Lion Hunt, detail of two men and a lion, 1621 (oil on canvas), Peter Paul Rubens, (1577-1640) / Alte Pinakothek, Munich, Germany, Giraudon / The Bridgeman Art Library

FEATURE

Killing predators stands as one of the most age-old and enduring forms of wildlife management. Even now, myth and politics trump ecology. Is there a way out?

US *Or* THEM

By William Stolzenburg

IN 1963, A PRESTIGIOUS PANEL of biologists was appointed to review the U.S. government's branch of Predator and Rodent Control. The panel looked into this bustling corps of civil-service hunters and trappers and poisoners, who on a budget of some US$6 million reported 191,000 animals vanquished that year. Their take included bears, bobcats, mountain lions, wolves, badgers, and foxes—along with a menagerie of lesser vermin. Chief among the dead were 89,653 coyotes, the tricksters of native legend, the lamb killers, and the arch-nemesis of the western livestock industry.

The examining committee, led by A. Starker Leopold, was not so favorably impressed with the government's body count. In its resulting Leopold Report of 1964, the first in a series of top-level critiques and reprimands over the following decades, the committee charged the predator controllers with catering to the livestock industry, ignoring science,

and wasting not only taxpayer money but also innocent multitudes of the nation's wildlife. "It is the unanimous opinion of this Board," Leopold and company summed up, "that control as actually practiced today is considerably in excess of the amount that can be justified in terms of total public interest."

Forty-three years later, it appears that little but the name has changed. Federal predator control (now Wildlife Services) with its hunters, trappers, and poisoners and with a livestock protection budget of roughly US$10 million, is killing more than 100,000 native predators each year. Topping the casualties are some 75,000 coyotes.

To the half-interested bystander, it's a case of *déjà vu*. To the impassioned activist, it's a nonstop witch hunt long overdue for retirement. And to the conservation biologist, it is an embarrassing contradiction between science and practice. Even as scientists learn more about the ecological value of predators and the intricacies of managing them, the practice of simply killing them endures. The answer to the conundrum, it turns out, requires digging deeper into the human mind than conservation scientists are used to venturing.

The chronic disconnect between science and practice seems more pronounced than ever as new predators from the past and new rumblings of predator control—also from the past—are resurfacing.

TEN YEARS AGO, as a master's student at the University of Nevada, Reno, Kim Murray Berger was intrigued by a research proposal that came across her desk, suggesting that coyotes respond to persecution by producing more coyotes. That premise alone cast suspicion upon the prevailing logic of a venerable U.S. industry: chronically killing coyotes by the tens of thousands for livestock profit. "I was surprised to discover that a good cost-benefit analysis had never been done," says Berger. "It just seemed odd that we would continue to invest public resources in a program when we had no idea if it was working."

So Berger—now with the Wildlife Conservation Society and studying the ecological role of coyotes in Grand Teton National Park—undertook her own investigation into the mysterious economics of organized predator control, starting with the U.S. sheep business. During the industry's heyday in the 1940s, 56 million sheep grazed U.S. pastures and public rangelands—a herd that has since withered by 85 percent, thanks in large part to the coyote, claim the sheepmen.

To stanch the bleeding, federal agents have been trying to please the complainers by trapping, gassing, poisoning, shooting, and snaring coyotes by the millions with an army and arsenal costing US$1.6 billion over the last sixty years. More recently, they've also been attempting to sterilize, scare, and otherwise trick the trickster away from the gasping patient that is the U.S. sheep industry.

One might ask, as Berger did in a 2006 issue of the journal *Conservation Biology*, isn't it time somebody checked their assumptions? (1) Berger, for her part, has expanded the interrogation beyond the coyote. It turns out the biggest culprit by far to explain the missing sheep is the high price of hay. Wages and lamb prices are important players, too. Even the rancher's age has more to do with his predicament than do predators. At the statistical bottom of Berger's list of prime suspects sits the coyote.

The coyote's persecution should come as no surprise. As long as animals have been domesticated, people have been killing wild

Opposite:
Red wolf (*Canis rufus*). Photo by John and Karen Hollingsworth/US Fish and Wildlife Service

Above: Mountain lion (*Puma concolor*) chasing snowshoe hare (*Lepus americanus*), Montana, USA. Photo by Mary Plage ©osf.co.uk. All rights reserved

predators in their defense. At least 2,500 years ago, Athenian statesmen offered bounties on wolves. In America, bounties on predators date from the time of European colonists.

Common or rare, killing predators is still practiced wherever the predators can be found. Cheetahs in Namibia, snow leopards in India, wild dogs in South Africa, pumas in Patagonia—all are under the gun. The latest census of lions in Africa has come in at 23,000 animals, less than one-fourth of the cats believed alive a decade before. In Kenya, young Maasai warriors, who once used only spears to prove their manhood, have added poison to their arsenal. In Europe last year, a celebrated brown bear (nicknamed Bruno) traveled from the Italian Alps to become the first wild bruin in Germany since 1835. Otherwise adorable, Bruno was also a mischievous bear—he ate a few sheep, killed some rabbits, tended to lounge in public places—and hence was tracked to a Bavarian alpine meadow and shot by contract hunters.

THERE IS LITTLE ARGUMENT that certain carnivores in certain situations can make life miserable for those struggling to make an honest living raising easy prey. Nor would many deny that a strident and sometimes lethal defense is indeed justified. But there is no end to the wrangling over what passes for justified killing.

Much of the dispute centers on selectivity, the degree to which the offending predator—and only the offending predator—is targeted. Whereas modern biologists would most often recommend surgical tweezers in that regard, the nostalgic tool of choice for those in charge remains the sledge hammer: kill enough coyotes—or bears or wolves or cougars, goes the thinking—and the problem will be solved.

Kim Berger is not the first to spell out the logical contradictions inherent in the sledgehammer philosophy. In a 2004 synthesis paper reviewing the state of coyote-depredation management, three scientists methodically pointed out the paucity of controlled studies to justify the millions of dollars and the multitudes of lives being spent. (2) By way of contrast, they pointed to their own work at the University of California's Hopland Research and Extension Center, a veritable factory of grad students and postdocs churning out dissertations and peer-reviewed publications on coyote and sheep ecology. The key and consistent point coming out of Hopland was that not all coyotes kill sheep.

Like their wolf cousins, coyotes are territorial pack animals ruled by a breeding pair—the alpha pair. Fourteen years of radio tracking and DNA testing at Hopland confirmed what the wisest trapper knows by experience—that practically every sheep killed by a coyote is killed by an alpha coyote.

Alpha coyotes are the savviest and most suspicious of the clan and hence the hardest to catch. The Hopland researchers found that randomly slaughtering a bunch of coyotes to protect a flock of sheep was as effective as killing no coyotes at all. They found that the most promising strategy to save sheep lay not in wasting the countryside of coyotes and other innocent bystanders but in understanding the complex coyote society.

"My bag has been arguing against nonselective control, based on everything we know about it," says Michael Jaeger, coauthor of the 2004 review. Ironically, Jaeger is a zoologist employed by the research arm of the USDA's Wildlife Services, whose operations arm continues to invest heavily in the very form of predator control that Jaeger's research invalidates. "It would probably be safe to say I'm not very popular among the operations people that advocate that."

Randomly slaughtering a bunch of coyotes to protect a flock of sheep was as effective as killing no coyotes at all.

ANOTHER ISSUE RAISED by Jaeger and colleagues but seldom accounted for by the predator bombers is that of collateral ecological damage. Over the last several decades, the long-speculated role of predators as ecological keystones and stabilizing forces of nature has been steadily fortified by scientists bearing hard data. From various ends of the biosphere where top predators have gone missing, investigators are coming back with reports of ecosystems oddly askew, of herbivores running unchecked, of middle-management predators shaking the lower levels of the food chain.

In 62 forest tracts across northern Wisconsin, ecologists Tom Rooney and Donald Waller have documented the demise of one in five species of native plants over the last half-century. The species tallies are most conspicuously short

in areas that are off-limits to deer hunters, the closest proxy to the long-gone wolves and cougars. The chief predator is now the white-tailed deer, and it is devouring the forest. What Waller refers to as "the slow-moving catastrophe" of lost species runs from Wisconsin to the Atlantic coast, throughout the predator-free, deer-plagued forest of the eastern United States.

A similar form of herbivorous clearcutting is taking down kelp forests across the Aleutian archipelago, where for decades marine biologist Jim Estes and colleagues have watched the rise and fall of kelp in concert with sea otter populations, which prey on kelp-eating sea urchins. Where sea otters disappear, sea urchins amass, grazing the marine forests down to urchin barrens.

Tropical ecologist John Terborgh recently documented "an ecological meltdown" in the predator-free archipelago of a man-made lake in Venezuela. In 1986, the rising waters of a huge hydroelectric dam created several hundred hilltop islands. Most were too small to harbor jaguars and harpy eagles. Leaf-eaters such as iguanas, howler monkeys, and leaf-cutter ants survived at densities up to 100 times their mainland norms. In turn, the most crowded of these small islands have become menacing tangles of weedy vines and scrawny trees, with saplings surviving at half the rate of those in predator-patrolled forests.

In one of the few places where native predators have been reintroduced, a brilliant display is underway of what animals who kill can add to life. For the past decade, packs of gray wolves have run loose in Yellowstone National Park. Their presence has apparently transformed the land's living fabric. For the previous 70 years, willows had been chewed to stubs by the world's largest herd of elk. Now, with wolves patrolling the stream valleys, willows have suddenly and conspicuously sprouted into thickets two meters tall. With the willows have come beavers, songbirds, salamanders, trout, and muskrat. The windfall of elk carcasses has drawn record gatherings of scavengers—ravens, magpies, eagles, grizzlies, and fellow beneficiaries—twelve species in all.

Even the coyote is on record as an enriching force of nature. Over the past century, 75 populations of scrub and chaparral birds on the outskirts of San Diego have winked out as urban development tattered their habitat. They've survived best where coyotes still rule. Conservation biologists Kevin Crooks and Michael Soulé offer an explanation in a 1999 paper in *Nature*: coyotes evict smaller carnivores, most significantly the birds' most lethal predator—the domestic cat. (3) Where coyotes no longer patrol, foxes, raccoons, opossums, and cats take charge. Soulé coined the term "mesopredator release" to describe the phenomenon.

When the top predator is away, the prey will play. It's an old adage backed by modern science, suggesting that even the stockman who takes aim at the coyote risks shooting himself in the foot. In the early 1990s, in a short-grass prairie of western Texas, PhD candidate Scott Henke set about measuring how other animals responded when coyotes were removed. Aerial gunners killed 354 coyotes on half of Henke's 20,000-hectare study area. Within nine months of the shooting, 11 of 12 rodents species had disappeared, and the range had been overrun by the twelfth. It was no big surprise that skunks, foxes, badgers, and bobcats flourished (Soulé's mesopredator release), gobbling who knows how many quail and other ground-nesting birds. Another finding of particular interest to the rancher: in the coyote's absence, black-tailed jackrabbits tripled in number, nibbling merrily on what might otherwise have been cattle forage. "Biologists need to remember," implored Henke, "that indirect effects are the rule rather than the exception in most ecosystems."

NO MATTER WHAT biologists may remember, it's fair to say their findings haven't exactly rocked the command centers of predator control. And the chronic disconnect between science and practice seems more pronounced than ever as new predators from the past and new rumblings of predator control—also from the past—are resurfacing.

Wolf packs are roaming again where they have been missing for most of the past century. Mountain lions are popping up in places where people don't remember ever having seen them before. The wolves and lions have not only ranchers fearing for their livestock but also game

commissioners fearing for their sport-hunting constituency and city councilmen for their voting citizenry. The apparent, albeit exaggerated, resurgence of the land's top carnivores has wildlife managers now parroting the livestock industry's everlasting rally cry: it's either us or them.

In January 2005, ten years into an endangered-species experiment to return gray wolves to the long-vacated wilds of Idaho, the US Fish and Wildlife Service rewarded the state's participation by granting it managerial authority over its new wolves. One week later, the state of Idaho unveiled a plan to begin killing those wolves. Their objective was ostensibly to boost elk numbers in one of their big-game hunting units, the logic of which still escapes James Peek, noted wildlife biologist from the University of Idaho: "The Clearwater elk decline is fundamentally attributable to habitat," he says, "and the efforts to cure it by killing off elk predators are akin to curing the common cold with an aspirin."

In Oregon, the most recent scapegoat is the mountain lion. Commissioners from Jackson County have hired a houndsman—on a half-yearly salary starting at US$30,000—to kill mountain lions before they hurt somebody. . . someday; for what logical reason, lion experts are hard-pressed to say. "The belief . . . that increased harvest or off-take of cougars will reduce the risk of an attack is simply not based on any scientific analysis and is logically deficient," notes biologist Rick Hopkins, who calculates an Oregonian's risk of attack by cougar somewhere "on the order of 1 to 100 million or more."

"WE'RE OPERATING in the realm of perception," says Hopkins. "We're not operating in the realm of science." It is one task for the conservation scientist to debate the viability of a vanishing species or argue the physical boundaries of a sanctuary. It is another to try rewiring an antipredator psyche forged over the millions of years of pressure-heated human evolution.

For a relative eternity preceding that last-minute revolution of agriculture, unarmed humans competed tooth and nail for meat and marrow with an intimidating horde of predators on the open plain. In a neighborhood roamed by lions, leopards, hyenas, and wild dogs, the slow and skinny ape often became the meat itself. In such a fiercely competitive arena, fear—and its alter ego, aggression—helped spare humanity.

From this anthropological perspective, there is no reasoning away the knee-jerk rage of the twenty-first-century farmer upon finding his pasture littered with dismembered lamb. It is a rage grounded in ancient fear and hunger. As for the hired gun who then comes to exact revenge on all perceived enemies of his friend the farmer, his is an act that some may call dirty and cruel and others may label altruistic.

If there is one comforting consolation for the predator conservationist, it is that fear and aggression are only part of the evolutionary equation. If such prehistoric psychoanalysis holds true, then curiosity and reverence served as benevolent countercurrents to the blind violence. Long ago these were traits that helped the human animal learn the art of survival, if not the grace of sportsmanship, from its most dangerous competitors. And so these traits remain, manifested as the inner magnets that bring world travelers to Serengeti lion safaris and throngs of wolf-watchers to Yellowstone's Lamar Valley. Therein may be reason to believe that the human capacity to live with predators may one day overhaul its overwrought habit of killing them. ❧

Literature cited:

1. Berger, K.M. 2006. Carnivore-livestock conflicts: Effects of subsidized predator control and economic correlates on the sheep industry. *Conservation Biology* 20(3):751-761.

2. Mitchell, B.R., M.M. Jaeger, and R.H. Barrett. 2004. Coyote depredation management: Current methods and research needs. *Wildlife Society Bulletin* 32(4):1209-1218.

3. Crooks, K.R. and M.E. Soulé. 1999. Mesopredator release and avifaunal extinctions in a fragmented system. *Nature* 400:563-566.

William Stolzenburg is a freelance journalist currently writing a book on the ecological consequences of our fellow predators' demise.