

America's Next Best Idea: The National Park System Looks to the Future

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FOR ALMOST 50 YEARS, the 23 pages officially titled “Wildlife Management in the National Parks,” colloquially known as the “Leopold Report,” has had a comprehensive and outsize influence on how America’s national parks are run. As the National Park Service (NPS) looks to its 100th birthday in 2016, and acknowledging the unprecedented challenges facing our natural resources today, last year Director Jonathan Jarvis convened a committee of the NPS advisory board to update the report. *Revisiting Leopold: Resource Stewardship in the National Parks* counts among its authors a Nobel Laureate, two recipients of the Presidential Medal of Science, and two members of the National Academy of Sciences. Contributions include those from conservation luminaries like Thomas Lovejoy, and, reflecting the contingencies it grapples with, Healy Hamilton, a scientist specializing in geospatial modeling of species persistence under different climate change scenarios. Remarkably, like its predecessor *Revisiting Leopold* also comes in at 23 pages.

The Leopold of the title is Starker, son of the famed Aldo, and a revered wildlife ecologist in his own right. Starker Leopold clearly inherited both his father’s deep passion for wildlife and his literary flair. The instigation for the original report was what Secretary of the Interior Stewart Udall (serving under President John F. Kennedy) called a “public relations crisis,” as superabundant elk decimating places like Yellowstone were culled by hired guns; some members of the public were appalled by the killing, and others wanted to do the killing themselves. It was clear that a coherent policy around wildlife management was necessary, and Leopold’s own illustrious committee set its sights on goals, policies to support them, and methods for getting things done. The historic report reads easily and much of it still makes a lot of sense. Its recommendations reflect a sophisticated ecological understanding, and include counsel that while maintaining habitat is “the key” to sustaining animals, habitat is “not a fixed or stable entity that can be set aside and preserved behind a fence, like a cliff dwelling or a petrified tree.” The report acknowledges that nature is made up of “biotic communities” that change; it points out that processes such as dispersal and migration regularly bring species into and out of park boundaries—this all in a time when the term “biodiversity” had yet to be coined. “Leopold’s report was dramatic at the time,” says Gary Machlis, science advisor to Director Jarvis. “Not everybody liked it, and it took about 15 years for the park managers to really put their minds around it.” The report references “successional” trajectories whereby natural fire and flooding regimes routinely change what grows where. It penetrates beyond the emotional charge around the seemingly destructive force of fire, which at the time was routinely suppressed, and its support for controlled burns

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was instrumental in reintroducing the practice to the parks. At the time, Machlis remarks, “general wildlife management was more about hunting and fishing and not so much about the elements of ecosystems. Leopold’s report brought science to the parks, something the new report fully endorses and builds on.”

Perhaps the Leopold report’s most prescient and relevant observation was that “few of the world’s parks are large enough to be in fact self-regulatory ecological units; rather, most are ecological islands subject to direct or indirect modification by activities and conditions in the surrounding areas.” The insight here, that national parks are embedded in larger systems, is taken up with emphasis by the authors of the revised report. Today’s report reprises the original’s initial characterization of the national parks as flash points in a network of adjacent landscapes of influence, and strongly suggests that the national parks be conceived of as “anchors of conservation in a continuum of uses.” The national parks are among the most protected land and seascapes in our nation. While the federal government owns and manages vast acreage—for example, Bureau of Land Management and Forest Service lands—these are mostly multi-use. With some exceptions, wildlife within their boundaries rarely enjoy the same level of protection as that within NPS terrain. As we go forward into a future in which nature’s traditional couplings and associations become unhinged by quickly changing temperature and precipitation patterns, national parks will become ever more important as core areas where natural systems are less perturbed by human activity. Marking these parks as a network, like a central nervous system, and connected to the other natural parts of our country is a brilliant and important idea. Providing plants and animals with the ability to move across boundaries to renew their genetic viability and to fulfill their migrational and territorial needs is essential; as Healy Hamilton puts it, “connecting up the natural places is the only way to ensure their long-term viability.”

Sign of the times

For all its wisdom, the original Leopold report got one thing really, really wrong. So wrong that this one sentiment justifies and even demands contemporary correction. It offers up a literal picture of what its management recommendations should result in: “As a primary goal, we would recommend that the biotic associations within each park be maintained, or where necessary recreated, as nearly as possible in the condition that prevailed when the area was first visited by the white man. A national park should represent a vignette of primitive America.”

Perhaps it summarizes our moral evolution of these past fifty years to enumerate the many ways this idea of a “vignette of primitive America” is chauvinistic, naïve, colonial, even offensive. To contemporary ears, more politically incorrect language is hard to imagine. But maybe we can give Leopold and his committee something of a pass here, and say the original report was a product of its time. Some of its language is misguided but in so many other ways it gets things right. The report decries the fact that white-man impacts, such as indiscriminate logging and livestock grazing, had profoundly altered landscapes, making many into “artifacts,” and it seeks to return them to what they once were.

Past perfect

The original Leopold report’s endorsement of restoring a past idea of nature resulted in at

least one major ecological controversy over the years. Interpreting the report to mean significantly reducing human influence on wildlife populations, Yellowstone National Park instituted a bear management program in 1970 that directed the removal of garbage dumpsters from the vicinity of grizzlies within the park's bounds. As far back as the late 1800s, tourists regularly gathered around Yellowstone's garbage dumps to watch the bears, which, along with other top carnivores, most notably the wolf, had been almost totally exterminated outside park boundaries. Researchers John and Frank Craighead, monitoring the park's grizzlies from 1959 onward, famously counseled against abrupt removal of the dumps. The Craigheads argued that the summary loss of an accustomed food source would put the bears in direct conflict with human visitors. The dumps were closed anyway, and more than 140 grizzly deaths attributed to human causes were documented in the years in which this was carried out.

The new report takes on this sensitive dimension of Starker Leopold's legacy with a distinctly literary flair. The prologue summons the reader to gaze upon "an early summer morning in a western national park.... The scene stands as a portrait of a national park at a single moment in time." The authors then fast-forward through the retrospective lens of all that has been learned and more deeply understood since Leopold committed his report to paper. "[T]here is another window through which this scene can be viewed, one fitted with the lens of science. Monitoring stations show that the soil is warming earlier in the season.... [N]ow widespread non-native grasses ... dry into fire fuels more rapidly than in previous years.... The scene shifts from just a moment in time or 'portrait' to a moving record of a dynamic and continuously moving system. And it is one we do not yet fully understand." The new report also addresses a seismic shift in the way we currently understand what we are protecting within our national parks. Today we view our cultural resources as not separate from but intimately connected to our ecological resources. Cultural resources include archaeological sites and historic built structures such as military fortresses. The concept of bridging biodiversity and cultural values finds itself most tightly twined in resources like salmon and maple trees; a bison is both "ecologically important and culturally significant." Elements of the biotic world have tremendous cultural and historical value to people now and going back in time.

Fast forward

As the new report enumerates them, the ecological woes impacting our national parks include "widespread, complex, accelerating and volatile changes" due to "biodiversity loss, climate change, habitat fragmentation, land use change, ground water removal, invasive species, overdevelopment, and air, noise, and light pollution." But there is also good news, as Hamilton points out: "Science knows so much more now, and we have amazing tools." It has only been 25 years since conservation biology became a formal discipline, and parallel with its drill-downs on such functions of nature as predation and extinction have come mind-stretching advances in computing power and statistical models. Satellite-transmitted imagery measures what is happening to vegetation on an hourly basis; from there we can infer what birds and mammals are making use of it. We can now track nature on a continental level, and we can understand the finest points of species differentiation through molecular examination of DNA. We have new capacities for macro- and micro-scale analysis of what is going on out

there, and it can help us make rapid decisions and move quickly to manage fast change. The new report emphasizes that to make management of our natural resources possible at the rate and to the extent necessary, the national parks must be equipped with consistent decision-making tools and connected with parallel efforts at other state and federal agencies. There are significant initiatives in this direction already underway.

At the same time, our contemporary landscape is even more beset by economic pressures to develop open land and repurpose its natural resources than the purview Leopold faced. The environmental degradation Leopold referenced is still a problem, but with ever-increasing consequences. The revised report advocates the “precautionary principle” be used to guide decision-making around potential park impacts—not only within the parks but on adjacent lands. Hamilton says, “We emphasize that the ‘precautionary principle’ be used to guide decision-making around potential park impacts—not only within the parks but on adjacent lands. For example, we need to look at connectivity ‘pinch points’ on the landscape, and not destroy these before we even recognize they are there.”

The cultural component

The report addresses the vast cultural and demographic shifts of the past 50 years; now each year, 279 million people visit our 398 national parks, historic sites, urban recreation areas, national monuments, wild and scenic rivers, and national trails. These visitors represent a big age range, from preschoolers to a bumper population of retirees, and likewise personify many ethnicities and nationalities. Our pluralist present makes the true nuances of our past more important. The report replaces the “primitive” ideal with a goal to support “authenticity” both on the landscape and in how cultural artifacts are interpreted.

Stephanie Toothman, associate director for cultural resources at NPS, remarks that the new report “captures a trend that has been developing in the field and the NPS for years; we need to understand the impact and effects of people’s interaction with their environment, not just immediately, but long-term.” Toothman addresses Leopold’s “vignette” concept as, yes, “poorly conceived to restore some pre-European context,” but she adds that “the act of creating parks and wilderness is a cultural construct. That makes some people uncomfortable but we have to understand how we got to where we are, and see our management as a multi-cultural effort.”

Ergo, the revised Leopold report expressly integrates what for many have historically been separate protective imperatives, the need to sustain nature in the parks, and the need to sustain their cultural artifacts, including, for example, the remains of ancient human settlements. Where the ecological lens of the report calls out the need for comprehensive sustenance of the “functional qualities of biodiversity, evolutionary potential, and system resilience,” it also calls for a deeper interpretation of our cultural resources, extending these “to include ... diverse forms of cultural knowledge.” An example of this kind of thinking is relevant in California’s Yosemite Valley, which is currently faced with the spread of conifers and a potential reduction in black oak due to the fact that Native Americans once actively cultivated an acorn crop there and no longer do. “What we inherited,” says Toothman, “is not just due to negative post-European impact, but thousands of years of favoring one species over another in the valley.” Native American use of fire was an integral part of the ecosystem,

a sterling example of the inextricability of natural and cultural resources.

Climate change poses enormous challenges to our cultural as well as our natural inheritance. Marcy Rockman, climate change adaptation coordinator for cultural resources for NPS, provides an example in Fort Jefferson, in the Dry Tortugas. This is “a brick and iron fort with enormous repair issues. But how much money should we invest in it, given sea level rise” due to global warming? Yet Fort Jefferson is a great place for on-the-ground visitor interpretation. As Rockman points out, “Fort Jefferson tells the story of a mid-19th century fort and allows visitors to get a sense of the kind of isolation the builders and inhabitants” went through. The Dry Tortugas are indeed not a good place to put your brick and iron structure, but strategically, it was the only place to put it at the time. “Fort Jefferson also gives us information about how political decisions can take precedence over environmental considerations.” Another dimension of the layers of learning possible in studying even disappearing resources is in coastal archaeological sites, including those subject to increasingly rapid erosion. For example, Rockman highlights the western Alaska coast, where soil “that used to be frozen hard almost all year is now the consistency of soggy bread—destroying the stratigraphy of archaeological sites.” NPS is inventorying the area as fast as it can—after all, this is an internationally important place, connected to the Bering Land Bridge across which North America’s first plants, animals, and people migrated. The treasures now quickly decomposing as they are exposed to air hold invaluable information about how life here began and evolved. As Rockman points out, the area illustrates “how learning to live and persist in that environment took place over thousands of years.” It is no small mission for the NPS to both identify and address the impact of climate change on these resources with the intention of conserving them, while at the same time examining them for information that can help us understand our contemporary situation in a variable environment. Rockman points out that the revised report recognizes that, while our resources cannot be “effectively frozen in time,” it also provides the guidance that as repositories for understanding human-environmental interactions over vast periods of time, they are “tremendous assets.”

All hands on deck

One of the most progressive and useful recommendations of *Revisiting Leopold* is that the national parks enlist us Americans as “citizen scientists” in helping to monitor what’s going on in the national parks. Regular people are now able to make valuable contributions to scientific research through the use of smart phone apps, and even by the use of regular old pencil and paper, providing a level of data input for which there are simply not enough PhDs around to supply otherwise. The quick-change challenges of the future above all necessitate that we keep our fingers on the pulse of what is happening with nature in order to make timely responses. Only mob-sourcing is adequate to provide this service, and it will do us citizens a great deal of good to participate. The new report references the “transformative experiences” the parks can provide; citizen science often begins with paying close attention to nature, which has a way of making people interested in understanding it, and also leads to loving nature. We want to love it before we lose it. *Revisiting Leopold* tells us how.

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