Doerr concluded, "the viewpoint of the armed forces is perhaps not the viewpoint of the National Park Service."⁴³

Military use had a particularly significant impact on a number of parks. For example, Army use of Hawaii National Park for motorized and infantry maneuvers and firing practice caused extensive damage to the forests and desert terrain, but with martial law in effect, NPS could not prohibit this use. The best park officials could do was work out a tentative agreement that confined Army use to a specified area on certain days each week. But the agreement was not upheld. Finally, in November 1944, Secretary Ickes complained to the War Department that the Army had been using the Ka'u area for two years without a permit, causing heavy damage. He pointed out that there was no longer a need to train men in a national park. In January 1945, the Army discontinued its unauthorized use of the Ka'u desert for training and maneuvers, and the following year cleared unexploded shells from Kilauea and most of the Ka'u section. Yet in 1955 the superintendent reported that duds were still being found in the Ka'u desert, and several areas would continue to show damage.⁴⁴

Military activities also had a negative impact on the parks in Alaska. In August 1942, a logging crew began sawing down trees on the shore of Excursion Inlet to provide piling for construction of a huge Army shipping base. The project would require 20,000 to 30,000 pilings at an estimated cost of \$15 million. Superintendent Frank T. Been visited the site two weeks after the cutting had begun and reported that the logging crew was felling trees at the north end of the inlet well within the boundary of Glacier Bay National Monument. While Been condemned the removal of the virgin stand, he reluctantly acquiesced. Regional Director Owen Tomlinson explained to Drury that the military necessity was so urgent that all they could do was try to prevent unnecessary damage.

Lieutenant General John Dewitt, head of the Western Defense Command, had ordered the construction of the shipping base in July 1942 as part of the Army's logistical preparation for air and land operations in the Aleutian Islands. The Army contracted with a San Francisco company to construct the facility at a cost of over \$17 million. The Aleutian campaign ended before the base was in operation. The only use made of the base was non-military. In March 1945, after two and a half years of secrecy, the Army revealed this project to reporters; only then did NPS officials learn of the plan. Tomlinson and Drury agreed that the land should be withdrawn from the monument and transferred to the War Department to protect the monument's integrity. As a result, in 1943 Interior officials negotiated a formal land transfer with the War Department, an agreement that allowed the secretary to terminate the public land order at any time subject to the approval of the president. The agreement also stated that upon termination of the public land order all buildings and facilities erected by the War Department would be transferred to Interior or removed and the sites restored as much as possible to their condition before the war. NPS efforts to contain the damage were only partly successful. The Army left NPS with a landing field inside the park that Interior officials later turned over to the Civilian Aeronautics Administration for commercial use.45

While the negative effects of having large numbers of troops in the park were clear, there were benefits as well. Opening up parks to the military allowed NPS to demonstrate its support for the war effort and its contributions at a time when the very existence of the national

park system was being threatened. The 1943 NPS director's annual report rationalized the national defense imperative, stating that, "There is significant justification of the national park concept in the fact that increasing thousands of members of the armed forces are being given opportunities they never had before, and may never have again, to see the inspiring beauty and historical significance of this land of ours."⁴⁶ Troop visits brought desperately needed business to park concessions that were struggling because of the drop in civilian tourism. Perhaps most important, it blunted accusations by grazing, lumbering, and mining interests that national parks were not making their share of sacrifices for the war effort. Faced with either opening the parks for use by military personnel or for use by war profiteers, NPS officials chose the former.⁴⁷

One of the greatest benefits for NPS was in exposing millions of soldiers and sailors to the parks for the first time. Even more beneficial than the overnight bivouacs and field maneuvers, Drury explained, was "the far-reaching effects upon the mental attitude of these members of the armed forces [which] resulted from their seeing some of the greatest aspects of the America that they are fighting to preserve." By August 1943, two million servicemen had visited national parks, often in parts of the country they had never seen before. Many would return after the war, contributing to the tremendous growth of park visits in the 1950s.⁴⁸

Toward the end of the war, Drury claimed that use of park land for military purposes saved the military an estimated \$30 million, with "little destruction of park properties." While the military benefited from the access to the parks for recreation and training, some concessionaires also benefited from the revenue that military and civilian war workers brought into the parks. The military also benefited from the expertise of park staff. In 1942, Drury reported that the knowledge NPS employees had of the areas they administered was "constantly sought by military authorities." The Army used NPS landscape architects, engineers, and "field men" to help locate gun emplacements and effectively camouflage them and to report weather data, road and trail conditions, and the accessibility of mountain and densely forested areas.⁴⁹

In 1944 Drury told Congress that NPS faced two basic questions: What relationship did its activities bear on the war program? and, What minimum activity was it required by law to perform as guardian of part of the federal estate? It had granted 463 permits to the Army, Navy, and other war agencies to use park land for training, rest and rehabilitation, and other purposes. There had been four transfers of jurisdiction for the duration of the war (including Cabrillo to the War Department and Fort Pulaski to the Navy); six temporary transfers; 31 cases of utilization of mineral, timber, forage, and water; and 71 permits involving occupancy and some constriction or modification of landscape. There were five cases of exclusive occupancy of facilities; 162 permits involved field exercises, maneuvers, and overnight bivouac; 27 cases permitted the loan or transmittal of equipment. In most cases the understanding or expectation was that the properties would be restored to their original condition after the war but, Drury conceded, this was not always the case.⁵⁰

In 1946 NPS reported that most outstanding permits and authorizations for the use of its areas and facilities for war purposes had been terminated, and it was returning the areas to their former condition as quickly as possible. Drury testified that during the war, the parks, monuments and historic sites, "have justified their existence if for no other reason than that since Pearl Harbor they have been a source of inspiration and pleasure" to some 5.5 million members of the armed forces. NPS had issued, he said, approximately 1,700 authorizations for various types of military use of national park areas and resources.⁵¹ Despite severe budget and staffing cuts and a drop in visitation from roughly 21 million before the war to roughly six million a few years later, NPS had with very few exceptions succeeded in preserving the national park system and keeping the parks open. Moreover, its experience with military use during the war and the related threats to park resources had left it with a greater appreciation for the need for resource protection.

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