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Climate Change and Public Lands

FRED POWLEDGE

A slew of new reports calls for federal agencies to address climate change through adaptive management of public lands and waters.

In January 2001, on his last day in office, the US Secretary of the Department of the Interior signed an executive order requiring the department's component agencies to do something about climate change. Bruce Babbitt wrote: "Each bureau and office of the Department will consider and analyze potential climate change impacts when undertaking long-range planning exercises, when setting priorities for scientific research and investigations, when developing multi-year management plans, and/or when making major decisions regarding the potential utilization of resources under the Department's purview."

The order applied to the guardians of most of the nation's public lands. Together, the National Park Service (NPS), US Fish and Wildlife Service, Bureau of Land Management, US Geological Survey (USGS), Bureau of Indian Affairs, Minerals Management Service, Office of Insular Affairs, Office of Surface Mining, Bureau of Reclamation, and their subdepartments, along with other federal agencies, control or influence the control of some 243 million hectares of public lands and nearly 400,000 square kilometers of protected waters. Much of that expanse and the natural resources it harbors are vulnerable to global climate change.

The next day, Babbitt was gone, along with the rest of the administration he served. New leadership, headed by President George W. Bush, moved in. From that point on, Babbitt's order was widely ignored. (In 2007, the General Accountability Office [GAO] surveyed resource managers at the Fish and Wildlife Service and found that some of them were "unaware of the order's existence.")

Now, however, climate change has become a prime buzzword in most of the federal land agencies. Committees, task forces, workshops, and Web sites discuss the subject and prospects for coping with it. Agency leaders almost universally point out, when testifying before Congress, that they've considered climate change a serious issue for quite some time—"The subject of climate change has generated ongoing discussions for many years," wrote an Interior official in 2007. But a sense of urgency did not exist until recently.

The reasons for new urgency, according to land managers themselves, include the following:

- A trenchant report by the GAO in August 2007 stated that the land agencies "have not made climate change a priority, and the agencies' strategic plans do not specifically address climate change"; staffers

"have limited guidance" about what they should do; and managers' concentration on short-term problems leaves little time to think and act about the long-term issues of threats such as climate change.

- A comprehensive study of federal land holdings—national parks, forests, estuaries, wild and scenic rivers, wildlife refuges, and marine protected areas—detailed the agencies' options for adaptation to climate change. This document, one of 21 "Synthesis and Assessment Products," is the work of the US Climate Change Science Program (USCCSP), a consortium of federal agencies. The report, *Preliminary Review of Adaptation Options for Climate-Sensitive Ecosystems and Resources* (also known by the equally opaque subtitle *Synthesis and Assessment Product 4.4*), echoed many of the GAO's findings, though with more circumspection.
- The 2007 report of the Intergovernmental Panel on Climate Change (IPCC) elaborated on its ongoing findings that climate change is happening and that humans are responsible for some of it.



The Trans-Alaska Pipeline, which runs through Kanuti National Wildlife Refuge, carries crude Arctic oil over permafrost, mountain ranges, fault lines, and wildlife migratory routes to the seaport of Valdez. The US Fish and Wildlife Service, which oversees the 584 National Wildlife Refuges, is one of many agencies, including the Bureau of Land Management, tribal reservation lands, Minerals Management Service, Bureau of Reclamation, and Office of Surface Mining Reclamation and Enforcement, run by the Department of the Interior, which manages an estimated 2.5 million square kilometers of public land. Photograph: Steve Hillebrand, US Fish and Wildlife Service.

- Al Gore, who lost the US presidential race in 2000, and the IPCC won a Nobel Peace Prize for their efforts to explain climate change to the public at large.
- Physical evidence, clearly visible to frontline managers of national parks, forests, and other public lands, continued to demonstrate that climate change is happening and is changing the nature of the lands: some species are migrating toward cooler climates; nonnative species are appearing where they never thrived before, often to the detriment of native species; drought is changing the nature of public land and waters; and some catastrophic events are being blamed on climate change. The problem has been magnified by the fact that much of the public land is in the West, where precipitation shifts are expected to cause major changes.

Other lands are in ecologically fragile coastal and wetland areas. In all the areas, pressure is growing because of population growth and citizens' demand for recreation space.

There has been a disjunction between agency headquarters officials and frontline staff members. Generally speaking, the field staff have been aware for some time of the growing threat of climate change and are eager to do something about it, while political appointees back at headquarters have avoided the issue. Some staffers at the field level have reported that they even were warned against uttering the term "climate change." Jill Baron, a scientist with the USGS and lead author of the USCCSP report's chapter on national parks, said in March that "at Interior, we weren't allowed to address climate change openly up until a year ago at the earliest. There

was a government embargo on the word 'climate change.'"

The attitude that GAO criticized seems to have changed recently. Every agency is now paying at least lip service to the notion that climate change is a factor in its work and that some adaptation is required. Some are transcending lip service. Baron says it's all right now to use the term "climate change."

Adaptation

"Adaptation" is the key word of the huge report assembled by the USCCSP, which defines the term as "adjustment in natural or human systems to a new or changing environment that exploits beneficial opportunities or moderates negative effects." Each of the report's chapters comments extensively on what the agency under review is doing to adjust to the change that is coming.

Adaptation is not easy, especially for bureaucracies trained in following pre-

scribed rules and methods. Peter Kareiva, chief scientist of the Nature Conservancy and lead author of the report's synthesis and conclusions chapter, writes that the first step toward adaptation is to clarify management goals; then managers can use a variety of procedures to instill resilience to climate change in their systems. These can include prioritizing adaptation actions, setting appropriate scales for response, and assessing the relevancy of current management goals.

"The current mind-set toward management of natural resources may have to change," he writes. This could mean "coordinated stewardship" of land agencies in a federal government not known for turf sharing. And, in a recommendation that echoes the conclusion of the GAO report and the comments of many agency staffers, "The specific recommendations for adaptation that emerge from studies" of public lands "will not take root unless there is leadership at the highest level to address climate adaptation."

Margaret Palmer, lead author of the USCCSP report chapter on wild and scenic rivers and director of the University of Maryland's Chesapeake Biological Laboratory, feels that such leadership is currently lacking. Climate change, she thinks, raises many new questions. Asked whether policymakers at federal land agencies are working on the answers, Palmer replies: "I think that the on-the-ground people know this already. We're not telling them anything that they don't know. An individual park manager, okay. It's the highest-level guys that don't get it. Will they wake up and see this? I don't know. Probably not, until there's a disaster."

Quite a few high-ranking administrators in the land agencies are already wide awake to the dangers of climate change and the need for adaptation. Allen M. Solomon, the US Forest Service's national program leader for global climate change research, is as aware of the challenges as any climate scientist. Solomon, with coeditors Richard A. Birdsey, Linda A. Joyce, and Jennifer Hayes, in February 2008 published the Forest Service's *Global Change Research Strategy* for 2009 to 2019, an effort to define climate change policy and develop best management



Many federal agencies control and manage public lands and waters—about 30 percent of the area of the United States. Some of these government entities are seldom included in the current discussion of climate change, though climate change surely affects areas under their control. The Department of Defense is one such example: it manages more than 120,000 square kilometers of US land; and Edwards Air Force Base, in the Mojave Desert, covers 1200 square kilometers.

Photograph: J. Douglas Ripley.



Oglala National Grassland, in Nebraska, is one of 20 US National Grasslands that comprise 15,500 square kilometers protected by the US Department of Agriculture (USDA). US National Forests, of which there are 155, cover 780,000 square kilometers that, together with National Grasslands, are operated jointly by USDA's Forest Service. Photograph: Brian Kell.

practices for national forests and grasslands “in order to sustain ecosystem health, optimize ecosystem services (‘adaptation’), and increase carbon sequestration,...all under changing climate conditions.” The strategy’s basic focus, write its authors, is to “increase understanding of forests, woodlands, and grasslands ecosystems so that they can be managed in a way that sustains and provides ecosystem services for future generations.” Understanding means forging adaptation tools that respond to local conditions, because climate change affects different public lands in different ways.

Solomon observes that the land agencies’ attitudes have changed: “When Congress came back [from its end-of-year break] in January 2007, almost all of the agencies with responsibilities for land kind of woke up.... And there’s been a great deal of activity in the Forest Service.” By the beginning of 2008, “things that were not being spoken in committees were now being spoken; hearings were being held on climate change that were not being held before. And I think that a lot of the managers took notice of that—and they took note of the Nobel Peace Prize that went to Al Gore and the IPCC.

“I think they began to understand that this is something that the world *is* taking seriously, and it’s *not* a controversial subject; it’s real, and it’s got to be part of what they’re doing. And so suddenly then they’re hearing the chiefs tell them, ‘Look, we’ve got to do something about this, and it’s gonna start with you guys.’ I think that global climate change is no longer a controversial subject. There are people who will argue that, and there are people who will argue that the Earth is flat and that smoking doesn’t cause cancer. But I think the argument is gone.”

The GAO report and other assessments charge that the federal land agencies have been lax in inventorying and monitoring the resources they control—a necessary prerequisite to devising adaptation. Solomon points to the Forest Inventory and Analysis Program, a US Forest Service (USFS) data bank that goes back many years, as an example of an existing program that can be immensely helpful in planning adaptation.

The program keeps and updates data on thousands of forest plots across the country. “It’s a tremendous store of information on what the state of carbon sequestration is now, what the Forest Service has found that’s changed over time in the carbon content.” The information is available online, he says, and is



Designated in 2006, Mission-Aransas National Estuarine Research Reserve is the only research reserve in the Western Gulf biogeographic region. The Environmental Protection Agency, which regulates 28 National Estuaries under the Clean Water Act, has a hand in the regulation of many other public lands. Photograph: Ben Mieremet, NOAA/NOS.

in a form that can be useful immediately by climate change scholars. Furthermore, there’s a move to integrate climate change into USFS models “so they can be more flexible and more useful in adaptive management.”

Some other officials at land agencies say that the new discussion was helped by President George Bush’s decision to finally acknowledge climate change and its causes, pointing to Bush’s recent state of the union addresses. (However, in the speeches of both 2007 and 2008, Bush mentioned climate change only briefly and tangentially, in both cases as a problem that could be cured by “technological breakthroughs.” There was no mention of adaptation.)

Kieran Suckling, the executive director of the Tucson-based Center for Biological Diversity, scoffs at any notion of a Bushian change of heart. The administration, he says, “is paying a little bit of lip service to the fact of global warming and riding out its time. It has no intention of actually altering any policy or any behavior to adjust to global warming.... All-round, I would have to give the federal agencies an ‘F’ for their efforts to engage with global warming.”



The Rio Grande, seen here passing through Santa Elena Canyon, on the US–Mexico border, is one of 165 National Wild and Scenic Rivers. These protected waters, covering 17,000 stream kilometers, are administered by the Bureau of Land Management, National Park Service, US Fish and Wildlife Service, and US Forest Service. Photograph: Daniel Schwen.

Henry Waxman certainly would agree. The California Democrat chairs the House Committee on Oversight and Government Reform, where he regularly challenges the White House on environmental and most other matters. In a December 2007 report titled *Political Interference with Climate Change Under the Bush Administration*, Waxman's committee presented chapter and verse on what he found to be censorship of scientists' contacts with media and White House editing of experts' congressional testimony, legal opinions of the Environmental Protection Agency (EPA), an EPA administrator's op-ed piece, and climate change reports by EPA and the USCCSP strategic plan. The congressman concluded: "The evidence before the Committee leads to one inescapable conclusion: the Bush Administration has engaged in a systematic effort to manipulate climate change science and mislead policy-makers and the public about the dangers of global warming."

Impediments to change

Impediments to successful adaptation are many, and they are complicated by the fact that climate change is a moving target. The public and other interested parties offer their own ideas about what constitutes proper use of public lands. Existing but continuously evolving issues include nonnative and invasive species, habitat connectivity, catastrophic weather events, altered disturbance regimes, habitat fragmentation and loss, and pollution. Climate change imposes different stressors on different natural resources on different time scales, and the stressors may interact with one another to produce other stressors. Many public land agencies are surprisingly behind schedule in inventorying and monitoring their resources. And policymakers are accustomed to coping with problems of far less complexity than those presented by climate change.

One form of adaptation might be thought of as attempts to shape public behavior and modify expectations. USGS's Baron, who works out of Fort Collins, Colorado, offers an example: Glacier National Park in Montana draws

close to two million visitors a year. But the glaciers have begun to melt, and even the winter snowpack is in jeopardy.

"Let's say all the glaciers melt, which they will in about 30 years," says Baron. "There still will be surpassing scenery up there, and it will be representative of the least developed parts of natural North America. So I think parks will not lose their value, even though some attributes may change." Baron finds that park managers and staffers are "very concerned and ready to start doing what they can" to adapt to climate change. Decision-makers among them are "beginning to have discussions about, let's say, 'You manage a certain endangered species this

way, but if climate change causes it to move 500 meters north [to a higher altitude], what are we going to do?'" Similarly, managers are starting to cope with the challenges of simultaneous disturbances that happen on different levels.

Another obstacle to adaptation, according to some land managers, is the current structure of land management itself. As things stand now, decisions are shaped largely by what an individual agency sees as its own particular goal—one often laid down in law, as with the NPS's mandate to conserve its resources "unimpaired for the enjoyment of future generations." (The meaning of "unimpaired" has provoked much head-scratching.) It may be that for adaptation to take place, the current policy and legal structures of federal land agencies must be consolidated, and state and other entities must be offered seats at the table. While several land-management officials say they understand the need for such new relationships, they add that government is far from ready to make them.

Palmer thinks land managers should devote more attention to resilience. "We should be thinking about managing and restoring for resilience, as opposed to some specific input," she says. "Because we can never predict what new stresses will come about, or what the interactions will necessarily be, so what we want to do is figure out a way to try to manage the system so that it can repair itself if some disturbance comes forward."

Jill Welling is the climate change coordinator in the NPS's Natural Resource Stewardship and Science Directorate, coordinator of NPS's Climate Friendly Parks program, and former staffer at Glacier National Park. Being at Glacier, which is part of the Crown of the Continent ecosystem, makes her very aware of the importance of interrelated areas of land and water. "The goal," she says, "is to start having some discussions on what are biologically recognizable areas. 'Ecosystem' can sometimes be a hard thing to define, but usually you think of an ecosystem as having some coherence in space and time, biologically." Welling is overseeing a series of workshops in the region to do just that.



The Department of the Interior also oversees the National Park Service, which includes 270 parks and other cultural and historical parks covering 340,000 square kilometers. Grinnell Glacier, shown here in 2005, is one of the many glaciers in Glacier National Park predicted to disappear by the year 2030. Photograph: Blase Reardon, USGS.

What's being done

Although the directors of land agencies have spoken of their concern about climate change for many years, there is little evidence that actual efforts are under way to create ways to adapt to it. Most of what has gone on, as of the summer of 2008, is still in the category of talking, meeting, and scheduling workshops. However, some agency heads are now trying to construct the guidance that GAO and others said has been sorely missing.

They also are realizing that climate change is not another pesky environmentalist buzzword that should be invoked alongside the usual suspects of habitat loss, invasive species, and the like. Ron Huntsinger, the national science coordinator for the Bureau of Land Management, says, "We have been addressing the impacts of changing climates for some time, but not under the rubric of 'climate change.'"

"We know what some of the anthropogenic causative factors are, and we should be taking appropriate action on those. Right now the focus is on greenhouse gases, which I think is shortsighted. We should be responding to ecosystem changes"—for example, the waste of natural resources, the "extravagant use of energy," and the use of products like broad-spectrum pesticides—and developing better recycling and transportation systems. "This is a systemic issue not restricted to the effects on climate change, but which encompasses the larger issues of the general health and well-being of humans and natural systems," Huntsinger says.

Lynn Scarlett, the interior department's deputy secretary, attributes increased activity at the department to a variety of



Northern elephant seals return to shore each summer to sun themselves on beaches, as this one does at Channel Islands National Marine Sanctuary (CINMS), while they grow a new coat of fur. The National Marine Sanctuary Program's 14 Marine Protected Areas are managed by the National Park Service, the Fish and Wildlife Service, and the Commerce Department. Photograph: Robert Schwemmer, CINMS, NOAA.

recent public reports. She points to "the accumulated amount of research information and knowledge building, all of which have come together to amplify the seriousness of the issue and drive people to take action." She named a number of assessments and task forces, along with the efforts of the USGS. "I think certainly the creation of the Climate Change Task Force by Secretary [Dirk] Kempthorne has been a spark to action. All of these things together, I think, have increased the pace and extent" of action. (Asked about Al Gore's contribution, she replied: "I don't know how much that figured into folks' thoughts. I haven't heard that mentioned by folks as a driver.")

The Climate Change Task Force that Scarlett cites, and which she heads, brings together some three dozen interior department experts to explore issues facing climate change science. The group has been meeting periodically for a year and a half, with the aim of providing Secretary Kempthorne with a body of information on which to act. The meetings have been closed to the public, and records of its deliberations are not available publicly.

Is the interior department now at the stage where it is actively responding to the order issued seven years ago by former Secretary Babbitt? Scarlett answers, "You know, this is a journey, not a destination. There's always more that can be done. But our agencies, our bureaus, are both actively trying to understand the effects of the change in climate on the lands and waters they manage, and constructively develop[ing] strategies to fulfill their missions in that context—that is, to address those challenges....The responses are varied and multifaceted, but I believe we have actively got such efforts under way. Can we do more? Yes. Are we planning to do more? Yes. But is there much under way? Yes."

For more information, visit these sites:

<http://downloads.climatescience.gov/sap/sap4-4/sap4-4-final-report-all.pdf>

www.ipcc.ch/ipccreports/tp-climate-change-water.htm

www.fs.fed.us/ccrc/strategy

www.gao.gov/new.items/d07863.pdf

<http://oversight.house.gov/documents/20071210101633.pdf>

www.doi.gov/ppp/Strategic%20Plan%20FY07-12/strat_plan_fy2007_2012.pdf

Action

If the workshops and task forces yield positive results, talk may be replaced by action soon—perhaps as early as 2009, when US political leadership undergoes a transition. The currently slow pace of action may even be beneficial, thinks Leigh Welling, of the NPS. She is concerned that “in the mad rush to start taking action” that followed society’s long period of denial about climate change, “people want to do something—which is fine; you can start educating; you certainly can do the sustainability effort, reducing emissions, constructing green buildings, no-brainers like that. But some of the more complex adaptive management responses require that [we]...be a little more thoughtful about what the right thing to do is, in order to get it right. Because we’re in this for the long haul.... We want to make sure that the solution to the strategies we put in place doesn’t have to be redone in a year or

two. I don’t think we need to off-the-cuff, knee-jerk go out and start moving species around. I don’t think we’re at that knowledge point.”

Baron, the USGS staffer and *Synthesis and Assessment* author, sees scant signs of active opposition or denial among the land agencies now. “We get the usual complaints that ‘We don’t have any money,’ or ‘We’re too busy; there’s no time.’ But I think all of that will change if we can provide reasonable ways for people to start thinking about it. They’re going to *have* to. It’s not an option not to.”

For all the newborn enthusiasm that the scientists are finding, there remains the fact that the top decisionmakers have been slow to produce the sort of action, guidance, and leadership that the GAO found lacking.

Interior deputy secretary Scarlett, asked about the pace of work on climate change, speaks of workshops and “accelerated attention” to the problem. One

NPS executive who believes the climate change threat has reached a much-feared “tipping point,” when asked if he’s seen a change among the policymakers, replied, “I think that’s coming. We don’t have any new revised policy as yet.” He speaks of a “robust debate” about policy change and adds that the change “has not taken place yet, but I believe the message is clear that that’s going to be happening very soon. Two thousand and eight could be the year that we say, ‘Well, this is when we started righting the ship.’”

On the other hand, the Department of the Interior has published its *Strategic Plan* for the years 2007 to 2012. The 100-page, 16,000-word document makes no mention of “climate change.”

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