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High Country News
For people who care about the West

Lost Frontier

As the North Dakota oil rush closes in on Theodore Roosevelt National Park, the badlands' most ardent defender wonders if it's time to leave. By Sierra Crane-Murdoch. Page 14.

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Ranger John Heiser looks over the Little Missouri River in Theodore Roosevelt National Park.
SCREENSHOT FROM THE FILM BLACK HARVEST (BLACKHARVESTFILM.COM), AN ANTEVITA FILM PRODUCTION (LUXEMBOURG) (ANTEVITA.LU) DIRECTED BY JEAN-LOUIS SCHULLER AND SEAN CLARK

On the cover

Well pads creep toward North Dakota's Little Missouri River and the boundary of the Elkhorn Unit of Theodore Roosevelt National Park, seen in the background.
CHRISTOPHER BOYER, KESTREL AERIAL SERVICES FOR NPCA

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FEATURE

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Editor's note

Knowledge, a wrecking ball

Until I was 18, I lived in the same house, in the same town, just a handful of blocks from the hospital where I was born. Ours was a neighborhood of unremarkable ranch houses on a mesa in Boulder, Colorado. My friends and I knew every backyard shortcut and nook, including a tiny pink house tucked back from the street on a sprawling, overgrown lot that we thought was haunted. Once, when we went there to pick irises, we peeked inside to see a TV turned on to snow in a dark, deserted room — and fled in terror.

Now, when I visit my folks, three megahouses stand on that once-haunted lot. A wall of palatial abodes with price tags in the millions rings the mesa's edge, part of an endless wave of gentrification. Sometimes, filled with quiet vengeance on night walks, I'm tempted to leave my dog's offerings on the manicured landscaping.

The gift of staying in any place long enough to learn it well is that it shapes your way of seeing the world, becomes mortar with which you assemble the pieces of yourself. And the grief is that it inevitably becomes something else beneath your feet.

In this issue's cover story, contributing editor Sierra Crane-Murdoch profiles a man grappling with the transformation of one of the grandest spaces of all: North Dakota's prairie and badlands. Over the last few years, the Bakken oil boom has chewed through private land and the Little Missouri National Grasslands all the way to the edge of Theodore Roosevelt National Park. John Heiser, the park's backcountry ranger, has lived near it his whole life and worked there longer than anyone. Arbitrarily drawn borders can do only so much to protect any landscape, so Heiser has watched with rising fury as drilling noise and lights diminish the park's sense of sanctuary, and an invasion of new visitors — mostly transient workers — brings in the crime and chaos that are de rigueur in Bakken boomtowns.

This erosion of peace has set off a deeper erosion of trust, cutting into the bedrock of those communities. Residents have turned inward and bunkered down; many have left. These are no longer places, Crane-Murdoch writes, where everybody knows everybody. Heiser, the boom's most vocal critic, is unusual for pointing these things out loudly and often. But he articulates a feeling many North Dakotans share: Something timeless has been changed forever. And when that happens, what's left for those who stay?

The kids growing up in my old neighborhood today don't know a cougar once killed a deer in the vacant lot down the hill where a church and condos now stand; I don't know what the mesa looked like before houses were there at all. It is hard to grieve what you never saw or understood. Ignorance can be shelter; knowledge can turn from mortar to wrecking ball.

–Sarah Gilman, contributing editor

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–Sarah Gilman, contributing editor

AP PHOTO/JOHN LOCHER

Cliven Bundy holds one of his grandsons at a Bunkerville, Nevada, event on the first anniversary of the Bureau of Land Management's failed attempt to remove his cattle from federal land.

Checking in on Cliven Bundy

Cliven Bundy, the rancher who refuses to recognize the federal government, held a rally near his land in Nevada in April. The three-day rally drew about 150 people and celebrated last April's "stand-down," when armed militia and protesters halted a Bureau of Land Management effort to round up Bundy's trespassing cattle. Bundy has since become a celebrity for extremists. At his rally, we met ex-cops, ex-firefighters, ex-military, a roofer, a tattoo artist, a mom-turned-Constitutionalist. Joe O'Shaughnessy, the leader of an Arizona militia who was part of a "security detail" to protect Bundy last year, told *HCN* that his Facebook group membership has skyrocketed over the last 12 months. "It's out of control," he said. As for Bundy, he told *HCN* he is unsure the government will ever take action against him: "The question is, who's the criminal? Is Cliven Bundy the criminal, or is the federal government and their bureaucrats the criminal?" **TAY WILES**
hcne.ws/1EGiB9V

24 million

acres covered in the original Northwest Forest Plan, in Washington, Oregon and California

2.5 million

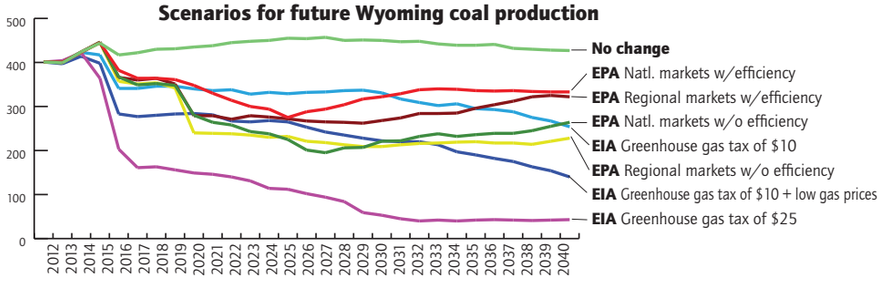
acres in western Oregon covered in new BLM plans expected to allow more logging

The Northwest Forest Plan was supposed to mark an end to the timber wars that crippled the region's economy in the 1990s. Now, the plan might be unraveling. This spring, the Bureau of Land Management and the Forest Service will revisit the plan, with an aim to replace it by 2019. At a Forest Service "listening session" in Portland in March, activists complained too many trees are already allowed to be cut. Industry advocates, meanwhile, say they've never gotten to harvest all the board-feet promised under the original plan. A new plan seems as unlikely as the old to settle the long-simmering conflict over Pacific Northwest forests. **PAUL KOBERSTEIN** hcne.ws/1CS8BYA

What's in store for Wyoming coal?

A team of economists at the University of Wyoming has released a study that shows how much Wyoming depends on coal. The industry accounts for 14 percent of the state's economy and 6 percent of its employment. And it's in decline. Natural gas and renewables are taking a bite, as are the increased costs of deeper mining in the Powder River Basin. That could add up to a 20 percent cut in production by 2030. And while some scenarios are grimmer than others, Wyoming will have to look to other sectors, like agriculture and tourism, to make up the loss. **KINDRA MCQUILLAN** hcne.ws/WY-coal

Scenarios for future Wyoming coal production



The EPA's Clean Power Plan proposal would mandate a 30 percent reduction in CO2 from 2005 levels. Simulations were run without energy efficiency measures by users, where the coal industry would carry the costs, or with energy efficiency measures, which would effectively distribute costs more broadly across the economy. Simulations were mixed with potential in national markets only and in regional markets for coal, where more demand exists but where export is proving difficult.

The EIA simulations are based on greenhouse gas taxes of different levels, each with an annual 5 percent increase, with anticipated natural gas production and with lower natural gas prices, which would come from higher production. All of these scenarios make coal more expensive and natural gas more attractive.

SOURCES: RHODIUM GROUP AND UNIVERSITY OF WYOMING CENTER FOR ENERGY ECONOMICS AND PUBLIC POLICY

64

The percent decline expected in the Custer County, Idaho, budget if Congress lets the Secure Rural Schools Act, which compensates counties for federal land ownership, expire in October. **SARAH TORY**
hcne.ws/1PoAqhY

Audio

Are we in a megadrought?

The short answer: not yet. But we should be thinking about long-term drought and how to use water more wisely. *HCN* recently sat down with four experts in water, climate and the economy, for an hour-long *Soundtable* livestream. In the future, dry regions will be drier, and that means a lot of the arid West will have to rethink how it manages water.
BRIAN CALVERT
hcne.ws/droughtforum

JOHN GURZINSKI/LASVEGASPHOTOGRAPHY.COM

"What do we do about all this water that we are essentially giving up to global warming?"

—Jonathan Overpeck, co-director, Institute of the Environment at the University of Arizona

Trending

USFS and greenhouse gases

The Forest Service says it will try to reinstate an exemption to Colorado's roadless rule, to allow coal mines to build roads in a protected area. The exemption was struck down last year by a federal judge, who said the government failed to assess the impact of future coal mining on the climate. Agency officials will now try to calculate greenhouse gas impacts from extracting coal and using it to generate electricity. But they aren't sure how to do so. Jim Bedwell, the agency's Rocky Mountain region director of recreation, lands and minerals, tells HCN: "That's all very much evolving." **ELIZABETH SHOGREN**

You say

DINA ROBERTS:
"Leave the coal in the ground and let the forests soak up the carbon we are already emitting. The Forest Service should recognize its mission is changing."

JOHN WREDE:
"Not only no, but heck no. Leave our elk pastures alone!"

NANCY LEE KAMINSKI:
"Roads are the beginning of the end for our majestic wildlands! If the GOP ever really created 'jobs, jobs, jobs,' the extractive industries would not be able to destroy our natural world with claims of 'jobs, jobs, jobs.' "

hcne.ws/1PkFROR and facebook.com/highcountrynews

Send letters to editor@hcn.org or
Editor, HCN, P.O. Box 1090, Paonia, CO 81428.

BOOM, GONE

The boom/bust cycle happens quite often in history with different industries ("The Winter of Oil's Discontent," *HCN*, 3/16/15). For example, in the 1940s, '50s and early '60s, it was uranium. We had various oil boom/busts from the '40s to the present. We had natural gas boom/busts, with the most recent one going from the '90s and dying around 2009. It kind of stayed alive; however, once the price of oil went bust, many natural gas companies used that as an excuse to cut back even further.

As a whole, the boom/busts are driven by prices going up or coming down. Unless the price comes back up quickly, it will be a long, long drought if you work in the energy industry. High-level company people are saying they are hoping the price comes back in a matter of months, but they expect it to be down for many years, which will pretty much decimate the energy industry jobs. There will be spurts of activity here and there, but as a whole, it's gone. You could say that the "free market" has done more to slow down/stop the energy industry drilling than all the lawsuits and billions of dollars spent by various environmental groups.

What hurts is all the higher-paid men and women supporting their families, who, after being laid off, lose their homes, cars, etc., and end up getting jobs that pay half or less of what they were making. Someday down the road, the energy boom will crank up again, and a whole new generation of men and women and their families will have to live the boom-then-bust cycle again.

Robert Gates
Pinedale, Wyoming

HARLEY SCHWADRON, ARTIZANS.COM

BUST HAPPENS

"The Winter of Oil's Discontent" is one of the best articles I have ever read in *HCN*! The article hit the nail on the head. I was born and raised in San Juan County, New Mexico. My family has a long history of "patch" employment in the San Juan Basin. We have endured multiple booms and busts over many decades. I believe it takes mental toughness and common sense to ride the roller coaster.

Sug McNall
Aztec, New Mexico

WATER GRAB

The in-depth profile of Pat Mulroy made the mistake many others have made in evaluating her, abandoning balance and working to explain away the hypocrisies of her tenure as Las Vegas' water boss ("Unite and Conquer," *HCN*, 4/13/15).

Her hard-nosed tactics may be viewed by admirers as feints meant to foster collaboration among other water managers on the Colorado River, but not for Nevadans in Pat's water-grab sacrifice zone. Pat and the culture she fostered at Southern Nevada Water Authority have fought tooth-and-nail against any efforts to reduce the scope of their $15.7 billion groundwater pipeline project, to set triggers at which the pumps would be shut off (or put into reverse, as suggested in the article), to push more aggressive or innovative indoor conservation techniques, or to ratchet up punitive rates for water wasters. They've fought both a full vetting of other options and a thorough accounting of the millions in tax- and ratepayer dollars spent on public affairs, property purchases, lawyers and "experts" whose findings have been challenged by the research of independent analysts and other agencies. Pat may be a collaborator with the other six Colorado River states, but rural Nevadans know otherwise.

If not for the fact that SNWA has been on a losing streak in court, pipe might already be laid. That sounds like the strong-arm water grab tactics of the past, not some idyllic new way of pumping. Mulroy is a polarizing figure who has earned the respect of allies and opponents. Now that she's retired, attempts seem to be underway to burnish her legacy by softening the edges and inconsistencies coming from her record on this issue. But the hard facts show that while she's given Nevada an outsized role in affairs on the Colorado River and done admirable things, she also stubbornly prioritized and pursued this disastrous eastern Nevada groundwater project against the better judgment of history, science and law. We would expect that *High Country News* would provide objective "warts and all" reporting of Mulroy's accomplishments and failures. She is not perfect, and *High Country News* shouldn't cover up those blemishes.

There is no benign name for Pat's pipeline. "The Las Vegas water grab" accurately conveys Mulroy's approach.

Abigail Johnson
Baker, Nevada

GNOME MAGNIFIQUE

The March 16 "Heard around the West" contained a lovely account of Boulder, Colorado's gnome liberation movement. Somewhere out there is a gorgeous French movie showing a young lady kidnapping her father's garden gnome and subsequently sending him photographs of his gnome in various exotic settings — Roman ruins, Golden Gate Bridge, rodeo arenas, etc. Boulder gnome-napper victims may be getting poems now, but there will be (so to speak) "Pictures at 11."

We used to give lawn flamingoes to puzzled folks in selected neighborhoods — in particular the million-dollar teardowns of the nouveaux nouveaux. Tacky is the best revenge for pretension. St. Thorstein of Veblen informs to this day.

Elizabeth Harris
Evening Shade, Arkansas

High Country News

High Country News is a nonprofit 501(c)(3) independent media organization that covers the issues that define the American West. Its mission is to inform and inspire people to act on behalf of the region's diverse natural and human communities.

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A crystal ball for the Pacific Northwest

What will Seattle's climate be like in 2050? A lot like this year

BY KATE SCHIMEL

If you're looking for unexpected ways the current drought is affecting the West, you might take a look in Kathie Dello's inbox. Until recently, Dello, the deputy director of Oregon's climate service, had been getting the same emails from prospective residents: *I'm thinking about moving to the Pacific Northwest, but I'm worried it's too wet. How much does it rain there, really?*

But this winter, as declarations of water shortages swept across the state, the questions changed. "I started to get emails from people wondering whether they should still move to the Pacific Northwest, because of the drought," Dello told me recently. They worry there won't be enough water once they get there.

Dello doesn't have an easy answer, but she knows this is just the beginning. In the Pacific Northwest, the water shortage isn't due to a lack of precipitation; most of Oregon and Washington saw near-normal amounts. But that moisture arrived mostly as rain, not snow. The rain ran off without adding to the snow reserves, and unseasonably warm temperatures have burned off a good part of the rest. That means there's little or no snowmelt to take the sting out of the region's dry summer. And that is close to what climate change models predict for the region.

"We absolutely are looking at our future, right now," Dello said.

Climate projections suggest that the West can expect years like this one to become more frequent by the middle of the century, although changes are already in motion. In the Northwest and the Northern Rockies, that means more rain and less snow. A rainier winter means lower springtime flows for fish and farmers and a less predictable summer water supply for reservoirs. In the Southwest, climate change likely means extended periods of drought, with low precipitation and a low snowpack, much like the one in California.

One of the hardest-hit places in the Northwest has been Oregon's Malheur County, an agricultural region of alfalfa farms and rocky rangelands tucked against the border with Idaho. Malheur received a near-normal amount of precipitation, 93 percent, but the snowpack was just 1 percent of normal on April 14. The Owyhee Reservoir, which provides much of the county's water, is at just 28 percent of capacity, thanks to the skimpy snowpack and a series of dry years before this one. Anticipating less than half their usual water allotment from storage, farmers have fallowed fields and switched to crops such as triticale, a hybrid of wheat and rye, that don't demand as much water.

"There's a prevailing thought that this is a dry spell," says Bill Buhrig, a crops agent for Oregon State University and a local farmer himself. But a disturbing question has started to percolate: "How long do you keep calling it a dry spell before you start making long-term adjustments to your operations?"

For municipal water-supply managers in the Northwest, this year's conditions are a crystal ball for a warmer, rainier future. Typically, water managers go through seasonal cycles of holding water back and then releasing it in order to juggle the shifting needs of human users and salmon. This year, the usual seasonal patterns have shifted, since winter barely arrived and summer looks to be coming early. That means managers have to adjust the times they release the water and how much of it they let go.

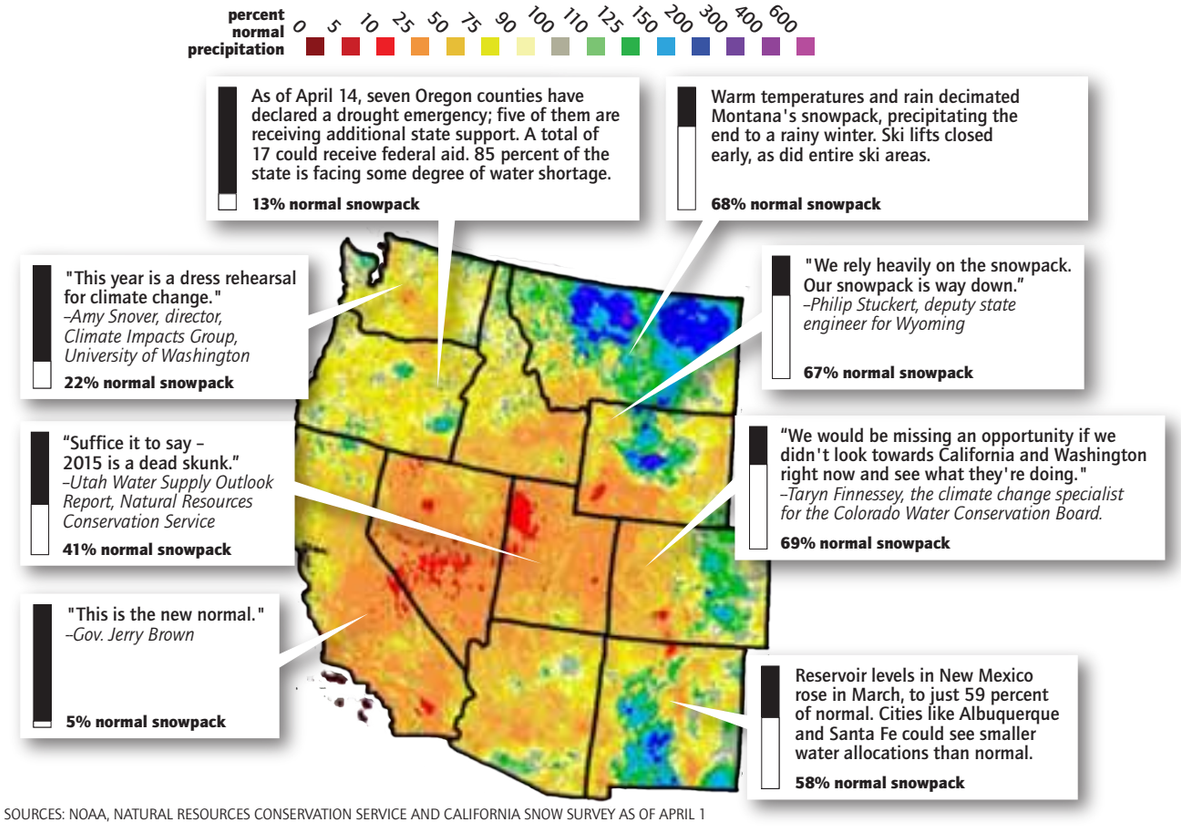
Seattle Public Utilities, which manages the city's water supply, has gone further than many in preparing for climate change, running a series of virtual scenarios. Paul Fleming, the director of the utility's climate resilience group, says that this year is a useful real-world test for the utility's infrastructure and strategy.

"It's helpful to be able to see how resilient your system is," he says. The utility is adjusting how it fills and draws down its reservoirs, which could prove useful as conditions like this year's become more common. In order to respond to low snowpack and paltry spring flows, Seattle Public Utilities kept reservoirs higher through the winter and spring. Most years, the reservoirs are kept lower to prevent flooding if a big storm hits. Other water managers are holding more water back longer into spring as well and figuring out which reservoirs to keep high, based on which areas are likely to get less snowmelt and which streams need water for fish.

This drought obviously isn't the first Westerners have experienced. Severe droughts in the 1970s, 1980s and early 2000s helped spur ongoing water conservation efforts, and much of the West has been flirting with drought for a decade and a half. But Oregon climate expert Dello says that though dry spells typically fade from people's memories, this year is different. "Folks are saying, 'OK, something's changed. If this is going to keep happening, we can't keep doing what we're doing,' " she told me. "It won't be so easy to forget." □

Kate Schimel (@kateschimel) is an *HCN* intern.

Drought double whammy:
Even where precipitation was normal this water year (Oct. 1- April 1) snow levels were low.

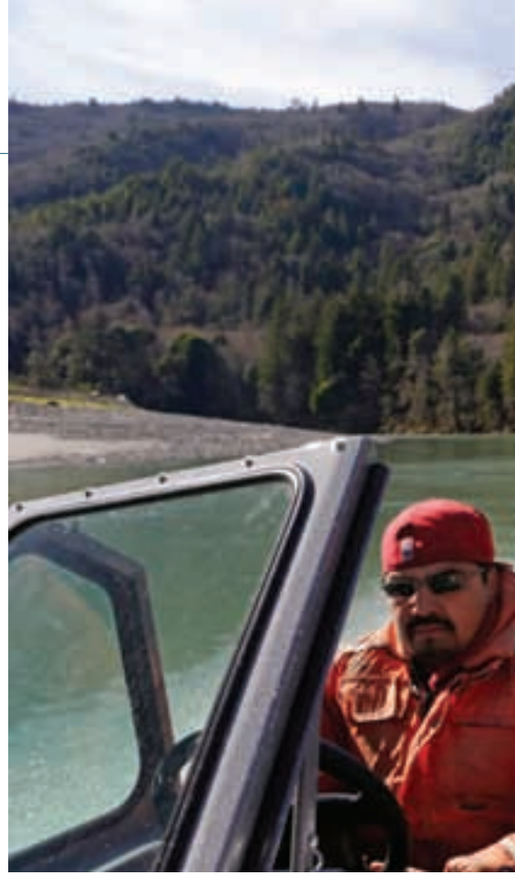


SOURCES: NOAA, NATURAL RESOURCES CONSERVATION SERVICE AND CALIFORNIA SNOW SURVEY AS OF APRIL 1

Plague on the Klamath

The race to prevent a repeat of the West's worst salmon-kill

BY TERRAY SYLVESTER



Mike Belchik, a senior biologist for the Yurok Tribal Fisheries Program, scans the lower Klamath River from a boat piloted by fisheries employee Bob Ray in February 2015, right. TERRAY SYLVESTER

On Monday, Sept. 15, 2014, Mike Belchik, a senior biologist for the Yurok Tribe, was overseeing an emergency laboratory on a remote gravel bar in the Klamath River on the tribe's Northern California reservation. Generators and folding tables stood on shore. Fish blood drifted in the weak current. That morning, crews had netted two dozen salmon from a 20-mile stretch of the lower river. Now they were inspecting their catch for a parasite dubbed "the Ebola of Klamath salmon."

Working quickly, the men snipped a layer of glistening gill tissue from each fish and slid it under a microscope. The parasite — a protozoan named *Ichthyophthirius multifiliis,* or simply *Ich* — is salt-colored and less than a millimeter wide, with a fringe of madly fluttering hairs. Belchik and his crew had monitored for it all summer, but only that weekend had infected fish begun appearing in their nets.

In 2002, *Ich* killed some 70,000 king salmon in the Klamath — the largest such die-off ever recorded on the West Coast. Afterward, the parasite population declined below detection, but it is native to the river, and there was reason to fear its resurgence.

Last September, California was already three years into perhaps its worst drought in more than a millennium, and the Klamath was low and warm. The fall salmon run had begun to arrive, but the fish were confined to pools, stressed and waiting for rain to swell the current and let them migrate upstream. In slow water thick with fish, *Ich* can reproduce rapidly. Thousands might feast on a single salmon. Once engorged with blood, they drop off and anchor to the river bottom. Then each one bursts open, releasing up to 1,000 offspring. The cycle can take as little as a week. "It felt like a catastrophe was looming," Belchik says.

The Yurok crews were trying to determine whether water should be released from reservoirs upstream in an attempt to disrupt the parasite's life cycle. *Ich* are relatively poor swimmers and can survive only a few days without a meal. Increased flows, the thinking goes, might disperse the parasites while letting salmon migrate out of infested holding pools, but such a tactic had never been attempted on an outbreak already underway. No one knew whether it would work in a fishery stressed nearly to failure by drought and diversions.

After the 2002 die-off, tribes, agencies, dam owners and other parties agreed to release water from reservoirs on the Trinity River, the Klamath's largest tributary, if at least 30 parasites were found in a single layer of gills in at least 5 percent of captured fish. By 1 p.m., Yurok crews had found *Ich* in nearly half of their catch.

Belchik dug out his cellphone and called the reservoirs' managers. Send water, he said — and fast.

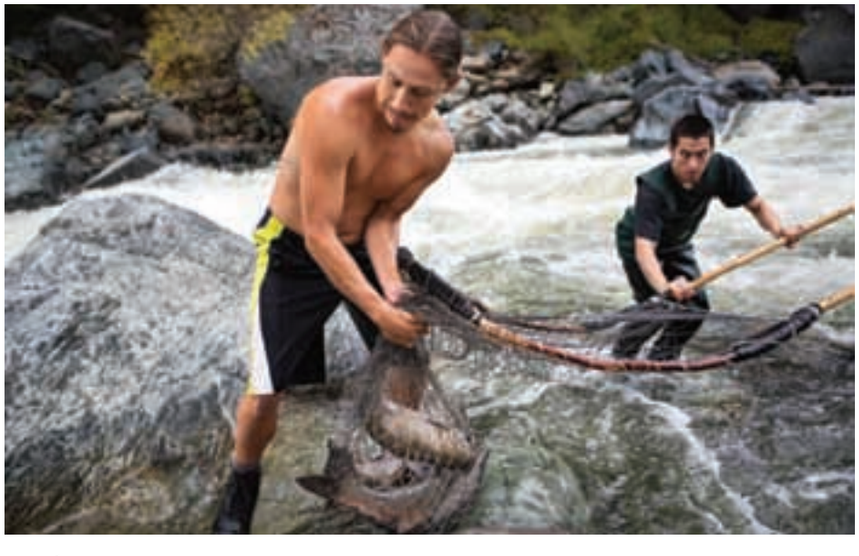
The upper Klamath River is impounded by seven dams, which serve some 170,000 acres of arid southern Oregon farmland. But downstream, the river flows unimpeded for 190 miles before spilling into the Pacific Ocean. This stretch and its tributaries support the third-richest salmon runs in the Lower 48. In an average year, 120,000 kings and a few hundred threatened coho muscle through these waters to spawn.

Relations between farmers and the basin's salmon-dependent tribes are notoriously tense, and in 2001, they snapped. That spring, during a severe drought, federal wildlife managers shut off agricultural diversions to protect coho and struggling sucker fish. Farmers, who had already sown potatoes, hay, wheat and other crops, were furious. They protested by forcing open a head gate and refilling an irrigation ditch with buckets.

The conflict caught the attention of the Bush administration, and the next summer — also dry — irrigators received their full water allotments. The Yurok and others protested that the fish needed more water, but "nobody was looking for *Ich,*" Belchik recalls. The parasite was known

WEB EXTRA
See a gallery of tribal subsistence fishing at **hcn.org**

Terray Sylvester (@TerraySv) is a writer and photographer based in Berkeley.



Karuk fisheries workers haul a net full of king salmon out of the Klamath River, left. The Karuk Tribe stepped in to monitor the *Ich* outbreak as salmon migrated upriver off the Yurok Reservation. Steelhead gills, above, red and swollen due to *Ich* (tiny white specks) and infected with another disease called columnaris, or "gill rot." TERRAY SYLVESTER, YUROK TRIBAL FISHERIES PROGRAM

for ravaging farmed fish, but such kills were almost unheard of in the wild.

By mid-September 2002, flows in the lower Klamath had dwindled to about 60 percent of average. The Yurok were celebrating an important ceremony just above the river when children began carrying dead salmon up to the dance grounds. Fish were dying by the thousands, infested with *Ich*.

"It went from nothing, to major catastrophe, in a span of a few days," Belchik says. An overwhelming stench of rot hung over the river.

Due to the die-off, the commercial Pacific salmon season in Northern California and southern Oregon was sharply curtailed in 2004 and 2005, and declared a disaster by the National Marine Fisheries Service in 2006. No one felt the kill like the Yurok. Their reservation, home to roughly 1,000 tribal members, flanks 44 miles of the lower river. The Yurok ply that territory for salmon, steelhead, sturgeon and Pacific lamprey to feed their families. In the tribe's commercial salmon season, a fisherman might earn $3,000 in just a few days — no small haul on a reservation where 40 percent of residents live below the poverty line. "We're a fishing people," says Chairman Thomas O'Rourke. "It was sickening."

In 2014, the Bureau of Reclamation reacted quickly when it learned another disaster was brewing. The morning after Belchik called, the agency began releasing enough water to double flows in the lower Klamath for a week. Belchik wondered how the parasite would respond. Since the 2002 kill, his crews had inspected salmon weekly during the fall runs. Now they stepped up their effort.

Their findings dismayed them. Crews had initially looked for 30 parasites in each fish — the threshold for the emergency response — and then stopped counting, even if more were present. But Belchik soon realized they were overlooking valuable data. He told workers to count to 100, then to 200. Eventually, finding nearly 1,000 parasites in some gills, he said, "Just count them all."

To an extent, tribes and biologists had seen the problem coming. Since the middle of summer, they had pushed the Bureau to release extra water. Such releases, purely precautionary, were a critical component of the post-2002 response measures, but had become increasingly controversial. In 2003, 2004 and 2012, the Bureau granted them, without any sign of an *Ich* outbreak. In 2013, however, the releases triggered a legal challenge from Central Valley irrigators. Last summer, with water supplies exceptionally limited, the agency unexpectedly announced it wouldn't release any water until infected fish were found.

The Bureau's hesitation sparked a backlash. In early August, members of the Hoopa Valley Tribe, on the Trinity, approached Interior Secretary Sally Jewell at a wildfire meeting in nearby Redding. A week later, tribal members and others protested outside the agency's Sacramento office. The Bureau eventually agreed to release preventative flows, but it was late August by the time water started flowing. *Ich* would appear soon after, necessitating the unprecedented emergency releases of mid-September.

Some argue the Bureau's delay meant more water was used in the end. All told, some 80,000 acre-feet poured downstream last summer to protect salmon — more than twice as much as in previous seasons. The Hoopa criticized the agency for its "reactive" approach. An outbreak, says biologist Joshua Strange, an expert on *Ich* in the Klamath, "has an inertia that is hard to stop."

By mid-October, the salmon had migrated off the Yurok Reservation, but infection levels remained severe. The Hoopa and the Karuk, farther upstream, inspected what fish they could but lacked the Yurok's capacity. Belchik was still anxious to keep tabs on the outbreak, but he was forced to postpone his monitoring until almost November, when he received permission to inspect salmon arriving in a hatchery at Iron Gate Dam, the upper limit of the Klamath run.

What he saw surprised him: not much *Ich*.

A few days later, he inspected fish entering a separate hatchery on the head of the Trinity. Again, very few parasites.

"OK, I get it," he realized. "It's not happening."

The outbreak had apparently dissipated somewhere between the Yurok Reservation and the dams. An unusual number of salmon in the Trinity had failed to spawn, perhaps as a result of *Ich*-induced stress, but no large-scale die-off occurred. "Now," said Belchik, "begins the long process of figuring out what exactly happened."

Of the many questions biologists are asking — How many parasites can a salmon withstand before dying? When, exactly, did the outbreak start, peak and subside? — one of the most critical is whether the mid-September emergency flows averted a catastrophe. Belchik cautions that *Ich* outbreaks are rare and poorly understood, but, he says, "the leading hypothesis is that, yeah, we saved the fish."

The triumph may prove precarious. Belchik, Strange and others think *Ich*'s re-appearance last year was prompted not just by years of drought, but by long-term ecological degradation caused by dams — degradation that's becoming more problematic in the warming West. The 2002 catastrophe prompted a landmark series of settlements, the Klamath Agreements, intended to resolve water conflicts in the basin, partly by removing four dams from the river — a great benefit for salmon. But the enabling legislation has stalled in Congress. For now, Klamath salmon, and the tribes that rely on them, must make do with conditions at hand.

Those conditions look grim: In early April, Trinity Reservoir levels were two-thirds of average, while snowpack in the Klamath Basin was 6 percent of the 30-year median — a record low. With so little snowmelt, the river will decline quickly. O'Rourke, the Yurok chairman, foresees a difficult summer: "I'm thinking we're in trouble." □

SCOTT JONES/FRIENDS OF SONORAN DESERT NATIONAL MONUMENT

THE LATEST

Backstory

The Sonoran Desert National Monument in southern Arizona was designated in 2001 by President Bill Clinton. But **when unrestricted recreational shooting damaged resources, including saguaro cacti, the Bureau of Land Management recommended a ban, citing concerns about wildlife, cultural relics and public safety.** After the National Rifle Association objected, the agency then backed down ("Inside the BLM's abrupt decision not to ban shooting in an Arizona national monument," *HCN*, 12/18/13). Environmental and historical preservation groups sued, claiming the reversal violated federal law.

Followup

On March 27, the U.S. District Court for Arizona agreed, saying the decision lacked a "rational connection to the facts" and ran counter to the evidence the BLM itself had presented in environmental impact studies. **The court revoked permission for shooting and instructed the BLM to reconsider its decision. "There are plenty of places in Arizona to target shoot without harming important resources and visitor safety,"** said Matthew Bishop of the Western Environmental Law Center, the plaintiffs' lawyer.

KATE SCHIMEL

USFWS

THE LATEST

Backstory

Twenty years ago, 50 scientists compared notes and warned that the northern spotted owl's decline was rapidly accelerating ("A doomed species?" *HCN*, 6/13/94). The 1994 Northwest Forest Plan aimed to preserve the threatened bird's shrinking habitat by protecting old-growth forest on federal land. But an unanticipated threat emerged – competition from barred owls. The bigger, more aggressive Eastern birds now outnumber spotted owls in much of their territory. Today, only about 4,000 remain, despite logging cutbacks and efforts to remove barred owls.

Followup

In early April, **the U.S. Fish and Wildlife Service announced that it would consider listing the northern spotted owl as endangered**, in response to an environmental group's petition. Federal biologists say they wouldn't expect management changes with an endangered listing. Meanwhile, the Forest Service and Bureau of Land Management are revising the Northwest Forest Plan. The Forest Service's version won't be ready for four years. The BLM's draft, due soon, may allow increased logging.

ELIZABETH SHOGREN

Tucson's rain-catching revolution

In the Sonoran Desert, rainwater harvesting — an obvious but long-ignored water conservation strategy — is finally gaining traction

BY TONY DAVIS

In the mid-1980s, Brent Cluff lived in a low-slung four-bedroom house on a quiet street in Oro Valley, an upscale suburb northwest of Tucson. Saguaro and prickly pear, mesquite trees and shrubs filled his front yard and most of the others on the street.

His backyard, however, stood out, with peach, plum and apricot trees, and a vegetable garden overflowing with cucumbers, tomatoes, carrots and okra. It was completely irrigated by stormwater, captured from the street by an eight-inch pipe and used to fill a figure 8-shaped 100,000-gallon concrete pond. The pond was stocked with trout from northern Arizona; periodically, Cluff let Cub Scouts fish there.

In his late 40s, Cluff was by turns a genial, brusque and combative visionary, sporting a crop of gray hair. A University of Arizona water researcher, he published more than a dozen papers on water harvesting, including one on his pond. It was more than an amenity, he said; it was an essential survival tool for his desert city and the apocalyptic droughts he believed were inevitable.

Cluff told anyone who would listen — and many city leaders who preferred not to — that harvesting rainwater could ease the region's reliance on its rapidly declining aquifer. It made no sense, he argued, to irrigate lawns, gardens and trees with potable water when more rain fell on Tucson annually than its residents consumed, racing down streets into washes and streams, or simply evaporating. The initial investment for equipment could be steep, but after that, harvesting required little energy and would neither increase water bills nor imperil aquifers or rivers.

Cluff, however, was no environmentalist. He believed that water harvesting could support unlimited growth, comparing his crusade to the building of the atomic bomb: "If I didn't do this," he said, "somebody else would."

But most city and state officials dismissed rainwater harvesting as futuristic at best. For years, the idea received little notice. "There was a climate of denial about the implications of water scarcity in Tucson," recalls William Lord, former director of the University of Arizona's Water Resources Research Center. "A lot of people didn't want to hear the kind of things (Cluff) was saying."

Today, however, Cluff's vision has become as trendy in Tucson as grass-fed beef burgers. Dealers sell cisterns as fast as they arrive. City rebates of up to $2,000 to purchase rain tanks have gone to more than 600 homeowners in three years, and every new university building harvests rain. How did this happen? And could it help Tucson survive the dry future that Cluff so accurately foresaw?

Rainwater harvesting is an ancient technology; it made human settlement possible in southern Arizona 3,500 years ago. The Hohokam Indians captured rainwater with rock dams and built sizable storage tanks. The neighboring Tohono O'Odham built earthen dams and brush weirs to divert water from washes for crops and personal use, and even today they store rainwater in earthen tanks for cattle.

But the practice fell out of use as European-style wells proliferated at the end of the 19th century. They tapped a seemingly inexhaustible underground water supply, which lubricated Tucson's growth for decades. When Cluff began his crusade, Tucson was the nation's largest city totally dependent on groundwater. Its leaders knew the aquifers wouldn't last forever, but they believed they could support future growth by pumping Colorado River water uphill for more than 300 miles and using treated effluent to irrigate golf courses and parks.

Back in the mid-'80s, just a handful of Tucson residents had rainwater cisterns. A decade later, when water-harvesting advocates decided to start teaching the practice, they had to pay people to sign up for their classes.

Two relentless and persuasive proponents led the turnaround: Brad Lancaster, a tall, reddish-haired writer, activist and lecturer, and Katie Bolger, a feisty city council aide.

These days, Lancaster, 46, is something of a guru. He has published two books on rainwater harvesting and earns up to $1,000 a day teaching the practice across the Middle East, including a U.S. State Department-funded tour. But he started out as an outlaw.

In 1998, using a handsaw, Lancaster illegally carved six cuts into his curb to divert rainwater into the vacant space between the curb and sidewalk. He and his brother had already transformed their barren front yard near downtown Tucson into a lush oasis by "planting the rain" — building earthen berms to capture rain in hand-dug basins. The curb cuts would help nourish mesquite and palo verde trees in the remaining empty space.

Lancaster has calculated that the average one-mile stretch of residential street in Tucson drains enough water annually to irrigate 400 drought-tolerant food-bearing trees: ironwood, mesquite, palo verde and hackberry. As his trees grew, his neighbors got interested, so Lancaster launched his own crusade to legalize the practice.

At first, city engineers balked, fearing that the tree roots would damage the public rights of way, and that saturated soils would cause sinkholes. "They thought the streets were designed to drain water," Lancaster says. "They put the water down the storm drain, or it evaporates."

It took Lancaster three years to get the curb cuts legalized, and he had to engage in fancy bureaucratic footwork to do so, finding a sympathetic city hydrologist who convinced authorities that the existing cuts hadn't caused problems. Lancaster argued that the shade from more trees would stretch the life of the asphalt. He got the backing of neighborhood groups and environmentalists, and found an important ally in Val Little, who runs the Water Conservation Alliance of Southern

Tony Davis (@tonydavis987) is an environmental reporter for the *Arizona Daily Star* in Tucson.

Brad Lancaster slides down a fire pole, left, from a patio overlooking his property in downtown Tucson, where he harvests enough rainwater to satisfy most of his water demands. Lancaster washes his dishes with rainwater used directly from the cisterns where it is stored, below. He then uses the dishwater to water his plants.
NICK COTE

Arizona. Back in the early 2000s, Little persuaded the state to legalize the use of gray water from sinks, showers and washing machines — another lost water source — on outdoor plants. (Gray water accounts for 30 percent of what comes out of a homeowner's tap, enough to irrigate 50,000 Tucson yards.)

Today, Lancaster stores about 100,000 gallons of rainwater a year. He uses city water for his washing machine and to shower, gray water on fruit trees, and rainwater for drinking. He says the system moderates summer heat, reduces street flooding and generates mulch. It also improves his neighborhood's look and feel: "This is not just about conserving water," he says.

Lancaster cut away the curb on his street so that storm runoff could more easily flow to plants, opposite page. This has helped transform the sidewalk along his street into an oasis of hardy desert shrubs and fruit-bearing succulents that make full use of the desert's sparse rainfall.
NICK COTE

Katie Bolger is a salty-tongued, politically savvy 45-year-old native Tucsonan. As an aide and chief of staff to two city councilmen, she helped change the law in other ways to help bring water harvesting into the mainstream.

In 2007, Bolger introduced Lancaster to Rodney Glassman, whose campaign for city council she was managing. The two quickly bonded. Glassman was already aware of the bureaucratic barriers to harvesting. A few years earlier, working for the developer KB Homes, he discovered that since rainwater harvesting wasn't covered in the land use code, builders had to get an exception to implement it.

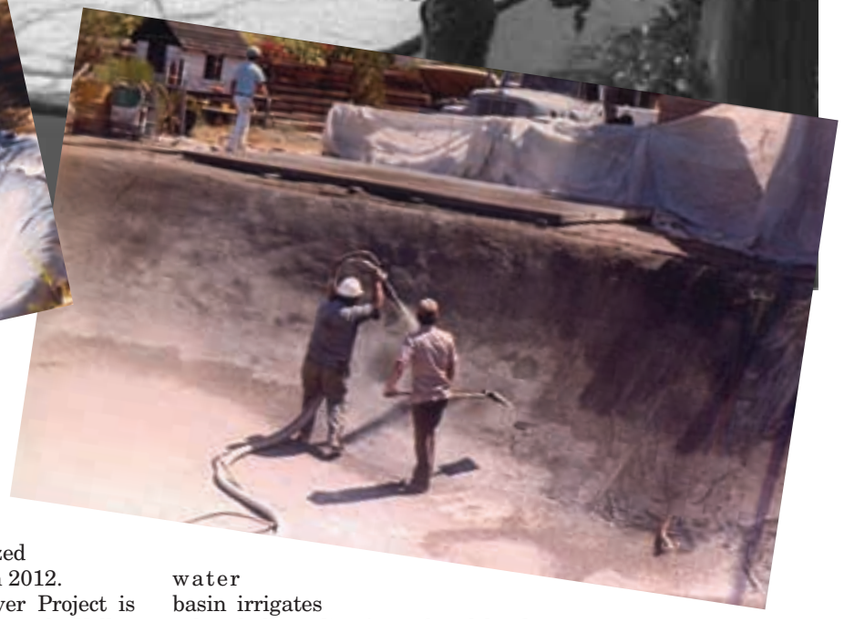
After meeting Lancaster, and at Bolger's urging, Glassman pledged to require harvesting in new developments — "To make water conservation the rule, not the exception." Once elected, he pushed through new regulations, requiring new businesses to use rainwater for 50 percent of their landscape irrigation and new homes to have gray-water hookups. "There was shitloads of pushback from homebuilders," Bolger recalls. "The enviros started at 100 percent, the builders started at zero. Now, we have an ordinance that was truly a compromise."

Later, when Bolger was working for a second councilman, Paul Cunningham, she fought to create a fee on water bills for investment in low-flow toilets, harvesting and other conservation programs. Tucson Water fought back. Officials at the cautiously run utility were reluctant to support anything that would cost ratepayers, and they doubted the cost-effectiveness of the harvesting rebates. Bolger, however, suspected that the utility had darker motives: If people used less water, it would make less money. Tucson Water officials deny this.

Bolger ultimately decided to bypass the utility: She orchestrated a public hearing packed with residents who told the council they would pay higher rates for conservation. This was astonishing for Tucson, where a 1976 recall of four council members who raised water rates withered government-sponsored conservation efforts for years. The council eventually agreed on an average monthly fee of 25 cents and approved rebates up to $2,000.

Bolger has three cisterns in her backyard that support grapevines, fruit trees, spinach and tomatoes. "If I can do it in my yard — and I have to hire someone to screw a fucking screw in my wall — it's ridiculous not to do it," Bolger says. "The last rain we had was 1.9 inches. I had 2,300 gallons of water of better quality than what comes from my tap delivered to my door. It blows my mind we're not doing it more."

Lancaster agrees, saying that even



Clockwise from right: Cub Scouts fish in Brent Cluff's pond, catching some of the 200 rainbow trout Cluff had stocked from a northern Arizona fish farm. Workmen spray gunnite, the pond's basic raw material. Brent Cluff's daughter, Shawna, walks along a walkway separating two sections of the pond, still under construction. COURTESY CLUFF FAMILY

during droughts, Tucson still gets more rain than its homes and businesses use in a year. He suggests redesigning "every government building, every park, every school, every library, every parking lot" to harvest rainwater: "What if the entire population in the Colorado River watershed harvested 20,000 gallons of rainwater per year, per family?"

What if, indeed? Some critics argue harvesting can "steal" storm runoff from people with rights to river water. However, a 2007 study in suburban Denver found that only 3 percent of rain runoff ever reached streams, with the rest evaporating or being used by plants. Still, two years ago in Arizona, the concern scuttled a proposed state study of large-scale rain capture.

Nobody knows exactly how many Tucsonans have cisterns or earthworks, where the ground is sloped to direct runoff into basins with trees and shrubs. But the numbers appear to be growing rapidly. A local Ace Hardware has sold $40,000 worth of rain tanks every two weeks for the past three years. Regionally, demand is strong enough that rain-tank manufacturer Bushman USA says its 24-hour-a-day California factory has a six-week backlog.

A few states besides Arizona have also liberalized their rules. Colorado once outlawed the harvesting of rainwater, reasoning that it belonged to people with water rights to rivers and streams. In 2009, it relaxed the law to allow homeowners who lack access to public water to catch rain, and permitted developers to install collection systems in 10 pilot projects. California legalized rooftop rainwater capture in 2012.

In Los Angeles, the River Project is now working with San Fernando Valley homeowners to use gray water on outdoor plants and to install earthworks and "permeable pavement," which allows rainwater to percolate into the aquifer. A pilot program at 22 homes saved and reused 1.2 million gallons annually, captured 505,000 gallons in the aquifer, and cut water bills.

The potential for water harvesting is significant, especially for arid states facing an even drier future. Outdoor landscaping accounts for 27 percent of residential water use among Tucson Water customers. If all of them got all of their outdoor water from gray water and the sky, the city could slash water use by 25 percent. The savings could be greater in cities like Phoenix and Los Angeles, where lawns are more common.

Yet achieving this may prove difficult. Last fall, Tucson Water warned that the rebates weren't working. Their research found that recipients were not conserving any more water than a control group of homeowners who didn't get rebates. Officials were concerned that rebate recipients were simply adding new landscaping to be watered with harvested rainfall. Some programs, though, have saved water. One allows participants who reduce city water use to direct the savings into environmental restoration projects. In two years, 60 participants saved 855,000 gallons. On Tucson's south side, a 6-acre rainwater basin irrigates a baseball stadium's turf and landscaping at public buildings. Since 2001, it's cut irrigation bills enough that the county's $6 million share of the project's cost should be repaid by 2018.

Drought is a big obstacle, however: "If it doesn't rain for four months, six months or a year, those cisterns are not going to be full," says Kathy Jacobs, who runs the University of Arizona Center for Climate Adaptation Science and Solutions. The up-front cost is also a problem. At $2,000, a cistern could take decades to pay for itself with savings on water bills. Earthworks, on the other hand, cost as little as a few hundred dollars. And even a cistern pencils out if you consider the community benefits of the landscaping: higher property values, reduced street flooding, food production and shade cover, which helps lower air-conditioning costs and reduce the urban heat island effect.

Today, Brent Cluff, who got the ball rolling 30 years ago, lives in assisted living in Rexburg, Idaho. The 79-year-old is battling illness and has difficulty speaking. I told his wife, Raydene, that rainwater harvesting is taking off in Tucson at last. When she told Brent, she said, he broke into tears.

Cluff's Tucson pond, however, has not survived: It dried up three years after he sold the home in 1999. The new owner filled it in with dirt. □

GLASS HALF FULL

This story is part of an ongoing series that looks at the people and ideas helping the West better understand and use its water.

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WILDERNESS, Debra Bloomfield
128 pages, hardcover: $50.
University of New Mexico Press, 2014.

San Francisco-area photographer Debra Bloomfield spent five years visiting the Pacific Northwest and Southeast Alaska. These are not your typical landscapes: The photographs collected in *Wilderness* offer a unique and genuinely personal perspective on the nooks and panoramas of those wild places — a puzzle of sky caught through a close-up tangle of leafless branches; the line where a streak of dark trees cuts a sudden edge into a clearing. The rawness and intimacy of the images lend them an emotional, meditative quality, reminding viewers of our own unexpected, astonishing glimpses of nature. An accompanying CD recording of natural sounds caught on location — the caw of a raven, the crunch of footsteps on snow — amplifies the sensation of being swallowed by wildness, stillness and unity.

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Spring visitors

It's been an unusually warm and windy spring here in western Colorado, home of *HCN*. Fortunately, a few visitors have blown our way.

Karen Olson and her parents, **Dorothy** and **Byron Olson**, stopped by our Paonia office on their way to visit family in nearby Delta. Karen, a writer and editor, got her first assignment with *HCN* in 1998, when she was a creative writing student at Colorado State University in Fort Collins. She says her first draft, on a controversial condominium development in remote Stehekin, Washington, had to be completely rewritten. But she credits *HCN* with helping start a career that's wound its way through *Utne Reader*, where she was editor-in-chief, to *Public Art Review*, in Minneapolis, where she's now executive editor. We'd love to see your byline here again, Karen!

Cece and **Laurance Headley** visited with their dog, Peddee, in late March, driving their camper from Eugene, Oregon, to visit friends and family. Though they frequently visit Colorado (Cece grew up on the Front Range), this was their first pilgrimage to *HCN* headquarters. Cece appeared in Jane Braxton Little's story "A new world in the woods," (*HCN*, 4/1/02) for her job as a forest restoration worker.

From Custer County, Colorado, **Paul Mosher** stopped in on his way to Arizona. He's been an on-and-off subscriber for 20 years. Paul, who's a contractor, is fascinated by water issues and thinks finding better ways to conserve it is crucial. We agree!

GIVE MOM A GIFT OF HCN

Spring in the West is such a treat. Make it more special for Mom with a gift subscription to *High Country News*, and we'll send her a free copy of Mary Sojourner's latest novel, *29*! It's a blistering story set in Twentynine Palms, California — a place where forgotten tribes and desert lovers unite to save ancient lands from corporate greed and huge solar and wind power farms. See the ad on page 25 for details about this Mother's Day special.

HCNERS IN NEW YORK

HCN Contributing Editor **Michelle Nijhuis** and board member **Laura Helmuth**, *Slate*'s science and health editor, both traveled to New York in March to give talks at the Arthur L. Carter Journalism Institute at New York University. Laura talked about nurturing new writers and shaping influential stories, while Michelle spoke about journalism and global change. Describing how she built a successful freelance writing career while living in tiny rural Paonia, Michelle said, "There were many challenges. … It was easy for editors to forget about me since they never saw me." But living in an off-grid straw-bale home, with almost no overhead, allowed her to work only on projects she valued, instead of having to take assignments just for the money. "My choice of place made me really lucky in that way," she said.

—Jodi Peterson for the staff

Karen Olson visiting *HCN* with her parents, Byron and Dorothy Olson.
KATE SCHIMEL

LOST FRONTIER

Most North Dakotans will not talk badly about the oil drilling that has consumed their state, even if they despise it, but they are glad to reminisce about the way things were before. People were friendlier, they like to say. Kids played in yards, neighbors waved, and families went driving just for fun. The prairie was as they wanted it — a place few would ever go. They say there will never be anywhere like it again. They say, *If you want a taste of how things were*, *drive west of Miles City* — or east of Minot, or south of Dickinson — though, even as crude prices drop and the boom slows to a creep, you must go farther and farther afield. The worst thing about the development, if they are angry enough to admit it, is that there is no escape. For the most part, a company will drill a well or build a pipeline wherever it pleases. This is deeply unsettling to landowners, no matter the financial rewards, who have had to learn that the places and things they hold sacred — their privacy, among them — are not sacred anymore.

In four years of reporting in the Bakken, as the oilfield region is called, I have often wondered why so many people are reluctant to admit their discontent. At times, I have been told, *We North Dakotans are too polite*; or, *God help us if we sound ungrateful*. So it was all the more surprising, one afternoon in September, when I got a call from a North Dakotan named John Heiser, who introduced himself as "a man who speaks his mind."

Heiser has worked for 41 years in Theodore Roosevelt National Park, in the badlands south of Watford City. The park, he told me, was "a colossal mess" and "inundated with oil people." The previous morning, he had found a scatter of shotgun cartridges and clay pigeons along the north boundary; the year before, some "yahoos" had shot a bison to death inside the park. "These clueless redneck fools have nothing else to do but kill things," he said, adding that this was only "part of the truth." What "truth" did he mean? "The mess!" he exclaimed. "Defacing natural features! Tipping over pedestal rocks! We're finding felons from other states, meth, marijuana — pint jars of marijuana!" Then came the kicker: On a recent Sunday, a bomb exploded on the edge of the park. Heiser was digging a trail when he saw it — a black column of smoke hundreds of feet high and shimmering with heat like a midsummer day. He figured an oil rig had blown, but when he looked through his binoculars, he saw a pickup truck on fire. Later, he would hear that two other trucks had fled the scene. "We're being invaded," he said, and suggested I come see it for myself.

WE MET ON A WARM OCTOBER DAY in the north unit of the park, in a sparsely wooded valley flanked by reptilian cliffs. Heiser was in good spirits, and as we traced the Little Missouri River east, he quizzed me on the difference between sage and winterfat. But when we turned north, he froze. His quiet can be unnerving, since it is rare. He speaks in rehearsed phrases so tightly strung that syllables blur, words are skipped over and sentences broken off. He touched a finger to his ear. Then

FEATURE BY SIERRA CRANE-MURDOCH

As the North Dakota oil rush closes in on Theodore Roosevelt National Park, the badlands' most ardent defender wonders if it's time to leave

it came — two cracks of a gun. His jaw tensed. His skull began to quake. Never had I seen so physical a reaction. "That's these fuckers," he said. "Oh, these fuckers make me so mad. I curse these sons of bitches. I curse them!"

Heiser wore black leather boots, faded jeans, a green flannel shirt with pearl snaps, and a JanSport fanny pack held together with five safety pins. He has slate-blue eyes and white hairs that stick out from his temples. He refuses to wear sunglasses, and his stubborn squint has left a thin white crease across the bridge of his nose. At 64, he has the vigor of a teenage boy. Spit from all his talking crusts in the corners of his mouth, and when he is frustrated, which these days is often, he presses his hands to his cheeks and drops his jaw, like the tortured figure in Edvard Munch's *The Scream*.

The source of his torment is the oil boom, which has crept closer to the park each year since it began around 2009. If one were to draw a circle around the Bakken, the park's north unit would fall just south of center. It is, by now, an island — perhaps the only place left in this part of North Dakota where a person can wander for miles without crossing a scoria road or seeing a frack sock dance like a blowup doll in the wind. Its bluffs overlook private and public land, both heavily drilled; dozens of derricks are visible from some vantages. In 2013, the Little Missouri National Grasslands — more than a million acres spread between the Missouri River and the state's border with South Dakota — sent $81 million to the National Treasury, 40 percent from the McKenzie Ranger District, which borders the park and contains some of the Bakken's richest deposits. Across the district's half-million acres, there are 800 miles of pipe and 340 "facilities," such as well pads, compressor stations, tank batteries and buildings. In 2013, an oil company proposed drilling within 100 feet of Elkhorn Ranch, where Theodore Roosevelt lived from 1884 to 1887, and where, the story goes, he became a conservationist. Some call Elkhorn Ranch the "Walden Pond of the West." Here, you might say, the national park idea that Roosevelt advocated has proven most prescient: that if all else were given up to commerce, at least some land would be saved.

Heiser began working in the park in June 1973, soon after graduating from Dickinson State University. He already knew the park well because his father, a rancher, was a maintenance man there. In 1978, the year it changed status from a national memorial park to a national park, with 80 percent of the north unit designated as wilderness, Heiser became a backcountry ranger. He built fences to contain the park's bison and chased them back in when they escaped. He named many features in the north unit — Eagle Butte, Coffee Creek, Whiskey Wash, Big Horn Bump — and built many of the trails, too. You can safely say that no one knows the park better than Heiser, nor has anyone worked there longer. His job has changed over the years, but he is best described as park ambassador. If you want to ski in midwinter, he will take you. If you want to swim, he will show you where. He knows where the quicksand is, where a longhorn steer got stuck and he had to shoot it in the head.

View from Buck Hill, South Unit of Theodore Roosevelt National Park.
SARAH CHRISTIANSON

John Heiser at his farm near Theodore Roosevelt National Park.

SCREENSHOT FROM THE FILM BLACK HARVEST (BLACKHARVESTFILM.COM), AN ANTEVITA FILM PRODUCTION (LUXEMBOURG) (ANTEVITA.LU) DIRECTED BY JEAN-LOUIS SCHULLER AND SEAN CLARK

Facing page: Wells encroach on the eastern boundary of TRNP-South Unit.

© BRUCE FARNSWORTH WITH AERIAL SUPPORT PROVIDED BY LIGHTHAWK

He knows weather statistics like baseball fans know batting averages and will recite them at a speed that rivals most auctioneers. People who know Heiser cannot imagine the park without him. A park law enforcement officer told me that when he pulls locals over for speeding, it is not uncommon for them to ask, "Where's John at?" Chances are, he is "roamin' range," as Heiser likes to say.

As we picked our way up a sunny draw, I wondered if there was some peril in knowing a place so well. Most North Dakotans say they knew the boom had arrived when they went to the grocery store and no longer recognized a soul. Heiser says this, too, but he is more likely to mention the mule deer, elk, antelope and porcupine he's counted dead on highway shoulders — unlucky prey to swelling traffic — or the night sky lit so bright with gas flares that he could not see the stars. He used to recognize birdsongs from a distance, but now, when he stops to listen, there is too much noise to easily place them. Noticing has its virtues, but when the details add up to something lost, they induce in Heiser a righteous anger. Nothing fans this fury more than the park's decaying sense of sanctuary: Because it is a haven from the surrounding chaos, it is not impervious to that chaos. In 2012, near the height of the boom, the park drew more visitors than it had in two decades, many of them oil workers. "These bastards that come here have no sense of place," Heiser said. "They don't want to be here, so they disrespect our place." An affront to the landscape was an affront to Heiser himself.

THE CRIME RATE inside Theodore Roosevelt National Park has indeed risen with the boom, and though it is nowhere near as high as in towns that surround the park, several people worried for my safety there as a young woman traveling alone. "You got bear spray?" a Forest Service ranger asked, when I mentioned I would camp in the north unit one night. I was confused. There were grizzlies? "No," he chided. "Think about it."

I did not have bear spray, but I did have a flashlight — the kind you can knock someone out with, which a boyfriend had given me years ago for this purpose. I slept with it beside my pillow and woke the next morning, relieved to see the cottonwoods backlit by dawn and the leaves quivering like swarms of flies. I drove the road west and came to a line of cars stopped behind some bison. A man emerged from the car behind mine and went onto a nearby bluff to make a call. When there was no answer, he noticed me watching him and approached. He was a welder from Georgia and had lived in Williston two years. He smiled as he said this, and I saw that he was missing his incisors. He explained that he often visited the park to photograph ducks. Once, he came in wintertime and walked to the river in the wind and snow. "It must have been cold," I said. "Boy, that was something," he agreed.

The bison loped off, and the welder returned to his car. In a few miles, I came to the end of the road. It began to rain. Three women in headscarves appeared in a Volkswagen, turned, and drove away. I walked to an overlook and found a man and woman huddled beneath a raincoat. The man was short and wore low-hung jeans and a black fleece imprinted with a company logo. She was shorter and bundled in sweaters. They were thrilled by the weather and laughed each time a gust of wind threw rain in their faces. The woman was from Los Angeles and sold real estate; the man, from Wisconsin,

laid gas pipe. They met when the man came looking for his own apartment and moved into hers instead. It was their first time in the park, but they had decided they would come again. "There's nobody out here," the man said. "With the boom, there's just so many people, and you come here, and it's like, '*Ahhh.*' "

When I told Heiser about these encounters, he conceded, "Some are really nice people." He recalled how he had been counting bighorn sheep in a park canyon, recently, when oil workers drove by. "They actually said, 'We're really sorry for what's going on here.' People apologize to me all the time, and it makes me mad, because I want to hate them all." I had sympathized with the young couple, but looking out on the prairie, on the flares that glowed bright against the clouds, I understood how for Heiser the park had become a flimsy parapet: Even here, you could not forget the boom, and you could acutely sense how it feels to be closed in upon.

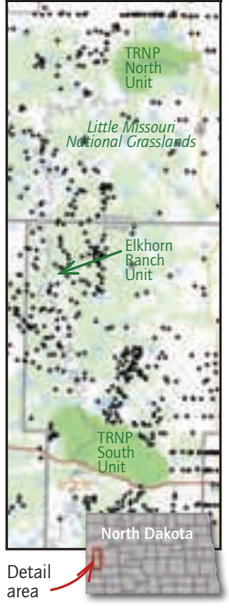
HEISER RECOUNTS HIS NORTH DAKOTA ANCESTRY in terms of survivorship: The long winters his great-grandparents endured after they arrived in 1891; then the Dust Bowl and the steady loss of people after that. Perhaps it is remarkable that so many have stuck it out. Had Heiser been given the choice, he might have left, too. He does not romanticize his upbringing, which he said was miserable: "My mother was cold as ice. I think she was radically unhappy." Both parents died before Heiser's 28th birthday, not long after his brother, who worked for an oil company, was killed in an explosion. The ranch and Heiser's youngest brothers, 11 and 14, fell to his care. Eventually, they grew up and moved out, but Heiser went on living in the same house, raising his father's cattle and then cattle of his own.

Today, the house is sunken into a swale amid windrows and scattered scraps of wood. Were it not for the large red barn Heiser erected some years ago, the place might look stuck in another time. The machinery is old, and anyhow, Heiser has little use for it. Every day, even in winter, he goes to the pasture on horseback or on foot. Then he cuts wood to heat his house with a 30-inch bow saw and hauls it on his shoulders. Whether this is by choice or financial necessity, he is quick to boast his moral winnings. This past winter, to feed 56 head of Hereford cattle, he burned six gallons of liquid fuel and did not start an engine for 76 days. This is odd behavior for a rancher, since most would rather not make a hard life harder. Odder still, he names his cows and cries when he sells them: "It breaks my heart every fucking time."

No doubt neighbors wonder how Heiser turned out this way; he is molded from the same earth as they are — the same red clay and buffalo grass, the same sale barns and Sunday church dinners. He is the person they talk about, or don't talk about, or are tired of talking about. "People either love John or they hate him," another park officer told me. Heiser has been known to offend park administrators, too. "He'll tell them his opinion, and they just write him off as the old-timer, and he'll say they're stupid," the officer explained. "But, you know, 99 percent of the time, he's right."

Heiser, for his own part, claims he has "nothing in common with my people," but if there is one thing he and his neighbors have shared in this boom, it is a sense of being invaded. Whether this distrust of outsiders is merited does not matter: Enough bad things have happened to convince them of the danger. The 2012 mur-

Active oil and gas wells near Theodore Roosevelt National Park



SOURCE: NORTH DAKOTA DEPARTMENT OF MINERAL RESOURCES

Rancher Joel Grieger, top, climbs down to examine a pickup that was launched off a bluff in the Little Missouri National Grasslands. Vehicle access in the grasslands is restricted, but off-roaders don't always stick to the approved trails and roads, above.
SARAH CHRISTIANSON

der of a Montana schoolteacher, Sherry Arnold, for example, was traumatic not only because it was unfair and gruesome, but because it happened in a place where everyone once knew everyone. Heiser knew Arnold's sister. The boom's most troubling effects rise from this distrust. People have told me that they rarely leave their houses anymore. Some have abandoned the state altogether, and even Heiser considers doing the same. "The day when I decide, 'Any place is better than this' — that will be a sad day," he told me. I was struck by his rare understatement: For Heiser to leave North Dakota would be like plucking his own heart from his body. I could not imagine it.

THERE ARE SIGNS that this broad but quiet unease is growing bolder. Even as most state leaders have embraced the boom wholeheartedly for its economic benefits, some, like Attorney General Wayne Stenejhem, have been more cautious. In December 2013, Stenejhem proposed that the state's Industrial Commission, on which he sits, draw a two-mile buffer around its "extraordinary places" — including Theodore Roosevelt National Park — and, within these bounds, require public comment on oil and gas development. The proposal did not succeed; industry protested, as did State Rep. Roscoe Streyle, R, who wrote in an editorial in the *Bismarck Tribune*, "What makes these sites so 'special'? … The state of North Dakota should be thanking the industry every day and working with it, not against it."

Park administrators took up the fight themselves, in what Superintendent Valerie Naylor likened to a game of "Whack-a-mole." A GIS specialist created a computer program to scan the Industrial Commission's hearing dockets for development proposals and select those that fell within the park's viewshed and soundscape. Then Naylor sent comments to the commission or called companies directly to work out agreements. Most companies were amenable; one withdrew a permit application for an injection well near the park boundary, and another installed mufflers on its equipment. Naylor retired last October, but her successors, with the help of the Badlands Conservation Alliance, have continued her work. Landowners have challenged state and local policies with similar success. This March, in a full courthouse north of Dickinson, Dunn County residents voted to reinstate a rule requiring that a proposed oil field waste landfill obtain consent from 60 percent of landowners within a half-mile radius. "When it impacts our neighbors," Curt Kralicek, a rancher, told the *Dickinson Press*, "they have rights, too."

That month, oil prices hit $50 per barrel, a 50 percent drop from their peak in June 2014. Drillers are pulling out and the boom has waned, but development is not over; booms will come and go as prices rise and fall, until either the oil is gone or there is no need for it anymore. The Little Missouri National Grasslands, which surround much of the park, are still a great concern to park and Forest Service administrators, who recognize that damage beyond its borders could affect its ecological health. Companies have been slower to drill on the grasslands, since leases here last longer than on private land, but Jay Frederick, the McKenzie River District ranger, told me the activity could easily double. "I wish I could say that all of the oil and gas development is on already-broken ground," he said. "That's not the case. The truth is, we are losing native prairie." Before the boom, 70 percent of North Dakota's native prairie had already been lost to agriculture and other development. When I asked Frederick how much the boom would destroy, he suggested 5 percent, but added, "I really don't know." The Forest Service, he said, wasn't prepared to properly monitor the chemical and ecological changes that the boom had brought. Frederick, who also has retired, hoped this would change, and was pushing companies to share well pads and pipelines to "reduce the prairie turned to scoria."

One morning, I joined Frederick, Heiser and Joel Grieger, a rancher who leases national grassland, on a drive along the park's north boundary. We met before sunrise at the park entrance. Heiser and Grieger took the backseat, I took the front, and soon we were bouncing west toward Pasture 10, where Grieger grazes his cattle. The road edged along a bluff so that you could see into the park, down bentonite caps that glistened like whale skin, to Squaw Creek, which meandered through a low, flat valley. Now and then, we came to a mess of rutted tracks — oil workers out for a joyride — and had to pick our way around. This proved challenging, since the prairie rose in steep, conical bluffs. To my companions' dismay, these, too, had been clawed with tire tracks. Each man seemed equally bothered, though each expressed it in a different way: Heiser cursed "the bastards," Frederick regarded

them with fatherly disappointment, and Grieger said little at all.

We were looking for the truck — the one bombed on that September Sunday. Grieger, who wore cowboy boots, matching jeans and jacket, aviator sunglasses, and a groomed silver mustache, had been the first to discover the abandoned vehicle. He was out in the pasture, giving a photographer a tour. From the looks of it, someone had loaded the truck with trash and launched it off a 100-foot cliff. Then, some weeks later, he was haying over the bluff when the bomb went off. His son, riding with him, pointed to the smoke. Whoever it was had packed the truck with a whole lot of Tannerite — an explosive sold at local hardware stores — and shot it with a high-velocity rifle.

Grieger rarely encountered oilworkers in the pasture. Once, he came across two men with guns "out shooting rocks," but normally, he found only the things they left behind: gates open, fence posts broken and burned in bonfires. When I asked about other nuisances, Grieger hesitated. "I don't want to mention things," he said, "because it puts ideas in peoples' heads. It hasn't happened yet, but a guy does worry about his cattle."

We came, again, to the edge of the bluff. Frederick stopped the car, and we descended on foot to a flat, grassy table. Trash was scattered about like it had been plundered from a shopping cart — laundry detergent, energy drinks, a jar of applesauce, window scrapers, WD-40, an assortment of sponges. In the middle of it all was the truck, though it didn't look like one. Only when I walked closer did I recognize the seat springs and red carpet, and the aluminum wheel rims melted into puddles and streams. The men scrambled up another bluff and stared down at the wreckage. A thin, sultry haze hung to the north, where pump jacks and excavators prodded the earth. Heiser had not ceased talking all morning, but now he was quiet. "Jesus," he finally said. "Blow a hole three feet deep in badlands gumbo, that's no small feat." Then his eyes caught on something else — a pair of bison at the edge of Squaw Creek.

A young male plains bison in Theodore Roosevelt National Park.
© BRUCE FARNSWORTH

MOST PEOPLE, WHEN THEY TALK ABOUT DYING, say they hope to go painlessly in their sleep. Heiser would prefer to be killed by a bison and tells several stories of coming close. In the first — many years ago — he outran a bull on his horse, Calypso, which is harder, he claims, than one might think. Another time, he came across a bison drinking and decided to keep it company in a nearby tree. As he waited like a cat on a limb, the bull came to rub against the trunk, and Heiser could hardly keep himself from dropping onto its back. The third encounter, his closest, was at Hagen Spring, when some 50 bison descended toward him: "I jumped up that slope above the spring — and this is the honest to God truth, the neatest thing in my life — I sat down. I sat with my knees up like this, and a stampeding calf hit me with his fucking knee in my fucking nose. There were bison all around me. Then it was all quiet. But to have a bison kick you in the nose — that was just badass cool."

In winter, a darkness settles over Heiser. He wakes at quarter to 5, lights the woodstove, and, for breakfast, eats oatmeal or Cream of Wheat. He might have coffee, but it is not essential. He feeds the cows, and then he walks above his ranch, where his two stillborn siblings are buried, to see the sun rise over the Killdeer Mountains. Now and then, he writes an account of these morning walks and sends it to a long list of friends and acquaintances. Years ago, these letters read like breathless entries in a survey notebook, broken by the odd rant or winking emoticon, or by the routine details that comprise a rancher's life: "The blustery wind naturally kept all the usual wild ones tucked into the many sheltered places afforded by badlands canyons & draws, but I still had the good fortune to see 12 mule deer, 3 white-tailed deer, a porcupine, and the typical feathered ones … black-capped chickadees, common redpolls, Lapland longspurs, horned larks, and downy woodpeckers." Always, Heiser noted the day's temperature, and often he signed off, "So long, Buckaroos."

Lately, though, the letters have been more infrequent, and when they do come, most words are spent on the boom. One, in late October, came after Heiser returned home to find flags marking the planned route of an industrial powerline across private pasture, 300 yards from his homestead. Originally, it was to cross his own land, to serve the growing towns to the north, but Heiser wouldn't allow it. "It's a good bet that this will run nearer to my place than anyone else's in its 100 or so miles," he wrote, " — what I get for telling a large corporation to take their powerline straight to Hell with them."

When I visited Heiser one last time before leaving North Dakota, he had been searching online for suitable property in Montana and Nevada. He talked of donating his place to the state park system, or to the Forest Service, which already manages much of the land that borders his own. We walked up the hill through his horse pasture and down a shallow draw to a creek. The morning was late and warm, and the animals in hiding, but Heiser summoned their ghosts, showing me where bucks came to rub felt from their antlers and where beavers had felled new timber. He told me it was not the newcomers who bothered him so much as it was their transience: They would come and go, and though their stay was short, their mark would last. That was the thing about humans, he said; our blundering mobility was deeply unfair: "If the animals can't leave, then how the fuck can I? If I could build an ark and take them with me, I'd say, 'Hey, let's roll!' " □

Sierra Crane-Murdoch is a contributing editor for *High Country News* and a visiting fellow in the Investigative Reporting Program at the University of California, Berkeley. She is at work on a book about the oil boom.

This story was funded with reader donations to the High Country News Research Fund.

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CONFERENCES AND EVENTS

Biennial Winter Wildlands Alliance Grassroots Advocacy Conference, June 18-20, at the American Mountaineering Center in Golden, Colo. This year's conference will focus on the Forest Service's new Over-Snow Vehicle Travel Management Rule. This is an opportunity for individuals and organizations who are passionate about protecting winter wildlands and human-powered recreation to gather and hear the latest on policy issues, network, share successes and meet with land managers. Please go to winterwildlands.org/2015-grassroots-advocacy-conference/ to learn more and register to attend.

Flagstaff Wool and Fiber Festival — A celebration of animals, fiber arts and history. May 30-31, 2015, 10 a.m.-4 p.m. at Pioneer Museum in Flagstaff, Ariz. On-site shearing, vendors, workshops, demonstrations, fiber arts competitions, kids activities. FREE admission. www.flagwool.com.

EWI 2015 — Environmental Writing Institute, led by David James Duncan, Sept. 9-13, 2015, in Missoula, Mont. www.umt.edu/ewi for application and details. Deadline July 15, 2015.

EMPLOYMENT

Wildfire Defense Systems Inc. — Hiring professional wildland firefighters. Please check our website at www.wildfire-defense.com to view current job positions.

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ence in aquatic biology or aquatic conservation strongly preferred. Go to www.defenders.org to see position description. How to apply: Interested applicants please reference Representative, Rockies and Plains Program in subject line and submit letter of interest, résumé and salary history to: HR@defenders.org. Defenders of Wildlife is EOE.

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Wyoming tough?

OPINION BY MARCIA HENSLEY

A recent article in *Time* magazine reported that the best place to be an old person is a city, primarily because of easy access to health care. If *Time*'s experts on aging are correct, those of us who choose to live in remote Western places will feel increasing pressure to urbanize, abandoning the landscapes that we love to find the health care that we need.

My husband and I moved to the Denver area from a small Wyoming community for this very reason. When we did, we gave up our dream of living out our lives in an old homestead in the High Plains of Wyoming. We gave up so much — our view of the Wind River Mountains, our harsh winters and glorious summers, the land's strong sense of history and our daily intimacy with nature.

We understood that the way we chose to live might seem weirdly tough to others — heating with woodstoves, driving 50 miles to the nearest grocery store, gardening in spite of a 42-day growing season. In fact, we lived — and relished — a way of life not all that different from that of the pioneers who built our place in the early 1900s. We reveled in our independence, and the last thing we ever wanted to do was live in a crowded city.

We would still be toughing it out in that homestead if my husband's Alzheimer's hadn't made our old-fashioned lifestyle increasingly difficult and finally, impossible to manage. He was no longer able to do the work needed to maintain our place, but he resented anyone we hired to do it. He'd get lost on our property, a place he'd known like the back of his hand. He couldn't be left alone.

Our children, visiting from out of state, were shocked. They helped me realize that our self-reliance had morphed into a need to rely on others. Friends and family could only do so much. We needed professional help, and I started looking for it.

There wasn't much. Although our community's excellent, and free, ambulance service and volunteer EMTs could get us the 50 miles to the nearest hospital, the closest specialists were 200 miles away in Salt Lake City. To get in-home respite care or certified nursing care was nearly impossible. Our local population was only about 500. I found one person with Alzheimer's care training, but she was only occasionally available. In the nearest town, there were some qualified people, but they were not willing or allowed by the agencies they worked for to make the 100-mile round trip to my house. Alzheimer's care facilities were rare even in larger Wyoming towns; nursing homes didn't offer the right kind of services for Alzheimer's sufferers.

So I learned firsthand the truth of an Alzheimer's Association report that listed among its major challenges "ill-equipped communities."

While facing this major medical problem with a limited family support system, I also found a flimsy safety net. A 2007 report on older adult health in Wyoming didn't even include Alzheimer's on its list of "major concerns for seniors." If Alzheimer's had been a concern then, perhaps what we experienced later wouldn't have been so disheartening.

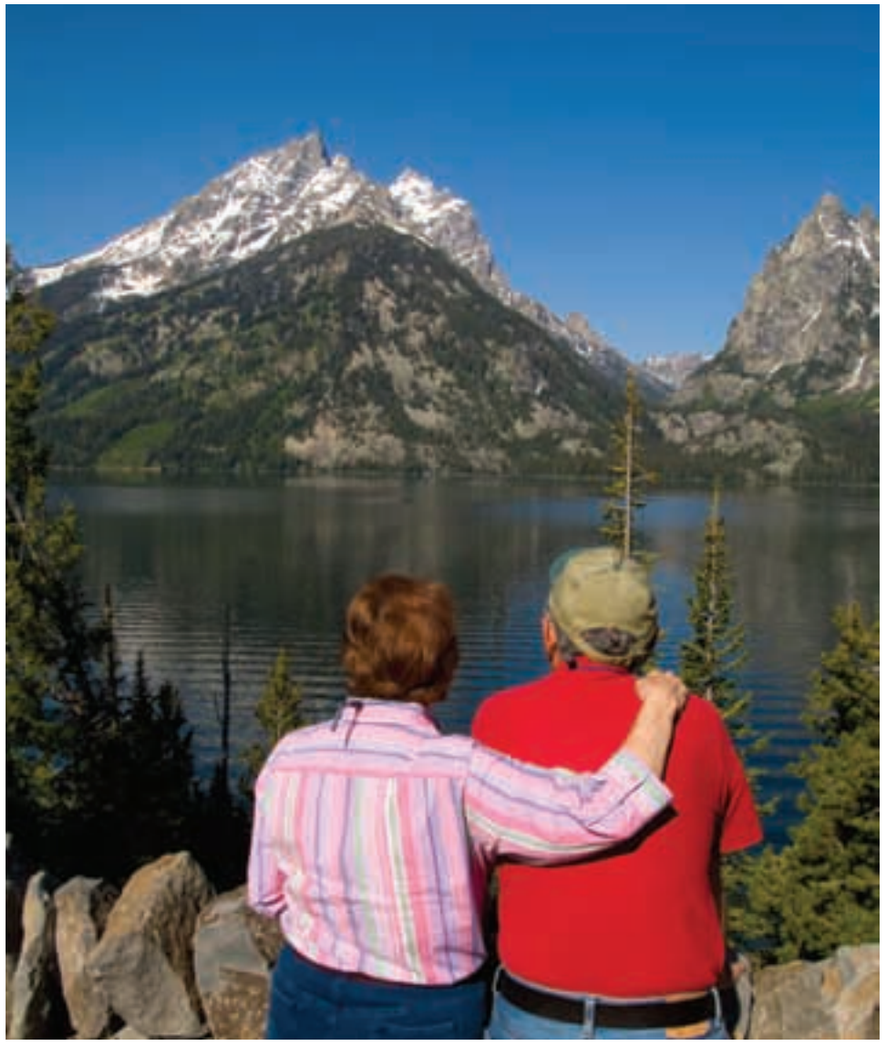
Wyoming's small population and lack of state income tax might explain why health-care resources are inadequate, although there's considerable evidence that other Western states face similar problems. Because we Westerners tend to see ourselves as rugged individualists, capable of handling the toughest challenges, we are unusually reluctant to admit it when we need help.

Maybe it is just a romantic notion, this longing of Westerners to remain independent, but my husband and I imagined we could always tough it out, like the settlers who built our home decades ago. Ironically, the hard physical challenges we valued were exactly the things that eventually made living in a remote place impossible, and this at a time when remaining in our home would have meant the most to us.

For us, it turned out that the toughest part of living in Wyoming was being forced to leave it. The experts were right to say that health care is better in cities. But I think many Westerners faced with the choice we had to make might agree, as I do, with these lines from poet Stephen Vincent Benét:

Go play with the towns you have built of blocks
The towns where you would have bound me!
(Let me) sleep in my earth like a tired fox,
(Until the) buffalo have found me. □

Marcia Hensley lives in Westminster, Colorado.



A couple looks out at Grand Teton, in Wyoming.
BILL BACHMANN

WEB EXTRA
To see all the current Writers on the Range columns, and archives, visit *HCN*'s website, **hcn.org**

Writers on the Range is a syndicated service of *High Country News*, providing three opinion columns each week to more than 70 newspapers around the West. For more information, contact Betsy Marston, betsym@hcn.org, 970-527-4898.

Westerners need to stand up for public lands

OPINION BY TODD TANNER

WEB EXTRA
To see all the current Writers on the Range columns, and archives, visit *HCN*'s website, **hcn.org**

As Google Earth flies, it's five miles and change from the Echo Lake Café in the Flathead Valley, one of Montana's great little restaurants, up to a parking area at a trailhead that leads to Jewel Basin. Down here in the valley, we're at 3,000 feet above sea level. Up where the gravel road dead-ends, you're looking at 5,700 feet. If you make it all the way to the top of 7,500-foot-high Mount Aeneas, you'll be rubbing elbows with some top-of-the-world views, not to mention mule deer and mountain goats.

We're talking about almost a mile of elevation change, yet the amazing thing is that once you leave the valley floor, all that land stretching on seemingly forever belongs to you and me and all of our fellow Americans. It doesn't matter whether you live here in Montana, or in Colorado, Wyoming, New Mexico or New Jersey. All that acreage, which is administered on our behalf by the U.S. Forest Service, is ours. We can roam where we choose, we can hike, we can fish the lakes and pick fresh huckleberries for lunch and pitch our tents under all that Big Sky. We're free to wander to our heart's content on public land, and for a lot of Americans, that's an incredible thing.

Whether you actually visit these places in person — go hiking in Jewel Basin or hunt in western Montana's backcountry — is almost beside the point. You still own those places, and you benefit from them, either directly or indirectly, because of all the clean air, clean water and wildlife, not to mention the billions of dollars, that our federal lands inject, year in and year out, into our economy. That's a pretty incredible dividend, paid on the principal, or make that the principle, of our public lands.

I'd go so far as to say that here in Montana and across the West, our public lands, which make up 50 percent or more of our states, equate to freedom. Let's make that freedom and prosperity, because almost everything of substance, from our Western heritage to our economy to our recreation, flows from the bounty of our public lands.

That is why it's so disappointing that 51 U.S. senators, every single one of them entrusted with our nation's well-being, recently cast a vote that could help destroy the West — one that could turn over America's public lands to multinational corporations, lock out hunters and hikers, and shift control of our timber, our grazing rights, and our minerals, along with the very lifeblood of the West — our water — to profiteers and foreign interests.

That's right. In an almost entirely party-line vote, 51 U.S. senators just voted in favor of Alaska Republican Sen. Lisa Murkowski's budget amendment to sell off our public lands, with only three Republicans voting no. Colorado's Cory Gardner was the lone Western Republican to vote no, joining all of the Western Democrats.

The senators won't tell you what transferring these lands out of federal management really means. No, they'll stand in front of their microphones, puffed up and proud, and state that they're for smaller government and state's rights and local control. But once

you make your way through the obligatory smoke and mirrors, you come to the truth: This is about power, plunder and money. It's about water, which is the source of all that power here in the West. And it's about the fact that an awful lot of folks back in Washington want to privatize our federal lands.

Montana writer Hal Herring called the vote "an attempt to re-create our country, to vanquish forever the notion that we citizens can hold anything in common. It's a new paradigm, where the majority of Americans are landless subjects with little recourse in the courts or political process."

Now we have an important decision to make. Do we turn our back on this grand experiment in democracy? Do we accept that the future will always be smaller and shabbier than the past? Do we resign ourselves to a world where our freedoms are locked away behind "No Trespassing" and "Keep Out" signs? Or will we choose to fight for what's ours?

Because that's the real question. Will we give up? Or will we as Western citizens stand up and defend the America that was passed down from our forefathers? It brings to mind a question that Elizabeth Willing Powel asked Benjamin Franklin following the Constitutional Convention in 1787. "Well, doctor, what have we got, a republic or a monarchy?"

Franklin's response still rings true today: "A republic, if you can keep it." □

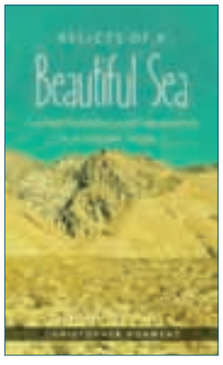
Hiker Bill Browne hangs out with a mountain goat on Montana's Mount Aeneas.
JOHN HENRY DYE

Todd Tanner lives in Big Fork, Montana, and is an outdoor writer and the president of Conservation Hawks, a nonprofit that defends hunting and angling.

Writers on the Range is a syndicated service of *High Country News*, providing three opinion columns each week to more than 70 media outlets around the West. For more information, contact Betsy Marston, betsym@hcn.org, 970-527-4898.

Salt Creek pupfish, *Cyprinodon salinus salinus*. SCOTT HEIN

Refugees from a well-watered West



Relicts of a Beautiful Sea: Survival, Extinction, and Conservation in a Desert World
Christopher Norment
288 pages, hardcover: $28.
University of North Carolina Press, 2014.

Relicts of a Beautiful Sea is a wide-ranging, obsessively detailed and oddly inspiring book — an intriguing tapestry of scientific exploration and natural history that also takes turns as a eulogy, a love letter, a poem and ultimately a plea.

In *Relicts*, Christopher Norment — a professor of environmental science and biology — sets out to consider the non-monetary value of six "relatively obscure" Great Basin and Mojave desert species that we can't eat, hunt or sell: black toads, Inyo slender salamanders and four species of pupfishes.

Why these six species? In part because of their obscurity: Due to their small sizes and relative inaccessibility, Norment writes, they "carry little of the innate appeal" of charismatic megafauna such as gray wolves or whooping cranes, nor do they play much of an economic role. That obscurity allows us to ponder their worth without immediately reaching for our wallets.

They are also, however, aquatic species restricted to tiny patches of habitat in the Mojave and Great Basin deserts — vulnerable to water prospectors, the bright tentacles of Las Vegas and the thirsty whirlpool roar of Los Angeles.

Norment points out that similar species have also survived withdrawing Pleistocene seas, earthquakes, uplift and hot water only to succumb to thirst or thoughtlessness: Tecopa pupfish, for example, which could endure temperatures up to 108 degrees but went extinct after hot springs outflows were developed and combined for bathhouses; Las Vegas dace and the Vegas Valley leopard frog, lost in the 1950s and 1940s, respectively, to groundwater pumping for and expansion of Las Vegas itself; the Ash Meadows montane vole, likely extirpated some time in the 1960s as alkali meadows devolved into peat mines, alfalfa farms and ranches.

After a pause to remember the fallen, Norment moves on to the precarious living, one species and one chapter at a time. As he weighs their worth, Norment visits the animals themselves, the people trying to save them and those who might someday have a hand in their destruction. He travels from the deep past — describing a volcanic eruption 760,000 years ago that could have buried or burned Inyo slender salamanders out of existence, but somehow didn't — to the present and near future, examining the threats the pupfishes face from Las Vegas' and Los Angeles' ongoing searches for water, among other things.

He explores abstract concepts such as loneliness and hope while circling back to concrete and enchanting tidbits of information, such as the world's remaining weight of Devils Hole pupfish — measured in raisins — and what their vocalizations sound like underwater (squirrels gnawing on walnuts).

Norment loves his diminutive subjects enough to actually risk using the word "love." What can a scientist so steeped in wonder communicate to someone who says, as one woman in the book does about extinct Tecopa pupfish, "I think they were pretty tiny, not good for much of anything. You couldn't eat them. Not like trout."?

Norment's answers turn out to be surprisingly good ones. He doesn't try to make a direct appeal to the people who prize false fountains and alfalfa farms far more than desert springs and species (and who — let's face it — are unlikely to read this book).

Instead, he writes a thoughtful and thought-provoking letter to the rest of us: those who didn't know desert aquatic species existed, those who take them for granted or rationalize that they'll survive our tender inattention, and even those who have almost given up, who are already privately lamenting the loss of the tiny beleaguered species and places they love. Especially those.

"Think about how resilient the pupfish are, and what they have endured," Norment writes, "and then contemplate, gently, your own struggles and what you have endured. For all of us, at some time or another, this can be a dogshit world, unbelievably cruel and sorrowful and painful. ... But I will say this: that in my own life I have been consoled and heartened by the strength of pupfish and salamanders. ... Their presence in the world, their insistent example, helps me to endure and go on, too."

BY CEAL KLINGLER

OUTSIDE THE HOOVER DAM

As it turned out, I couldn't tour the Hoover Dam. It was full of magnets.

"Tours are not recommended for anyone who suffers from claustrophobia, or has a pacemaker or defibrillator," read the sign in the gift shop. "Tours are conducted in confined spaces and in a power plant with generators emitting electromagnetic fields."

"Well," I told my friends, "I guess I'll see you guys after." I climbed the long staircase back up into thin October sun. I'd get a tea at the concession stand, I decided. The dam hummed behind me.

By the time I arrived at the Hoover Dam, three years had passed since I'd been through a metal detector. At age 24, I'd had my first internal cardiac defibrillator implanted — insurance against the family arrhythmia. I'd collapsed in a gravel lot. Since my younger sister had multiple cardiac arrests under her belt, my decision seemed obvious.

I'd anticipated many of the changes that accompanied implantation: a month unable to drive, three before I could pull my shirt over my head, and six worrying about jostling the wire in my heart. But I didn't anticipate what it would be like to be a technological person — redefined by what I contained. ("You're bionic!" a friend shrieked.) I was chained to tech; every three months I'd need a doctor to check my ICD. In other ways, my technological options were restricted. I would never have an MRI. I would be patted down by an endless line of TSA agents in blue rubber gloves.

Electromagnetic interference occurs when the waves emitted by one device impede the function of another. Cellphones can keep a defibrillator from doing its job; theft surveillance gates can trigger a shock. The Hoover Dam, of course, was bigger than these. It generated electricity when water spun a turbine, which turned a shaft, which rotated a series of magnets past copper coils, creating a charge. Put through a resistor, this charge became electricity, powering colored fountains in Las Vegas and hair dryers in L.A.

Magnets! I thought to myself, browsing in the snack shop. No, I would never wander the narrow passages beneath all that concrete now. The Hoover Dam and I were contraindicated.

Styrofoam cup in hand, I went out to the patio and pressed my belly against the concrete divider, craning my neck to catch a glimpse of the water. Sparrows nipped crumbs beside me. If I was honest, it was OK to miss the tour. Despite having a motherboard implanted above my left breast, I'd never been charmed by technology. I was grumpy in my complicity, always resisting new developments before lurching into them. I owned a flip phone. I didn't watch TV. So when I looked at the bowed white concrete, gleaming in the sunlight, it was with Ed Abbey's rants in mind. I liked to think I agreed with him: that the dams were less a world wonder than a monstrosity. That a free-flowing river trumped the amenities it could power.

I liked to think I agreed with him, but the defibrillator in my chest was really no different than a dam. Both were part of the cultural belief that man's ingenuity could upend natural laws. Both created the illusion of security; both answered a sense of urgency. Both delayed the inevitable for a while. We'd manufactured water in the desert, a life without death. Even a Luddite like me could see there was human brilliance at work here.

When the first defibrillator was invented, doctors dubbed it the "Lazarus machine." The Hoover Dam, too, seemed the salvation of the Southwest, approved in 1928 to provide irrigation and municipal water to a wide swath of desert, allowing cities to sprawl where before cacti reigned.

And yet, looking at the white bathtub ring on the cliffs along Lake Mead, I knew the inevitabilities were still inevitable: L.A. and Vegas would be constrained by water. And I, of course, would still die. I was cyborg enough to be barred from the dam but not cyborg enough to avoid that dust-to-dust business altogether.

The defibrillator in my chest was really no different than a dam. Both were part of the cultural belief that man's ingenuity could upend natural laws.

And though it was easy to be snide while drinking tea in an environmentally unfriendly cup at a tourist stop, I'd been the one who asked for this dam in my own way, when my cardiologist looked at me in the hospital and said, "What would you like me to do?" I paused a long minute. I gulped down guilt and fear, but in the end I eyeballed him and said, "Put it in." I bought into the myth that we can hold back these forces, that we can rearrange life itself, that technology will save us.

It will for a while, I thought, pulling on a flannel shirt against the morning chill. For one person, maybe that's long enough.

I stared down the dam from a safe distance. □

Katherine E. Standefer writes about the body, consent and medical technology from Tucson.

A view looking down Hoover Dam. DUNCAN RAWLINSON/CC FLICKR

U.S. $5 | Canada $6

HEARD AROUND THE WEST | BY BETSY MARSTON

UTAH

The "giant genitalia" gracing a bull statue placed atop Barista's Restaurant in Hurricane, Utah, March 14, created such a humongous brouhaha, reports the *St. George News*, that a few weeks later, the statue was, in effect, castrated. Over 600 of the town's 14,576 residents signed a petition demanding non-renewal of the restaurant's business license because of the bull's offensive, er, member, and though restaurateur Stephen Ward called his brand-new copper statue "beautiful and amazing," he was forced to back down. To many Hurricaners, apparently, the intact bull was too lascivious for the likes of teenagers, who attend high school across the street and are much too young and innocent to be exposed to the differences between male and female mammals.

UTAH **"Giant genitalia" before and after. (See news at left.)** KIMBERLY SCOTT/ST. GEORGE NEWS

GRAND CANYON

Something vitally important is missing from a recent ballyhooing brochure from the developers of Escalade, the controversial proposal to build a tram on Navajo land and then ferry tourists from the Grand Canyon's rim thousands of feet down to the Colorado River. Nowhere is there any mention of a sewage treatment plant for the 4,000-square-foot bathroom that would be built near the river to serve 10,000 tram-riders each day. And "other issues are pooping on the profiteers' parade," reports *Boatman's Quarterly Review*, the magazine of Grand Canyon river guides. One is a lawsuit from 30 grazing-permit holders, who are members of a growing coalition called Save the Confluence. Another obstacle is an Intertribal Compact that gives the Hopi Tribe a vote on approving the Escalade project. So far, Hopi leaders are united in their rejection of it.

WASHINGTON

"Near nature, near perfect" is the motto of Spokane, Washington, but sometimes nature can get a little too close for comfort. How many wild turkeys in your backyard are just too many, for example? More than 120 turkeys have abandoned the backcountry of eastern Washington, where they were introduced to benefit hunters. Now, the big birds hanging out in the city's South Hill neighborhood have discovered that urban life can be rewarding, no doubt because few hunters lurk in backyards. For many residents, that's "too many turkeys traipsing" over their lawns, reports the *Spokesman-Review*. Since last year, the state Department of Fish and Wildlife has fielded some 60 complaints about flocks pooping indiscriminately and squawking loudly in the morning, so it recently hosted a community meeting to propose "search-and-destroy squads." Volunteers would set forth on quasi-Easter egg hunts, though in this case the eggs they found would be slated for destruction or coated with corn oil to prevent them from hatching. A hunter on the paper's website commented that finding nests wouldn't be all that easy, because in 30 years he'd never spotted one in the wild. Another reader recommended bringing back cougars to reduce the wild turkey population, adding, "This is just another in a long legacy of expert wildlife-management gone awry."

ARIZONA

The "cactus doctor" of Phoenix, Rilée Leblanc, loves his ailing patients, telling *The New York Times* that long-lived saguaros radiate personality and character. "And the flowers are some of the most beautiful in the world. You could put a cactus here and just meditate on it for a week." The cactus doctor, whom everybody calls "Frenchie," works every day of the year and still has more patients than he can handle. Considered the symbol of the Southwest, saguaros have become increasingly popular because of their water-frugal ways, yet they're often poorly cared for by their caretakers, who sometimes overwater and crowd them, causing sick cactus skin and precariously leaning limbs. For a cactus doctor, house calls are a necessity, and Leblanc has to erect scaffolding in order to perform surgery 30 feet in the air; "other times his crew works on limbs weighing hundreds of pounds that can easily snap off." Though he can't always help a prickly patient that's dying, he finds that most saguaros are amazingly resilient: "You know, he could have fallen," he said of one resuscitated plant. "You can tell he really wanted to be saved. He's saying, 'I've got more life left.' "

CALIFORNIA

Holding aloft the trophy fish he'd caught, a proud fisherman was standing in a boat approaching a marina in San Diego, when he caught the hungry eye of a sea lion who *really*, really wanted that big fish for himself. The sea lion leaped out of the water "and onto the boat railing," reports the *Los Angeles Times*. But it missed the trophy and nailed the 62-year-old fisherman instead, hauling him out of the boat and holding him under the water for some 15 or 20 seconds. Luckily, the man got away and was pulled back into the boat by his companions, suffering from bites to his hands and feet. Meanwhile, the trophy fish went thataway.

"Good-natured and non-bullying, a buff Orpington has a lot of strengths, especially in the realm of **common sense**, which is **a challenging area for many chickens**."

Ari LeVaux, in his essay, "A street-smart chicken for your backyard," from Writers on the Range, www.hcn.org/wotr

AP PHOTO/JOHN LOCHER

Cliven Bundy holds one of his grandsons at a Bunkerville, Nevada, event on the first anniversary of the Bureau of Land Management's failed attempt to remove his cattle from federal land.

Checking in on Cliven Bundy

Cliven Bundy, the rancher who refuses to recognize the federal government, held a rally near his land in Nevada in April. The three-day rally drew about 150 people and celebrated last April's "stand-down," when armed militia and protesters halted a Bureau of Land Management effort to round up Bundy's trespassing cattle. Bundy has since become a celebrity for extremists. At his rally, we met ex-cops, ex-firefighters, ex-military, a roofer, a tattoo artist, a mom-turned-Constitutionalist. Joe O'Shaughnessy, the leader of an Arizona militia who was part of a "security detail" to protect Bundy last year, told *HCN* that his Facebook group membership has skyrocketed over the last 12 months. "It's out of control," he said. As for Bundy, he told *HCN* he is unsure the government will ever take action against him: "The question is, who's the criminal? Is Cliven Bundy the criminal, or is the federal government and their bureaucrats the criminal?" **TAY WILES**
hcne.ws/1EGiB9V

24 million

acres covered in the original Northwest Forest Plan, in Washington, Oregon and California

2.5 million

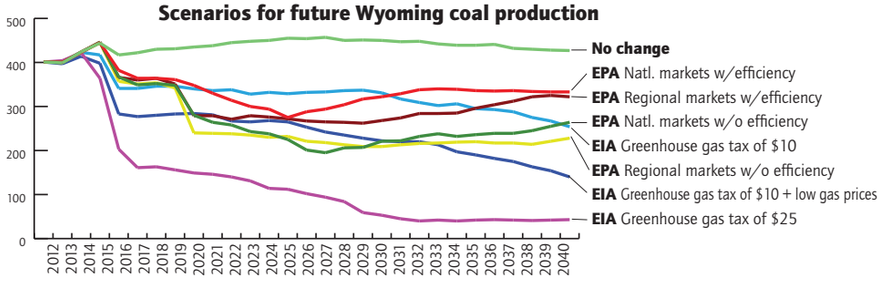
acres in western Oregon covered in new BLM plans expected to allow more logging

The Northwest Forest Plan was supposed to mark an end to the timber wars that crippled the region's economy in the 1990s. Now, the plan might be unraveling. This spring, the Bureau of Land Management and the Forest Service will revisit the plan, with an aim to replace it by 2019. At a Forest Service "listening session" in Portland in March, activists complained too many trees are already allowed to be cut. Industry advocates, meanwhile, say they've never gotten to harvest all the board-feet promised under the original plan. A new plan seems as unlikely as the old to settle the long-simmering conflict over Pacific Northwest forests. **PAUL KOBERSTEIN** hcne.ws/1CS8BYA

What's in store for Wyoming coal?

A team of economists at the University of Wyoming has released a study that shows how much Wyoming depends on coal. The industry accounts for 14 percent of the state's economy and 6 percent of its employment. And it's in decline. Natural gas and renewables are taking a bite, as are the increased costs of deeper mining in the Powder River Basin. That could add up to a 20 percent cut in production by 2030. And while some scenarios are grimmer than others, Wyoming will have to look to other sectors, like agriculture and tourism, to make up the loss. **KINDRA MCQUILLAN** hcne.ws/WY-coal

Scenarios for future Wyoming coal production



The EPA's Clean Power Plan proposal would mandate a 30 percent reduction in CO2 from 2005 levels. Simulations were run without energy efficiency measures by users, where the coal industry would carry the costs, or with energy efficiency measures, which would effectively distribute costs more broadly across the economy. Simulations were mixed with potential in national markets only and in regional markets for coal, where more demand exists but where export is proving difficult.

The EIA simulations are based on greenhouse gas taxes of different levels, each with an annual 5 percent increase, with anticipated natural gas production and with lower natural gas prices, which would come from higher production. All of these scenarios make coal more expensive and natural gas more attractive.

SOURCES: RHODIUM GROUP AND UNIVERSITY OF WYOMING CENTER FOR ENERGY ECONOMICS AND PUBLIC POLICY

64

The percent decline expected in the Custer County, Idaho, budget if Congress lets the Secure Rural Schools Act, which compensates counties for federal land ownership, expire in October. **SARAH TORY**
hcne.ws/1PoAqhY

Audio

Are we in a megadrought?

The short answer: not yet. But we should be thinking about long-term drought and how to use water more wisely. *HCN* recently sat down with four experts in water, climate and the economy, for an hour-long *Soundtable* livestream. In the future, dry regions will be drier, and that means a lot of the arid West will have to rethink how it manages water.
BRIAN CALVERT
hcne.ws/droughtforum

JOHN GURZINSKI/LASVEGASPHOTOGRAPHY.COM

"What do we do about all this water that we are essentially giving up to global warming?"

—Jonathan Overpeck, co-director, Institute of the Environment at the University of Arizona

Trending

USFS and greenhouse gases

The Forest Service says it will try to reinstate an exemption to Colorado's roadless rule, to allow coal mines to build roads in a protected area. The exemption was struck down last year by a federal judge, who said the government failed to assess the impact of future coal mining on the climate. Agency officials will now try to calculate greenhouse gas impacts from extracting coal and using it to generate electricity. But they aren't sure how to do so. Jim Bedwell, the agency's Rocky Mountain region director of recreation, lands and minerals, tells HCN: "That's all very much evolving." **ELIZABETH SHOGREN**

You say

DINA ROBERTS:
"Leave the coal in the ground and let the forests soak up the carbon we are already emitting. The Forest Service should recognize its mission is changing."

JOHN WREDE:
"Not only no, but heck no. Leave our elk pastures alone!"

NANCY LEE KAMINSKI:
"Roads are the beginning of the end for our majestic wildlands! If the GOP ever really created 'jobs, jobs, jobs,' the extractive industries would not be able to destroy our natural world with claims of 'jobs, jobs, jobs.' "

hcne.ws/1PkFROR and facebook.com/highcountrynews

Send letters to editor@hcn.org or
Editor, HCN, P.O. Box 1090, Paonia, CO 81428.

BOOM, GONE

The boom/bust cycle happens quite often in history with different industries ("The Winter of Oil's Discontent," *HCN*, 3/16/15). For example, in the 1940s, '50s and early '60s, it was uranium. We had various oil boom/busts from the '40s to the present. We had natural gas boom/busts, with the most recent one going from the '90s and dying around 2009. It kind of stayed alive; however, once the price of oil went bust, many natural gas companies used that as an excuse to cut back even further.

As a whole, the boom/busts are driven by prices going up or coming down. Unless the price comes back up quickly, it will be a long, long drought if you work in the energy industry. High-level company people are saying they are hoping the price comes back in a matter of months, but they expect it to be down for many years, which will pretty much decimate the energy industry jobs. There will be spurts of activity here and there, but as a whole, it's gone. You could say that the "free market" has done more to slow down/stop the energy industry drilling than all the lawsuits and billions of dollars spent by various environmental groups.

What hurts is all the higher-paid men and women supporting their families, who, after being laid off, lose their homes, cars, etc., and end up getting jobs that pay half or less of what they were making. Someday down the road, the energy boom will crank up again, and a whole new generation of men and women and their families will have to live the boom-then-bust cycle again.

Robert Gates
Pinedale, Wyoming

HARLEY SCHWADRON, ARTIZANS.COM

BUST HAPPENS

"The Winter of Oil's Discontent" is one of the best articles I have ever read in *HCN*! The article hit the nail on the head. I was born and raised in San Juan County, New Mexico. My family has a long history of "patch" employment in the San Juan Basin. We have endured multiple booms and busts over many decades. I believe it takes mental toughness and common sense to ride the roller coaster.

Sug McNall
Aztec, New Mexico

WATER GRAB

The in-depth profile of Pat Mulroy made the mistake many others have made in evaluating her, abandoning balance and working to explain away the hypocrisies of her tenure as Las Vegas' water boss ("Unite and Conquer," *HCN*, 4/13/15).

Her hard-nosed tactics may be viewed by admirers as feints meant to foster collaboration among other water managers on the Colorado River, but not for Nevadans in Pat's water-grab sacrifice zone. Pat and the culture she fostered at Southern Nevada Water Authority have fought tooth-and-nail against any efforts to reduce the scope of their $15.7 billion groundwater pipeline project, to set triggers at which the pumps would be shut off (or put into reverse, as suggested in the article), to push more aggressive or innovative indoor conservation techniques, or to ratchet up punitive rates for water wasters. They've fought both a full vetting of other options and a thorough accounting of the millions in tax- and ratepayer dollars spent on public affairs, property purchases, lawyers and "experts" whose findings have been challenged by the research of independent analysts and other agencies. Pat may be a collaborator with the other six Colorado River states, but rural Nevadans know otherwise.

If not for the fact that SNWA has been on a losing streak in court, pipe might already be laid. That sounds like the strong-arm water grab tactics of the past, not some idyllic new way of pumping. Mulroy is a polarizing figure who has earned the respect of allies and opponents. Now that she's retired, attempts seem to be underway to burnish her legacy by softening the edges and inconsistencies coming from her record on this issue. But the hard facts show that while she's given Nevada an outsized role in affairs on the Colorado River and done admirable things, she also stubbornly prioritized and pursued this disastrous eastern Nevada groundwater project against the better judgment of history, science and law. We would expect that *High Country News* would provide objective "warts and all" reporting of Mulroy's accomplishments and failures. She is not perfect, and *High Country News* shouldn't cover up those blemishes.

There is no benign name for Pat's pipeline. "The Las Vegas water grab" accurately conveys Mulroy's approach.

Abigail Johnson
Baker, Nevada

GNOME MAGNIFIQUE

The March 16 "Heard around the West" contained a lovely account of Boulder, Colorado's gnome liberation movement. Somewhere out there is a gorgeous French movie showing a young lady kidnapping her father's garden gnome and subsequently sending him photographs of his gnome in various exotic settings — Roman ruins, Golden Gate Bridge, rodeo arenas, etc. Boulder gnome-napper victims may be getting poems now, but there will be (so to speak) "Pictures at 11."

We used to give lawn flamingoes to puzzled folks in selected neighborhoods — in particular the million-dollar teardowns of the nouveaux nouveaux. Tacky is the best revenge for pretension. St. Thorstein of Veblen informs to this day.

Elizabeth Harris
Evening Shade, Arkansas

High Country News

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A crystal ball for the Pacific Northwest

What will Seattle's climate be like in 2050? A lot like this year

BY KATE SCHIMEL

If you're looking for unexpected ways the current drought is affecting the West, you might take a look in Kathie Dello's inbox. Until recently, Dello, the deputy director of Oregon's climate service, had been getting the same emails from prospective residents: *I'm thinking about moving to the Pacific Northwest, but I'm worried it's too wet. How much does it rain there, really?*

But this winter, as declarations of water shortages swept across the state, the questions changed. "I started to get emails from people wondering whether they should still move to the Pacific Northwest, because of the drought," Dello told me recently. They worry there won't be enough water once they get there.

Dello doesn't have an easy answer, but she knows this is just the beginning. In the Pacific Northwest, the water shortage isn't due to a lack of precipitation; most of Oregon and Washington saw near-normal amounts. But that moisture arrived mostly as rain, not snow. The rain ran off without adding to the snow reserves, and unseasonably warm temperatures have burned off a good part of the rest. That means there's little or no snowmelt to take the sting out of the region's dry summer. And that is close to what climate change models predict for the region.

"We absolutely are looking at our future, right now," Dello said.

Climate projections suggest that the West can expect years like this one to become more frequent by the middle of the century, although changes are already in motion. In the Northwest and the Northern Rockies, that means more rain and less snow. A rainier winter means lower springtime flows for fish and farmers and a less predictable summer water supply for reservoirs. In the Southwest, climate change likely means extended periods of drought, with low precipitation and a low snowpack, much like the one in California.

One of the hardest-hit places in the Northwest has been Oregon's Malheur County, an agricultural region of alfalfa farms and rocky rangelands tucked against the border with Idaho. Malheur received a near-normal amount of precipitation, 93 percent, but the snowpack was just 1 percent of normal on April 14. The Owyhee Reservoir, which provides much of the county's water, is at just 28 percent of capacity, thanks to the skimpy snowpack and a series of dry years before this one. Anticipating less than half their usual water allotment from storage, farmers have fallowed fields and switched to crops such as triticale, a hybrid of wheat and rye, that don't demand as much water.

"There's a prevailing thought that this is a dry spell," says Bill Buhrig, a crops agent for Oregon State University and a local farmer himself. But a disturbing question has started to percolate: "How long do you keep calling it a dry spell before you start making long-term adjustments to your operations?"

For municipal water-supply managers in the Northwest, this year's conditions are a crystal ball for a warmer, rainier future. Typically, water managers go through seasonal cycles of holding water back and then releasing it in order to juggle the shifting needs of human users and salmon. This year, the usual seasonal patterns have shifted, since winter barely arrived and summer looks to be coming early. That means managers have to adjust the times they release the water and how much of it they let go.

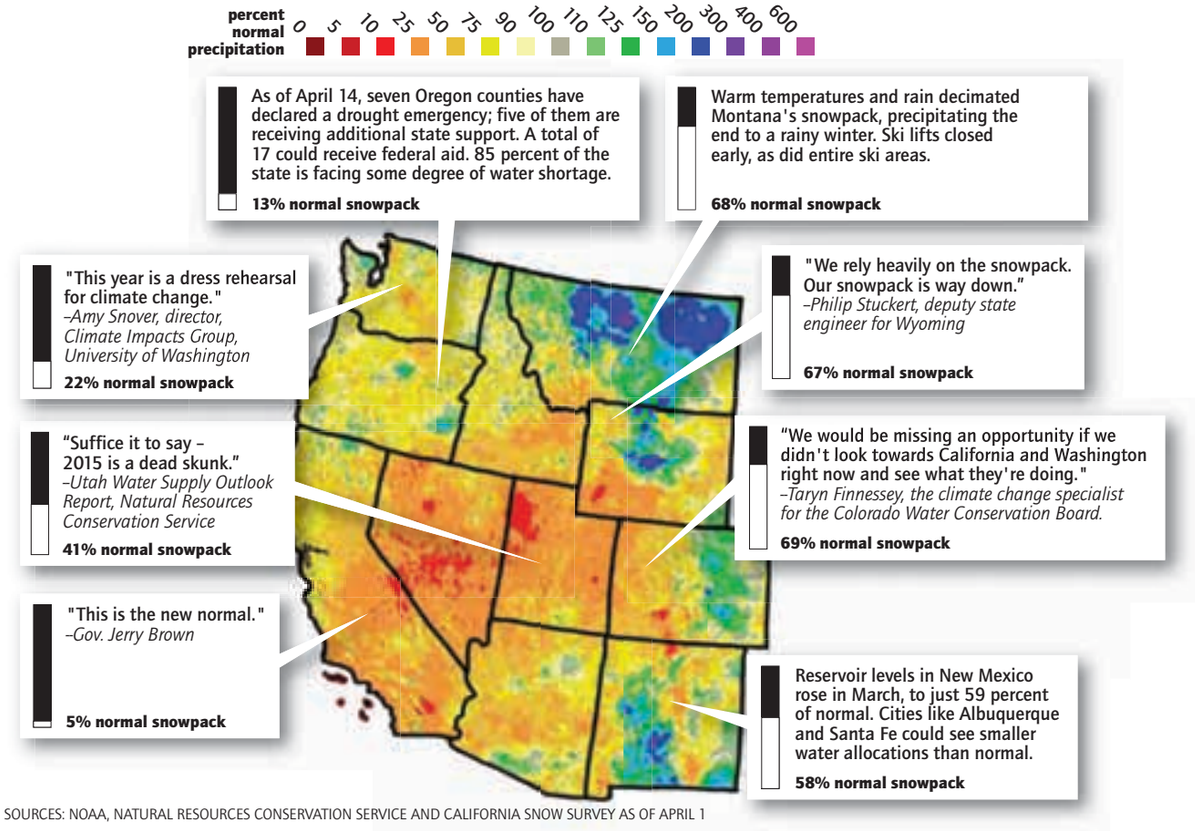
Seattle Public Utilities, which manages the city's water supply, has gone further than many in preparing for climate change, running a series of virtual scenarios. Paul Fleming, the director of the utility's climate resilience group, says that this year is a useful real-world test for the utility's infrastructure and strategy.

"It's helpful to be able to see how resilient your system is," he says. The utility is adjusting how it fills and draws down its reservoirs, which could prove useful as conditions like this year's become more common. In order to respond to low snowpack and paltry spring flows, Seattle Public Utilities kept reservoirs higher through the winter and spring. Most years, the reservoirs are kept lower to prevent flooding if a big storm hits. Other water managers are holding more water back longer into spring as well and figuring out which reservoirs to keep high, based on which areas are likely to get less snowmelt and which streams need water for fish.

This drought obviously isn't the first Westerners have experienced. Severe droughts in the 1970s, 1980s and early 2000s helped spur ongoing water conservation efforts, and much of the West has been flirting with drought for a decade and a half. But Oregon climate expert Dello says that though dry spells typically fade from people's memories, this year is different. "Folks are saying, 'OK, something's changed. If this is going to keep happening, we can't keep doing what we're doing,' " she told me. "It won't be so easy to forget." □

Kate Schimel (@kateschimel) is an *HCN* intern.

Drought double whammy:
Even where precipitation was normal this water year (Oct. 1- April 1) snow levels were low.

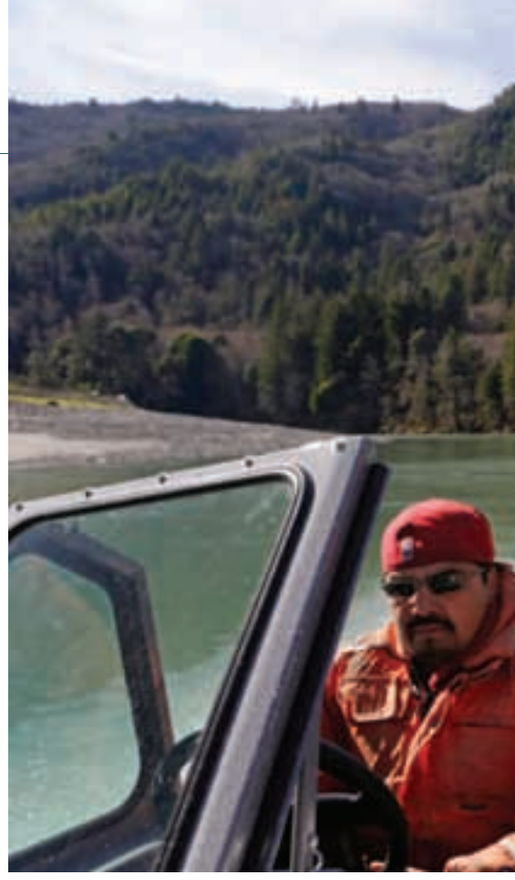


SOURCES: NOAA, NATURAL RESOURCES CONSERVATION SERVICE AND CALIFORNIA SNOW SURVEY AS OF APRIL 1

Plague on the Klamath

The race to prevent a repeat of the West's worst salmon-kill

BY TERRAY SYLVESTER



Mike Belchik, a senior biologist for the Yurok Tribal Fisheries Program, scans the lower Klamath River from a boat piloted by fisheries employee Bob Ray in February 2015, right. TERRAY SYLVESTER

On Monday, Sept. 15, 2014, Mike Belchik, a senior biologist for the Yurok Tribe, was overseeing an emergency laboratory on a remote gravel bar in the Klamath River on the tribe's Northern California reservation. Generators and folding tables stood on shore. Fish blood drifted in the weak current. That morning, crews had netted two dozen salmon from a 20-mile stretch of the lower river. Now they were inspecting their catch for a parasite dubbed "the Ebola of Klamath salmon."

Working quickly, the men snipped a layer of glistening gill tissue from each fish and slid it under a microscope. The parasite — a protozoan named *Ichthyophthirius multifiliis,* or simply *Ich* — is salt-colored and less than a millimeter wide, with a fringe of madly fluttering hairs. Belchik and his crew had monitored for it all summer, but only that weekend had infected fish begun appearing in their nets.

In 2002, *Ich* killed some 70,000 king salmon in the Klamath — the largest such die-off ever recorded on the West Coast. Afterward, the parasite population declined below detection, but it is native to the river, and there was reason to fear its resurgence.

Last September, California was already three years into perhaps its worst drought in more than a millennium, and the Klamath was low and warm. The fall salmon run had begun to arrive, but the fish were confined to pools, stressed and waiting for rain to swell the current and let them migrate upstream. In slow water thick with fish, *Ich* can reproduce rapidly. Thousands might feast on a single salmon. Once engorged with blood, they drop off and anchor to the river bottom. Then each one bursts open, releasing up to 1,000 offspring. The cycle can take as little as a week. "It felt like a catastrophe was looming," Belchik says.

The Yurok crews were trying to determine whether water should be released from reservoirs upstream in an attempt to disrupt the parasite's life cycle. *Ich* are relatively poor swimmers and can survive only a few days without a meal. Increased flows, the thinking goes, might disperse the parasites while letting salmon migrate out of infested holding pools, but such a tactic had never been attempted on an outbreak already underway. No one knew whether it would work in a fishery stressed nearly to failure by drought and diversions.

After the 2002 die-off, tribes, agencies, dam owners and other parties agreed to release water from reservoirs on the Trinity River, the Klamath's largest tributary, if at least 30 parasites were found in a single layer of gills in at least 5 percent of captured fish. By 1 p.m., Yurok crews had found *Ich* in nearly half of their catch.

Belchik dug out his cellphone and called the reservoirs' managers. Send water, he said — and fast.

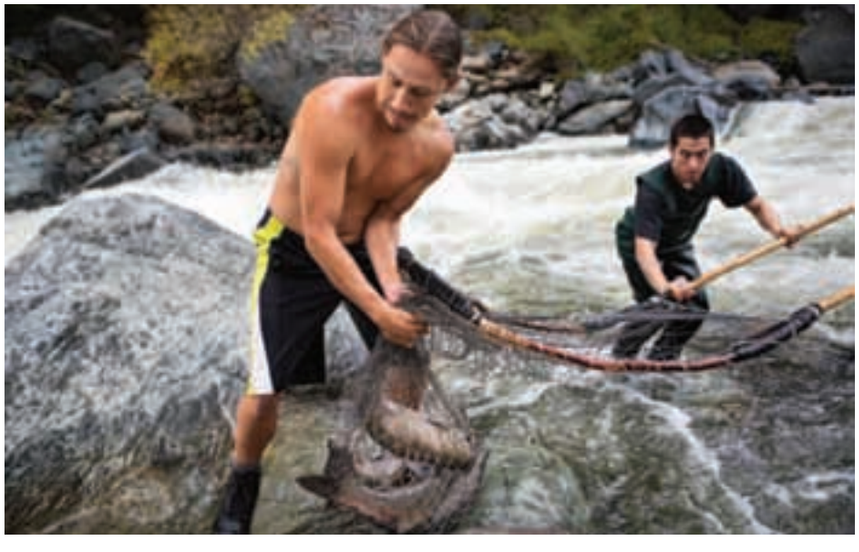
The upper Klamath River is impounded by seven dams, which serve some 170,000 acres of arid southern Oregon farmland. But downstream, the river flows unimpeded for 190 miles before spilling into the Pacific Ocean. This stretch and its tributaries support the third-richest salmon runs in the Lower 48. In an average year, 120,000 kings and a few hundred threatened coho muscle through these waters to spawn.

Relations between farmers and the basin's salmon-dependent tribes are notoriously tense, and in 2001, they snapped. That spring, during a severe drought, federal wildlife managers shut off agricultural diversions to protect coho and struggling sucker fish. Farmers, who had already sown potatoes, hay, wheat and other crops, were furious. They protested by forcing open a head gate and refilling an irrigation ditch with buckets.

The conflict caught the attention of the Bush administration, and the next summer — also dry — irrigators received their full water allotments. The Yurok and others protested that the fish needed more water, but "nobody was looking for *Ich,"* Belchik recalls. The parasite was known

WEB EXTRA
See a gallery of tribal subsistence fishing at **hcn.org**

Terray Sylvester (@TerraySv) is a writer and photographer based in Berkeley.



Karuk fisheries workers haul a net full of king salmon out of the Klamath River, left. The Karuk Tribe stepped in to monitor the *Ich* outbreak as salmon migrated upriver off the Yurok Reservation. Steelhead gills, above, red and swollen due to *Ich* (tiny white specks) and infected with another disease called columnaris, or "gill rot." TERRAY SYLVESTER, YUROK TRIBAL FISHERIES PROGRAM

for ravaging farmed fish, but such kills were almost unheard of in the wild.

By mid-September 2002, flows in the lower Klamath had dwindled to about 60 percent of average. The Yurok were celebrating an important ceremony just above the river when children began carrying dead salmon up to the dance grounds. Fish were dying by the thousands, infested with *Ich*.

"It went from nothing, to major catastrophe, in a span of a few days," Belchik says. An overwhelming stench of rot hung over the river.

Due to the die-off, the commercial Pacific salmon season in Northern California and southern Oregon was sharply curtailed in 2004 and 2005, and declared a disaster by the National Marine Fisheries Service in 2006. No one felt the kill like the Yurok. Their reservation, home to roughly 1,000 tribal members, flanks 44 miles of the lower river. The Yurok ply that territory for salmon, steelhead, sturgeon and Pacific lamprey to feed their families. In the tribe's commercial salmon season, a fisherman might earn $3,000 in just a few days — no small haul on a reservation where 40 percent of residents live below the poverty line. "We're a fishing people," says Chairman Thomas O'Rourke. "It was sickening."

In 2014, the Bureau of Reclamation reacted quickly when it learned another disaster was brewing. The morning after Belchik called, the agency began releasing enough water to double flows in the lower Klamath for a week. Belchik wondered how the parasite would respond. Since the 2002 kill, his crews had inspected salmon weekly during the fall runs. Now they stepped up their effort.

Their findings dismayed them. Crews had initially looked for 30 parasites in each fish — the threshold for the emergency response — and then stopped counting, even if more were present. But Belchik soon realized they were overlooking valuable data. He told workers to count to 100, then to 200. Eventually, finding nearly 1,000 parasites in some gills, he said, "Just count them all."

To an extent, tribes and biologists had seen the problem coming. Since the middle of summer, they had pushed the Bureau to release extra water. Such releases, purely precautionary, were a critical component of the post-2002 response measures, but had become increasingly controversial. In 2003, 2004 and 2012, the Bureau granted them, without any sign of an *Ich* outbreak. In 2013, however, the releases triggered a legal challenge from Central Valley irrigators. Last summer, with water supplies exceptionally limited, the agency unexpectedly announced it wouldn't release any water until infected fish were found.

The Bureau's hesitation sparked a backlash. In early August, members of the Hoopa Valley Tribe, on the Trinity, approached Interior Secretary Sally Jewell at a wildfire meeting in nearby Redding. A week later, tribal members and others protested outside the agency's Sacramento office. The Bureau eventually agreed to release preventative flows, but it was late August by the time water started flowing. *Ich* would appear soon after, necessitating the unprecedented emergency releases of mid-September.

Some argue the Bureau's delay meant more water was used in the end. All told, some 80,000 acre-feet poured downstream last summer to protect salmon — more than twice as much as in previous seasons. The Hoopa criticized the agency for its "reactive" approach. An outbreak, says biologist Joshua Strange, an expert on *Ich* in the Klamath, "has an inertia that is hard to stop."

By mid-October, the salmon had migrated off the Yurok Reservation, but infection levels remained severe. The Hoopa and the Karuk, farther upstream, inspected what fish they could but lacked the Yurok's capacity. Belchik was still anxious to keep tabs on the outbreak, but he was forced to postpone his monitoring until almost November, when he received permission to inspect salmon arriving in a hatchery at Iron Gate Dam, the upper limit of the Klamath run.

What he saw surprised him: not much *Ich*.

A few days later, he inspected fish entering a separate hatchery on the head of the Trinity. Again, very few parasites.

"OK, I get it," he realized. "It's not happening."

The outbreak had apparently dissipated somewhere between the Yurok Reservation and the dams. An unusual number of salmon in the Trinity had failed to spawn, perhaps as a result of *Ich*-induced stress, but no large-scale die-off occurred. "Now," said Belchik, "begins the long process of figuring out what exactly happened."

Of the many questions biologists are asking — How many parasites can a salmon withstand before dying? When, exactly, did the outbreak start, peak and subside? — one of the most critical is whether the mid-September emergency flows averted a catastrophe. Belchik cautions that *Ich* outbreaks are rare and poorly understood, but, he says, "the leading hypothesis is that, yeah, we saved the fish."

The triumph may prove precarious. Belchik, Strange and others think *Ich*'s re-appearance last year was prompted not just by years of drought, but by long-term ecological degradation caused by dams — degradation that's becoming more problematic in the warming West. The 2002 catastrophe prompted a landmark series of settlements, the Klamath Agreements, intended to resolve water conflicts in the basin, partly by removing four dams from the river — a great benefit for salmon. But the enabling legislation has stalled in Congress. For now, Klamath salmon, and the tribes that rely on them, must make do with conditions at hand.

Those conditions look grim: In early April, Trinity Reservoir levels were two-thirds of average, while snowpack in the Klamath Basin was 6 percent of the 30-year median — a record low. With so little snowmelt, the river will decline quickly. O'Rourke, the Yurok chairman, foresees a difficult summer: "I'm thinking we're in trouble." □

SCOTT JONES/FRIENDS OF SONORAN DESERT NATIONAL MONUMENT

THE LATEST

Backstory

The Sonoran Desert National Monument in southern Arizona was designated in 2001 by President Bill Clinton. But **when unrestricted recreational shooting damaged resources, including saguaro cacti, the Bureau of Land Management recommended a ban, citing concerns about wildlife, cultural relics and public safety.** After the National Rifle Association objected, the agency then backed down ("Inside the BLM's abrupt decision not to ban shooting in an Arizona national monument," *HCN*, 12/18/13). Environmental and historical preservation groups sued, claiming the reversal violated federal law.

Followup

On March 27, the U.S. District Court for Arizona agreed, saying the decision lacked a "rational connection to the facts" and ran counter to the evidence the BLM itself had presented in environmental impact studies. **The court revoked permission for shooting and instructed the BLM to reconsider its decision. "There are plenty of places in Arizona to target shoot without harming important resources and visitor safety,"** said Matthew Bishop of the Western Environmental Law Center, the plaintiffs' lawyer.

KATE SCHIMEL

USFWS

THE LATEST

Backstory

Twenty years ago, 50 scientists compared notes and warned that the northern spotted owl's decline was rapidly accelerating ("A doomed species?" *HCN*, 6/13/94). The 1994 Northwest Forest Plan aimed to preserve the threatened bird's shrinking habitat by protecting old-growth forest on federal land. But an unanticipated threat emerged – competition from barred owls. The bigger, more aggressive Eastern birds now outnumber spotted owls in much of their territory. Today, only about 4,000 remain, despite logging cutbacks and efforts to remove barred owls.

Followup

In early April, **the U.S. Fish and Wildlife Service announced that it would consider listing the northern spotted owl as endangered**, in response to an environmental group's petition. Federal biologists say they wouldn't expect management changes with an endangered listing. Meanwhile, the Forest Service and Bureau of Land Management are revising the Northwest Forest Plan. The Forest Service's version won't be ready for four years. The BLM's draft, due soon, may allow increased logging.

ELIZABETH SHOGREN

Tucson's rain-catching revolution

In the Sonoran Desert, rainwater harvesting — an obvious but long-ignored water conservation strategy — is finally gaining traction

BY TONY DAVIS

In the mid-1980s, Brent Cluff lived in a low-slung four-bedroom house on a quiet street in Oro Valley, an upscale suburb northwest of Tucson. Saguaro and prickly pear, mesquite trees and shrubs filled his front yard and most of the others on the street.

His backyard, however, stood out, with peach, plum and apricot trees, and a vegetable garden overflowing with cucumbers, tomatoes, carrots and okra. It was completely irrigated by stormwater, captured from the street by an eight-inch pipe and used to fill a figure 8-shaped 100,000-gallon concrete pond. The pond was stocked with trout from northern Arizona; periodically, Cluff let Cub Scouts fish there.

In his late 40s, Cluff was by turns a genial, brusque and combative visionary, sporting a crop of gray hair. A University of Arizona water researcher, he published more than a dozen papers on water harvesting, including one on his pond. It was more than an amenity, he said; it was an essential survival tool for his desert city and the apocalyptic droughts he believed were inevitable.

Cluff told anyone who would listen — and many city leaders who preferred not to — that harvesting rainwater could ease the region's reliance on its rapidly declining aquifer. It made no sense, he argued, to irrigate lawns, gardens and trees with potable water when more rain fell on Tucson annually than its residents consumed, racing down streets into washes and streams, or simply evaporating. The initial investment for equipment could be steep, but after that, harvesting required little energy and would neither increase water bills nor imperil aquifers or rivers.

Cluff, however, was no environmentalist. He believed that water harvesting could support unlimited growth, comparing his crusade to the building of the atomic bomb: "If I didn't do this," he said, "somebody else would."

But most city and state officials dismissed rainwater harvesting as futuristic at best. For years, the idea received little notice. "There was a climate of denial about the implications of water scarcity in Tucson," recalls William Lord, former director of the University of Arizona's Water Resources Research Center. "A lot of people didn't want to hear the kind of things (Cluff) was saying."

Today, however, Cluff's vision has become as trendy in Tucson as grass-fed beef burgers. Dealers sell cisterns as fast as they arrive. City rebates of up to $2,000 to purchase rain tanks have gone to more than 600 homeowners in three years, and every new university building harvests rain. How did this happen? And could it help Tucson survive the dry future that Cluff so accurately foresaw?

Rainwater harvesting is an ancient technology; it made human settlement possible in southern Arizona 3,500 years ago. The Hohokam Indians captured rainwater with rock dams and built sizable storage tanks. The neighboring Tohono O'Odham built earthen dams and brush weirs to divert water from washes for crops and personal use, and even today they store rainwater in earthen tanks for cattle.

But the practice fell out of use as European-style wells proliferated at the end of the 19th century. They tapped a seemingly inexhaustible underground water supply, which lubricated Tucson's growth for decades. When Cluff began his crusade, Tucson was the nation's largest city totally dependent on groundwater. Its leaders knew the aquifers wouldn't last forever, but they believed they could support future growth by pumping Colorado River water uphill for more than 300 miles and using treated effluent to irrigate golf courses and parks.

Back in the mid-'80s, just a handful of Tucson residents had rainwater cisterns. A decade later, when water-harvesting advocates decided to start teaching the practice, they had to pay people to sign up for their classes.

Two relentless and persuasive proponents led the turnaround: Brad Lancaster, a tall, reddish-haired writer, activist and lecturer, and Katie Bolger, a feisty city council aide.

These days, Lancaster, 46, is something of a guru. He has published two books on rainwater harvesting and earns up to $1,000 a day teaching the practice across the Middle East, including a U.S. State Department-funded tour. But he started out as an outlaw.

In 1998, using a handsaw, Lancaster illegally carved six cuts into his curb to divert rainwater into the vacant space between the curb and sidewalk. He and his brother had already transformed their barren front yard near downtown Tucson into a lush oasis by "planting the rain" — building earthen berms to capture rain in hand-dug basins. The curb cuts would help nourish mesquite and palo verde trees in the remaining empty space.

Lancaster has calculated that the average one-mile stretch of residential street in Tucson drains enough water annually to irrigate 400 drought-tolerant food-bearing trees: ironwood, mesquite, palo verde and hackberry. As his trees grew, his neighbors got interested, so Lancaster launched his own crusade to legalize the practice.

At first, city engineers balked, fearing that the tree roots would damage the public rights of way, and that saturated soils would cause sinkholes. "They thought the streets were designed to drain water," Lancaster says. "They put the water down the storm drain, or it evaporates."

It took Lancaster three years to get the curb cuts legalized, and he had to engage in fancy bureaucratic footwork to do so, finding a sympathetic city hydrologist who convinced authorities that the existing cuts hadn't caused problems. Lancaster argued that the shade from more trees would stretch the life of the asphalt. He got the backing of neighborhood groups and environmentalists, and found an important ally in Val Little, who runs the Water Conservation Alliance of Southern

Tony Davis (@tonydavis987) is an environmental reporter for the *Arizona Daily Star* in Tucson.

Brad Lancaster slides down a fire pole, left, from a patio overlooking his property in downtown Tucson, where he harvests enough rainwater to satisfy most of his water demands. Lancaster washes his dishes with rainwater used directly from the cisterns where it is stored, below. He then uses the dishwater to water his plants.
NICK COTE

Arizona. Back in the early 2000s, Little persuaded the state to legalize the use of gray water from sinks, showers and washing machines — another lost water source — on outdoor plants. (Gray water accounts for 30 percent of what comes out of a homeowner's tap, enough to irrigate 50,000 Tucson yards.)

Today, Lancaster stores about 100,000 gallons of rainwater a year. He uses city water for his washing machine and to shower, gray water on fruit trees, and rainwater for drinking. He says the system moderates summer heat, reduces street flooding and generates mulch. It also improves his neighborhood's look and feel: "This is not just about conserving water," he says.

Lancaster cut away the curb on his street so that storm runoff could more easily flow to plants, opposite page. This has helped transform the sidewalk along his street into an oasis of hardy desert shrubs and fruit-bearing succulents that make full use of the desert's sparse rainfall.
NICK COTE

Katie Bolger is a salty-tongued, politically savvy 45-year-old native Tucsonan. As an aide and chief of staff to two city councilmen, she helped change the law in other ways to help bring water harvesting into the mainstream.

In 2007, Bolger introduced Lancaster to Rodney Glassman, whose campaign for city council she was managing. The two quickly bonded. Glassman was already aware of the bureaucratic barriers to harvesting. A few years earlier, working for the developer KB Homes, he discovered that since rainwater harvesting wasn't covered in the land use code, builders had to get an exception to implement it.

After meeting Lancaster, and at Bolger's urging, Glassman pledged to require harvesting in new developments — "To make water conservation the rule, not the exception." Once elected, he pushed through new regulations, requiring new businesses to use rainwater for 50 percent of their landscape irrigation and new homes to have gray-water hookups. "There was shitloads of pushback from homebuilders," Bolger recalls. "The enviros started at 100 percent, the builders started at zero. Now, we have an ordinance that was truly a compromise."

Later, when Bolger was working for a second councilman, Paul Cunningham, she fought to create a fee on water bills for investment in low-flow toilets, harvesting and other conservation programs. Tucson Water fought back. Officials at the cautiously run utility were reluctant to support anything that would cost ratepayers, and they doubted the cost-effectiveness of the harvesting rebates. Bolger, however, suspected that the utility had darker motives: If people used less water, it would make less money. Tucson Water officials deny this.

Bolger ultimately decided to bypass the utility: She orchestrated a public hearing packed with residents who told the council they would pay higher rates for conservation. This was astonishing for Tucson, where a 1976 recall of four council members who raised water rates withered government-sponsored conservation efforts for years. The council eventually agreed on an average monthly fee of 25 cents and approved rebates up to $2,000.

Bolger has three cisterns in her backyard that support grapevines, fruit trees, spinach and tomatoes. "If I can do it in my yard — and I have to hire someone to screw a fucking screw in my wall — it's ridiculous not to do it," Bolger says. "The last rain we had was 1.9 inches. I had 2,300 gallons of water of better quality than what comes from my tap delivered to my door. It blows my mind we're not doing it more."

Lancaster agrees, saying that even

Clockwise from right: Cub Scouts fish in Brent Cluff's pond, catching some of the 200 rainbow trout Cluff had stocked from a northern Arizona fish farm. Workmen spray gunnite, the pond's basic raw material. Brent Cluff's daughter, Shawna, walks along a walkway separating two sections of the pond, still under construction. COURTESY CLUFF FAMILY

during droughts, Tucson still gets more rain than its homes and businesses use in a year. He suggests redesigning "every government building, every park, every school, every library, every parking lot" to harvest rainwater: "What if the entire population in the Colorado River watershed harvested 20,000 gallons of rainwater per year, per family?"

What if, indeed? Some critics argue harvesting can "steal" storm runoff from people with rights to river water. However, a 2007 study in suburban Denver found that only 3 percent of rain runoff ever reached streams, with the rest evaporating or being used by plants. Still, two years ago in Arizona, the concern scuttled a proposed state study of large-scale rain capture.

Nobody knows exactly how many Tucsonans have cisterns or earthworks, where the ground is sloped to direct runoff into basins with trees and shrubs. But the numbers appear to be growing rapidly. A local Ace Hardware has sold $40,000 worth of rain tanks every two weeks for the past three years. Regionally, demand is strong enough that rain-tank manufacturer Bushman USA says its 24-hour-a-day California factory has a six-week backlog.

A few states besides Arizona have also liberalized their rules. Colorado once outlawed the harvesting of rainwater, reasoning that it belonged to people with water rights to rivers and streams. In 2009, it relaxed the law to allow homeowners who lack access to public water to catch rain, and permitted developers to install collection systems in 10 pilot projects. California legalized rooftop rainwater capture in 2012.

In Los Angeles, the River Project is now working with San Fernando Valley homeowners to use gray water on outdoor plants and to install earthworks and "permeable pavement," which allows rainwater to percolate into the aquifer. A pilot program at 22 homes saved and reused 1.2 million gallons annually, captured 505,000 gallons in the aquifer, and cut water bills.

The potential for water harvesting is significant, especially for arid states facing an even drier future. Outdoor landscaping accounts for 27 percent of residential water use among Tucson Water customers. If all of them got all of their outdoor water from gray water and the sky, the city could slash water use by 25 percent. The savings could be greater in cities like Phoenix and Los Angeles, where lawns are more common.

Yet achieving this may prove difficult. Last fall, Tucson Water warned that the rebates weren't working. Their research found that recipients were not conserving any more water than a control group of homeowners who didn't get rebates. Officials were concerned that rebate recipients were simply adding new landscaping to be watered with harvested rainfall. Some programs, though, have saved water. One allows participants who reduce city water use to direct the savings into environmental restoration projects. In two years, 60 participants saved 855,000 gallons. On Tucson's south side, a 6-acre rainwater basin irrigates a baseball stadium's turf and landscaping at public buildings. Since 2001, it's cut irrigation bills enough that the county's $6 million share of the project's cost should be repaid by 2018.

Drought is a big obstacle, however: "If it doesn't rain for four months, six months or a year, those cisterns are not going to be full," says Kathy Jacobs, who runs the University of Arizona Center for Climate Adaptation Science and Solutions. The up-front cost is also a problem. At $2,000, a cistern could take decades to pay for itself with savings on water bills. Earthworks, on the other hand, cost as little as a few hundred dollars. And even a cistern pencils out if you consider the community benefits of the landscaping: higher property values, reduced street flooding, food production and shade cover, which helps lower air-conditioning costs and reduce the urban heat island effect.

Today, Brent Cluff, who got the ball rolling 30 years ago, lives in assisted living in Rexburg, Idaho. The 79-year-old is battling illness and has difficulty speaking. I told his wife, Raydene, that rainwater harvesting is taking off in Tucson at last. When she told Brent, she said, he broke into tears.

Cluff's Tucson pond, however, has not survived: It dried up three years after he sold the home in 1999. The new owner filled it in with dirt. □

GLASS HALF FULL

This story is part of an ongoing series that looks at the people and ideas helping the West better understand and use its water.

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DEBRA BLOOMFIELD, 2012

WILDERNESS, Debra Bloomfield
128 pages, hardcover: $50.
University of New Mexico Press, 2014.

San Francisco-area photographer Debra Bloomfield spent five years visiting the Pacific Northwest and Southeast Alaska. These are not your typical landscapes: The photographs collected in *Wilderness* offer a unique and genuinely personal perspective on the nooks and panoramas of those wild places — a puzzle of sky caught through a close-up tangle of leafless branches; the line where a streak of dark trees cuts a sudden edge into a clearing. The rawness and intimacy of the images lend them an emotional, meditative quality, reminding viewers of our own unexpected, astonishing glimpses of nature. An accompanying CD recording of natural sounds caught on location — the caw of a raven, the crunch of footsteps on snow — amplifies the sensation of being swallowed by wildness, stillness and unity.

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Spring visitors

It's been an unusually warm and windy spring here in western Colorado, home of *HCN*. Fortunately, a few visitors have blown our way.

Karen Olson and her parents, **Dorothy** and **Byron Olson**, stopped by our Paonia office on their way to visit family in nearby Delta. Karen, a writer and editor, got her first assignment with *HCN* in 1998, when she was a creative writing student at Colorado State University in Fort Collins. She says her first draft, on a controversial condominium development in remote Stehekin, Washington, had to be completely rewritten. But she credits *HCN* with helping start a career that's wound its way through *Utne Reader*, where she was editor-in-chief, to *Public Art Review*, in Minneapolis, where she's now executive editor. We'd love to see your byline here again, Karen!

Cece and **Laurance Headley** visited with their dog, Peddee, in late March, driving their camper from Eugene, Oregon, to visit friends and family. Though they frequently visit Colorado (Cece grew up on the Front Range), this was their first pilgrimage to *HCN* headquarters. Cece appeared in Jane Braxton Little's story "A new world in the woods," (*HCN*, 4/1/02) for her job as a forest restoration worker.

From Custer County, Colorado, **Paul Mosher** stopped in on his way to Arizona. He's been an on-and-off subscriber for 20 years. Paul, who's a contractor, is fascinated by water issues and thinks finding better ways to conserve it is crucial. We agree!

GIVE MOM A GIFT OF HCN

Spring in the West is such a treat. Make it more special for Mom with a gift subscription to *High Country News*, and we'll send her a free copy of Mary Sojourner's latest novel, *29*! It's a blistering story set in Twentynine Palms, California — a place where forgotten tribes and desert lovers unite to save ancient lands from corporate greed and huge solar and wind power farms. See the ad on page 25 for details about this Mother's Day special.

HCNERS IN NEW YORK

HCN Contributing Editor **Michelle Nijhuis** and board member **Laura Helmuth**, *Slate*'s science and health editor, both traveled to New York in March to give talks at the Arthur L. Carter Journalism Institute at New York University. Laura talked about nurturing new writers and shaping influential stories, while Michelle spoke about journalism and global change. Describing how she built a successful freelance writing career while living in tiny rural Paonia, Michelle said, "There were many challenges. … It was easy for editors to forget about me since they never saw me." But living in an off-grid straw-bale home, with almost no overhead, allowed her to work only on projects she valued, instead of having to take assignments just for the money. "My choice of place made me really lucky in that way," she said.

—Jodi Peterson for the staff

Karen Olson visiting *HCN* with her parents, Byron and Dorothy Olson.
KATE SCHIMEL

LOST FRONTIER

Most North Dakotans will not talk badly about the oil drilling that has consumed their state, even if they despise it, but they are glad to reminisce about the way things were before. People were friendlier, they like to say. Kids played in yards, neighbors waved, and families went driving just for fun. The prairie was as they wanted it — a place few would ever go. They say there will never be anywhere like it again. They say, *If you want a taste of how things were*, *drive west of Miles City* — or east of Minot, or south of Dickinson — though, even as crude prices drop and the boom slows to a creep, you must go farther and farther afield. The worst thing about the development, if they are angry enough to admit it, is that there is no escape. For the most part, a company will drill a well or build a pipeline wherever it pleases. This is deeply unsettling to landowners, no matter the financial rewards, who have had to learn that the places and things they hold sacred — their privacy, among them — are not sacred anymore.

In four years of reporting in the Bakken, as the oilfield region is called, I have often wondered why so many people are reluctant to admit their discontent. At times, I have been told, *We North Dakotans are too polite*; or, *God help us if we sound ungrateful*. So it was all the more surprising, one afternoon in September, when I got a call from a North Dakotan named John Heiser, who introduced himself as "a man who speaks his mind."

Heiser has worked for 41 years in Theodore Roosevelt National Park, in the badlands south of Watford City. The park, he told me, was "a colossal mess" and "inundated with oil people." The previous morning, he had found a scatter of shotgun cartridges and clay pigeons along the north boundary; the year before, some "yahoos" had shot a bison to death inside the park. "These clueless redneck fools have nothing else to do but kill things," he said, adding that this was only "part of the truth." What "truth" did he mean? "The mess!" he exclaimed. "Defacing natural features! Tipping over pedestal rocks! We're finding felons from other states, meth, marijuana — pint jars of marijuana!" Then came the kicker: On a recent Sunday, a bomb exploded on the edge of the park. Heiser was digging a trail when he saw it — a black column of smoke hundreds of feet high and shimmering with heat like a midsummer day. He figured an oil rig had blown, but when he looked through his binoculars, he saw a pickup truck on fire. Later, he would hear that two other trucks had fled the scene. "We're being invaded," he said, and suggested I come see it for myself.

WE MET ON A WARM OCTOBER DAY in the north unit of the park, in a sparsely wooded valley flanked by reptilian cliffs. Heiser was in good spirits, and as we traced the Little Missouri River east, he quizzed me on the difference between sage and winterfat. But when we turned north, he froze. His quiet can be unnerving, since it is rare. He speaks in rehearsed phrases so tightly strung that syllables blur, words are skipped over and sentences broken off. He touched a finger to his ear. Then

As the North Dakota oil rush closes in on Theodore Roosevelt National Park, the badlands' most ardent defender wonders if it's time to leave

it came — two cracks of a gun. His jaw tensed. His skull began to quake. Never had I seen so physical a reaction. "That's these fuckers," he said. "Oh, these fuckers make me so mad. I curse these sons of bitches. I curse them!"

Heiser wore black leather boots, faded jeans, a green flannel shirt with pearl snaps, and a JanSport fanny pack held together with five safety pins. He has slate-blue eyes and white hairs that stick out from his temples. He refuses to wear sunglasses, and his stubborn squint has left a thin white crease across the bridge of his nose. At 64, he has the vigor of a teenage boy. Spit from all his talking crusts in the corners of his mouth, and when he is frustrated, which these days is often, he presses his hands to his cheeks and drops his jaw, like the tortured figure in Edvard Munch's *The Scream*.

The source of his torment is the oil boom, which has crept closer to the park each year since it began around 2009. If one were to draw a circle around the Bakken, the park's north unit would fall just south of center. It is, by now, an island — perhaps the only place left in this part of North Dakota where a person can wander for miles without crossing a scoria road or seeing a frack sock dance like a blowup doll in the wind. Its bluffs overlook private and public land, both heavily drilled; dozens of derricks are visible from some vantages. In 2013, the Little Missouri National Grasslands — more than a million acres spread between the Missouri River and the state's border with South Dakota — sent $81 million to the National Treasury, 40 percent from the McKenzie Ranger District, which borders the park and contains some of the Bakken's richest deposits. Across the district's half-million acres, there are 800 miles of pipe and 340 "facilities," such as well pads, compressor stations, tank batteries and buildings. In 2013, an oil company proposed drilling within 100 feet of Elkhorn Ranch, where Theodore Roosevelt lived from 1884 to 1887, and where, the story goes, he became a conservationist. Some call Elkhorn Ranch the "Walden Pond of the West." Here, you might say, the national park idea that Roosevelt advocated has proven most prescient: that if all else were given up to commerce, at least some land would be saved.

Heiser began working in the park in June 1973, soon after graduating from Dickinson State University. He already knew the park well because his father, a rancher, was a maintenance man there. In 1978, the year it changed status from a national memorial park to a national park, with 80 percent of the north unit designated as wilderness, Heiser became a backcountry ranger. He built fences to contain the park's bison and chased them back in when they escaped. He named many features in the north unit — Eagle Butte, Coffee Creek, Whiskey Wash, Big Horn Bump — and built many of the trails, too. You can safely say that no one knows the park better than Heiser, nor has anyone worked there longer. His job has changed over the years, but he is best described as park ambassador. If you want to ski in midwinter, he will take you. If you want to swim, he will show you where. He knows where the quicksand is, where a longhorn steer got stuck and he had to shoot it in the head.

View from Buck Hill, South Unit of Theodore Roosevelt National Park.
SARAH CHRISTIANSON

John Heiser at his farm near Theodore Roosevelt National Park.

SCREENSHOT FROM THE FILM BLACK HARVEST (BLACKHARVESTFILM.COM), AN ANTEVITA FILM PRODUCTION (LUXEMBOURG) (ANTEVITA.LU) DIRECTED BY JEAN-LOUIS SCHULLER AND SEAN CLARK

Facing page: Wells encroach on the eastern boundary of TRNP-South Unit.

© BRUCE FARNSWORTH WITH AERIAL SUPPORT PROVIDED BY LIGHTHAWK

He knows weather statistics like baseball fans know batting averages and will recite them at a speed that rivals most auctioneers. People who know Heiser cannot imagine the park without him. A park law enforcement officer told me that when he pulls locals over for speeding, it is not uncommon for them to ask, "Where's John at?" Chances are, he is "roamin' range," as Heiser likes to say.

As we picked our way up a sunny draw, I wondered if there was some peril in knowing a place so well. Most North Dakotans say they knew the boom had arrived when they went to the grocery store and no longer recognized a soul. Heiser says this, too, but he is more likely to mention the mule deer, elk, antelope and porcupine he's counted dead on highway shoulders — unlucky prey to swelling traffic — or the night sky lit so bright with gas flares that he could not see the stars. He used to recognize birdsongs from a distance, but now, when he stops to listen, there is too much noise to easily place them. Noticing has its virtues, but when the details add up to something lost, they induce in Heiser a righteous anger. Nothing fans this fury more than the park's decaying sense of sanctuary: Because it is a haven from the surrounding chaos, it is not impervious to that chaos. In 2012, near the height of the boom, the park drew more visitors than it had in two decades, many of them oil workers. "These bastards that come here have no sense of place," Heiser said. "They don't want to be here, so they disrespect our place." An affront to the landscape was an affront to Heiser himself.

THE CRIME RATE inside Theodore Roosevelt National Park has indeed risen with the boom, and though it is nowhere near as high as in towns that surround the park, several people worried for my safety there as a young woman traveling alone. "You got bear spray?" a Forest Service ranger asked, when I mentioned I would camp in the north unit one night. I was confused. There were grizzlies? "No," he chided. "Think about it."

I did not have bear spray, but I did have a flashlight — the kind you can knock someone out with, which a boyfriend had given me years ago for this purpose. I slept with it beside my pillow and woke the next morning, relieved to see the cottonwoods backlit by dawn and the leaves quivering like swarms of flies. I drove the road west and came to a line of cars stopped behind some bison. A man emerged from the car behind mine and went onto a nearby bluff to make a call. When there was no answer, he noticed me watching him and approached. He was a welder from Georgia and had lived in Williston two years. He smiled as he said this, and I saw that he was missing his incisors. He explained that he often visited the park to photograph ducks. Once, he came in wintertime and walked to the river in the wind and snow. "It must have been cold," I said. "Boy, that was something," he agreed.

The bison loped off, and the welder returned to his car. In a few miles, I came to the end of the road. It began to rain. Three women in headscarves appeared in a Volkswagen, turned, and drove away. I walked to an overlook and found a man and woman huddled beneath a raincoat. The man was short and wore low-hung jeans and a black fleece imprinted with a company logo. She was shorter and bundled in sweaters. They were thrilled by the weather and laughed each time a gust of wind threw rain in their faces. The woman was from Los Angeles and sold real estate; the man, from Wisconsin,

laid gas pipe. They met when the man came looking for his own apartment and moved into hers instead. It was their first time in the park, but they had decided they would come again. "There's nobody out here," the man said. "With the boom, there's just so many people, and you come here, and it's like, '*Ahhh.*' "

When I told Heiser about these encounters, he conceded, "Some are really nice people." He recalled how he had been counting bighorn sheep in a park canyon, recently, when oil workers drove by. "They actually said, 'We're really sorry for what's going on here.' People apologize to me all the time, and it makes me mad, because I want to hate them all." I had sympathized with the young couple, but looking out on the prairie, on the flares that glowed bright against the clouds, I understood how for Heiser the park had become a flimsy parapet: Even here, you could not forget the boom, and you could acutely sense how it feels to be closed in upon.

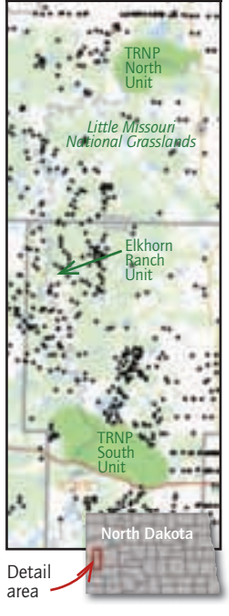
HEISER RECOUNTS HIS NORTH DAKOTA ANCESTRY in terms of survivorship: The long winters his great-grandparents endured after they arrived in 1891; then the Dust Bowl and the steady loss of people after that. Perhaps it is remarkable that so many have stuck it out. Had Heiser been given the choice, he might have left, too. He does not romanticize his upbringing, which he said was miserable: "My mother was cold as ice. I think she was radically unhappy." Both parents died before Heiser's 28th birthday, not long after his brother, who worked for an oil company, was killed in an explosion. The ranch and Heiser's youngest brothers, 11 and 14, fell to his care. Eventually, they grew up and moved out, but Heiser went on living in the same house, raising his father's cattle and then cattle of his own.

Today, the house is sunken into a swale amid windrows and scattered scraps of wood. Were it not for the large red barn Heiser erected some years ago, the place might look stuck in another time. The machinery is old, and anyhow, Heiser has little use for it. Every day, even in winter, he goes to the pasture on horseback or on foot. Then he cuts wood to heat his house with a 30-inch bow saw and hauls it on his shoulders. Whether this is by choice or financial necessity, he is quick to boast his moral winnings. This past winter, to feed 56 head of Hereford cattle, he burned six gallons of liquid fuel and did not start an engine for 76 days. This is odd behavior for a rancher, since most would rather not make a hard life harder. Odder still, he names his cows and cries when he sells them: "It breaks my heart every fucking time."

No doubt neighbors wonder how Heiser turned out this way; he is molded from the same earth as they are — the same red clay and buffalo grass, the same sale barns and Sunday church dinners. He is the person they talk about, or don't talk about, or are tired of talking about. "People either love John or they hate him," another park officer told me. Heiser has been known to offend park administrators, too. "He'll tell them his opinion, and they just write him off as the old-timer, and he'll say they're stupid," the officer explained. "But, you know, 99 percent of the time, he's right."

Heiser, for his own part, claims he has "nothing in common with my people," but if there is one thing he and his neighbors have shared in this boom, it is a sense of being invaded. Whether this distrust of outsiders is merited does not matter: Enough bad things have happened to convince them of the danger. The 2012 mur-

Active oil and gas wells near Theodore Roosevelt National Park



SOURCE: NORTH DAKOTA DEPARTMENT OF MINERAL RESOURCES

Rancher Joel Grieger, top, climbs down to examine a pickup that was launched off a bluff in the Little Missouri National Grasslands. Vehicle access in the grasslands is restricted, but off-roaders don't always stick to the approved trails and roads, above.
SARAH CHRISTIANSON

der of a Montana schoolteacher, Sherry Arnold, for example, was traumatic not only because it was unfair and gruesome, but because it happened in a place where everyone once knew everyone. Heiser knew Arnold's sister. The boom's most troubling effects rise from this distrust. People have told me that they rarely leave their houses anymore. Some have abandoned the state altogether, and even Heiser considers doing the same. "The day when I decide, 'Any place is better than this' — that will be a sad day," he told me. I was struck by his rare understatement: For Heiser to leave North Dakota would be like plucking his own heart from his body. I could not imagine it.

THERE ARE SIGNS that this broad but quiet unease is growing bolder. Even as most state leaders have embraced the boom wholeheartedly for its economic benefits, some, like Attorney General Wayne Stenejhem, have been more cautious. In December 2013, Stenejhem proposed that the state's Industrial Commission, on which he sits, draw a two-mile buffer around its "extraordinary places" — including Theodore Roosevelt National Park — and, within these bounds, require public comment on oil and gas development. The proposal did not succeed; industry protested, as did State Rep. Roscoe Streyle, R, who wrote in an editorial in the *Bismarck Tribune*, "What makes these sites so 'special'? … The state of North Dakota should be thanking the industry every day and working with it, not against it."

Park administrators took up the fight themselves, in what Superintendent Valerie Naylor likened to a game of "Whack-a-mole." A GIS specialist created a computer program to scan the Industrial Commission's hearing dockets for development proposals and select those that fell within the park's viewshed and soundscape. Then Naylor sent comments to the commission or called companies directly to work out agreements. Most companies were amenable; one withdrew a permit application for an injection well near the park boundary, and another installed mufflers on its equipment. Naylor retired last October, but her successors, with the help of the Badlands Conservation Alliance, have continued her work. Landowners have challenged state and local policies with similar success. This March, in a full courthouse north of Dickinson, Dunn County residents voted to reinstate a rule requiring that a proposed oil field waste landfill obtain consent from 60 percent of landowners within a half-mile radius. "When it impacts our neighbors," Curt Kralicek, a rancher, told the *Dickinson Press*, "they have rights, too."

That month, oil prices hit $50 per barrel, a 50 percent drop from their peak in June 2014. Drillers are pulling out and the boom has waned, but development is not over; booms will come and go as prices rise and fall, until either the oil is gone or there is no need for it anymore. The Little Missouri National Grasslands, which surround much of the park, are still a great concern to park and Forest Service administrators, who recognize that damage beyond its borders could affect its ecological health. Companies have been slower to drill on the grasslands, since leases here last longer than on private land, but Jay Frederick, the McKenzie River District ranger, told me the activity could easily double. "I wish I could say that all of the oil and gas development is on already-broken ground," he said. "That's not the case. The truth is, we are losing native prairie." Before the boom, 70 percent of North Dakota's native prairie had already been lost to agriculture and other development. When I asked Frederick how much the boom would destroy, he suggested 5 percent, but added, "I really don't know." The Forest Service, he said, wasn't prepared to properly monitor the chemical and ecological changes that the boom had brought. Frederick, who also has retired, hoped this would change, and was pushing companies to share well pads and pipelines to "reduce the prairie turned to scoria."

One morning, I joined Frederick, Heiser and Joel Grieger, a rancher who leases national grassland, on a drive along the park's north boundary. We met before sunrise at the park entrance. Heiser and Grieger took the backseat, I took the front, and soon we were bouncing west toward Pasture 10, where Grieger grazes his cattle. The road edged along a bluff so that you could see into the park, down bentonite caps that glistened like whale skin, to Squaw Creek, which meandered through a low, flat valley. Now and then, we came to a mess of rutted tracks — oil workers out for a joyride — and had to pick our way around. This proved challenging, since the prairie rose in steep, conical bluffs. To my companions' dismay, these, too, had been clawed with tire tracks. Each man seemed equally bothered, though each expressed it in a different way: Heiser cursed "the bastards," Frederick regarded

them with fatherly disappointment, and Grieger said little at all.

We were looking for the truck — the one bombed on that September Sunday. Grieger, who wore cowboy boots, matching jeans and jacket, aviator sunglasses, and a groomed silver mustache, had been the first to discover the abandoned vehicle. He was out in the pasture, giving a photographer a tour. From the looks of it, someone had loaded the truck with trash and launched it off a 100-foot cliff. Then, some weeks later, he was haying over the bluff when the bomb went off. His son, riding with him, pointed to the smoke. Whoever it was had packed the truck with a whole lot of Tannerite — an explosive sold at local hardware stores — and shot it with a high-velocity rifle.

Grieger rarely encountered oilworkers in the pasture. Once, he came across two men with guns "out shooting rocks," but normally, he found only the things they left behind: gates open, fence posts broken and burned in bonfires. When I asked about other nuisances, Grieger hesitated. "I don't want to mention things," he said, "because it puts ideas in peoples' heads. It hasn't happened yet, but a guy does worry about his cattle."

We came, again, to the edge of the bluff. Frederick stopped the car, and we descended on foot to a flat, grassy table. Trash was scattered about like it had been plundered from a shopping cart — laundry detergent, energy drinks, a jar of applesauce, window scrapers, WD-40, an assortment of sponges. In the middle of it all was the truck, though it didn't look like one. Only when I walked closer did I recognize the seat springs and red carpet, and the aluminum wheel rims melted into puddles and streams. The men scrambled up another bluff and stared down at the wreckage. A thin, sultry haze hung to the north, where pump jacks and excavators prodded the earth. Heiser had not ceased talking all morning, but now he was quiet. "Jesus," he finally said. "Blow a hole three feet deep in badlands gumbo, that's no small feat." Then his eyes caught on something else — a pair of bison at the edge of Squaw Creek.

MOST PEOPLE, WHEN THEY TALK ABOUT DYING, say they hope to go painlessly in their sleep. Heiser would prefer to be killed by a bison and tells several stories of coming close. In the first — many years ago — he outran a bull on his horse, Calypso, which is harder, he claims, than one might think. Another time, he came across a bison drinking and decided to keep it company in a nearby tree. As he waited like a cat on a limb, the bull came to rub against the trunk, and Heiser could hardly keep himself from dropping onto its back. The third encounter, his closest, was at Hagen Spring, when some 50 bison descended toward him: "I jumped up that slope above the spring — and this is the honest to God truth, the neatest thing in my life — I sat down. I sat with my knees up like this, and a stampeding calf hit me with his fucking knee in my fucking nose. There were bison all around me. Then it was all quiet. But to have a bison kick you in the nose — that was just badass cool."

A young male plains bison in Theodore Roosevelt National Park.
© BRUCE FARNSWORTH

In winter, a darkness settles over Heiser. He wakes at quarter to 5, lights the woodstove, and, for breakfast, eats oatmeal or Cream of Wheat. He might have coffee, but it is not essential. He feeds the cows, and then he walks above his ranch, where his two stillborn siblings are buried, to see the sun rise over the Killdeer Mountains. Now and then, he writes an account of these morning walks and sends it to a long list of friends and acquaintances. Years ago, these letters read like breathless entries in a survey notebook, broken by the odd rant or winking emoticon, or by the routine details that comprise a rancher's life: "The blustery wind naturally kept all the usual wild ones tucked into the many sheltered places afforded by badlands canyons & draws, but I still had the good fortune to see 12 mule deer, 3 white-tailed deer, a porcupine, and the typical feathered ones … black-capped chickadees, common redpolls, Lapland longspurs, horned larks, and downy woodpeckers." Always, Heiser noted the day's temperature, and often he signed off, "So long, Buckaroos."

Lately, though, the letters have been more infrequent, and when they do come, most words are spent on the boom. One, in late October, came after Heiser returned home to find flags marking the planned route of an industrial powerline across private pasture, 300 yards from his homestead. Originally, it was to cross his own land, to serve the growing towns to the north, but Heiser wouldn't allow it. "It's a good bet that this will run nearer to my place than anyone else's in its 100 or so miles," he wrote, " — what I get for telling a large corporation to take their powerline straight to Hell with them."

When I visited Heiser one last time before leaving North Dakota, he had been searching online for suitable property in Montana and Nevada. He talked of donating his place to the state park system, or to the Forest Service, which already manages much of the land that borders his own. We walked up the hill through his horse pasture and down a shallow draw to a creek. The morning was late and warm, and the animals in hiding, but Heiser summoned their ghosts, showing me where bucks came to rub felt from their antlers and where beavers had felled new timber. He told me it was not the newcomers who bothered him so much as it was their transience: They would come and go, and though their stay was short, their mark would last. That was the thing about humans, he said; our blundering mobility was deeply unfair: "If the animals can't leave, then how the fuck can I? If I could build an ark and take them with me, I'd say, 'Hey, let's roll!' " □

Sierra Crane-Murdoch is a contributing editor for *High Country News* and a visiting fellow in the Investigative Reporting Program at the University of California, Berkeley. She is at work on a book about the oil boom.

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Wyoming tough?

OPINION BY MARCIA HENSLEY

A recent article in *Time* magazine reported that the best place to be an old person is a city, primarily because of easy access to health care. If *Time*'s experts on aging are correct, those of us who choose to live in remote Western places will feel increasing pressure to urbanize, abandoning the landscapes that we love to find the health care that we need.

My husband and I moved to the Denver area from a small Wyoming community for this very reason. When we did, we gave up our dream of living out our lives in an old homestead in the High Plains of Wyoming. We gave up so much — our view of the Wind River Mountains, our harsh winters and glorious summers, the land's strong sense of history and our daily intimacy with nature.

We understood that the way we chose to live might seem weirdly tough to others — heating with woodstoves, driving 50 miles to the nearest grocery store, gardening in spite of a 42-day growing season. In fact, we lived — and relished — a way of life not all that different from that of the pioneers who built our place in the early 1900s. We reveled in our independence, and the last thing we ever wanted to do was live in a crowded city.

We would still be toughing it out in that homestead if my husband's Alzheimer's hadn't made our old-fashioned lifestyle increasingly difficult and finally, impossible to manage. He was no longer able to do the work needed to maintain our place, but he resented anyone we hired to do it. He'd get lost on our property, a place he'd known like the back of his hand. He couldn't be left alone.

Our children, visiting from out of state, were shocked. They helped me realize that our self-reliance had morphed into a need to rely on others. Friends and family could only do so much. We needed professional help, and I started looking for it.

There wasn't much. Although our community's excellent, and free, ambulance service and volunteer EMTs could get us the 50 miles to the nearest hospital, the closest specialists were 200 miles away in Salt Lake City. To get in-home respite care or certified nursing care was nearly impossible. Our local population was only about 500. I found one person with Alzheimer's care training, but she was only occasionally available. In the nearest town, there were some qualified people, but they were not willing or allowed by the agencies they worked for to make the 100-mile round trip to my house. Alzheimer's care facilities were rare even in larger Wyoming towns; nursing homes didn't offer the right kind of services for Alzheimer's sufferers.

So I learned firsthand the truth of an Alzheimer's Association report that listed among its major challenges "ill-equipped communities."

While facing this major medical problem with a limited family support system, I also found a flimsy safety net. A 2007 report on older adult health in Wyoming didn't even include Alzheimer's on its list of "major concerns for seniors." If Alzheimer's had been a concern then, perhaps what we experienced later wouldn't have been so disheartening.

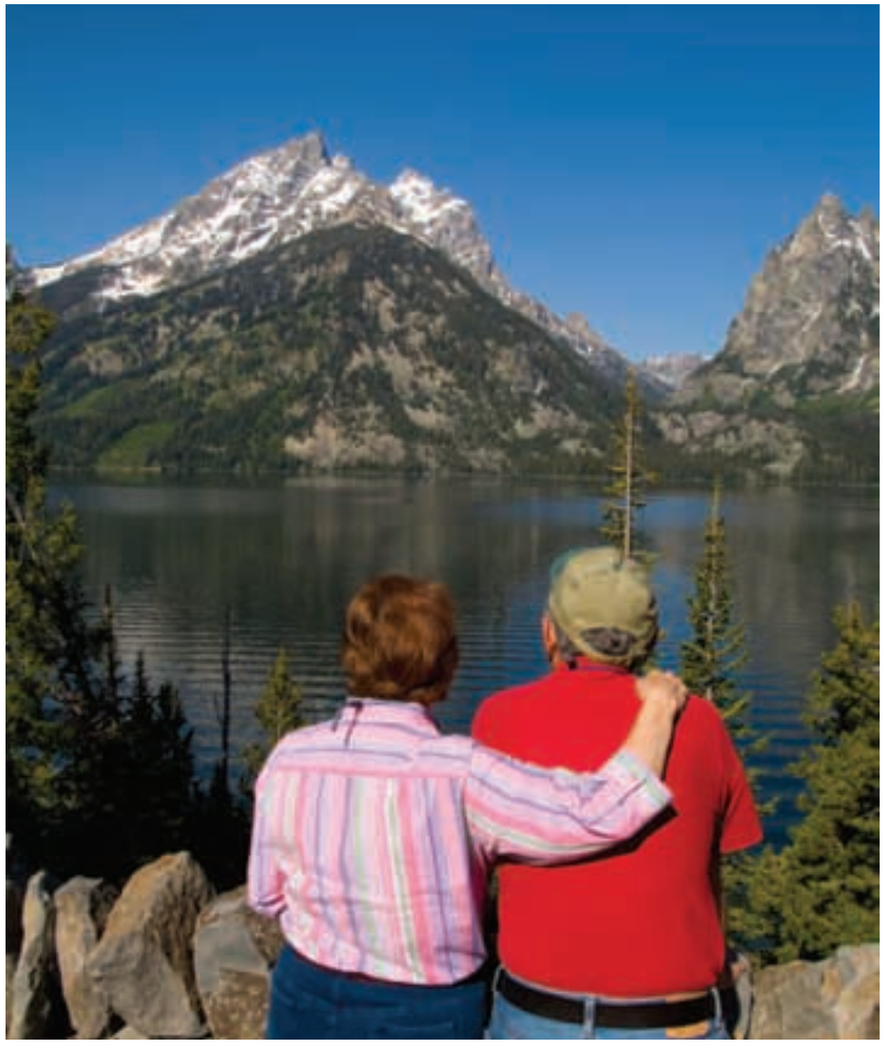
Wyoming's small population and lack of state income tax might explain why health-care resources are inadequate, although there's considerable evidence that other Western states face similar problems. Because we Westerners tend to see ourselves as rugged individualists, capable of handling the toughest challenges, we are unusually reluctant to admit it when we need help.

Maybe it is just a romantic notion, this longing of Westerners to remain independent, but my husband and I imagined we could always tough it out, like the settlers who built our home decades ago. Ironically, the hard physical challenges we valued were exactly the things that eventually made living in a remote place impossible, and this at a time when remaining in our home would have meant the most to us.

For us, it turned out that the toughest part of living in Wyoming was being forced to leave it. The experts were right to say that health care is better in cities. But I think many Westerners faced with the choice we had to make might agree, as I do, with these lines from poet Stephen Vincent Benét:

Go play with the towns you have built of blocks
The towns where you would have bound me!
(Let me) sleep in my earth like a tired fox,
(Until the) buffalo have found me. □

Marcia Hensley lives in Westminster, Colorado.



A couple looks out at Grand Teton, in Wyoming.
BILL BACHMANN

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To see all the current Writers on the Range columns, and archives, visit *HCN*'s website, **hcn.org**

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Westerners need to stand up for public lands

OPINION BY TODD TANNER

WEB EXTRA
To see all the current Writers on the Range columns, and archives, visit *HCN*'s website, **hcn.org**

As Google Earth flies, it's five miles and change from the Echo Lake Café in the Flathead Valley, one of Montana's great little restaurants, up to a parking area at a trailhead that leads to Jewel Basin. Down here in the valley, we're at 3,000 feet above sea level. Up where the gravel road dead-ends, you're looking at 5,700 feet. If you make it all the way to the top of 7,500-foot-high Mount Aeneas, you'll be rubbing elbows with some top-of-the-world views, not to mention mule deer and mountain goats.

We're talking about almost a mile of elevation change, yet the amazing thing is that once you leave the valley floor, all that land stretching on seemingly forever belongs to you and me and all of our fellow Americans. It doesn't matter whether you live here in Montana, or in Colorado, Wyoming, New Mexico or New Jersey. All that acreage, which is administered on our behalf by the U.S. Forest Service, is ours. We can roam where we choose, we can hike, we can fish the lakes and pick fresh huckleberries for lunch and pitch our tents under all that Big Sky. We're free to wander to our heart's content on public land, and for a lot of Americans, that's an incredible thing.

Whether you actually visit these places in person — go hiking in Jewel Basin or hunt in western Montana's backcountry — is almost beside the point. You still own those places, and you benefit from them, either directly or indirectly, because of all the clean air, clean water and wildlife, not to mention the billions of dollars, that our federal lands inject, year in and year out, into our economy. That's a pretty incredible dividend, paid on the principal, or make that the principle, of our public lands.

I'd go so far as to say that here in Montana and across the West, our public lands, which make up 50 percent or more of our states, equate to freedom. Let's make that freedom and prosperity, because almost everything of substance, from our Western heritage to our economy to our recreation, flows from the bounty of our public lands.

That is why it's so disappointing that 51 U.S. senators, every single one of them entrusted with our nation's well-being, recently cast a vote that could help destroy the West — one that could turn over America's public lands to multinational corporations, lock out hunters and hikers, and shift control of our timber, our grazing rights, and our minerals, along with the very lifeblood of the West — our water — to profiteers and foreign interests.

That's right. In an almost entirely party-line vote, 51 U.S. senators just voted in favor of Alaska Republican Sen. Lisa Murkowski's budget amendment to sell off our public lands, with only three Republicans voting no. Colorado's Cory Gardner was the lone Western Republican to vote no, joining all of the Western Democrats.

The senators won't tell you what transferring these lands out of federal management really means. No, they'll stand in front of their microphones, puffed up and proud, and state that they're for smaller government and state's rights and local control. But once

you make your way through the obligatory smoke and mirrors, you come to the truth: This is about power, plunder and money. It's about water, which is the source of all that power here in the West. And it's about the fact that an awful lot of folks back in Washington want to privatize our federal lands.

Montana writer Hal Herring called the vote "an attempt to re-create our country, to vanquish forever the notion that we citizens can hold anything in common. It's a new paradigm, where the majority of Americans are landless subjects with little recourse in the courts or political process."

Now we have an important decision to make. Do we turn our back on this grand experiment in democracy? Do we accept that the future will always be smaller and shabbier than the past? Do we resign ourselves to a world where our freedoms are locked away behind "No Trespassing" and "Keep Out" signs? Or will we choose to fight for what's ours?

Because that's the real question. Will we give up? Or will we as Western citizens stand up and defend the America that was passed down from our forefathers? It brings to mind a question that Elizabeth Willing Powel asked Benjamin Franklin following the Constitutional Convention in 1787. "Well, doctor, what have we got, a republic or a monarchy?"

Franklin's response still rings true today: "A republic, if you can keep it." □

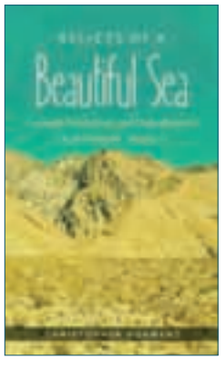
Hiker Bill Browne hangs out with a mountain goat on Montana's Mount Aeneas.
JOHN HENRY DYE

Todd Tanner lives in Big Fork, Montana, and is an outdoor writer and the president of Conservation Hawks, a nonprofit that defends hunting and angling.

Writers on the Range is a syndicated service of *High Country News*, providing three opinion columns each week to more than 70 media outlets around the West. For more information, contact Betsy Marston, betsym@hcn.org, 970-527-4898.

Salt Creek pupfish, *Cyprinodon salinus salinus*. SCOTT HEIN

Refugees from a well-watered West



Relicts of a Beautiful Sea: Survival, Extinction, and Conservation in a Desert World
Christopher Norment
288 pages, hardcover: $28.
University of North Carolina Press, 2014.

Relicts of a Beautiful Sea is a wide-ranging, obsessively detailed and oddly inspiring book — an intriguing tapestry of scientific exploration and natural history that also takes turns as a eulogy, a love letter, a poem and ultimately a plea.

In *Relicts*, Christopher Norment — a professor of environmental science and biology — sets out to consider the non-monetary value of six "relatively obscure" Great Basin and Mojave desert species that we can't eat, hunt or sell: black toads, Inyo slender salamanders and four species of pupfishes.

Why these six species? In part because of their obscurity: Due to their small sizes and relative inaccessibility, Norment writes, they "carry little of the innate appeal" of charismatic megafauna such as gray wolves or whooping cranes, nor do they play much of an economic role. That obscurity allows us to ponder their worth without immediately reaching for our wallets.

They are also, however, aquatic species restricted to tiny patches of habitat in the Mojave and Great Basin deserts — vulnerable to water prospectors, the bright tentacles of Las Vegas and the thirsty whirlpool roar of Los Angeles.

Norment points out that similar species have also survived withdrawing Pleistocene seas, earthquakes, uplift and hot water only to succumb to thirst or thoughtlessness: Tecopa pupfish, for example, which could endure temperatures up to 108 degrees but went extinct after hot springs outflows were developed and combined for bathhouses; Las Vegas dace and the Vegas Valley leopard frog, lost in the 1950s and 1940s, respectively, to groundwater pumping for and expansion of Las Vegas itself; the Ash Meadows montane vole, likely extirpated some time in the 1960s as alkali meadows devolved into peat mines, alfalfa farms and ranches.

After a pause to remember the fallen, Norment moves on to the precarious living, one species and one chapter at a time. As he weighs their worth, Norment visits the animals themselves, the people trying to save them and those who might someday have a hand in their destruction. He travels from the deep past — describing a volcanic eruption 760,000 years ago that could have buried or burned Inyo slender salamanders out of existence, but somehow didn't — to the present and near future, examining the threats the pupfishes face from Las Vegas' and Los Angeles' ongoing searches for water, among other things.

He explores abstract concepts such as loneliness and hope while circling back to concrete and enchanting tidbits of information, such as the world's remaining weight of Devils Hole pupfish — measured in raisins — and what their vocalizations sound like underwater (squirrels gnawing on walnuts).

Norment loves his diminutive subjects enough to actually risk using the word "love." What can a scientist so steeped in wonder communicate to someone who says, as one woman in the book does about extinct Tecopa pupfish, "I think they were pretty tiny, not good for much of anything. You couldn't eat them. Not like trout."?

Norment's answers turn out to be surprisingly good ones. He doesn't try to make a direct appeal to the people who prize false fountains and alfalfa farms far more than desert springs and species (and who — let's face it — are unlikely to read this book).

Instead, he writes a thoughtful and thought-provoking letter to the rest of us: those who didn't know desert aquatic species existed, those who take them for granted or rationalize that they'll survive our tender inattention, and even those who have almost given up, who are already privately lamenting the loss of the tiny beleaguered species and places they love. Especially those.

"Think about how resilient the pupfish are, and what they have endured," Norment writes, "and then contemplate, gently, your own struggles and what you have endured. For all of us, at some time or another, this can be a dogshit world, unbelievably cruel and sorrowful and painful. ... But I will say this: that in my own life I have been consoled and heartened by the strength of pupfish and salamanders. ... Their presence in the world, their insistent example, helps me to endure and go on, too."

BY CEAL KLINGLER

OUTSIDE THE HOOVER DAM

As it turned out, I couldn't tour the Hoover Dam. It was full of magnets.

"Tours are not recommended for anyone who suffers from claustrophobia, or has a pacemaker or defibrillator," read the sign in the gift shop. "Tours are conducted in confined spaces and in a power plant with generators emitting electromagnetic fields."

"Well," I told my friends, "I guess I'll see you guys after." I climbed the long staircase back up into thin October sun. I'd get a tea at the concession stand, I decided. The dam hummed behind me.

By the time I arrived at the Hoover Dam, three years had passed since I'd been through a metal detector. At age 24, I'd had my first internal cardiac defibrillator implanted — insurance against the family arrhythmia. I'd collapsed in a gravel lot. Since my younger sister had multiple cardiac arrests under her belt, my decision seemed obvious.

I'd anticipated many of the changes that accompanied implantation: a month unable to drive, three before I could pull my shirt over my head, and six worrying about jostling the wire in my heart. But I didn't anticipate what it would be like to be a technological person — redefined by what I contained. ("You're bionic!" a friend shrieked.) I was chained to tech; every three months I'd need a doctor to check my ICD. In other ways, my technological options were restricted. I would never have an MRI. I would be patted down by an endless line of TSA agents in blue rubber gloves.

Electromagnetic interference occurs when the waves emitted by one device impede the function of another. Cellphones can keep a defibrillator from doing its job; theft surveillance gates can trigger a shock. The Hoover Dam, of course, was bigger than these. It generated electricity when water spun a turbine, which turned a shaft, which rotated a series of magnets past copper coils, creating a charge. Put through a resistor, this charge became electricity, powering colored fountains in Las Vegas and hair dryers in L.A.

Magnets! I thought to myself, browsing in the snack shop. No, I would never wander the narrow passages beneath all that concrete now. The Hoover Dam and I were contraindicated.

Styrofoam cup in hand, I went out to the patio and pressed my belly against the concrete divider, craning my neck to catch a glimpse of the water. Sparrows nipped crumbs beside me. If I was honest, it was OK to miss the tour. Despite having a motherboard implanted above my left breast, I'd never been charmed by technology. I was grumpy in my complicity, always resisting new developments before lurching into them. I owned a flip phone. I didn't watch TV. So when I looked at the bowed white concrete, gleaming in the sunlight, it was with Ed Abbey's rants in mind. I liked to think I agreed with him: that the dams were less a world wonder than a monstrosity. That a free-flowing river trumped the amenities it could power.

I liked to think I agreed with him, but the defibrillator in my chest was really no different than a dam. Both were part of the cultural belief that man's ingenuity could upend natural laws. Both created the illusion of security; both answered a sense of urgency. Both delayed the inevitable for a while. We'd manufactured water in the desert, a life without death. Even a Luddite like me could see there was human brilliance at work here.

When the first defibrillator was invented, doctors dubbed it the "Lazarus machine." The Hoover Dam, too, seemed the salvation of the Southwest, approved in 1928 to provide irrigation and municipal water to a wide swath of desert, allowing cities to sprawl where before cacti reigned.

And yet, looking at the white bathtub ring on the cliffs along Lake Mead, I knew the inevitabilities were still inevitable: L.A. and Vegas would be constrained by water. And I, of course, would still die. I was cyborg enough to be barred from the dam but not cyborg enough to avoid that dust-to-dust business altogether.

The defibrillator in my chest was really no different than a dam. Both were part of the cultural belief that man's ingenuity could upend natural laws.

And though it was easy to be snide while drinking tea in an environmentally unfriendly cup at a tourist stop, I'd been the one who asked for this dam in my own way, when my cardiologist looked at me in the hospital and said, "What would you like me to do?" I paused a long minute. I gulped down guilt and fear, but in the end I eyeballed him and said, "Put it in." I bought into the myth that we can hold back these forces, that we can rearrange life itself, that technology will save us.

It will for a while, I thought, pulling on a flannel shirt against the morning chill. For one person, maybe that's long enough.

I stared down the dam from a safe distance. □

Katherine E. Standefer writes about the body, consent and medical technology from Tucson.

A view looking down Hoover Dam. DUNCAN RAWLINSON/CC FLICKR

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HEARD AROUND THE WEST | BY BETSY MARSTON

UTAH

The "giant genitalia" gracing a bull statue placed atop Barista's Restaurant in Hurricane, Utah, March 14, created such a humongous brouhaha, reports the *St. George News*, that a few weeks later, the statue was, in effect, castrated. Over 600 of the town's 14,576 residents signed a petition demanding non-renewal of the restaurant's business license because of the bull's offensive, er, member, and though restaurateur Stephen Ward called his brand-new copper statue "beautiful and amazing," he was forced to back down. To many Hurricaners, apparently, the intact bull was too lascivious for the likes of teenagers, who attend high school across the street and are much too young and innocent to be exposed to the differences between male and female mammals.

UTAH **"Giant genitalia" before and after. (See news at left.)** KIMBERLY SCOTT/ST. GEORGE NEWS

GRAND CANYON

Something vitally important is missing from a recent ballyhooing brochure from the developers of Escalade, the controversial proposal to build a tram on Navajo land and then ferry tourists from the Grand Canyon's rim thousands of feet down to the Colorado River. Nowhere is there any mention of a sewage treatment plant for the 4,000-square-foot bathroom that would be built near the river to serve 10,000 tram-riders each day. And "other issues are pooping on the profiteers' parade," reports *Boatman's Quarterly Review*, the magazine of Grand Canyon river guides. One is a lawsuit from 30 grazing-permit holders, who are members of a growing coalition called Save the Confluence. Another obstacle is an Intertribal Compact that gives the Hopi Tribe a vote on approving the Escalade project. So far, Hopi leaders are united in their rejection of it.

WASHINGTON

"Near nature, near perfect" is the motto of Spokane, Washington, but sometimes nature can get a little too close for comfort. How many wild turkeys in your backyard are just too many, for example? More than 120 turkeys have abandoned the backcountry of eastern Washington, where they were introduced to benefit hunters. Now, the big birds hanging out in the city's South Hill neighborhood have discovered that urban life can be rewarding, no doubt because few hunters lurk in backyards. For many residents, that's "too many turkeys traipsing" over their lawns, reports the *Spokesman-Review*. Since last year, the state Department of Fish and Wildlife has fielded some 60 complaints about flocks pooping indiscriminately and squawking loudly in the morning, so it recently hosted a community meeting to propose "search-and-destroy squads." Volunteers would set forth on quasi-Easter egg hunts, though in this case the eggs they found would be slated for destruction or coated with corn oil to prevent them from hatching. A hunter on the paper's website commented that finding nests wouldn't be all that easy, because in 30 years he'd never spotted one in the wild. Another reader recommended bringing back cougars to reduce the wild turkey population, adding, "This is just another in a long legacy of expert wildlife-management gone awry."

ARIZONA

The "cactus doctor" of Phoenix, Rilée Leblanc, loves his ailing patients, telling *The New York Times* that long-lived saguaros radiate personality and character. "And the flowers are some of the most beautiful in the world. You could put a cactus here and just meditate on it for a week." The cactus doctor, whom everybody calls "Frenchie," works every day of the year and still has more patients than he can handle. Considered the symbol of the Southwest, saguaros have become increasingly popular because of their water-frugal ways, yet they're often poorly cared for by their caretakers, who sometimes overwater and crowd them, causing sick cactus skin and precariously leaning limbs. For a cactus doctor, house calls are a necessity, and Leblanc has to erect scaffolding in order to perform surgery 30 feet in the air; "other times his crew works on limbs weighing hundreds of pounds that can easily snap off." Though he can't always help a prickly patient that's dying, he finds that most saguaros are amazingly resilient: "You know, he could have fallen," he said of one resuscitated plant. "You can tell he really wanted to be saved. He's saying, 'I've got more life left.' "

CALIFORNIA

Holding aloft the trophy fish he'd caught, a proud fisherman was standing in a boat approaching a marina in San Diego, when he caught the hungry eye of a sea lion who *really*, really wanted that big fish for himself. The sea lion leaped out of the water "and onto the boat railing," reports the *Los Angeles Times*. But it missed the trophy and nailed the 62-year-old fisherman instead, hauling him out of the boat and holding him under the water for some 15 or 20 seconds. Luckily, the man got away and was pulled back into the boat by his companions, suffering from bites to his hands and feet. Meanwhile, the trophy fish went thataway.

"Good-natured and non-bullying, a buff Orpington has a lot of strengths, especially in the realm of **common sense**, which is **a challenging area for many chickens**."

Ari LeVaux, in his essay, "A street-smart chicken for your backyard," from Writers on the Range, www.hcn.org/wotr