

Predators in the 'Hood

As cougars, coyotes, and bears spread into backyards and downtowns, science is helping to show how people and predators can coexist

TWO YEARS AGO, IN JUNE 2011, A COUGAR wandered through backyards and peered into homes in Milford, Connecticut, the first mountain lion in that state in more than 100 years. Later that same year, a gray wolf crossed the Oregon border into California, the first wolf in that state in more than 80 years. Black bears now lumber through subdivisions in Ohio and Missouri, states that were bearless until recently. And coyotes, once restricted to the prairie states, now live from Panama to Alaska, including a booming population in downtown Chicago. The only chunk of North America that coyotes have not colonized is Long Island. “But it’s only a matter of time before they do,” says Mark Weckel, a conservation biologist at the American Museum of Natural History in New York City who is happily following coyotes’ spread into his city.

Once hunted nearly to extinction in the lower 48, America’s biggest predators are making a remarkable comeback. Their return has sparked a range of emotions, from surprise and joy to demands that the animals be harshly controlled, if not shot outright. Europe is experiencing a similar resurgence, and similar reactions (*Science*, 3 November 2006, p. 746). Recently, the Dutch were astonished to learn that a wolf had made its way to the Netherlands from Eastern Europe—the first since 1897—while French shepherds complain that wolves slaughter sheep and endanger their way of life.

Yet ecologists agree that the animals benefit ecosystems, and many citizens,

At home. An American black bear roamed downtown Aspen, Colorado, on a summer night.

especially in cities of the western United States, seem willing to have them back, says Stanley Gehrt, a wildlife biologist at Ohio State University, Columbus, who tracks Chicago’s coyotes. That leaves scientists, conservationists, and wildlife managers all scrambling to figure out how to best manage animals that literally live next door and are capable of killing humans. “If you’re interested in large carnivores, it’s a very exciting time,” Gehrt says. “There are more people than ever and yet we’re seeing a resurgence and acceptance of these predators. Thirty years ago, no one would have predicted this would happen.”

On the move

Several factors are spurring the predators’ expansion. First, the landscape is getting greener: Forest land has expanded by 28% across 20 of the northern states, even as the human population has jumped by 130%, according to a 2012 U.S. Forest Ser-

Online

sciencemag.org

Podcast interview with author Virginia Morell (http://scim.ag/pod_6152).

American Black Bear

Ursus americanus, 57–250 kg

Omnivore: Eats nuts, berries, insects, salmon, fawns

Populations growing; 15,000 live in Pennsylvania alone

vice report. Cities contain more tree cover, plus bountiful white-tailed deer and cottontails. “Maybe having coyotes living next to us isn’t what we were going for when we talked about ‘greening’ our cities,” Weckel says. “But this is the result—and it’s a positive thing. If they’re successful here, it means we’ve succeeded.”

Predators bring ecological benefits: Coyotes help control Canada geese; black bears spread seeds; mountain lions and wolves eat deer. Wolves have helped restore Yellowstone National Park, for example, although managers face criticism from all sides (see sidebar, p. 1334).

In addition, most of North America’s surviving predators have traits that make coexistence at least possible, says David Mattson, a wildlife biologist with the U.S. Geological Survey in Flagstaff, Arizona. “They’re the last of the large Pleistocene carnivores and they’ve survived because they’re the shyest and least aggressive,” he says. “Most of them try to avoid [confronting] us.”

Take the black bears of Durango, Colorado, a community of 20,000 people that abuts the 1.8 million-acre San Juan National Forest. At a recent meeting,* Heather Johnson, a wildlife researcher with Colorado Parks and Wildlife in Durango, told of her informal survey of the city’s school kids. “If you ask them if they’ve seen a bear in the wild, one or two will raise their hands. But if you ask, ‘Have you seen a bear in your backyard?’ every hand goes up.”

During the dry summer of 2012, a black bear broke into someone’s home or car in Durango most every night. Johnson and her team trap and count bears within 10 kilome-

ters of the city to try to understand why. One reason is obvious: Bears need 20,000 calories per day in the late summer and can eat the same kinds of foods we do. Plus their huge home ranges, up to 260 square kilometers or more, inevitably overlap with some neighborhoods, where they find bounty in fruit trees and dumpsters. “It’s a perfect storm for bear-human conflicts,” Johnson says, adding that the same pattern afflicts many cities in the mountain west.

Although bears increasingly encounter humans, the interactions are rarely violent. Since 1900, black bears have killed only 14 people in the lower 48 states. As a result, we’ve reduced “the mindset that we should get rid of every bear we run into,” says Brian Scheick of the Florida Fish and Wildlife Conservation Commission in Gainesville.

In Durango, for example, despite 431 complaints in the summer of 2012—about bears interrupting barbecues, ripping off siding, and eating trash—residents are surprisingly tolerant. In a formal survey,



Cougar

Puma concolor, 42–62 kg

Prey: Deer, elk, bighorn sheep

Seldom seen, but found across the West, including in Los Angeles

Johnson’s agency found an almost 100% approval rating for bears. “People love the bears,” Johnson says.

Occasionally bears may scratch someone, if a person acts foolishly by feeding it. Or they may break into someone’s home, as a few have done in Durango. “People don’t see their behavior as endangering themselves and the bear,” Johnson says. But after such incidents, the animal may be identified as a “problem bear,” requiring managers to try to capture or kill it.

Lethal force?

When a bear—or a cougar or coyote—becomes a nuisance, officers typically reach for a gun. It “is the easiest thing to do,” Johnson says. “But there’s no evidence that

this is effective on a large scale.” A growing number of wildlife researchers say that shooting a predator often doesn’t solve the problem, because it merely opens territory to another animal. “It isn’t a simple numbers game,” says Robert Wielgus, a wildlife ecologist at Washington State University in Pullman.

For the last 30 years, Wielgus and his colleagues have studied what happens when cougars and grizzly bears are heavily hunted. In 1996, Washington state passed a law banning hunting cougars with dogs—the best method for finding the elusive animals. Some livestock owners feared that the population of mountain lions, as cougars are also called, would soar, leading to more stock losses. In response, state agencies extended the hunting season, increased the number of lions a hunter could take, and dropped the cost of a hunting tag. More than 66,000 tags were sold in 2007 (up from 1000 in 1996), although the cougar population was then estimated at fewer than 4000 animals. Cougar deaths skyrocketed—but so did complaints about problem animals.

State wildlife officials had made the common mistake of modeling the lions’ response to hunting as if the carnivores were white-tailed deer, Wielgus says. Managers hadn’t considered what

happens to cougar society with such a high mortality rate. “A stable cougar society has senior, adult males,” who patrol large territories and father and protect the kittens of several females, Wielgus explains. When a male dies, incoming younger males will fight over his territory, and kill kittens in order to bring the females into estrus again, as his team will report in *Biological Conservation* in November.

When the researchers looked at the cougar population of the Selkirk Mountains in eastern Washington, where lion complaints had increased, they discovered that most of the older male cats had been replaced by adolescent males. Because of the threat from these

*Conservation Behavior Workshop, Merging Science and Application, sponsored by the Animal Behavior Society in Boulder, Colorado, 28 July 2013.

Man in the Middle

MAMMOTH HOT SPRINGS, YELLOWSTONE NATIONAL PARK—In February 2012, wildlife biologist Douglas Smith fired a tranquilizing dart at a Rocky Mountain gray wolf, a member of a pack living here in Yellowstone, as part of his ongoing project to tag wolves and study their movements. As he knelt next to the drugged wolf, Smith realized he'd mistakenly darted the pack's alpha or breeding female, named '06 for the year of her birth by the park's wolf-watchers. Darting the wolf wouldn't hurt her, Smith knew, as he took her measurements, checked her teeth, and fastened a GPS collar around her neck. But this wolf was hugely popular with park visitors, and the collar would trigger complaints that she no longer looked wild. The GPS unit, shaped like a tin can, juttied out slightly beneath the wolf's neck. Henceforth, she'd be known as 832F for the number on her collar.

Less than a year later, 832F was dead—felled by a hunter's bullet 15 miles outside of Yellowstone's border in Wyoming (<http://scim.ag/832Fdeath>). Smith's phone began to ring, and angry messages poured into his e-mail inbox. "People from the wolf-watching community blame me," Smith said. "They think that if 832 hadn't been wearing a collar, the



Gray Wolf

Canis lupus, 36–45 kg

Prey: Elk, bison, moose, deer, rodents

Found in eight states; dispersal slowed by hunters

infanticidal young males, many of the female lions there had also moved to higher elevations with their cubs, Wielgus's team discovered. "The females moved to areas they would normally never use, where they eat prey they normally wouldn't eat, including the highly endangered mountain caribou," Wielgus says. The younger males also attacked livestock. "They're the ones that haven't learned to avoid people and so get into trouble."

Wielgus and his colleagues have worked with Washington's Department of Fish and Wildlife to overhaul cougar hunting rules to help restore the cat's society. Cougars in the state are no longer regarded as a single population. Instead, the state recommends that no more than 14% of the lions in any of 49 man-

agement units be killed annually. "It should lessen this massive social disruption they've experienced in the past," Wielgus says. He points out that California, which bans sport hunting of cougars, has one of the largest mountain lion populations (about 4000) and the lowest rate of livestock depredations. In contrast, other western states with lion hunts also have high depredation rates.

California's citizens seem as willing to accommodate cougars as Durango's inhabitants do bears—even though the big cats occasionally kill people. Since 1986 in California, cougars have attacked a dozen people and killed three, probably because of the growing human population. Yet Governor Jerry Brown signed a bill earlier this month that prevents managers from killing lions unless they pose an urgent threat to public safety. Wildlife wardens are to help capture and relocate the animals instead. "I'm amazed that Californians still want to protect them," says Gehrt, the coyote watcher.

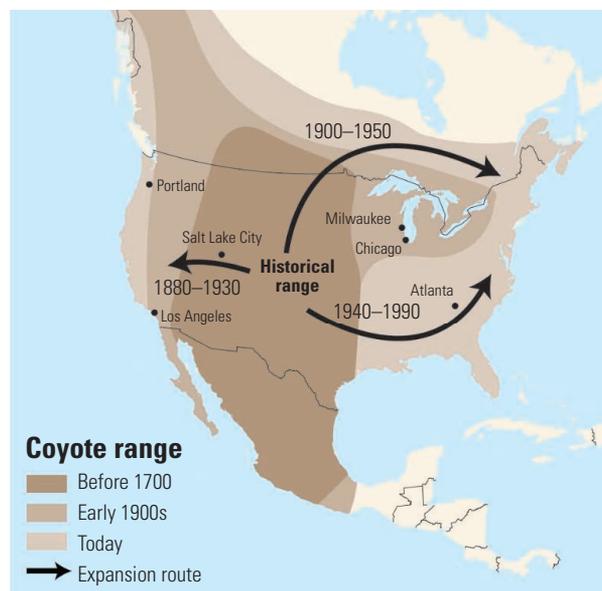
The coyotes are coming

No predator has faced more lethal force than the coyote, which has never been protected. Several states still pay bounties for killing coyotes, and the U.S. Department of Agriculture (USDA) killed nearly 80,000 in 2012. Yet they have thrived anyway, Gehrt says.

In part, that's thanks to humans: We removed coyotes' top competitor and killer, the gray wolf, in the early 20th century. With wolves out of the way, coyotes began spreading across the country, and they're still on the move (see map). They arrived on the outskirts of Chicago in the 1990s, most likely by following railroad tracks, where fences and walls offer cover and make hunting easy. By 2000, they were in the city proper, and over the next decade their numbers rocketed by 3000%, to about 2000, for reasons that Gehrt is still trying to understand. "They've flexed their adaptive muscle and crept into openings in the urban landscape," he says. "Any small natural area in the city now has coyotes."

Over the past 13 years, he has published a string of studies analyzing coyote numbers, prey, and social structure using radio collars and camera traps. He's found that Chicago's coyotes eat the same prey that rural ones do: voles, shrews, rabbits, and fawns. To avoid people, city coyotes have switched to a nocturnal lifestyle, hunting at dawn and dusk. But they are clearly at home in the city. They cross lanes of traffic with aplomb, trot down the center of roads, duck into subways, and seek shelter in culverts and underpasses. And it's not just Chicago. Coyotes are moving east into every major U.S. city, including Milwaukee, Atlanta, and Dallas. They'll eventually meet up with those already in New York City, which migrated in via Canada.

Coyotes have some ecological benefits: They devour the eggs of Canada geese, and in Chicago have pushed the geese's



Diplomat. Wolf expert Douglas Smith faces scrutiny from all sides in Yellowstone.

hunter wouldn't have targeted her." Smith is in the crossfire of the wolf wars. On one side are the wolf-watchers who thrill at the sight of the animals; on the other are the ranchers and hunters who blame wolves for a plunge in Yellowstone's elk population and for livestock losses, and who eagerly shoot as many wolves as legally allowed once the animals stray outside the park. It is an occupational hazard, says Smith, who recalls another researcher saying that "the landscape is littered with the carcasses of wolf biologists," who couldn't handle the constant attacks and quit or were fired. "Every year my main goal has been to survive to the next [year] and keep the study going," Smith says. "You always hear from people when you're working with wolves."

Tall and fit, with a ranch hand's lanky build and straightforward manner, Smith, 53, has been working with wolves—and hearing from people—since he was 18. He decided to become a wolf biologist after reading a cover story about the animals in *National Geographic* in 1977. Fresh out of high school, he landed a plum job as a field assistant with the wolf-moose project at Isle Royale National Park in Lake Superior (*Science*, 24 May, p. 919). Project leader Rolf Peterson of Michigan Technological

University in Houghton recalls how the then–assistant secretary of the interior, no fan of wolves, cut off the team's permits and funding that winter. "But we were already on the island, so we just persevered. It was good training for Doug—he saw at a very early age how wolf research gets co-opted by various agendas."

Since arriving in Yellowstone in 1994 to help reintroduce gray wolves to the park, Smith has had many occasions to put that training to use. Scientifically, the project has been a huge success (*Science*, 23 October 2009, p. 506), as the newly arrived wolves reduced an out-of-control elk population and allowed the park's ecosystem to recover. "For a long time, Yellowstone wasn't natural," Smith says. "Now it's as pristine as it's ever been."

But politically the project is a hot potato. "I'm criticized for not being more outraged about the hunting of the park's wolves; I'm criticized for calling them 'the park's wolves,' and for asking the states to put a protective buffer-zone outside the park," Smith says. He's been called a liar and some ranchers and state officials have lobbied for his removal.

With nine of the park's collared wolves lost to hunters since 2009, Smith is steeling himself for the coming months. Wolf hunting season just opened.

—V. M.

annual population growth down from 10% or 20% per year around 1990 to 1% to 2% now. They may also be welcomed by suburban gardeners, because they eat fawns. The coyotes found in the Northeast, which have some wolf ancestry, can even take down adult deer.

People will need to adjust to their new neighbors, Gehrt says. Coyotes may bite—especially if they are accustomed to people feeding them—and they hunt pet cats and dogs. At first, many Chicagoans demanded the animals' removal, Gehrt says, in "a typical response to a new carnivore." However, as 2 centuries of hunting shows, a coyote killed will simply be replaced by another—so it's important that people know how to deal with them, says Valerie Matheson, the urban wildlife conservation coordinator for Boulder, Colorado. "People need to know that coyotes do pose a threat and they need to learn what to do when they see one," she says. Or what not to do: Coyotes chased and bit five people over 2 years on Boulder's bike path, probably because someone had first fed them.

Once coyotes are accepted, they may boost tolerance to other predators. "They crack open the door for other large carnivores to live next door to us," Gehrt says.

However, one large carnivore is not likely to set up shop near U.S. cities anytime soon:

the wolf. Once found across most of the country, wolves became the most hated of predators once European settlers arrived. When sentiment changed in the 1970s, gray wolves were one of the first species to be protected by the federal Endangered Species Act, and the federal government actively helped restore them to the wilds of Montana, Wyoming, and Idaho. Other wolves independently loped in from Canada. Now, the federal government is seeking to remove their protected status, and they are hunted fiercely in several states.

people, but they do at times attack unprotected livestock. In 2010, USDA fingered them for the deaths of about 8100 cattle. But conservationists like to put that number in context: The same figures show that domestic dogs killed 21,800 cattle, and coyotes 116,700. "About 80% of wolf packs don't do this," says Wielgus, who's just launched a new study in conjunction with federal and Washington state agencies and livestock operators to find ways to alter the behavior of the other 20%.



Coyote

Canis latrans (the barking dog), 6.8–21 kg

Prey: Voles, shrews, cottontails, invertebrates, fawns, and more

Urban Chicago population: 2000

Even so, wolves aren't expected near a city anytime soon, says Douglas Smith, the head of the National Park Service's wolf project in Yellowstone National Park. Given the space they need and the feelings against them, "they'll always be restricted to places with a few people and no agriculture," he predicts.

But if the wolf remains a creature of wilderness, North America's other predators have, like so many of its human inhabitants, opted for the suburbs.

—VIRGINIA MORELL