

High Country News

FOR PEOPLE WHO CARE ABOUT THE WEST

Wildlife Services and its eternal war on predators

The federal agency has been researching nonlethal means to protect livestock for decades. So why is it still killing so many carnivores?

Ben Goldfarb | Jan. 25, 2016 | *From the print edition*

The verb that people most often associate with coyotes is “howl,” though it fails to capture *Canis latrans*’ vocal spectrum. Wolves howl. Coyotes also yip, squawk, whine, bray, bark, wail and croon. First one starts — motivated by changing barometric pressure or its neighbor’s insolent gaze or who knows what — and another joins in, and another, and soon a discordant chorus hollers skyward, voices melding into an eerie drone. And then one coyote drops out, and another, and the aural tapestry unravels to a single thread until the original soloist, too, tapers off. And then it’s silent on the steppe.

So it sounds at the Predator Research Facility in Millville, Utah, when I visit Julie Young, the wildlife biologist who directs the station, one crisp October morning. The 165-acre compound, which houses 100 coyotes in fenced enclosures, is operated by the National Wildlife Research Center, the scientific arm of an agency called Wildlife Services. If you're well acquainted with Wildlife Services, a branch of the U.S. Department of Agriculture, you're likely a rancher who relies on the agency, or a conservationist who despises it. Otherwise, you may have only a vague idea that an army of trappers has used your tax dollars to kill millions of animals every year for most of the past century.

Wildlife Services overwhelmingly targets invasive species and nuisance birds: Over 40 percent of its 2.7 million kills in 2014 were European starlings. But it's the slaughter of native predators — mostly to defend livestock and revenue-generating game animals like deer, often on public land — that outrages environmentalists. In 2014, Wildlife Services exterminated 796 bobcats, 322 wolves, 580 black bears, 305 cougars, and 1,186 red foxes. And that's nothing compared to coyotes. That year, the agency killed 61,702, one coyote every eight and a half minutes.

That bloody reputation notwithstanding, scientists at the agency's Predator Research Facility have spent decades considering more peaceful deterrents: guard dogs, electric fencing, motion-activated alarms, and strings of flags, called fladry, that confuse carnivores. Researchers also study coyote behavior — how dominants and submissives interact, how individuals learn from neighbors, how they defend territory. Young and I talk inside an observation tower that stands, panopticon-like, near the facility's center. Below us, pairs of coyotes pace wedge-shaped pens. No two animals look alike — we see rust-tinged foxy ones, robust wolfish ones, scrawny piebalds. One lopes clockwise around its pen; two more jog along a fence line, like mirror images. A coyote trots to the tower's base and stares up, watching the watchers.

The tower's interior has fallen into disrepair: Paint peels from walls, smudges cloud windows, dead flies litter sills. The coyotes have proven too smart to let humans observe them. "They know when you're in here, and no matter how long you sit, some never behave normally," says Young, a Southern California native with startling

aquamarine eyes and an ebullient laugh. “We’ve tried having three people walk in and two walk out. But coyotes can count.” Now Young uses the room to set up video cameras. The coyotes haven’t figured out they’re being recorded, yet.



A coyote shies from a transportation box at the Predator Research Facility near Logan, Utah, where biologists study coyote behavior to determine what might keep the animals from killing livestock. This facility is one of two in Utah; the other is in Millville.

Kristin Murphy

A canid starts to yip, and soon the whole research center is singing again. I ask Young what the nearby town thinks of the ruckus. Nobody seems to mind, she says. One neighbor was stunned to learn that he lived near coyotes at all. He thought he’d been hearing cheers from a football stadium.

That the Predator Research Facility evades detection without being altogether hidden seems fitting: Wildlife Services annually publishes voluminous charts tallying its kills, but other information — why it killed which creatures, at whose behest, and after attempting what alternatives — remains elusive. Activists and journalists have long sought to drag the agency's lethal activities into the public glare. Wildlife Services has weathered exposés (including a 1991 *High Country News* feature), multiple federal investigations, scathing environmental group reports and countless angry petitions. “This is an agency whose time has passed,” Rep. Peter DeFazio, D-Ore., Wildlife Services' most vocal congressional assailant, told the *Los Angeles Times* in 2014.

In response to criticism and evolving science, Wildlife Services claims that it's changing course. Agency scientists and officials have spoken at Humane Society conferences, launched new nonlethal research projects, and held workshops on deterrence techniques. Even 2014's eye-popping coyote kill total represented the agency's lowest figure in more than 20 years, though whether that's a one-year aberration or an emerging trend remains to be seen. “We've always had nonlethal methods, but we're getting more proactive in recommending them,” says John Steuber, Wildlife Services' Montana state director. “We're evolving with the rest of wildlife management.”

Still, 100 years of tradition can breed inertia in any organization. Though biologists at the Utah field station have studied nonlethal techniques since 1972, body counts have mostly stayed level. “The National Wildlife Research Center does good work, and their scientists collaborate with all sorts of non-agency people,” says biologist Bradley Bergstrom, who chairs the Conservation Committee of the American Society of Mammalogists. “But they don't seem to influence field operations.”

All the science in the world means nothing, in other words, unless it sways the agency's field trappers — and the states, counties, municipalities, private businesses and ranchers whose contracts supply half of Wildlife Services' funding. Antipathy toward predators often runs bone-deep among those partners. Reform, therefore, may require

transforming attitudes at the agency's grassroots, rather than merely assailing it through courts and Congress. "Until Wildlife Services is told differently by the people who pay the bills, it's hard to imagine real change," says former agency biologist John Shivik. "Managing animals is easy. Managing people is really hard."



Officials radio-collar a wolf after darting it from a helicopter.

USDA

Westerners have been battling carnivores since before Meriwether Lewis shot a grizzly along a Montana creek in 1805. But Wildlife Services' story doesn't truly begin until 1915, when Congress allocated \$125,000 to exterminate wolves, coyotes and other predators. Sixteen years later, President Herbert Hoover created the Division of Predator and Rodent Control (PARC) to remove irksome wildlife. PARC, Wildlife

Services' progenitor, took plenty of fire: In 1964, a committee of scientists led by A. Starker Leopold — son of Aldo Leopold, America's most famous carnivore-killer-turned-defender — published a report concluding the agency was slaughtering far more animals than could be “justified in terms of total public interest.”

A handful of name changes notwithstanding, Wildlife Services' predator playbook has changed little since. Operations, one former trapper told me, tend to be “very professional, not just driving through the desert with our guns out.” Yet as reporter Tom Knudson documented in a 2012 *Sacramento Bee* series, the agency's specialists, as its trappers are called, have been implicated in various ugly imbroglios, including taking eagles, wolverines and family pets as collateral damage. Whistleblowers have described fellow specialists siccing hunting dogs on defenseless coyotes and leaving traps unchecked for months. “These individuals have such deeply entrenched mindsets that it's hard to imagine how the agency can ever be reformed,” argues Brooks Fahy, director of the nonprofit Predator Defense. Wildlife Services nearly lost its predator control funding to a 1998 House bill, but was saved by eleventh-hour lobbying from ranching-state lawmakers.

To be sure, combating carnivores is just one task among many, and killing animals that damage crops and livestock occupies a smaller proportion of Wildlife Services' attention than it once did. These days, the agency also eradicates harmful feral pigs, fights rabies, protects endangered sea turtles and drives birds off runways. “We help keep people safe and healthy, and strive to do it in a way that won't impact wildlife populations,” says agency biologist Buck Jolley. “You don't think about it when you're flying, but there are people nationwide relocating thousands of raptors to keep planes in the air.”

Still, around a quarter of the agency's budget goes toward protecting livestock. And no predator occupies Wildlife Services' attention like coyotes, fast-reproducing generalists that over the past century have colonized the United States' length and breadth, from Alaskan tundra to Cape Cod beaches. In Chicago, eastern coyotes have learned to follow traffic lights; in New York City, they roam rooftops. In the West, their fierce intelligence makes them

formidable foes for ranchers. Though hazards like disease, foul weather and lambing complications take a much greater cumulative toll on sheep, coyotes killed a reported 118,000 in 2014, far more than other carnivores. Dogs finished second.

According to agency officials, specialists strive to remove only the offending animals when trappers resort to lethal measures. “Although we emphasize the use of nonlethal tools ... no one tool provides 100 percent protection,” Wildlife Services Western Regional Director Jason Suckow and National Wildlife Research Center Director Larry Clark wrote in an email to *High Country News*. “In many cases, producers have already tried and exhausted their nonlethal options.”

Oftentimes, however, coyotes also face population reduction, a presumed-guilty policy critics call “mowing the grass.” Terminate enough coyotes with poisons, traps, and aircraft-based guns, the logic goes, and you can preemptively quell livestock conflicts or protect mule deer. “The closer preventative work is associated with lambing or calving, the more successful it is,” explains Steuber. “If you do it six months ahead, there’s a good possibility that other coyotes will move in. But if you do it right before, you give calves a chance to grow to where they’re less susceptible.” A 1999 experiment in Idaho and Utah found that fewer than 1 percent of lambs were lost to coyotes in pastures strafed with aerial gunning, while losses in untreated fields hovered near 3 percent.

External researchers, however, challenge such studies. Adrian Treves, a University of Wisconsin-Madison conservation biologist, notes fatal flaws with the aerial gunning paper, including substantial differences between the pastures studied. Shoddy experimental design is not an isolated issue. When Treves and his colleagues recently sifted through more than 100 papers on lethal and nonlethal predator management, they found a mere three that adequately deployed randomized controlled trials, what Treves calls the scientific “gold standard”— all of which tested nonlethal methods. “The standard of evidence in the field is really low,” Treves says. “There has *never* been a properly designed study of lethal control.”

Coyotes, too, seem almost supernaturally resistant to eradication. As one maxim goes, “Kill one coyote, and two show up to its funeral.” “When you reduce the number of breeding adults in a territory, there’s more food to go around, and that food is shunted to the pups,” says Bob Crabtree, an ecologist who began studying coyotes in Yellowstone in the 1980s. Pup survival skyrockets — and since alpha coyotes with young kill the most livestock, eliminating coyotes willy-nilly typically fails to reduce predation, an inconvenient truth corroborated by the agency’s own researchers. Extermination can also catalyze disastrous chain reactions: Soon after the government began slaying carnivores in 1915, rabbit populations exploded, and the agency poisoned lagomorphs en masse.

“Wildlife Services bears the burden of proof to justify the indiscriminate killing of predators — economically, ecologically and ethically,” Crabtree says. “I’ll go to my grave saying that.”



Giulia Chivee, an intern at the National Wildlife Research Center near Logan, Utah, watches how coyotes interact with strings of flapping red flags, or fladry, from an observation tower.

Kristin Murphy

fter Julie Young and I leave the tower, we drive to the Predator Research Facility's equipment shed, where jumbled tractors and ATVs await repair. Bouquets of retired traps dangle from pegs on one wall, jaws aglint. "Most of these designs don't get used anymore," Young says. But some do: She hoists one metal apparatus, its padded mouth snapped tight. "These are still the main traps for wolves: the long-spring."

After collecting her doctorate studying coyote territoriality at Utah State, Young spent two years with the Wildlife Conservation Society, researching saiga, an endangered antelope, in Mongolia and examining drilling's impacts on pronghorn in Wyoming. A scientist with those conservation credentials might seem a strange fit for an agency despised by conservationists. But when I ask about that apparent contradiction, Young shrugs. "I've always been

A pragmatic about it,” she says. “Carnivores have personalities. Some are going to cause problems.” That’s especially true of coyotes. “Their behavioral profiles fall along this bell curve on the bold-shy spectrum,” Young explains. “Too shy, and you’re not going to establish a territory. Too bold, and you’re probably getting shot.” Understanding their dispositions has important implications: Discourage a dominant coyote’s taste for sheep, for example, and its subordinates might stay away, too.

Young pursues a dizzying array of deterrence research. With help from engineers, she’s looking into livestock ear tags that will activate an alarm if a sheep’s heart rate spikes, possibly indicating an attack. In the coyote paddocks, she’s experimenting — unsuccessfully, so far — with hormonal sterilization treatments. She’s been distributing bolder breeds of guard dogs from Bulgaria, Turkey and Portugal to ranchers coping with recovering wolves and grizzlies in five Western states. In one room, a French intern busily rolls a bundle of red flags, a design that’s been tweaked to prevent coyotes from adapting to fladry.

Nonetheless, Young defends Wildlife Services’ lethal activities. Among her proudest achievements was designing an M-44 — an exploding cyanide cartridge favored by many trappers — that kills coyotes without accidentally taking swift and kit foxes. “I know people will disagree, because it’s still lethal,” she says, “but this is a great selective tool.”



Fladry didn't keep this coyote from reaching for a morsel.

Kristin Murphy

Every ecosystem, she explains, has an ecological carrying capacity: the number of animals it can sustain given food, water and habitat. But systems also have a *social* carrying capacity — the number of carnivores that their human cohabitants will accept. Wildlife Services, Young claims, boosts that capacity by giving ranchers somewhere to turn when they lose stock. Other researchers disagree: Adrian Treves, who dismisses the theory as “a little blood buys a lot of good will,” has observed that lethal removal actually *reduces* wolf tolerance, perhaps by diminishing the animals’ perceived value. Young, however, recently found that Western ranchers who had lethal options better accepted the wolves in their midst.

“Imagine you’re a rancher: You have guard dogs, you have herdsmen, you put up fladry, yet you still have depredation,” Young says, gazing over the sprawling compound. “Now what do you do? You call us. We’re your last resort.”

he next day, I drive up a long hill overlooking the nearby town of Logan to visit John Shivik, the Predator Research Facility’s previous director. In 2014, five years after he left Wildlife Services, Shivik published *The Predator Paradox*, a book that explores advances in nonlethal management. One needn’t read between the lines to detect his frustration with his former employer. “Given bureaucratic realities ... there is a certain amount of inertia involved” in its preference for lethal control, Shivik writes.

Shivik, a gregarious biologist with close-set blue eyes and tousled brown hair, cut his teeth in coyote research under the tutelage of Bob Crabtree in Yellowstone. When the young scientist assumed control of the Predator Research Facility in 2002, he launched an ambitious nonlethal program, investigating aversive taste conditioning, territorial marking with coyote urine, and a heat- and motion-activated alarm called the Critter Gitter. He even found evidence for potential “guard coyotes,” territorial animals whose fear of fladry also kept submissives at bay.

TWhile Wildlife Services awarded him raises and promotions for publishing in prestigious journals, however, trappers seemed to ignore his research. Sometimes, his nonlethal tools conflicted with traditional ones: M-44s, for instance, may kill guard dogs alongside coyotes, leaving some specialists reluctant to prescribe dogs. At annual state meetings, he found himself politely disregarded. “They were always gracious,” he recalls. “But what I was saying didn’t seem to have any immediate relevance to them.”

Among the few trappers who incorporated Shivik’s research was Rick Williamson, the agency’s longtime Idaho wolf specialist. In 2000, Shivik began supplying Williamson with radio-activated guard boxes that erupt with disturbing noises — shattering glass, tumbling bowling pins — when a radio-collared wolf approaches. Though the boxes only worked on collared wolves, Williamson, with the help of agency scientists, discovered they effectively discouraged predation in small pastures. Yet few trappers shared his interest. “The majority felt like they had a full workload already,” says Williamson,



John Shivik, who became disenchanted with Wildlife Services’ “inertia.”

“and this was going to take more time at the scene versus just setting a trap. I think that was a huge mistake.”

Kristin Murphy

That attitude, Shivik believes, stems partly from Wildlife Services’ funding mechanism, whereby “cooperators” — the agency’s term for those who contract with it — share operational costs. In 2013, cooperators provided the agency \$80 million, compared with \$85 million in federal money. As a consequence, trappers can feel pressure to appease their de facto clients. “I was out with a specialist once, and he said, ‘John, I think the nonlethal stuff is worth trying,’ ” Shivik says. “ ‘But unless I show up with a dead wolf on the tailgate, they don’t think I’m doing my job.’ ”

Sam Sanders, a former Wildlife Services assistant district supervisor from eastern Nevada, corroborates Shivik’s account. According to Sanders, who departed the agency in 2011 and later founded a private pest control company, his supervisors favored aerial gunning for its visibility, even in situations where other tools would have proved more effective. “They’d say, ‘Make sure you fly over that politically powerful rancher’s house so he knows we’re out there doing our job and will funnel state money to the agency,’ ” Sanders recalls.

Former Nevada Wildlife Services Director Robert Beach backs that claim in a 2008 affidavit: “One of the first things I was told by the Sheepmen when I arrived ... was that they could have me removed in a heartbeat if I did not (*sic*) something they felt jeopardized their livestock operations. ... Mr. Paris told me on several occasions that he would have me removed if I tried to take (his trapper) away from him.” The Mr. Paris in question, a sheep rancher, today chairs Nevada’s Predatory Animal and Rodent Control Committee, which helps fund Wildlife Services’ -operations.

The cooperator model may also explain why the battering ram of public outrage has scarcely dented the agency. If you're reading this article in San Francisco or Seattle, you're not an influential constituent, no matter how many petitions you sign. Environmentalists who want to reform the agency, Shivik says, delighting in the heresy, shouldn't fight to slash Wildlife Services' federal funding — they should *double* it, making it fully accountable to taxpayers. "All stakeholders are created equal," he adds as the last glimmers of sun fall on the distant Bear River Range. "But some stakeholders are more equal than others."



Workers hold down a coyote in preparation for a vaccination shot.

Kristin Murphy

Wildlife Services' fealty to its cooperators frustrates critics. But it comes with a promising corollary: If ranchers buy into nonlethal management, specialists may follow suit.

WMany producers already appear to be coming around, in some cases nudged by predator-friendly groups like Defenders of Wildlife. According to USDA surveys, 58 percent of sheep ranchers now employ some form of nonlethal deterrence, compared to 32 percent in 2004. “We fence, we have herders, we have guard dogs, we have sheds for lambs,” says John Baucus, a Helena-based rancher who serves on the American Sheep Industry’s Predator Management Committee and is the brother of former Montana Sen. Max Baucus. “We’ve been working with predators for a long time, and we understand what’s required.”

In Montana, the agency appears to be following ranchers’ lead. According to state director John Steuber, specialists recommended guard dogs 1,655 times in 2014. “You’ll see producers coming out of the feed store with a one-ton pallet of dog food on a forklift.” When the Office of the Inspector General audited Wildlife Services last year, investigators observed nonlethal techniques on every ranch.

What’s more, the agency has taken some steps in response to Shivik’s primary criticism — that nonlethal research doesn’t percolate from scientists to specialists. In 2009, Wildlife Services promoted Michael Marlow, a biologist and ex-trapper, to serve as liaison between researchers, trappers and livestock producers. Marlow’s networking has paid dividends: A tip he gleaned at an American Sheep Industry conference, for instance, led to Julie Young’s



Biologists Julie Young and Eric Gese ready vaccinations for coyotes at the Predator Research Facility near Logan, Utah.

Kristin Murphy

European guard dog project. “We talk about being in contact with livestock more, altering pasture schedules, using scare techniques,” Marlow says in an Oklahoma drawl. “Across the board, we’ve seen people interested in learning how to better protect their livelihood.”

Wildlife Services has also stepped up its education efforts. That’s especially true in Montana, where in January 2015, Steuber launched a series of workshops at which ranchers, conservationists and scientists recommend nonlethal tools, from fencing off chicken coops to safely discarding cow carcasses. A half-dozen other states, including Oregon and Idaho, have also held workshops, and Utah, Nevada and Washington will soon stage their own conferences.

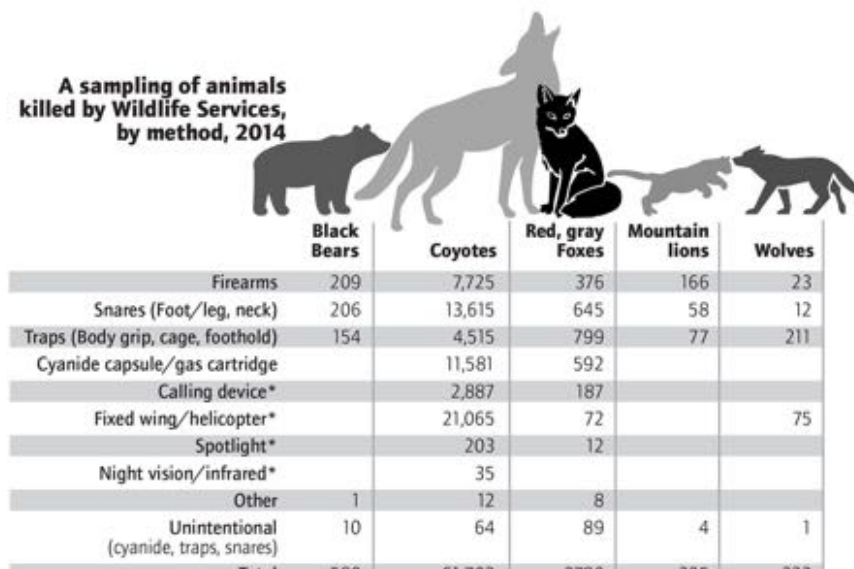
For all its consulting and outreach work, however, the agency’s fundamental approach remains unchanged. Though Wildlife Services’ directives advise specialists to recommend nonlethal methods first, the instructions aren’t requirements, and former trappers say the directives hold little sway. What’s more, the agency doesn’t generally view nonlethal management as its duty. “We get asked all the time, ‘Why doesn’t Wildlife Services use nonlethal more?’ ” says Stewart Breck, a biologist at the National Wildlife Research Center. “Part of the answer is that we do, and people don’t know about it. And part is a paradigm that says it’s not the responsibility of Wildlife Services to use those tools. Specialists may recommend them, but it’s up to the livestock owner to implement them.”

Need help killing the coyotes menacing your lambs? We’ll put out traps. Want to erect an electric fence? We’ll offer advice, but the wire’s coming from your wallet.

Officials claim they lack capacity to deploy nonlethal measures on a large scale. “It would be expensive and impractical to have our limited numbers of Wildlife Services experts dedicated to daily implementation,” wrote Suckow and Clark. But killing takes money and manpower, too: In 2014, Idaho paid Wildlife Services \$140,000 to

gun down 31 wolves — \$4,600 per wolf. Zack Strong, wildlife advocate at the Natural Resources Defense Council, sees that disconnect as illogical. “More producers are beginning to ask, ‘Why shouldn’t Wildlife Services help us prevent conflicts from happening in the first place?’ ”

The agency has begun taking hesitant steps in Montana, where Wildlife Services and NRDC will soon split costs for around \$13,000-worth of so-called “turbo fladry,” flags attached to electrified fences. “People are starting to grasp that predators are here to stay, and we gotta figure out how to deal with them,” says Bryan Ullring, owner of Yellowstone Grassfed Beef, who attended one of Steuber’s workshops in Dillon. Ullring uses range riders to protect his own Centennial Valley herd. “Sometimes that’s going to mean lethal. But I don’t think anybody wants to spend \$5,000 to kill a wolf with a helicopter when there are better ways of doing things.”



total	580	61,702	2,780	305	342
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*Accessories used to aid killing, which would take place by firearm or other means.

SOURCE: USDA ANIMALS EUTHANIZED OR KILLED BY WILDLIFE SERVICES - FY 2014. ILLUSTRATIONS: THE NOUN PROJECT, INCLUDING AMANDA WRAY (COYOTE), LORENZO STELLA (FOX) AND JASON DILWORTH (WOLF)

Percent of operations using various nonlethal methods, by year

	1994	1999	2004	2014
Guard dogs	28.2*	28.2	31.6	40.5
Fencing	29.6	57.0	52.5	54.8
Herding	unavailable data	6.6	5.7	11.0
Fright tactics	7.2	5.1	2.2	3.1
Lamb sheds	unavailable data	46.0	30.8	34.4

*1994 number refers to guard animals in general.

SOURCE: USDA SHEEP AND LAMB PREDATOR AND NONPREDATOR DEATH LOSS IN THE UNITED STATES, 2015

An unlit broom closet tucked inside a Petaluma, California, airplane hanger seems like a strange place to observe those better ways. Yet that's where I find myself one steamy afternoon, surrounded by the dim outlines of mops and boxes. Windex tingles in the air. The only light emanates from a yellow cylinder, a bit chunkier than a thermos, which flashes white, then blue, then red. Some bursts are strobe-like, others, long, lighthouse-style beams.

This is a FoxLight, invented by an Australian sheep rancher. "The lights are random, so it's harder for predators to habituate to it," Keli Hendricks says from the darkness. "You set this out in a field during lambing season, and coyotes think it's people out there."

Hendricks, an amiable rancher with a curtain of blond hair, raises around 300 cows down the road from the airplane hangar, which sits on her father's ranch and vineyard. She despises the wanton predator killing endemic to her industry, and she forbids it on her ranch. "Our cows calve in pastures with coyote packs," she says as we depart the closet. "Coyotes eat the afterbirth and leave. We don't shoot 'em and we don't trap 'em. I'm not saying

we never have problems, but they're rare." Granted, cows are far less vulnerable to coyotes than sheep. Still, fire a few warning shots over coyotes' heads, and Hendricks says you can almost train them. The well-behaved resident packs keep out troublesome transients — the "guard coyote" dynamic hypothesized by John Shivik.

Hendricks' gentle approach would make her an outlier in Wyoming, but it's less remarkable in Marin County, a liberal, affluent community just across the Golden Gate Bridge from San Francisco. More than 15 years ago, Marin expelled Wildlife Services and implemented a nonlethal approach to deterring coyotes, a campaign led by an activist named, appropriately, Camilla Fox. Today, Fox, with help from Hendricks and other volunteers, runs Project Coyote, a Larkspur-based nonprofit devoted to human-carnivore coexistence — and one of the noisiest bees in Wildlife Services' bonnet.

Carnivore advocacy comes naturally to Fox, a slim, laser-focused woman whose father, Michael, studied canids at Washington University in St. Louis. Camilla grew up alongside an orphaned wolf named Tiny, which had imprinted on her father. (She's reluctant to share that detail for fear it will encourage others to make pets of wild predators.) Michael fed the wolf roadkill he peeled off the streets himself. "Tiny was the most intelligent, conscientious, sensitive being I have ever been around," Fox tells me inside the echoing hangar.

Fox moved to California in the early 1990s, eventually joining an advocacy group called the Animal Protection Institute. Shortly thereafter, Wildlife Services — then known as Animal Damage Control — proposed inserting Compound 1080, a once-banned poison, into special livestock collars that would administer a lethal mouthful to any predator that bit them. Fox and other advocates fought the idea, and in 1998, California voters passed a ballot initiative prohibiting 1080, sodium cyanide and steel-jawed leghold traps. Soon local conservationists were clamoring for Marin to drop its Wildlife Services contract altogether. Stacy Carlsen, Marin's agricultural commissioner, sought a compromise: What if the agency killed predators only as a last resort? Wildlife Services, however, rejected the bargain. The restrictions, wrote one official, "hamper the effectiveness of providing needed services." It was Wildlife Services' way or the highway. Carlsen reluctantly pointed the agency toward the highway.



A FoxLight can fool coyotes into thinking people are around by flashing random light.

Courtesy Project Coyote

Not all of his constituents were pleased. “My job is to promote agriculture, and you want to back your guys,” says Carlsen, a genial man with a tan pate. “At a gut level, services were being taken away from a community.” What, ranchers wondered, would replace their federal support?

The answer emerged in 2000 -- the Marin County Livestock and Wildlife Protection Program. The arrangement rerouted Wildlife Services contract funds to ranchers to help them build fences, house guard dogs and llamas, install alarms, and change husbandry practices. Ranchers with more than 200 sheep could receive up to \$2,000, smaller flocks up to \$500. You could still shoot or trap coyotes on your

property, but you’d have to do it on your dime.

The Marin program, in other words, flipped Wildlife Services’ paradigm on its head: The county provided support for nonlethal measures, and laid the burden of killing at ranchers’ feet.

But did it work? Fox interviewed ranchers, pored over records and collected data for a master’s thesis at Arizona’s Prescott College. Her study, completed in 2008, showed substantial reductions in both wildlife killed and in annual predator take of sheep and lambs, from 24 head per ranch to just 8.5. These days, the program covers over 2,000 acres of sheep ranches, as well as 11,000 head of poultry.

Among the beneficiaries is Marcia Barinaga, a dairy owner who grazes sheep on around 100 acres. Though Barinaga grew up in New York, her grandparents raised sheep in Idaho, and her dad recounted harrowing tales of coyote attacks on livestock. After a career in biology and journalism, Barinaga returned to her ranching roots in 2009. She's used Great Pyrenees guard dogs since day one — county payments cover a substantial portion of food and vet bills — and has installed impermeable fences. She's never lost a lamb.

“I hear coyotes howling every night, and it used to strike fear into my soul,” Barinaga says. “But the dogs have proven so effective that it doesn't scare me anymore, and I feel no need to kill a coyote. I'm proud of this program.”



Big Otis, a Great Pyrenees, stands guard as Marcia Barinaga feeds her flock of ewes in Marin County, California.

Terray Sylvester

Wildlife Services, however, has fought to prevent Marin's model from spreading. Soon after the program launched, Carlsen was attending California's annual agricultural commissioners conference when he made an unpleasant discovery: Wildlife Services had used his data — inaccurately, Carlsen says — to distribute reports detailing how much money other California counties stood to lose if they followed Marin's lead. "I thought that was about the lowest thing they could do," he says.

More than a decade later, the agency's opinion of Marin remains unchanged. When Wildlife Services published a draft environmental assessment evaluating its Idaho operations in July 2015, it rejected a Marin-style option as impractical and ineffective. The agency based this dismissal entirely on a 2006 analysis by Stephanie Larson, director of the University of California's Sonoma County extension office, which suggested that Marin's

Wconversion to nonlethal management led to more dead coyotes. “Taxpayer dollars aren’t being used to manage coyotes, but ranchers are shooting whatever they see,” Larson claims. Dissenting wildlife biologists, however, point out that Larson’s paper lacks listed sources for its coyote estimates and makes the dubious assumption that ranchers rarely killed predators before losing their trapper.

Still, no two ranches are alike, and techniques that deter coyotes in Barinaga’s tight pastures might prove less manageable in the sprawling meadows grazed by ranchers like Bill Jensen. For years, Jensen, a fourth-generation sheepman whose 500 acres overlook Tomales Bay, ranked among the Marin program’s most outspoken advocates; indeed, he helped author it. Today, his fields are crisscrossed by county-funded electric fences, which helped Jensen limit predation to just six sheep last year, a fraction of his historic losses. But the fences require constant upkeep: Trees fall on them, floods wash them out, pampas grass engulfs them. So Jensen keeps a .22-250 varmint rifle in his truck. He estimates he killed 35 coyotes in 2015.

“Nonlethal is the term that makes it palatable,” Jensen says as we rumble past two dappled lambs nudging at their mother. “But all it’s changed is who kills the coyotes. I’m tired of being pointed at as the model for everyone. This is just another idea.”



A coyote attacking a sheep.

USDA

Jensen contends that escalating depredation has pushed some sheepmen out of business and compelled others to convert to cows. Budget cuts have forced Carlsen to cease compensating ranchers for slain sheep, an initial feature of the program. Even so, agricultural reports state that Marin's sheep industry has grown by 2,500 head since 1999. Nearby Mendocino County, which retained its trapper, has lost 6,000 sheep.

Yet despite pressure from Project Coyote and other animal groups, California counties have been slow to follow Marin's lead. The city of Davis terminated its Wildlife Services contract after a trapper triggered public outrage by killing five coyotes on a golf course in 2012, and Sonoma County defected in 2013. But other dominoes haven't toppled. Humboldt and Mendocino Counties suspended their contracts, but ultimately opted to renew. Mendocino's contract remains in jeopardy: The county now faces a lawsuit from wildlife groups for failing to evaluate Wildlife Services' environmental impact before re-upping.

Two recent court cases suggest the lawsuit may succeed. In July 2015, an appeals court ruled that the conservation group WildEarth Guardians had standing to challenge lethal activities in Nevada, where it had sued the agency for relying on outdated science. And in December, a judge barred Wildlife Services from killing wolves in Washington without preparing a full environmental impact statement, deeming that experts have "significant disagreement" about whether lethal removal works.

That Wildlife Services has sought to discredit Marin's model rather than learn from it is, Fox believes, proof that the agency hasn't truly embraced nonlethal methods. "Wildlife Services has done everything it can to make sure other counties don't sever their contracts," Fox says. "We are such a target."



Camilla Fox, founder and director of Project Coyote, helped push through a California ballot initiative to ban certain methods of killing predators.

Terray Sylvester

In December, I travel to the Hopland Research and Extension Center, a University of California field station tucked in 5,300 acres of Mendocino woodland, to see a Wildlife Services workshop in action.

Though the mood is amicable enough, a glance around the room reveals entrenched battle lines. Trappers in Carhartts congregate on the left side, while activists, Keli Hendricks among them, cluster to starboard. A parade of Wildlife Services scientists — Michael Marlow, Stewart Breck, Julie Young — detail their research. “I can think of people who hate the fact that I work for the agency I work for,” Young says at the end of her presentation. “But 90 percent of what we’re trying to do is the exact same thing.”

IThere's some truth to that: Camilla Fox preaches the gospel of FoxLights; Young has a FoxLight sitting in her facility. Guard animals are a pillar of the Marin program that Fox champions; Young studies the efficacy of new breeds. Where the agency and its detractors differ is in the application of those techniques — should nonlethal be the foundation of a predator management regime that kills only as last resort, or a tool on the same shelf as airplanes and cyanide? How acceptable should it be to slaughter coyotes? Each answer requires cracking open another question: Who belongs on the land, and for what purpose? How much risk should ranchers accept? What is a coyote's life worth — or a sheep's? Who pays, in the end?



Marin County Agricultural Commissioner Stacy Carlsen broke ties with Wildlife Services when the agency refused to hold off on killing predators unless absolutely necessary.

Terray Sylvester

Those philosophical nested dolls have ecological and economic answers. But wildlife management is also a cultural dilemma, one whose spiritual and ethical facets frequently supersede technical ones. Many ranchers feel a moral obligation to defend their stock by any means necessary; for their part, animal activists see inflicting superfluous suffering upon individual carnivores as profoundly wrong. Today, too, many Westerners regard lethal management as an agrarian relic, one that no longer reflects the region's urbanized, recreation-oriented reality. As land changes hands, as "best and highest use" swings from sheep and cows toward hiking and conservation, the very meaning of wildlife evolves as well. Once, predators signified an impediment to making a living. Now vast segments of the public believe they're one of the things worth living for — an evolution that has yet to permeate Wildlife Services' cost-benefit analyses.

Wildlife Services' foes often point out the hypocrisy of conservative producers demanding federal aid when carnivores come calling. As Predator Defense's Brooks Fahy asks: "Why should we subsidize sheep ranchers and not, say, plumbers?" It's a fair question, one that Fahy used in 2005 to convince Oregon's Lane County to end its predator control contract. Then again, sustaining ranching, at least on some private lands, provides a bulwark against the tide of subdivision — the classic "cows, not condos" argument. Wildlife Services' prioritization of M-44s and aerial gunning may contravene national sentiment and available science, but preventing conflicts between the wild animals we worship and the domestic ones we eat qualifies, in some cases, as the public interest. The need for reform runs deep, but a Wildlife Services that kills as a last resort rather than a reflex, and that first and foremost distributed guard dogs and fladry and alarm boxes — the techniques that its own researchers have devoted their lives to developing — could be a valuable agency indeed.

After the workshop, a small cohort of ranchers, activists and trappers wander up to a 28-acre pasture, a field where Camilla Fox had proposed a series of FoxLight trials. Sunset bathes the hills; ungulate pellets squish underfoot. "Sheep tend to sleep in the highest spot in the pasture," says Jeff Furlong, Sonoma County's trapper, pointing to a clearing. "You could put the light up here and get it as close as possible."

Furlong, whose position was partly funded by Wildlife Services until Sonoma dropped its contract, also moonlights as a rancher in Marin County. At an agricultural meeting nearly a year back, Camilla Fox had asked the room whether anyone might be willing to try out FoxLights. Furlong, the trapper, was the sole volunteer. Ravens hammered his new lambs, but *Canis latrans* mostly left him alone, though he still snared a few that tried to breach his pasture. "Coyotes will habituate to anything," Furlong says; he's worked with ranchers who keep 22 guard dogs and suffer predation nevertheless. "But if it helps for two weeks during lambing season, it's worth it."

Back at the grassy parking lot, Fauna Tomlinson, a Project Coyote volunteer, hands Furlong two FoxLights still enclosed in packaging. He's recommended the devices to his producers, and decided to buy more himself. Tomlinson claps her hands in delight. "We're going to save some animals," she cheers. Furlong smiles tolerantly

and stows the FoxLights in his truck as the light fades over Mendocino County. In the hills, coyotes prepare to hunt, the chorus silent, for now.

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Coyotes at the Predator Research Facility near Logan, Utah, where non-

lethal methods of predator control are studied.

Kristin Murphy