

**coexistence:
living harmoniously with wildlife
in a human-dominated world**



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**International
Fund for
Animal Welfare**

The fact is that no species has ever had such wholesale control over everything on earth, living or dead, as we now have. That lays upon us, whether we like it or not, an awesome responsibility. In our hands now lies not only our own future, but that of all other living creatures with whom we share the earth.

~ David Attenborough

contents

executive summary	2
living with wildlife in the anthropocene	3
a brief history of human-wildlife interactions	4
why we need wildlife	5
how we can coexist with wildlife	6
in-depth case study: coyotes in north america	7
in-depth case study: gray wolves across the northern hemisphere	9
snapshot: community-based conservation in montana	11
snapshot: urban black bears in colorado	12
snapshot: jaguars in mexico.	13
snapshot: african lions in kenya.	14
conclusion	15
additional reading: selected bibliography	16



executive summary

▲ A giant river otter (*Pteronura brasiliensis*) snacks on a spiny fish in a river in Brazil. Despite their positive impact on the ecosystem and their endangered status from decades of poaching, giant river otters are sometimes viewed as nuisances that interfere with fishing. © Sue Edwards

- ▶ We are living in the Anthropocene, the modern era characterized by human-dominated landscapes, reduced wildlife populations, and chaotic climates.
 - ▶ At the same time, some wildlife thrive in and adapt to human-dominated landscapes. These species are often considered inconvenient and untold numbers, from black birds to coyotes, are killed through destructive, cruel, and mostly ineffective methods. The result is wasted resources, animal welfare violations, and ecosystem damage. Human efforts to kill wildlife simply because they are considered a nuisance are not justified.
 - ▶ The best available science indicates humane techniques that emphasize coexistence and are adapted to context and changing conditions over time are more effective at preventing or reducing conflicts and wildlife management costs over the long-term.
 - ▶ In many cases, human-wildlife interactions are labeled as “conflict” due to negative perceptions associated with the mere presence of a wild animal.
- ▶ In these instances, solutions center on addressing concerns and changing human behaviors to reduce interactions between humans and wildlife.
 - ▶ Evidence that humane coexistence strategies are effective abound. Case studies illustrating successful coexistence are included in this report: coyotes in North America, gray wolves across the Northern Hemisphere, community-based conservation in Montana, urban black bears in Colorado, jaguars in Mexico, and African lions in Kenya.
 - ▶ Wildlife have diverse and important values. From global economies to local livelihoods, they contribute various ecosystem services and support human well-being. Wildlife also have value simply in their existence.
 - ▶ When humans coexist with and avoid persecuting wildlife in and around our communities, we safeguard ecosystem health, agricultural stability, food security, and the creation of new sustainable economies (e.g., ecotourism). Ultimately, coexistence with wildlife is essential for all life, humans and animals alike.

living with wildlife in the anthropocene

The modern era is dominated by humans and the impacts of our actions are felt across the globe. Scientists have named this era the Anthropocene—the prefix “anthrop” translates to “human”—due to the significance of our impacts to Earth’s ecosystems and atmosphere. Humans have directly and indirectly altered landscapes through urban sprawl, greenhouse gas emissions, pollution, habitat fragmentation, and destruction. One major consequence of our landscape-level alterations is widespread extinctions of wildlife species across the planet. According to recent reports from conservation organizations and the United Nations, humans have contributed to an average 60 percent reduction in wildlife populations globally¹ and, of the species known to science, approximately one million are threatened with extinction.²

Although some species, like coyotes, are adapting to and expanding their ranges in response to anthropogenic change, many species, such as African lions, are imperiled because of our actions. In many instances, humans kill (sometimes referred to as lethal “control”) wildlife because animals are considered nuisances (e.g., raccoons in the attic), dangerous (e.g., wolves near livestock), or perceived to be more valuable dead than alive (e.g., lions as trophies). Modern science is increasingly revealing that rather than reducing real or perceived conflict, exploiting wildlife results in more conflict between humans and wildlife. For example, researchers have found that when humans do not kill coyotes, the animals’ populations are more stable and individuals are less likely to impact resources valued by humans. Yet, unrestrained destruction of coyotes and other carnivores by cruel, archaic, and expensive means (e.g., traps, snares, poisons) continues across the globe.

The global loss of wildlife signals dire consequences for the interrelated and complex workings of our singular shared home. Ecosystems are the result of complex relationships among species, as well as relationships

and cycles between living and non-living elements. All life, including human needs and activities, is reliant upon ecosystem function and health. For example, a recent study on ecosystem services provided by bee pollination across five continents reported that wild bees contribute an average value of \$3,215 per hectare to crop production.³ Reliable food production and stable livelihoods based on agriculture, natural resources, outdoor recreation, and tourism require wildlife like birds, bees, bats, and bears to play their part. Furthermore, the consequences of current levels of anthropogenic change are not limited to food and livelihoods. Human disruption of natural systems is also linked to emerging zoonotic diseases that increasingly jump from animals to humans and invasive species that may disrupt native communities of flora and fauna and reduce biodiversity.

Fortunately, harmonious alternatives exist and are being implemented in diverse contexts across the globe. Coyotes hunt rodents in Chicago, providing much needed rodent control. Long-tailed macaque monkeys have lived in and near temples on the Indonesian island of Bali and are integral characters in Hindu spirituality. Tigers in Nepal are known to shift to more nocturnal patterns where they overlap with people, who use the same areas to collect natural materials for building houses. Coexistence between humans and wildlife is not only possible but advantageous to everyone and contributes to human health and well-being in sometimes surprising ways.⁴

We live in a hot, hungry, and crowded world. Increasingly obvious are the negative impacts of our old approaches to managing wildlife. We can no longer separate humans from nature, fail to consider long-term effects of our actions, and perpetuate conflict by indiscriminately killing wildlife. Harmony is required to sustain life on Earth in the Anthropocene. **This report outlines how we can coexist with wildlife.**

¹ Grooten, M. and Almond, R.E.A. (eds). 2018. Living planet report—2018: Aiming higher. Gland, Switzerland: World Wildlife Fund. <https://www.worldwildlife.org/pages/living-planet-report-2018>

² Diaz, S. et al. 2019. Summary for policymakers of the global assessment report on biodiversity and ecosystem services of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services. https://www.ipbes.net/system/tdf/spm_global_unedited_advance.pdf?file=1&type=node&id=35245

³ Carvalheiro, G. et al. 2016. Delivery of crop pollination services is an insufficient argument for wild pollinator conservation. *Nat. Commun.* 6, 7414. <https://doi.org/10.1038/ncomms8414>

⁴ O’Bryan, C.J. et al. 2018. The contribution of predators and scavengers to human well-being. *Nat. Ecol. Evol.* 2, 229–236. <https://doi.org/10.1038/s41559-017-0421-2>

a brief history of human-wildlife interactions

Our history of interacting with wildlife is deep and complex. Scholars postulate that our affinity for wildlife—sometimes referred to as biophilia or “love of life”—is innate and much of human psychology has been influenced by this affinity. Biophilia motivates humans to watch, learn from, and study wildlife. Unfortunately, our history with wild nature also includes darker stories.

With the expansion of human influence and development across landscapes globally, people increasingly viewed wildlife in antagonistic ways. In agricultural contexts, for instance, species from baboons to raccoons have been portrayed as inconvenient crop-raiders. The benefits of carnivores to ecosystems were not appreciated; instead, they were vilified as threats to livestock or seen as the embodiment of spiritual evils. With the expansion of cities, suburbs, and exurban areas, humans perceived nature as separate from our “unnatural” systems and constructed landscapes. Even in the absence of specific harms or conflicts, wild animals have been treated as disposable. But wildlife were never far away from us, even in cities, making false dichotomies of humans as separate from nature all the more artificial.

Our long history of conflict—real or perceived—with wildlife is dominated by stories of our short-sighted attempts to eradicate species that were deemed inconvenient to human enterprise. The persecution of carnivores is a particularly dark chapter in human-wildlife interactions. Because carnivores were (and in many contexts, still are) considered competitors for or threats to food resources (e.g., deer, domestic cows), species like wolves and lions have been targets of inhumane lethal “management” using tools like foothold traps, neck snares, and poison. We have also used every means available to rid landscapes of “nuisance” species such as beavers, blackbirds, and coyotes. Some of these

methods, such as use of the toxic pesticide dichlorodiphenyltrichloroethane (DDT), are infamous for their insidious impacts at every level of an ecosystem. In such cases, the means were unjustified and short-sighted, and the ends were equally devastating. Eradication of “ecosystem engineers” like beavers, and the services such species provided, resulted in cascading losses of biodiversity. When commercial fur trapping decimated beaver populations, the wetlands they created and the associated cycling of water and nutrients disappeared. In turn, many species that depended on those wetlands quickly declined.

Damage stemming from our eradication campaigns eventually became so apparent and alarming that people could no longer ignore the warning signs. The resulting habitat restoration and species protection efforts have brought some species such as bald eagles and bison back from the brink of extinction. However, traps, poisons, and other inhumane and ineffective methods still are used today in an attempt to “control” animals deemed inconvenient or threatening. In the U.S., for instance, a federal government program called Wildlife Services under the Department of Agriculture (USDA) kills millions of wild animals each year, continuing the barbaric legacy of killing coyotes, trapping wolves, and poisoning songbirds at the expense of taxpayer dollars and ecosystem health.

Given our current knowledge regarding the impacts of our actions on wildlife, our responsibility is to find a better way. We now know that wiping carnivores off the landscape and littering our public lands with poisons is not only detrimental to the wild world but also our capacity to live and thrive in these systems. **Our responsibility is to learn how to coexist.**

Bird
watchers
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**\$41
billion**
on equipment
and travel
in 2011.

why we need wildlife

Although our history with wildlife is dominated by persecution and misunderstanding, many wildlife species have been able to adapt to human-dominated spaces, and thereby continue their contributions to healthy ecosystems and the foundations of life.

Increasingly, societies recognize that healthy wildlife populations play a central role in supporting human well-being through improved mental health, ecosystem health, tourism and associated local economies, outdoor recreation industries, and livelihoods. Although values for wildlife surpass and exist beyond human utility, studies have measured the benefits of thriving wildlife populations in terms of ecosystem services. Consider for instance:

- ▶ The worth of one living bobcat to the local economy around Yellowstone National Park was estimated at over \$308,000, which is almost 1,000 times greater than the maximum potential value of a dead bobcat at \$315.⁵
- ▶ Bird watchers spent almost \$41 billion on equipment and travel in 2011, which resulted in creation of 666,000 jobs in support of bird watching activities.⁶
- ▶ The U.S. Fish and Wildlife Service reports that 34 percent of Americans (i.e., 86 million people) engaged in wildlife watching activities in 2016.⁷

Additional ecosystem services include pollination of plants that humans rely on and control of insects that impact crop production. Bats, for example, are such effective insectivores and pollinators that they are worth up to \$53 million to North American agriculture alone.

Given the cascading effects of such services in complex systems, it is difficult to measure all the benefits humans derive from wildlife. Carnivores' influence on prey can have far-reaching impacts throughout ecosystems, including increased biodiversity throughout the food web. Carnivores discourage prey from crowding and overgrazing riverside areas, which in turn reduces erosion and leads to better flood mitigation, nutrient retention, and water quality.

Wildlife have value simply in their existence. Some people derive benefits by seeing or knowing that a species exists in the wild. One has to look no further than the plethora of animals as mascots and on state flags to observe the importance of wildlife to community pride and heritage. Modern societies also attribute wildlife with intrinsic value, which is the value of an entity beyond its use to others. The implications of recognizing intrinsic value of life is that a life cannot be taken for the wrong reasons. Although people may disagree on which reasons are appropriate justifications for killing wildlife, most people agree that killing wildlife is not justified when it does not accomplish a greater good. In other words, most human efforts to kill wildlife simply because they are considered a nuisance are not justified.

Wildlife are extremely valuable, regardless of how you measure that value. When humans coexist with and do not persecute wildlife, we see vast improvements to ecosystem health, agricultural stability, food security, and the creation of new sustainable economies. Ultimately, coexistence with wildlife is essential for all life, humans and animals alike.

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⁵ Elbroch, L.M. and Fitzgerald, J. 2017. Contrasting bobcat values. *Biodivers. Conserv.* 26, 2987–2992. <https://doi.org/10.1007/s10531-017-1397-6>

⁶ U.S. Department of the Interior and U.S. Fish and Wildlife Service. Birding in the United States: a demographic and economic analysis addendum to the 2011 national survey of fishing, hunting, and wildlife-associated recreation. <https://digitalmedia.fws.gov/digital/collection/document/id/1874/>

⁷ U.S. Department of the Interior, U.S. Fish and Wildlife Service, and U.S. Department of Commerce, and U.S. Census Bureau. 2016. National survey of fishing, hunting, and wildlife-associated recreation. <https://www.census.gov/library/publications/2018/demo/fhw-16-nat.html>

Scientists define coexistence as a “dynamic but sustainable state in which humans and [wildlife] adapt to living in shared landscapes.”

how we can coexist with wildlife

Scientists define coexistence as a “dynamic but sustainable state in which humans and [wildlife] adapt to living in shared landscapes.”⁸ To share space in perpetuity, conflict—even where unlikely or merely perceived—can typically be avoided with preventative measures. The best available modern science points to non-lethal techniques and changes in human behavior as more effective (relative to lethal measures) at reducing costs and preventing conflicts with wildlife over the long-term. Non-lethal methods are context dependent and require adaptive responses over time. Therefore, coexistence looks different depending on the place: the wildlife, domestic animals, humans, terrain, and climate all play a part. Non-lethal options for peacefully living alongside wildlife and avoiding conflict are diverse but include the following:

- ▶ Simple solutions to avoid habituation of wild animals in urban and suburban settings include not leaving human or companion animal food outside, removing bird feeders, and using animal-proof garbage cans.
- ▶ Simple, commonsense actions, such as keeping smaller companion animals on leash when walking, can help avoid conflicts with coyotes and other wildlife.
- ▶ Where residents are concerned about potential property damage from beavers, installing culverts for beaver dams is an effective alternative to trapping and killing beavers.
- ▶ In agricultural contexts, methods such as employing range riders, guardian animals, fences, and good husbandry practices (e.g., burning or burying livestock carcasses) are the foundation of conflict prevention.

Coexistence does not include indiscriminate killing. Killing wildlife that share landscapes with us is neither sustainable nor in our best interest. Lethal control methods are highly dangerous and often indiscriminate. Traps, snares, and poisons can seriously injure or kill non-target wildlife, pets, and even people. One such tragedy occurred in 2017 when an M-44 “cyanide bomb”—used by USDA Wildlife Services to kill coyotes—killed a family dog and poisoned a teenage boy playing just outside their backyard.⁹

The costs of lethal control are not always reflected in actual prices for the tools and services used to kill wildlife. Such costs are referred to as externalities and include companion animals’ loss of life and limb, non-target animal deaths (both domestic and wild), disruption to carnivore social structures that increases conflict, overpopulation of prey (e.g., crop-raiding rodents, rabbits), and myriad negative impacts to ecosystems. Lethal control is labor intensive and often creates conflict that did not exist in the first place, requiring a constant influx of resources rather than effective and long-lasting solutions. It is not a sustainable solution.

Fortunately, there are nonlethal methods that are proactive and prevent conflict from occurring in the first place, as opposed to reactive and ineffective lethal control. Nonlethal tools are also more cost-effective in the long term and avoid the negative impacts to non-target animals and stable, healthy ecosystems.

In the following case studies, we outline six places where humans and wildlife are coexisting and thriving together.

⁸ Carter, N.H. and Linnell, J.D.C. 2016. Co-adaptation is key to coexisting with large carnivores. *Trends Ecol. Evol.* 31, 575–578. <https://doi.org/10.1016/j.tree.2016.05.006>

⁹ Brulliard, K. April 11, 2017. Feds halt cyanide traps in Idaho after one harms a child and kills a dog. *Washington Post*. <https://www.washingtonpost.com/news/animalia/wp/2017/04/11/feds-halt-cyanide-traps-in-idaho-after-one-harms-a-child-and-kills-a-dog/>



in-depth case study: coyotes in north america

The coyote (*Canis latrans*) is a highly adaptable animal that has carved a niche in urban and suburban settings. Examples frequently can be found in local news coverage of the newest coyote encounter on a subway train or the studies documenting coyote packs living near Chicago's O'Hare airport. Rather than experiencing range reductions in response to human expansion, this native carnivore is expanding from its original range in the southwestern U.S. across North America. From Los Angeles to New York City, coyotes make a living among some of the densest human populations on the continent.

Although coyotes are adaptable and wide-ranging, humans have the potential to conflict with them mainly due to misperceptions. Coyotes may attack smaller domestic animals but

these instances are rare, especially when one considers the high degree to which urban coyotes live near city dwelling humans without incident. Because coyotes share space with humans but do so at times when human activity is low, many urban residents do not realize coyotes live nearby.

The presence of coyotes, while not obvious to many of their human neighbors, is beneficial in myriad ways. As the largest predator in many urban ecosystems, coyotes exert top-down influences on those systems, regulating populations of other urban wildlife such as geese and deer and providing important rodent control services. Coyotes are also culturally important to communities across North America. They are common characters in Native American stories, American folk songs, and

▲ Coyotes are often persecuted because of misconceptions and fears. © Pond5/Igor Stevanovic



▲ A coyote living on the sandy beaches of Cape Cod, MA. © Andrea Spence

contemporary cartoons. Coyotes symbolize cleverness and intelligence to many, perhaps given how adaptable they are to diverse ecological contexts.

Although most coyotes living near humans do so without incident, coexistence tools exist to prevent and mitigate conflict when it does occur. Rural coexistence tools center on protecting livestock through non-lethal methods. Coyotes are not large enough to take most healthy, adult cows but calves, lambs, and adult sheep can be vulnerable to predation. The presence of humans and/or guardian animals, deterrence devices, and fences are effective methods to prevent conflict.

Rural communities are increasingly implementing nonlethal coexistence programs. The longer these programs are in effect, the more we realize the sustainability gains and fiscal advantages to non-lethal coyote management. For instance, Marin County, California, implemented a cost-share program to help local ranchers transition to effective non-lethal methods and experienced a 62 percent reduction in livestock losses and a cost saving of \$50,000 in the first several years of implementation.¹⁰ Modern scientific studies are finding that when coyote populations are left to regulate themselves, pack structures are more stable and adults survive to teach young how to hunt native prey like white-tailed deer. Previously, scientists were not able to measure the dynamics of unexploited populations because humans have been killing coyotes for hundreds of years. As communities move toward coexistence, we find the benefits outweigh any costs.

Coexistence tools also exist for urban and suburban contexts. Simple behavior changes such as removing attractants (e.g., feeding pets outdoors) and leashing small dogs are usually all that is needed to prevent any potentially undesired interactions. The biggest challenge to coexistence with coyotes near human residences is changing misperceptions that the presence of coyotes is cause for alarm. In most cities where coyotes are present, problems do not occur and coexistence is simply a matter-of-fact.

Despite the ease of human-coyote interactions in most areas, challenges remain where misperceptions and exploitation persist. A major challenge to effective coexistence strategies are coyote killing contests that occur across the United States. Although a few states have passed or introduced legislation to ban these contests, which award prizes of cash or sometimes guns to people who kill coyotes, they continue across the continent. This practice is neither scientifically based nor does it accomplish any legitimate management goals. Instead, it perpetuates blood sports and a chaotic landscape where splintered pack structures may lead to increased conflict. Another major challenge to coexistence exists within our federal government where current policies allow unscientific lethal control of coyotes and other wildlife. The USDA Wildlife Services program admits to killing more than 70,000 coyotes every year.¹¹ Until these cruel, archaic, and ineffective programs end, coexistence with coyotes remains a work in progress.

¹⁰ Fox, C.H. 2008. Analysis of the Marin County Strategic Plan. Master's thesis, Prescott College; Project coyote report. 2015 <https://www.projectcoyote.org/project/marin-county-livestock-wildlife-protection-program/>

¹¹ U.S. Department of Agriculture, Animal and Plant Health Inspection Service. Wildlife services program data reports. https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/sa_reports/sa_pdrs/ct_pdr_home_2016



in-depth case study: gray wolves across the northern hemisphere

The history of human-wolf interactions is a long and sordid one. One of the widest ranging canid species, gray wolves (*Canis lupus*) once lived in habitats from desert to tundra across the Northern Hemisphere. Early hunting and gathering humans likely admired and learned from the cooperative hunting of wolves. Researchers postulate that this close proximity may have led to the domestication of wolves into the modern dogs we know and love.

But the story changes as humans shifted from roaming hunters to sedentary farmers. Beginning with the advancement of early agriculture in Europe, humans vilified and killed wolves because they were worried wolves would attack livestock. History repeated itself in North America. Humans were conquering a new wilderness but the same wolf. Where wolves had once been considered fellow hunters, they were now seen as competitors for game and threats to livestock and livelihood.

While humans targeted many species, from bison to beaver, in the westward

expansion of Manifest Destiny, the persecution of wolves is different. As Barry Lopez explains in *Of Wolves and Men*:

The history of killing wolves shows far less restraint and far more perversity. A lot of people didn't just kill wolves; they tortured them... This is not predator control, and it goes beyond the casual cruelty sociologists say manifests itself among people under stress, or where there is no perception of responsibility. It is the violent expression of a terrible assumption: that men have the right to kill other creatures not for what they do but for what we fear they may do.

Fear is perhaps the root of human persecution of wolves. Although wolf attacks on people were always rare, they ceased almost altogether once rabies was significantly reduced in wild populations. Attacks on livestock are also quite rare, accounting for 0.009 percent loss of the 112 million cattle (adults and calves) inventoried

▲ The return of gray wolves to the western United States is a success story, but further recovery is stymied by fear and political pressure. © Maureen Santina

in the United States in 2015.¹² Although any losses can be difficult for ranchers, the extremely low likelihood of risk posed by wolves means that their persecution is not justified.

As adaptable habitat generalists, wolves became synonymous with roadless wilderness because those were the only remaining places they could escape human persecution. Their benefits to habitats across the hemisphere is increasingly apparent as wolf populations recover in wild places. For example, researchers have documented how wolves at the top of the food chain have positive effects across landscapes in Yellowstone National Park where they are not exploited. Wolves regulate prey populations, which in turn distributes how and where prey animals graze (e.g., less concentrated along rivers) and thereby increases biodiversity (e.g., through regeneration of streamside vegetation that provides habitat for birds and beavers). This phenomenon is known as trophic cascades, because of the cascading changes seen throughout food webs.

Wolves benefit not only ecosystems but also people.

Wolves, particularly in the Lamar Valley of Yellowstone where they were re-introduced in the 1990s, draw huge crowds of tourists. This draw is a boon to local economies as they shift from waning, unsustainable industries based on agriculture and natural resource extraction. As symbols of family, cooperation, and wildness, wolves are also important spiritual and cultural characters. For example, wolves are fundamental to the creation stories of the Ojibwe people of the Great Lakes region, who consider wolves as brothers separated in time but united by a parallel story of persecution and recovery.

Despite fear and political contention, examples of human-wolf coexistence abound. In places where humans do not kill but coexist with wolves, we find abundant evidence that they pose very little risk to humans and domestic animals.¹³ Tools that aid coexistence in agricultural contexts are sometimes quite simple, including human acceptance of seeing wolves return to an area to use of fladry (i.e., a string or rope with flags attached) under which wolves are reluctant to walk. Fences and fladry have been used for centuries to separate livestock and wolves, and with modern upgrades like electricity and solar power, can be used and easily moved almost anywhere. The age-old shepherd profession also has benefited by technological advancements such as radios (to communicate with each other or track wolves that have telemetry-enabled collars) and all-terrain vehicles. Yet



▲ Governments in Europe are working with herders and other pastoralists to ensure coexistence with the recovering gray wolf populations. © IFAW

the mere presence of people is often sufficient to protect livestock, especially during key times like calving season. Having shepherds or range riders around when calves or lambs are being born has added advantages of identifying birthing complications early or finding and removing dead animals before they attract carnivores.

In Northern and Central Europe, innovative programs to aid coexistence exemplify additional ways we can share space with wolves. For example, pay-for-presence programs incentivize reindeer herders to accept wolves in Scandinavia by, as the name suggests, paying herders based on the number of wolves living in those shared landscapes. Subsidized fencing and other preventative measures have also been successful in encouraging coexistence, both in terms of changes to human attitudes and increases in wolf numbers. As the old adage goes, an ounce of prevention is worth a pound of cure—these programs work better than compensation schemes that reimburse ranchers for losses to carnivores but do nothing to prevent problems before they occur.

Despite the growing body of evidence that human-wolf coexistence is possible and does not require killing, efforts to reduce wolf populations continue. In North America, wolves are only recovered in approximately 15 percent of their historic range, yet political pressure from those who still fear wolves results in continued attempts to remove their Endangered Species Act (ESA) protections. Yet, removing ESA protections will not address challenges to human-wolf coexistence. Incentivizing coexistence, as was done with the above-referenced programs in Europe, is an effective and sustainable answer to the modern challenges of sharing space with large carnivores like wolves.

¹² U.S. Department of Agriculture—National Agricultural Statistics Service. 2017. Death loss in u.s. cattle and calves due to predator and nonpredator causes. 2015. https://www.aphis.usda.gov/animal_health/nahms/general/downloads/cattle_calves_deathloss_2015.pdf

¹³ Stone, S.A. et al. 2017. Adaptive use of nonlethal strategies for minimizing wolf–sheep conflict in Idaho. *J. Mammal.* 98, 33–44. <https://doi.org/10.1093/cercor/bhw393>; van Eeden, L.M. et al. 2018. Carnivore conservation needs evidence-based livestock protection. *PLoS Biol.* 16, 1-e2005577.



snapshot: community-based conservation in montana

In Montana remains some of the wildest landscapes in the contiguous United States. While large carnivores were extirpated elsewhere in the lower 48 states and globally, Montana's bears and wolves defended a foothold in a region known as the Crown of the Continent. Perhaps due to their more consistent presence (although they were and still are threatened by human intolerance, climate change, habitat loss, and fragmentation) many Montanans have and are continuing to learn how to live with large carnivores.

One exemplary effort is the cooperative conservation project, the Blackfoot Challenge. Organically driven, this community-based program was founded by landowners who saw commercial development as a common threat to both their rural livelihoods and wildlife habitat. This grassroots organization takes a holistic approach to managing lands within the watershed of the Blackfoot River and pools resources to hire range riders, monitor carnivores, erect fences, remove livestock

carcasses, and purchase tools like scare devices to keep carnivores from getting comfortable near livestock. Workshops and educational opportunities ensure that best practices are adapted and shared. As a result, the Blackfoot Challenge has raised funds in excess of \$5 million for habitat restoration and management of more than 15,000 acres of wetlands, 200 miles of streams, 15,000 acres of grasslands, and protection of 45,000 acres of private land in conservation easements.¹⁴

Human-carnivore coexistence is one critical piece of the Blackfoot Challenge's holistic approach to conservation. By protecting the integrity of the watershed, the program ensures sustainability of local livelihoods and biodiversity for this and future generations. Integral to the success of this program is the leadership and cooperation of ranchers and local landowners that support the program that sustains their way of life as well as that of their wild neighbors in the Blackfoot River Valley.

▲ The best way to coexist with bears is to remove attractants and prevent habituation. © IFAW

¹⁴ Sullivan, Gary L. 1997. Partners in practice: The fine line between success and failure. Transactions of the 62nd North American Wildlife and Natural Resource Conference, U.S. Fish and Wildlife Service, Great Falls, Montana. <http://biz170.inmotionhosting.com/~blackf22/Clone//history-and-evolution-of-the-blackfoot-challenge-2/>



snapshot: urban black bears in colorado

▲ Black bears are highly adaptable and are able to live in and around human-dominated landscapes. © Lynn Bystrom

Places where cities exist in close proximity to wildlife habitat (i.e., the wildland-urban interface) can pose unique challenges to coexistence. Colorado's quickly growing and increasingly diverse human population, in part attracted to its beautiful mountain landscapes, make it the quintessential ground for creative coexistence solutions in the wildland-urban interface.

The diversity of local residents in cities like Boulder and Durango, combined with impacts from climate change (e.g., extreme fires), set the stage for interesting human-black bear (*Ursus americanus*) interactions. When typical sources of food are in short demand (e.g., due to summer drought, wildfires), bears can be driven closer to human residences where garbage cans

provide temptingly easy meals. Many residents are new to Colorado and have never lived near bears; they might expect to find a rummaging raccoon, but bears often pose a bigger surprise and greater concern.

Yet coexistence in these contexts is not only possible but likely with a simple change to human habit: the use of bear-proof garbage containers. When used properly, bear-proof containers substantially reduce potential conflict and increase people's positive attitudes toward bears.¹⁵ One of the keys to successful coexistence programs in wildland-urban interfaces is achieving community-wide behavior change. The greatest gains in peaceful human-bear interactions occurred once 60 percent of the community properly used their bear-proof containers.

¹⁵ Johnson, H.E. et al. 2018. Assessing ecological and social outcomes of a bear-proofing experiment. *J. Wildl. Manage.* 82, 1102–1114. <https://doi.org/10.1002/jwmg.21472>

snapshot: jaguars in mexico

One does not typically think of cities as homes to big cats, but indeed that is the case in places like Playa del Carmen, Mexico. Here, jaguars (*Panthera onca*) live in close proximity to one of the fastest growing human populations in Latin America. Although jaguars are not directly conflicting with people, they do prey on domestic free-ranging dogs. Additionally, free ranging dogs eat eggs of imperiled marine turtles. Coexistence might seem highly unlikely in this situation and yet IFAW has developed an innovative but simple solution to a complex coexistence challenge: blue dog houses.

By providing materials for dog houses, IFAW's Casitas Azules (i.e., "little blue houses" in Spanish) Project empowers communities in Playa del Carmen to protect their dogs, which in turn protects local wildlife. Dog houses provide direct shelter and prevent dogs from ranging far from humans. Encouraging proximity between

humans and dogs leads to improved care of dogs, which prevents their hunger-driven need to eat turtle eggs and reduces their vulnerability to jaguars. Houses are built by community members and their bright blue color is a symbol of the values represented by this program: community, care, and coexistence. As more distinctive blue dog houses appear, more people learn of the solution and eventually social norms shift toward improved guardianship of dogs and the associated protection of wildlife.

This creative solution to a complex problem can be scaled to many other areas where conflict exists between dogs, jaguars, turtles, or other wildlife. Because dogs are ubiquitous companions to people the world over, improved guardianship of dogs will be key to coexisting with wildlife in cities, suburbs, and rural areas—anywhere that people and their companion animals live.

▼ A jaguar peeks out of the bushes in the Pantanal in Brazil. © Jessica Boklan



snapshot: african lions in kenya

Another example of innovative coexistence programs with big cats exists on the other side of the world in Kenya. African lions (*Panthera leo*) and local pastoralists have lived alongside each other for a very long time. Lions are an important element of the Maasai culture. Traditionally, a young warrior came of age by killing a lion. Lion populations are rapidly declining due to habitat loss, hunting, and retaliatory killing for attacks on livestock. Lions now occupy only 8 percent of their historical range and populations have decreased by an estimated 40 percent in the past 20 years.

To shift away from the lethal relationship between locals and lions, two conservation groups, Ewaso Lions and Lion Guardians, are empowering pastoral communities to simultaneously protect livestock and lions. The groups provide training, food stipends, and general education in exchange for community participation in lion conservation. Instead of a Maasai or Samburu warrior tracking lions to kill them, they are now using those traditional

skills with the aid of GPS (global positioning system) collars to monitor lion movement and keep livestock a safe distance away. When lion-livestock conflict occurs, these trained lion guardians work with herders to prevent retaliation and future conflict through improved husbandry and non-lethal deterrents.

These programs are also resulting in long-term attitudinal shifts. Participating lion guardians are ambassadors to their communities, promoting practices that lead to sustainable and peaceful coexistence. Through the data gathered from GPS tracking collars, they contribute important scientific knowledge to understanding lion behavior and population dynamics. Impact evaluation of these programs is finding increased tolerance toward not only lions but other large carnivores such as leopards. Lions are still an important part of local culture, but now warriors take pride in using their skills and becoming leaders through their roles as protectors of livestock and lions alike.

▼ A lioness with her cub in the Maasai Mara, Kenya. © IFAW/Julia Cumes





conclusion

In an era of alarming change to landscapes, wildlife populations, and climates, humans must reassess our impact on the ecosystems upon which we and all life depend. Outdated and false dichotomies between humans and nature are being left behind as science continuously reveals the intricate relationships within and among social and ecological systems.

To support the holistic health of ecosystems that support humans and all life, evidence-based and ethically consistent practices must promote coexistence rather than conflict. From coyotes and wolves in North America to big cats in North America and Africa, we see that coexistence is not only possible, but also essential to life and livelihoods.

The examples covered in this report provide evidence of the progress societies are making toward sustainable futures.

Yet, the dire predictions for loss of wild species and changes to climates across the globe mean that more action is needed now. Both top-down policies and grassroots change are required to enact the coexistence solutions and adaptations needed in a changing world.

◀ Red foxes (*Vulpes vulpes*) can be found in urban and suburban areas. They are an important check on small rodents. © Kerry Boytell

additional reading: selected bibliography

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A grizzly bear (*Ursus arctos*) lounges on a dead tree in the middle of a river. © Betty Byrd



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