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High Country News

For people who care about the West

Unnatural Preservation

feature article - February 4, 2008 *by M. Martin Smith and Fiona Gow*

In the age of global warming, public-land managers face a stark choice: They can let national parks and other wildlands lose their most cherished wildlife. Or they can become gardeners and zookeepers.

Armored in a rain slicker and floppy hat against guano-bombing waterfowl, Russ Bradley pokes about for signs of life on a craggy island paradise just off the California shore. One might expect the search to be easy, given the hundreds of thousands of common murrelets, ash-colored storm petrels, Brandt's cormorants, Leach's storm petrels, Western gulls, double-crested cormorants, glaucous-winged gulls, black oystercatchers, pigeon guillemots, rhinoceros auklets, tufted puffins, bald eagles, peregrine falcons, and Cassin's auklets that summer on the Farallon Islands, 27 miles off San Francisco in the Pacific Ocean.

During the past three years, however, Bradley has been checking on the breeding sites of the black, burrow-nesting Cassin's auklet, and he's been finding abandoned eggs; dead, black, cue-ball-sized chicks; and skinny, faltering fledglings. "Most of the chicks have died," says Bradley, a research biologist with PRBO Conservation Science, a nonprofit, founded as the Point Reyes Bird Observatory, that has spent the last 40 years counting and observing the hundreds of thousands of birds that nest yearly on the Farallons. "This was as complete a failure response as we'd ever seen before. And we'd been following this species for 35 years."

The apparent culprit: Ocean currents, redirected by rising sea temperature, have swept out of range the millions of tiny krill that the adult birds scoop into their beaks, chew into purple smelly goo and then spit up for their young. In other words, this unprecedented starvation wave may be a result of global warming.

Bradley is one of the experts who knows most about the auklet die-off. Just the same, he's adamant in his belief that he should not attempt to save any of the dying chicks. To do so, he says,

would be considered unnatural and unscientific. "You definitely grimace when you see the guy next door who hasn't done so well and has died at a very young age," Bradley says. "We try to maintain ourselves as scientists. But we really feel for the birds."

In the world of natural preservation, it's not just scientists who take Bradley's don't-mess-with-Mother-Nature stance. Since the 1960s, the idea that natural preservation consists mostly of letting nature take its course - absent manmade environmental disturbance - has been doctrine among public parks bureaucrats, biologists, environmentalists, rangers and other members of the vast landscape of individuals and organizations involved in preserving America's natural environment. When naturalists have intervened to save species, as in the 40-year struggle to save the bald eagle, their efforts have been driven by the goal of returning life to its wild state, so that a damaged ecosystem can tilt back into balance. For the most part, naturalists have not sought to save nature purely from itself. With global warming, however, this hands-off approach is rapidly becoming quaint and out-of-date.

As the planet grows hotter, and the consensus mounts that the temperature is not turning back down, there may be a lot less meaning in the idea of preserving "naturalness" than has been the case. After all, in the not-too-distant future, the state of nature will in many cases be something nobody's ever seen.

So far, however, public-land managers have responded by doing almost nothing, according to a new report by the U.S. Government Accountability Office, the agency that evaluates federal programs. By and large, the GAO says, officials who manage U.S. public lands have simply ignored a 2001 Department of Interior directive ordering them to identify and protect resources that might be threatened by climate change.

This is no minor failure. An emerging scientific consensus says that unless the National Park Service, the U.S. Forest Service, the U.S. Fish and Wildlife Service, the Bureau of Land Management, the National Oceanic and Atmospheric Administration, state fish and game departments and private environmental organizations re-direct their missions to deal with climate change, they'll oversee the advance of nationwide environmental catastrophe. The character of public wildlands will be drastically - and permanently - altered.

So professional preservationists, and the environmental movement as a whole, are left with unnatural choices: They can intervene aggressively to maintain habitat threatened by planetary warming - installing sprinkler systems around California's giant sequoias, to name one suggestion

floated by scientists. In the process they would become something akin to farmers and pet fanciers.

They can intervene aggressively to provide huge migration paths northward for heat-threatened plants and animals. Because this would require them to help dramatically change existing ecosystems, it would turn the current conservation ethic on its head.

Or they can decide to continue to use the traditional hands-off approach - and thereby allow millennia-old ecosystems to die off and be replaced in ways that would never have happened naturally, if not for global warming.

In January 2001, just as Bill Clinton handed the White House keys to George W. Bush, the Department of the Interior issued a broad order to the National Forest Service, the U.S. Fish and Wildlife Service, the Bureau of Land Management and the other agencies that manage one-third of the nation's surface land as well as numerous marine sanctuaries. The order was at once simple and fiendishly complex: The agencies should "consider and analyze potential climate change effects in their management plans and activities."

It was a reasonable directive. Trees on millions of acres of forests in Glacier National Park have fallen to a beetle infestation apparently linked to climate change. At the Florida Keys National Marine Sanctuary, coral reef bleaching - a phenomenon that, if prolonged, would undermine the area's marine ecosystem - may be connected to warmer sea temperatures. On the 2.6 million acres of U.S. land managed by the BLM in northwestern Arizona, a recently intensified cycle of drought, wildfire and flooding has caused desert scrub and cactus to be replaced by grasslands.

According to a GAO report released this summer, however, the bureaucracies that manage public land throughout the United States were provided no guidance of any kind on how to deal with climate change, and park and other natural resource managers did not attempt to deal with the problem on their own.

Since 2001, of course, these federal departments have been ultimately directed by George W. Bush, who has famously not concerned himself with climate change. But the GAO report, and interviews with National Park Service scientists and managers around the country, strongly suggest that government stewards of parks, wildlife and public land simply don't understand the problems they face in an era of climate change. "Resource managers we interviewed ... said that they are not aware of any guidance or requirements to address the effect of climate change, and

that they have not received direction regarding how to incorporate climate change into their planning activities," the GAO report said.

The Department of the Interior, which oversees many of the bureaucracies that manage public land, seems unclear on the very concept of addressing the effects, rather than the causes, of climate change. In its official response to the GAO report, the department had an associate deputy secretary rebut the criticism that the agency has "made climate change a low priority" by, essentially, changing the subject. In its response, the Park Service highlighted what it viewed as its successes - none of which were successes in protecting parks, forests and rangeland from global warming's effects. Instead, the agency's response letter said, "We have made a high priority on developing renewable energy resources; improving energy efficiency and the use of alternative energies at our facilities across the nation."

The officials who manage America's natural resources deserved the GAO's scathing critique. But there are roadblocks beyond bureaucratic intransigence that keep naturalists from effectively grappling with global warming's effects. Though researchers have identified some species, regions and ecosystems already threatened by global warming, science is mostly ignorant of climate change's impacts; until recently, there was little experimental research in the field. Science doesn't yet have information as basic as how much heat or dryness it takes to kill a tree, or whether foggy coastal and less foggy inland California will become warmer or cooler due to global warming.

Beyond the lack of scientific data is a fundamental philosophical problem: To preserve public wildlife during a time of significant climate change, managers will have to do things that run counter to the current ethic of "natural preservation."

"Conservation and land management agencies like the Park Service are confronted with a collapse of the paradigm they've operated under, which is (that) the future will be more or less like the past, and nature needs to be managed only on the margins, where we correct for the minor injustices humans inflict on the natural environment," says David Graber, chief scientist for the Pacific West region of the National Park Service, whose office is at Sequoia and Kings Canyon National Park. "We're facing a period of dramatic uncertainty. What managing nature would mean is a dramatic unknown. We don't know what our goals would have to be. "We're literally talking about things that have only been talked about for months, rather than years."

Global warming undermines almost all the rules that environmental stewards have lived by.

With a warming planet, invasive species are no longer merely exotic pests that hitch ship passage from other continents. They're native grasses, shrubs, beetles, bacteria and viruses that have had new "native" habitat opened for them to invade, courtesy of higher average temperatures. The millions of acres of forests that have been recently killed by beetles - which now thrive in the recently warmer northern winters - are but one apparent testament to this emerging phenomenon. "The west side of the park used to have much colder winters, which slowed the beetles. But winters for the past 15 or so years have not been as cold," notes Judy Visty, natural resource management specialist at Rocky Mountain National Park. "Pine beetles are wreaking havoc."

With planetary warming, forest fires and droughts in the Western U.S. have transformed into something more significant than mere components of a historic cycle of life. Scientists now predict that escalating droughts, tree die-offs and fires could cause Western forests to contribute more carbon dioxide to the atmosphere than they extract.

Research into California's giant sequoia indicates that with warmer average temperatures, these monarchs of the forest may slow and then stop producing seedlings. And "if the fog, or if the ocean currents were to change, (the coastal redwood) would be in real trouble," says Ken Lavin, interpretive specialist at Muir Woods National Monument.

Many global warming-induced changes aren't yet as noticeable as forest die-offs, but are notable nonetheless. Mountain lakes disappear along with the glaciers at Montana's Glacier National Park. The pika, a cool-weather-loving mountain rodent, is vanishing from the Sierra Nevada. Rising seawater threatens to salinize the freshwater ecosystems of the Everglades and submerge beach habitat along the Northern California coast. And an increasingly hot and dry climate is projected to kill 90 percent of the trees at Joshua Tree National Monument.

For most people, these events are the canaries in the ecological coal mine, portending the far-off day when climate change may have life-and-death implications for humanity. For conservationists, however, these embattled plants and animals - and all the other species global warming will kill or push to new habitats - *are* the coal mine. Conservationists need to think hard and fast *now*: Do we rush to rescue climate-imperiled species before it's too late? Or do we let nature take its course, quietly watching the disappearance of species that we have spent decades restoring and protecting?

"It may be that soon one-third of the species I'm seeing outside my window might not be able to find habitat here. Maybe half of them will be new species that find the new climate here amenable," says Graber. "Am I going to fight the new species? Am I going to welcome them?"

The questions are agonizing for naturalists such as Graber. For nearly a half-century, preserving native species and fighting invasive ones has been the reason for his existence. That goal is enshrined in the job descriptions of thousands of people running the vast natural-industrial complex made up of parks, preserves, refuges, private nature conservatories, and millions of other acres of protected U.S. wildlands.

The ecological movement wasn't always so sure of itself. There are other possible, sensible-sounding approaches to maintaining nature preserves. New York's Central Park and San Francisco's Golden Gate Park are horticultural fabrications, with scant relationship to the natural world that came before. Locals seem to like them just fine. In fact, the idea of "preserving" nature as a pleasing aesthetic spectacle, as opposed to the restoration and maintenance of authentic ancient ecosystems, drove park management well into the 20th century.

Then, in 1962, the secretary of the Interior set up a special advisory board on wildlife management, led by ecologist A. Starker Leopold, that went about researching and discussing exactly what America's parks should be. The board came up with a revolutionary idea, summarized in a pamphlet known universally in the nature bureaucracy as the "Leopold Report." It is best known for five evocative words summarizing what became the American scientific community's consensus on what nature preserves should be: "a vignette of primitive America."

That phrase has evolved to mean that public-land managers should endeavor to preserve plants, animals and other natural features so they remain within the range that they exhibited before Europeans first arrived in North America. Any meddling that occurs in protected areas, therefore, must be in the service of a perceived previous natural order.

"It instituted in the Park Service in a way a kind of respect for nature that was apart from gardening," Graber says. "Before the Leopold Report, I called it cowboy biology. We made it up as we went along. If Yellowstone wanted more buffalo, they got it."

Under the new regime, it became necessary to prove that such a bison introduction would be

"natural."

Notwithstanding some controversies - such as "natural" wolves versus "introduced" ranchers in the Yellowstone area - this approach has met with monumental success. Nearly a century after Congressman William Kent introduced the legislation that created the National Park Service, the 295-acre ravine he donated to create Muir Woods National Monument remains much as it was a millennium ago, filled with redwoods, ferns and ladybugs.

"We don't move anything unless it falls on someone," notes Muir Woods interpretive specialist Lavin.

Another impressive legacy of the new ethos lies 20 or so miles to the west. At the turn of the century, egg hunters and pelt gatherers had reduced the wildlife-rich Farallons to a relatively barren state. Since they became protected as the Farallon National Wildlife and Wilderness Refuge in 1969, the islands have become the largest seabird colony outside Alaska and Hawaii. Northern fur seals, which once populated the Farallons by the tens of thousands, were hunted to extinction there following the Gold Rush. They, too, have returned in force. A single pup was born on the islands in 1996. Last year, there were 100 pups.

The starving Cassin's auklets, however, point to a possible future when this let-it-be strategy will no longer produce the desired results.

Strategies that do something effective - that don't just let nature succumb to climate change - are hard to come by.

Two hundred and fifty miles southeast of San Francisco, new studies resulting from decades of research show that giant sequoia saplings are thriving less robustly in the warming central Sierra Nevada. So do officials in Sequoia National Park build sequoia sapling greenhouses? Do they install sprinkler systems around the great sequoia monarchs? Or do they prepare a new habitat farther north, removing other species to make space for sequoia saplings? Should such moves even be contemplated, given the still-fledgling nature of predictive climatology?

And what of the rest of the trees in the West - the ones doomed to die from drought, fire and beetle infestation?

Scientists studying forest diebacks say one response to the dying might be to thin forests, so that individual trees are hardier and more beetle-resistant. It remains to be seen how well this would

go over with an environmental movement accustomed to opposing logging. Other controversial ideas include intensive breeding and genetic engineering to create insect-resistant tree species, combined with the aggressive use of herbicides and pesticides.

Wildlife managers have long believed that local plant species should be kept genetically pure. But climate change may ultimately call for a sophisticated type of wildlife gardening, in which heat-loving southern plant species are brought north and encouraged to crossbreed with cold-loving cousins.

Already, a massive die-off of pinon pine trees in the Southwest is being called a "global warming type event." Again, selective logging might be one answer, scientists say: If fewer trees share scarce water, they just might survive in the new climate.

But for plant species that simply can't survive in their old habitat, some scientists are floating the idea of a forced march north.

Animals whose habitat dwindles as the climate changes might just scurry elsewhere, explains Nathan Stephenson, a research ecologist at the Western Ecological Science Center at Sequoia and Kings Canyon National Parks. But trees cannot get up and walk away. "The National Park Service has to decide: Are we going to assist species migration?" says Stephenson.

Helping plants and animals migrate north isn't just a matter of leasing fleets of flatbed nursery trucks. Many species under threat aren't easy to dig up and put in a pot. Soil microorganisms, fungi, butterflies, and other small creatures critical to the functioning of ecosystems may also find their traditional homes unlivable. Assisting species migration would mean setting aside broad swaths of wild land to provide an uninterrupted pathway north for entire habitats.

"I've had a number of conversations with land managers, identifying all the land in California that could conceivably be used as refugia, and what would be the appropriate species to go where. The magnitude of the problem is mind-boggling," says Graber, the Park Service scientist. "There is a vocal minority of people in the conservation community who believe that things should unfold on their own. The theory being, we don't know what we're doing, and we're bound to screw things up.

"What we're talking about is an order of intrusion greater than anything we've done in the past."

Already the nonprofit Nature Conservancy is considering buying land and ecological easements to create north-south habitat-migration superhighways. "We need to take into account this

vulnerability to large vegetation shifts," says Patrick Gonzalez, a forest ecologist who works with The Nature Conservancy under the title "climate change scientist." "One way in which we're using that data is in the establishing and maintaining of corridors that link areas in the network."

Doing this on any sort of meaningful scale, however, would require making the preservation of American grasses, trees and rodents an expensive national priority. And it would mean treating habitat-choking urban sprawl as even more of an environmental calamity than is currently recognized.

Putting America on this sort of ecological wartime footing - to prepare for an environmental future that nobody can fully predict - will likely prove a hard sell in Washington. Almost as difficult will be convincing the environmental community to abandon a hard-won national consensus about what it means to preserve the natural world.

The vast bureaucracies that manage public land already have to answer to myriad bickering constituencies. Some of global warming's greatest impacts will appear without warning, as ocean temperatures and currents, extended growing seasons, extinction of microorganisms, or any combination of these factors cause cascading effects - such as the ones that are apparently killing the Farallon Islands auklet chicks. Saving species in such a quickly changing environment may not allow for policy meetings, comment periods, revised management plans and alternate implementation strategies. It might just mean deciding at a moment's notice to mash up buckets of krill stew and spoon-feed auklet chicks - now and forevermore.

Although there are reams of conclusive science on the "whether" of global warming - it is definitely occurring - there's very little precise information on when, and where, and what will happen next. Before park officials begin loading ferns onto flatbeds or launch the mother of all tree-thinning operations in the Colorado Rockies, they need scientific backing to be sure what they're doing has some hope of preserving life on earth.

Such science is scarce.

Despite the vast swath of death wrought across the West by drought, heat and bark beetles, science still doesn't know exactly what it takes for nature to kill a tree. At Muir Woods, to note an extreme example of this area of human ignorance, there's no record whatsoever of a mature

redwood dying a "natural," non-human-induced death.

And though there's been vast observational research on the effects of global warming, there's not much experiment-derived knowledge about what a warmer planet will do to particular habitats. "I think one of the big challenges of planning, is the amount of uncertainty. We don't even know if it's going to get warmer and drier or warmer and wetter, and if you don't even know that, it starts to get really hard," says Stephenson, the USGS forest ecologist. "Often people have talked about desired future conditions. Now, you talk about switching to undesired future conditions. We know we don't want to completely lose our forest; perhaps we don't care if we don't have species abundance. And that does really bring you to a really general approach to try to increase resilience to ecosystems."

But it's hard to talk about making an ecosystem resilient if one doesn't know what it takes to kill it in the first place. Science is just now getting down to the brass tacks of cooking and parching trees to death on purpose - in a recently christened 500-ton welded stainless-steel-and-glass habitat-cooking oven.

The oven used to be known as Biosphere II, an artificial enclosed ecosystem originally intended for space research. The University of Arizona recently agreed to lease this giant terrarium near Phoenix from its owner, a land developer. The university will rededicate Biosphere II for research on how organisms react to climate change.

Finally, scientists can write an accurate recipe for baked dead tree.

"Wow, that (must) sound like a really dopey experiment," says University of Arizona natural resources professor Dave Breshears, who's on the faculty of the Institute for the Study of Planet Earth. "But we don't really have the right kind of quantitative information. We've got a drought, and we've got bark beetle infestations, and have higher densities than before and warmer temperatures. And it's hard to unravel the effects of those."

There are scientists who hold the reasoned belief that, given the lack of useful information, any decision to abandon the traditional approach to natural preservation is bound to be rash. Eric Higgs, director of the School of Environmental Studies at the University of Victoria, British Columbia, fears land managers may wreak havoc if they begin meddling with, rather than preserving, wild habitat.

"How is it we find respectful ways of intervening, of removing invasive species, or planting or translocating species? How do we do that in our deeply respectful way?" Higgs wonders. "We want future generations to say, 'They didn't get it all right, but they got some of it right.' Leopold certainly made many mistakes, but he was an individual who kind of had it right. I'd like to think that contemporary restorationists would blaze that kind of trail."

With that in mind, National Park Service trailblazers all over America are holding meetings, conferences and symposia to incorporate climate change into a scheduled revision of overall park policy. The Park Service has created a Task Force on Climate Change to figure out what, if anything, to do about threatened park resources.

Officials with the Golden Gate National Recreation Area along California's North Central Coast, for example, are preparing to study the question with a series of global warming-themed staff meetings scheduled throughout next fall.

The agency is still sidestepping some of what's at stake, however. When asked what it was doing to preserve wildlands in the face of global warming, the Park Service's climate change coordinator boasted of a program called Climate Friendly Parks, which seeks to reduce parks' carbon footprint by doing things like installing low-flow toilets. Addressing the threat to ecosystems by reducing parks' resource consumption is like treating a cancer patient by telling her to cut back on food additives. Scientists are well aware of this apparent lack of direction in the agency's response to climate change.

"There's kind of a chaotic feeling right now. Everyone understands the situation is really problematic. We need to start. We can't wait to act until things start dying," Graber notes. "But we don't know what to do." Leigh Welling, the Park Service climate change coordinator, puts it a different way.

"It's a scary thought," says Welling, "Managers are looking at their job and saying, 'Oh jeez, how do I do my job?' "

Some naturalists have a one-word answer to that question: Differently.

One of the predictions of global warming is that there will be changes in the wind patterns and ocean currents that move nutrients to places where creatures can reach them. "In May of 2005, and roughly the same time of year in 2006, we had highly unusual wind patterns and ocean

currents that were atypical," said Ellie Cohen, executive director of PRBO Conservation Science, the organization that monitors birds on the Farrallon Islands.

If those new patterns become the norm, some of the bird species that now blanket the Farallons could perish. Others, however, might thrive. Will preserving a semblance of the status quo turn conservationists into something closer to gardeners or zookeepers?

"It may be that at some point ecologists and conservationists decide the level of intervention may have to be higher than anything we've ever considered before," says Cohen. "Are we willing to go on the Farallon Islands to feed Cassin's auklet chicks until they're big enough to survive?"

And if not, what outcomes are we willing to accept?

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