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INTERNATIONAL WOLF

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In the Long Shadow of the Pyramids and Beyond: Glimpse of an African...Wolf?

Geneticists have found that some of Africa's golden jackals are members of the gray wolf lineage. Biologists are now asking: how many golden jackals across Africa are a subspecies known as the African wolf? Are Africa's golden jackals, in fact, wolves?

by Cheryl Lyn Dybas

The Red Wolf Species Survival Plan: Saving the Red Wolf Through Partnerships

In 1967 the number of red wolves was rapidly declining, forcing those remaining to breed with the more abundant coyote or not to breed at all. The rate of hybridization between the two species left little time to prevent red wolf genes from being completely absorbed into the expanding coyote population. The Red Wolf Recovery Program, working with many other organizations, has created awareness and laid a foundation for the future to conserve the species.

by Jeremy Hooper

Are Gray Wolves Still Endangered?

In December a federal judge ruled that protections be reinstated for gray wolves in the Great Lakes wolf population area, reversing the USFWS's 2011 delisting decision that allowed states to manage wolves and implement harvest programs for recreational purposes. If biological security is apparently not enough rationale for conservation of the species, then the challenge arises to properly express the ecological value of the species.

by Mike Phillips

On the Cover

Photo by Cécile Bloch.

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Raptors, Meet Our Wolves

As an education-oriented organization celebrating its 30th year, we're fascinated with the relationship wolves have with many animal species. Like wolves, birds of prey command interest and reverence worldwide. We're excited to partner with raptor organizations and experts starting this May to bring a new exhibit for all ages to the International Wolf Center's interpretive center in Ely, Minnesota. Through demonstrations featuring live raptors, educational displays, and beautiful photography from Minnesota's Heidi Pinkerton, we hope to enlighten the tens of thousands of annual visitors about other majestic predators.

Rob Schultz

With our bias towards interactive learning, this temporary exhibit, *Raptors … Predators from the Sky*, will teach about the habitat, prey, biology and behavior of these carnivorous birds. We invite you to swoop in and become uplifted by the eagle, falcon, hawk, owl, condor, kestrel, vulture, kite, osprey, merlin, harrier and more!

Many of us venture out into the world's wildlands to enjoy tranquility and beauty, while building lasting memories with family and friends. Although, unfortunately, we rarely see wolves and other apex predators in the wild, a look skyward will often reward us with a glimpse—and if we are prepared, a photograph—of a soaring predator. Heidi's stunning raptor photos will serve as encouragement to the photographer in all of us.

Our summer issue of *International Wolf* will have more about this educational exhibit, as will www.wolf.org. We hope you'll join us in Ely from May 2015 through May 2016 to learn together about raptors and, of course, wolves. ■

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Rob Schultz, executive director

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In the Long Shadow of the Pyramids and Beyond: Glimpse of an African... Wolf?

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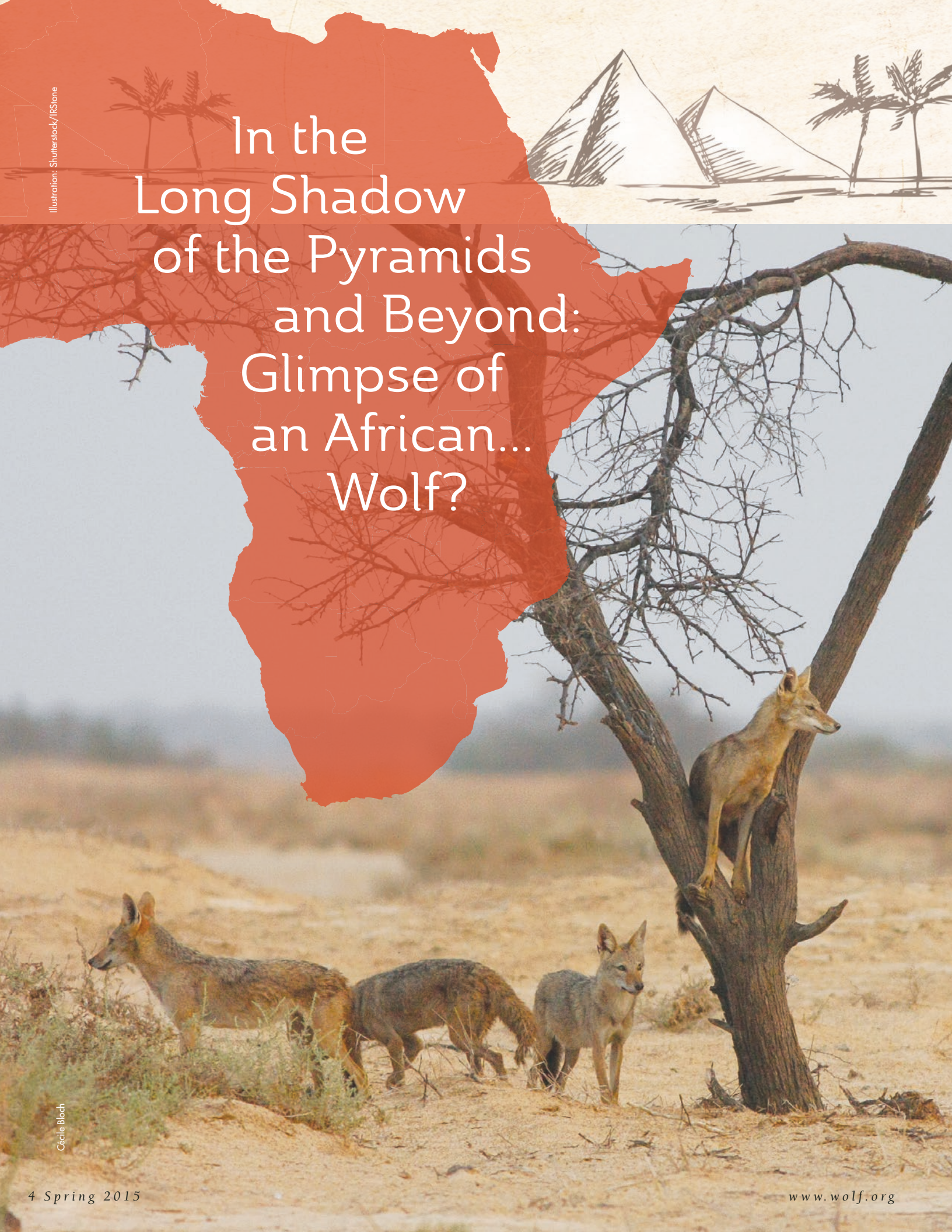


Cécile Bloch

by CHERYL LYN DYBAS

A New Wolf in Town

Kheune, Senegal. The village, perched along the Senegal River, doesn't appear on a map, but it's the site of one of the most far-reaching conservation genetics discoveries of the decade. There Africa's first gray wolf, *Canis lupus lupaster*, formerly thought to be the golden jackal *Canis aureus*, lopes across the rolling sandy plains of the western Sahel. The "new wolf" has a range that extends more than 6,000 kilometers (3,700 miles) from Egypt to Senegal. Biologist Philippe Gaubert of the Museum National d'Histoire Naturelle in Paris and his colleagues reported the finding in the August, 2012, issue of the journal *PLOS ONE*.

When the wolf was initially discovered by geneticists in 2011, its range, they believed, was confined to Ethiopia and Egypt. Now biologists are asking: how many golden jackals across Africa are in fact wolves? "Unique field observations in Senegal allowed us to provide a diagnosis of the 'African wolf' that clearly distinguished it from the golden jackal," says Gaubert. But hybridization between the two may be happening, at least in Senegal, based on detection of *Canis lupus lupaster* genes in *Canis aureus* there.

In July 2011, researcher Cecile Bloch, a co-author of the 2012 *PLOS ONE* paper, observed wolf-like canids on the periphery of packs of golden jackals near Kheune. The animals were larger and darker than the jackals. They also behaved differently, with solitary and somewhat shy demeanors. The only interactions observed between the two were fighting by the larger canids for carcasses being eaten by golden jackals, "the latter inevitably abandoning its food to the former," says Gaubert.

Ultimately, Bloch, Gaubert and others looked at the DNA of seven animals that proved to be African wolves: one east of Parc National du Djoudj near Kheune; five in Algeria's coastal region between Skikda and El-Kala; and one in Mali, Adrar des floras, Terarabat. They also found that two other seeming golden jackals were mostly African wolves. Both were in Senegal, one a captive animal at the Zoo du Parc de Hann in Dakar, and one in the wild not far from Kheune.

Mitochondrial DNA, which the scientists used in their study, "shows only part of the picture of the African wolf's lineage," says biologist Dr. L. David Mech of the U.S. Geological Survey and the University of Minnesota. It tells us about the wolf's heritage through the mother's side; nuclear DNA offers a more complete view. As with other wild canids, studies (and scientific journal papers to be published soon) are underway to reveal its origins and genetic makeup. Is *lupaster* a wolf or a close relative?

While the research is ongoing, "our assessment of the African wolf's range supports the idea of a wide spectrum of habitats for the species," says Gaubert, "from Mediterranean coastal and hill areas, including hedged farmlands, scrublands, pinewoods and oak forests in Algeria, to tropical, semi-arid savannas in Senegal and massifs in Mali." This range, he says, poses the question of how such large carnivores went undetected for so long. Or did they?

In the Time of the Jackal-Gods

It is 2494 B.C., Egypt's Fifth Dynasty. A procession makes its way to a sun-temple, where the pharaoh's Sed Festival, held in the 30th year of his reign, is set to begin. The gathering renews the sovereign's youthful vitality. A greeting awaits him: two officers wearing caps and tails lined with fur—fur the Egyptians believe came from wolves. The human sentries represent the jackal gods Anubis and Wepwawet, Anubis' lesser-known twin. The two were the guardians of the border between life and death, a boundary which, in ancient Egypt, only canine

Cécile Bloch

divinities traversed. Called "the openers of the roads," Anubis led the way to the south, Wepwawet to the north.

Anubis and Wepwawet were named for the propensity of jackals to hunt rodents by night near cemeteries. Some believe the Egyptians fashioned elaborate tombs to protect the dead from the jackals. But were Anubis and Wepwawet in fact jackals? Could one or both gods have been something else? Egyptians thought so long ago. What did they know that we don't, or didn't, until 2011? That Wepwawet and Anubis were wolves in jackals' clothing.

Shutterstock/IRStone

Millennia later, Aristotle was the first European to write of wolves in Egypt, stating that they were smaller than those found in Greece. "The same observation was made by twentieth-century biologists when they compared the sizes of jackal skulls," says ecologist Claudio Sillero-Zubiri, deputy director of the Wildlife Conservation Research Unit (WildCRU) at the University of Oxford in the U.K.

Fast-forward to a few years ago, when an Indian biologist named Yugal Tiwari sent Sillero-Zubiri a picture from a video Tiwari had filmed in Eritrea. The footage showed a lanky canine with large paws "that might have been a desert-dwelling wolf," says Sillero-Zubiri. "We hoped more information would turn up, but unfortunately it didn't."

More to the Story

But Wepwawet and Anubis did not remain quiet in their underworld. While doing field work in Ethiopia, scientists from universities in Ethiopia and Norway noticed that certain golden jackals looked different. "They were larger, more slender, and sometimes had a whitish color," says Nils Stenseth, a geneticist at the University of Oslo. The researchers collected scat specimens for DNA analysis. The samples, including some from "more usual-looking" golden jackals, were shipped to Stenseth's laboratory for analysis. "With breathless excitement," remembers Sillero-Zubiri, the Oslo scientists contacted him and others on the project. The jackal samples appeared to be wolf DNA—but didn't correlate with samples in GenBank, the world's largest repository of genetic sequences.

Field observations distinguish the African wolf (left) from the golden jackal (right), but biologists have unveiled evidence that the golden jackal, with its soft, pale fur may be a hybridization of the blackish-yellow* lupaster*, with its brush-like tail and mane of coarse, black-tipped fur.

"We could hardly believe our eyes," says Eli Rueness, a geneticist at the University of Oslo and lead author of the January 2011 paper in *PLOS ONE* reporting the results. "We had unwittingly uncovered genetic evidence of a cryptic canid [a species hidden within a species] that looked like a golden jackal," says Sillero-Zubiri, "but whose genetic code told another tale." The biologists unveiled the news: some golden jackals are gray wolves. Scientists then updated the wolf's scientific name to *Canis lupus lupaster*, after the gray wolf *Canis lupus*. Hereafter, it is referred to simply by its scientific name, *lupaster.*

Lupaster is the only gray wolf on the African continent. The discovery tells researchers that members of the gray wolf lineage lived in Africa as far back as three million years ago. The wolves eventually spread through the Northern Hemisphere. They became the well-known gray wolves of the northern United States and Canada. "We now know that wolves were indeed in Africa in the days of the ancient Egyptians—and long, long before," says Stenseth.

Lupaster looks like a large, blackish-yellow dog. Its tail is brush-like, with black hairs on the end. A mane of long, coarse, black-tipped fur runs from its crown to the base of its tail and onto its shoulders and hips. The golden jackal is smaller than *lupaster*, with soft, pale fur, and it is a social animal. A breeding pair is often followed by its offspring, and it sometimes forms packs when hunting. Its cry, heard just after dark or shortly before dawn, is a long, wailing howl followed by three yelps: "dead Hindoo, where, where, where."

In contrast, *lupaster* travels alone. A nocturnal creature, it is sometimes glimpsed as the sun begins to set, when it emerges from caves and crevices, and from tombs. Whether it howls remains unknown.

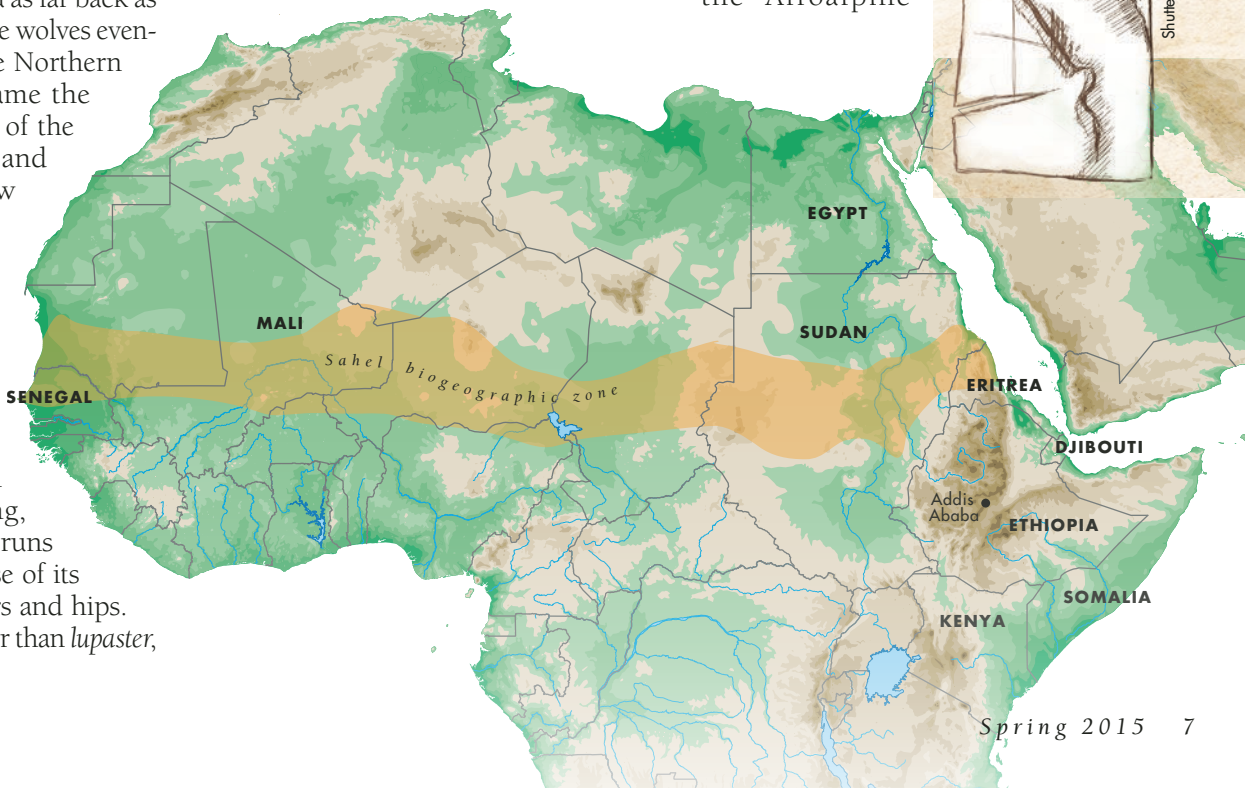
Wepwawet continues to open new roads. Further analysis links the *lupaster* specimens from Ethiopia with the same genetic sequences of animals 2,500 kilometers to the north in Egypt. "The results place *lupaster* in Egypt, as well," says Sillero-Zubiri.

Lupaster's range extended as far south as the Sinai Peninsula, scientists knew, but didn't, it was thought, reach mainland Africa. Stenseth, Sillero-Zubiri and others, however, believed that many canids identified as golden jackals as far south as Kenya and beyond might be *lupaster.*

Philippe Gaubert proved them right. "As we look more closely with genetic tools at even well-studied species such as the gray wolf in North America," says biologist Dr. Rolf Peterson of Michigan Technological University, "we're refining our understanding of these animals. For Africa, and for North America, what we thought 10 years ago about the biogeography of the wolf has been turned on its head." The 2011 and 2012 findings, Peterson believes, are far from the end of the story.

Lone Wolf in a Starkly Beautiful Land

Genetic techniques are revealing the hidden biodiversity of largely unexplored places such as Ethiopia. The discovery of *lupaster's* true identity shines a light on a formerly dark corner of the world: the Afroalpine




Cécile Bloch

fauna and flora, an assemblage of species that evolved in the relative isolation of the highlands of the Horn of Africa.

Understanding the intricacies of that biodiversity may come not a moment too soon for *lupaster*. Although golden jackals are listed by the International Union for Conservation of Nature (IUCN) as a "species of least concern," *lupaster* may be much rarer. "It's a priority, for both scientific and conservation efforts, to determine this wolf's whereabouts and numbers," says Stenseth.

Gaubert agrees. "Since 'jackal-like' canids in Africa are regularly killed to protect livestock," he says, "it's urgent to develop a conservation strategy for the African wolf. Shepherds say that the African wolf hunts larger livestock such as sheep, goats, and even cows, whereas the golden jackal only preys on lambs."

The Menz Guassa Community Conservation Area in Ethiopia's highlands may hold the key. *Lupaster* has been seen most often in this land of short scrub plants sprouting from rock-strewn hillsides. "The region is among the Ethiopian highlands' most pristine and secluded natural wonders," says Zelealem Tefera, a scientist at the Frankfurt Zoological Society (FZS) Ethiopia Office. The FZS supports conservation projects throughout Africa in countries like Ethiopia, Tanzania and Zambia.

Guassa villagers live in kebeles (farmers' associations). In the day's last light, Wepwawet may walk among them. "Out of the corner of your eye at sunset you might just spot *lupaster*," says Karen Laurenson, an ecologist and veterinarian at the FZS-Ethiopia Office. She's glimpsed an animal that emerges at dusk, seemingly out of thin air, to disappear just as quickly. "I think I've seen *lupaster*, but didn't know at the time what it was." Laurenson is concerned that the wolf could be gone before we know it. "Golden jackals and other canids are susceptible to rabies, canine distemper virus, and other diseases. With a population that may, or may not, be very small, lupaster could disappear in the blink of an eye."

Lupaster vs. Homo sapiens?

Disease and inbreeding clearly aren't the only challenges *lupaster* faces. Uncovering this cryptic species' secrets may be a mixed blessing.

"My Grandma told me about wolves that stole her livestock," offers one villager. "I'd always ask if she was sure it wasn't a hyena, dog, jackal, or fox, but her answer was firm: 'it's a wolf.' She said that wolves were once very common, but that she hasn't seen any for decades. I've heard many claims like that."

Where there's livestock, *lupaster* may be, too. "We know so little about this subspecies," says Zillero-Zubiri. "Who can say whether and when it takes sheep? It's still a shadow on a ridge." Luckily, says Tefera, "People here refer to it as the 'nomad jackal' rather than the more common jackals they've accused of killing their lambs." Its elusiveness may be *lupaster's* salvation.

Wepwawet Among Us

"Woollff!" shouted Lajos Nemeth-Boka, lead naturalist and tour leader for GreenEye Ecotours in the U.K. It was November 2007 when Nemeth-Boka was driving slowly along the west bank of the Nile River between Luxor and Aswan, Egypt. "An animal crossed the road in front of us, coming from the Nile's shore and running toward the Sahara sands," he says. "I've seen golden jackals and I've seen wolves, and there is a big difference between the two. This was clearly a wolf." It was, he believes, *lupaster*.

In later Egyptian art, Wepwawet was depicted as part-human, part-wolf, with the body of a human and the head of a wolf. European Egyptologists mistook Wepwawet for a jackal, even though the ancient Egyptians clearly identified the god, and the animal for which it was named, as a wolf. According to texts inscribed in the pyramids, Wepwawet often led the way to success for Egyptians from messengers to kings. Five thousand years later, will we give Wepwawet's incarnation the recognition—and protection—its position as Africa's only gray wolf deserves? ■

Science journalist and ecologist Cheryl Lyn Dybas, a Fellow of the International League of Conservation Writers, also brings a passion for wildlife and conservation to National Geographic, Natural History, National Wildlife, BBC Wildlife, Scientific American, The Washington Post, *and other publications.*

Editors Note: This article has been adapted from previous pieces in Natural History *and* Africa Geographic.

The Red Wolf Species Survival Plan: Saving the Red Wolf Through Partnerships

If the road to extinction was a hundred miles long, the red wolf was already in the ninety-ninth mile and was about to drop off the edge into extinction." These were the words of Curtis Carley, wildlife biologist and future coordinator of the Red Wolf Recovery Program. In the 1970s, Carley, with help from scientists including Ron Nowak and Howard McCarley, led a charge to save the remaining red wolves. They were about to embark on a conservation journey unlike any other.

Text and Photos
by JEREMY HOOPER

Like all wolf populations in the United States, the red wolf *(Canis rufus)* had been mostly eliminated from the landscape due to intense human persecution, habitat loss and degradation, and prey declines resulting from over-harvesting by humans. This forced scientists, government officials, and the general public to make a decision—attempt to save the species or watch it go extinct.

In 1967 the red wolf was listed by the newly adopted federal Endangered Species Preservation Act. When the Endangered Species Act became law in 1973, a recovery plan was developed for the red wolf. At this time, the number of red wolves was in rapid decline, with those remaining forced to breed with the more abundant coyote *(Canis latrans)* or not to breed at all. The rate of hybridization between the two species left little time to prevent red wolf genes from being completely absorbed into the expanding coyote population. Recognizing that the red wolf's existence was in peril, the U.S. Fish and Wildlife Service (USFWS), led by Carley, began an effort to capture and remove the remaining red wolves from the wild.

Though such an effort to cause the functional extinction of a species in the wild seemed counterintuitive and was challenged by many, Carley believed that this was the only way to save the species from extinction. Over a seven-year period (1973-1980), 400 canids that resembled red wolves were captured within the wolf's historical range. Of these 400, only 17 were identified as red wolves; the majority were coyotes and red wolf-coyote hybrids. Of these 17, 14 would become the "founders" of the red wolf captive population, removed from the wild and taken to Point Defiance Zoo and Aquarium (PDZA) in Tacoma, Washington. This marked the beginning of the red wolf captive breeding program.

The commitment of the Red Wolf SSP will continue to be a critical factor in the long-term survival of one of the world's most endangered animals as the U.S. Fish and Wildlife Service prepares to announce its decision about whether to continue or to terminate the Red Wolf Recovery Program.

Captive Program History

The USFWS partnered with PDZA in 1973 to maintain and manage red wolves in captivity that had been removed from the wild. Their goals were to certify the genetic purity of wild-caught wolves, increase the number of genetically pure red wolves in captivity, and maintain a continuing red wolf gene pool for reestablishment of the species in the wild and for distribution to selected zoos. New husbandry techniques were quickly developed, including the adoption of an unconventional "hands-off" approach designed to reduce the likelihood of wolf-human habituation by minimizing interactions between wolves and their keepers (unlike some gray wolves, red wolves are not hand-raised in captivity). Scientists were hopeful this approach would maintain a level of the wolves' intolerance of humans, minimizing the potential for human-wolf conflict at reintroduction sites.

By 1981 the American Association of Zoos and Aquariums (AZA) had developed the Species Survival Plan (SSP) program with a stated mission to "cooperatively manage specific, and typically threatened or endangered, species populations within AZA-accredited Zoos and Aquariums, Certified Related Facilities, and Sustainability Partners." The AZA approved the red wolf for the SSP program in 1984, leading to the development of a new manage-

Brief Historic Time Line for the Endangered Red Wolf

ment plan to ensure the persistence of a "healthy, genetically diverse, and demographically varied captive population." By 1989 the USFWS had integrated the SSP into the Red Wolf Recovery Program, marking the first time a USFWS Recovery Plan had been combined with a Species Survival Plan.

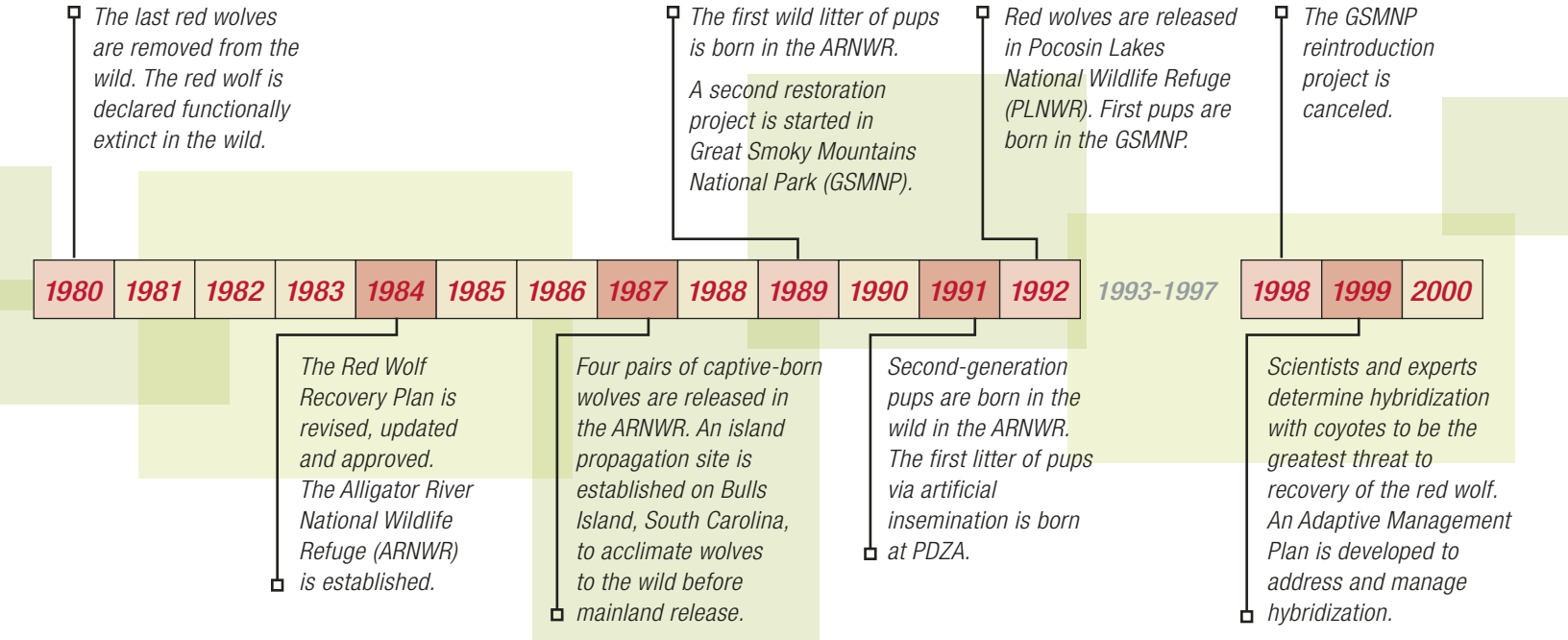
The Red Wolf Species Survival Plan (RWSSP) initiated a network of facilities across the country with a common goal of restoring the red wolf to its native range. This network provided more space for housing red wolves, increased opportunities for breeding and research, and a broader outreach campaign. Resulting increases in the captive population brought the program closer to its goal of wild reintroduction.

In 1987, ten years after the first pups were born in captivity and seven years after the species was declared biologically extinct in the wild, eight red wolves were released into Alligator River National Wildlife Refuge in eastern North Carolina. This represented several firsts: an attempt to reintroduce a wolf into the wild; a carnivore from captive stock; and a species previously declared extinct in the wild.

While the need for assisting in wild recovery efforts has shifted as the wild population has grown, the RWSSP, led by coordinator Will Waddell, continues to play an integral role in recovery efforts by: 1) scientifically managing the captive population and supplying wolves for release when needed to add genetic vigor to the wild population or when additional reintroduction sites are identified; 2) supporting field conservation activities, such as by applying captive research to the field; 3) working in areas such as genome banking and assisted reproduction, contraception, behavior and husbandry; and 4) promoting red wolf awareness.

The RWSSP: A Closer Look

A cornerstone of the RWSSP's success has been the management of captive breeding. In a systematic fashion, breeding efforts are designed to increase genetic



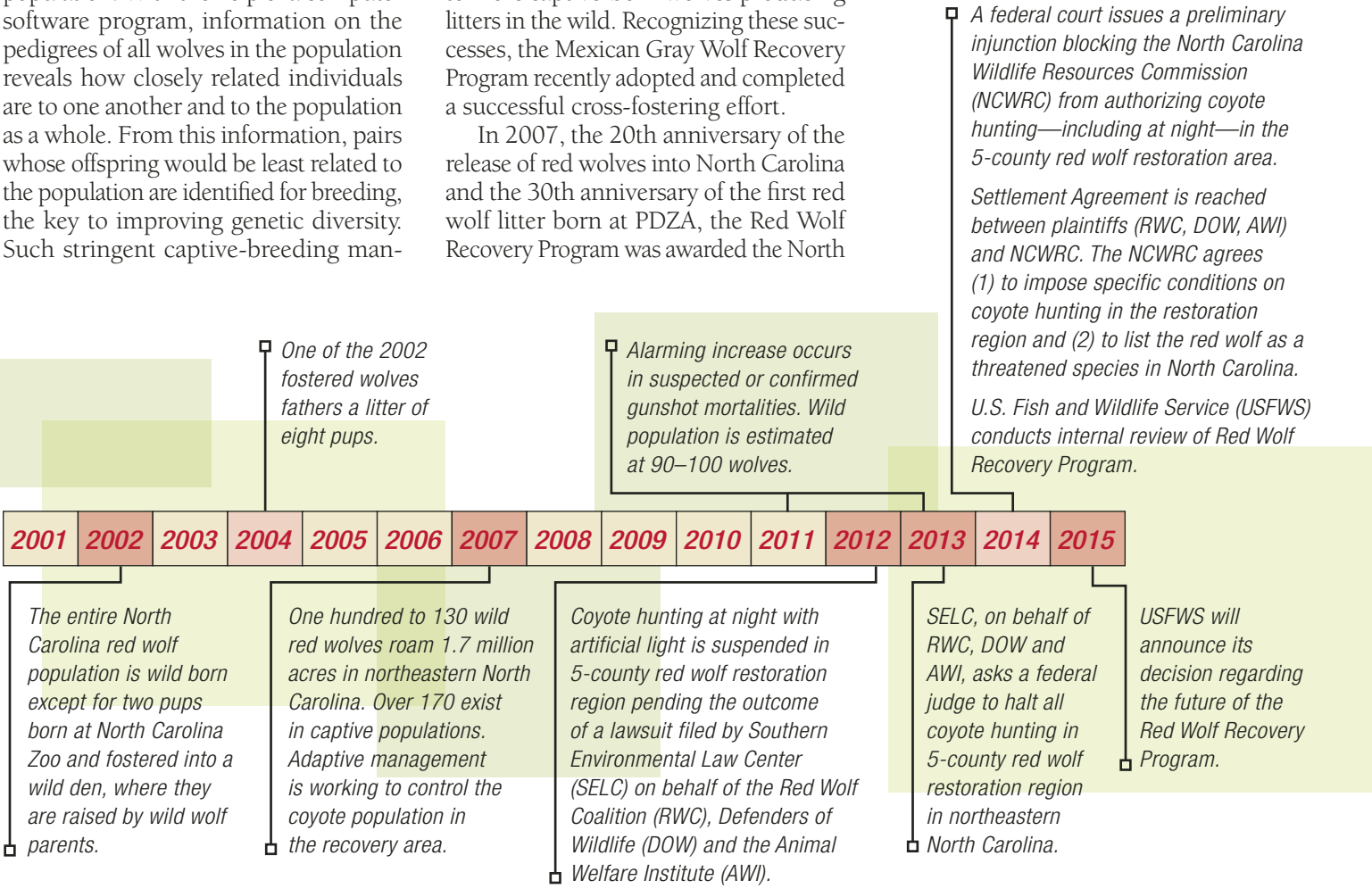
diversity and ensure long-term viability of the red wolf population. Built from just 14 wolves, the current population is characterized by closely-related individuals. As a result, undesirable effects believed to be attributed to inbreeding, such as lower birth weights, smaller litter sizes, physical abnormalities, and increased pup mortality, continue to pose potential problems. To mitigate these effects, the RWSSP collaborates with scientific advisors from the AZA Population Management Center (PMC) to base breeding efforts on a comprehensive genetic and demographic analysis of the population. With the help of a computer software program, information on the pedigrees of all wolves in the population reveals how closely related individuals are to one another and to the population as a whole. From this information, pairs whose offspring would be least related to the population are identified for breeding, the key to improving genetic diversity. Such stringent captive-breeding management became even more valuable in 2002 when program biologists began a pioneering effort to supplement the wild population with captive-born pups.

Red Wolf Recovery Program … demonstrates that zoos, nature centers, and similar organizations can and will play a significant role in future red wolf conservation.

Cross-fostering integrates genetically valuable, captive-born pups into wild litters in an attempt to increase population numbers and, most importantly, genetic diversity. For both an increase in population and diversity to occur, a captive-born pup must be raised by a wild wolf pack, survive to maturity, and reproduce. Usually, candidates for fostering, both captive and wild, are selected based on three ideal factors. The captive and wild-born pups must be similar in age, less than 2 weeks old, and the wild litter must be relatively small, to prevent overburdening the mother. The first successful cross-fostering in 2002 led to a captive-born male wolf producing a wild litter of his own in 2004. Cross-fostering has become an effective tool in red wolf recovery efforts. Acceptance of fostered pups by wild mothers has been high, leading to more captive-born wolves producing litters in the wild. Recognizing these successes, the Mexican Gray Wolf Recovery Program recently adopted and completed a successful cross-fostering effort.

In 2007, the 20th anniversary of the release of red wolves into North Carolina and the 30th anniversary of the first red wolf litter born at PDZA, the Red Wolf Recovery Program was awarded the North American Conservation Award from the AZA, illustrating the benefits of organizations working together to conserve a species. Moreover, it demonstrates that zoos, nature centers, and similar organizations can and will play a significant role in future red wolf conservation. Not only do they bring awareness to red wolf conservation, they provide the public an opportunity to see red wolves and to experience a rare glimpse into the social lives of these mysterious canids. ■

Jeremy Hooper is a graduate student at the University of Tennessee, Chattanooga, where he's studying the relationship between humans and coyotes in the city of Atlanta, Georgia. He has been involved with the RWSSP since 2008 through his work at the Reflection Riding Arboretum and Nature Center in Chattanooga. Jeremy's goals are to improve relations between humans and predators through research, education and partnerships.



Old Mom Stands Firm

In December 2012, a large male red wolf weighing 70-80 pounds arrived at the Reflection Riding Arboretum and Nature Center, a RWSSP cooperator located in Chattanooga, Tennessee. His name was Cane, and all we knew about him was that he had a history of dominant and aggressive behaviors toward other wolves, notably females. Due to these persistent behavioral issues, the RWSSP wanted to transfer 7-year-old Cane to a new facility. Tish Gailmard was the Director of Wildlife at Reflection Riding and also a member of the RWSSP Advisory Committee. She and I came to a similar conclusion—if any wolf was capable of holding its own, it was Old Mom.

An 11-year-old, 40-pound female red wolf, Old Mom is a very confident, dominant animal. Nicknamed "Busy Feet" by a past keeper, she's constantly on the move, patrolling her enclosure, eyes alert and tail held high. She usually initiates and ends howls, closing with a long series of impressive barks, as if reinforcing claim of her area. As I've watched her over the years, I've imagined what she would have been like as a wild red wolf. My thoughts raced with comparisons of well-known, successful gray wolves from Yellowstone—the Cinderella Wolf (wolf 42) and the 06' female (wolf 832). Known for their intelligence, leadership, hunting abilities, and parenting, these wolves are admired by scientists and the general public.

As is standard practice, Cane was placed in quarantine before release into the main enclosure with Old Mom. Met with nervous anticipation, the day finally arrived. We opened the door. He was in. Mom initiated the first meeting. Side by side they both stood firm and tall. Several times early on, Cane put a paw on Old Mom's back, and she would soon return the favor. After a couple of minutes, Cane went on his way seemingly more interested in exploring his new home.

According to the reports, Cane was most aggressive around food. We threw in two pieces of meat. Each grabbing a piece, the two wolves moved away from each other. Then, in a moment I've never forgotten, Old Mom seemed to decide, "I want his piece, too." She took it from him. Since that day, neither Tish nor I have seen any of the behaviors mentioned by Cane's past keepers. Old Mom had straightened him out. ■

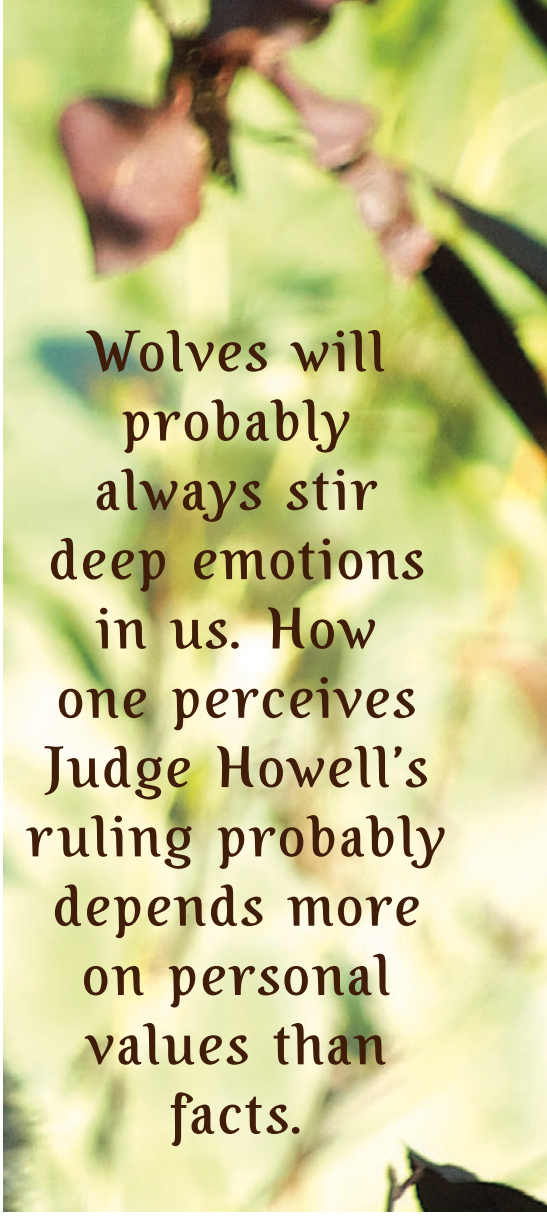
— *Jeremy Hooper*

Are Gray Wolves Still Endangered?

by MIKE PHILLIPS

Rob Jackson

In a stunning move on December 19, 2014, Federal Judge Beryl Howell ruled that Endangered Species Act protections be reinstated for gray wolves *(Canis lupis)* in Michigan, Minnesota, Wisconsin, and parts of Illinois, Indiana, Iowa, North Dakota and South Dakota. The ruling resulted from a lawsuit filed by the Humane Society of the United States and other wildlife protection groups against the U.S. Fish and Wildlife Service's (USFWS) December 2011 decision that removed the act's protections. That delisting decision allowed state fish and game departments to manage wolves and to implement harvest programs for recreational purposes. The judge's ruling ended all public taking of wolves in the Great Lakes states for depredation control or any other purpose except defense of human life. The ruling did not put an end to federally enacted depredation control efforts in Minnesota, where the wolf was returned to threatened rather than endangered status.



Even though the ruling could be interpreted as indicating otherwise, the gray wolf is biologically secure in Minnesota, Michigan, and Wisconsin and should have remained so, even with liberal state management. However, a thorough reading of the Endangered Species Act indicates that biological security and legal recovery are not necessarily one and the same. The latter requires wolves to be far more common and widely distributed than the former.

One can argue that wolves have been biologically secure in Minnesota since the 1970s when approximately 1,000 animals lived there. The state used that argument to oppose the original listing of the species. But the Endangered Species Act has always required that the gray wolf be more common than that. The law requires that a species be secure (not endangered or threatened, but suitable for delisting) across a significant portion of its range. Put another way, recovery requires that before delisting can occur a species can only remain insecure (threatened, endangered, or extirpated) across no more than an insignificant portion of its range.

This notion of recovery is consistent with the definitions for important words in the act including *endangered*, *threatened*, and *species*. It is consistent with the USFWS's previous delisting decisions for species other than the wolf. In those cases, the species in question were fairly common and widespread at the time of delisting. Finally, this notion of recovery is consistent with the all-important "Findings" section of the Endangered Species Act which specifically identifies ecological value as an important reason for conserving imperiled species. It is very hard for the ecological value of a species to be properly expressed if it is absent from many of the ecoregions of its historical range.

In sum, Judge Howell took sharp exception to the USFWS's advance of a novel, relatively easily attained approach to gray wolf recovery. While it is easy to understand that the difficulty of wolf recovery offered rationale for this approach, it is important to note that the courts have rendered it unlawful.

Why?

Judge Howell set aside the delisting decision because she concluded that the USFWS had failed to adequately explain why the majority of the Great Lakes wolf population area, where the species remains extirpated, was insignificant and, therefore, superfluous to recovery. The term *insignificant* is important in the context of the Endangered Species Act, since its counterpart *significant* is included in the definitions for endangered and threatened species:

- Endangered species—any species …which is in danger of extinction throughout all or a significant portion of its range.
- Threatened species—any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

When considering *significant* and *insignificant* it is important to accept that the *insignificant* portion of a species' range can include large areas that are not occupied securely, if at all, by the species. Recovery does not require that a species occupy all of its range. It is equally important, however, to accept that in every meaningful way, *significant* has to mean more than *insignificant*. Recovery does require that a species be fairly widespread in the area considered by the original listing action, which typically is the species' historical range, before federal protections are lifted.

Judge Howell also concluded that the USFWS erred by adopting a piecemeal approach to wolf recovery by delisting the Great Lakes gray wolf population when it was never more than a subset of the originally listed entity (i.e., the gray wolf across a much larger area) which had not been recovered. According to the judge the Endangered Species Act only allows for the delisting of the originally listed entity in total, rather than piecemeal.

Lastly, Judge Howell was concerned that the USFWS had failed to adequately explain why a liberal recreational harvest of wolves did not threaten the species. It is worth noting that since delisting, Great Lakes region trophy hunters and trappers have killed more than 1,500 wolves. A recent USFWS internal report indicates that recreational and management harvests can cause declines in wolf populations, despite the birth of far more pups (about 11,000 since delisting) than wolves killed by hunters and trappers. Since Judge Howell's ruling was something of a shocker, given the presence of more than 3,000 wolves and several hundred breeding packs in the Great Lakes states, it is reasonable to consider possible consequences.


Rob Jackson

The USFWS's most recent vision for recovery of the wolf subspecies that occupies the Great Lakes states called for delisting from the Great Plains to the Pacific Northwest based solely on its biological security in Minnesota, Michigan, and Wisconsin (and, curiously, Canada). Judge Howell's ruling strongly suggests that this vision comes up short. Why? Because the area targeted for delisting includes vast tracts of highly suitable, but unoccupied, habitat that is significant in many relevant ways. Judge Howell's ruling bolsters an interpretation of the Endangered Species Act that concludes that federal protections for the wolf must apply until the species is securely distributed across much more of this area.

The judge's ruling might prompt some elected officials to try to gut the act. Given the controversial nature of wolves, it is reasonable to expect blowback of this sort. I suspect, however, that any substantive change to the Endangered Species Act would be hard to enact. Given the public's overwhelming and persistent support of the law, President Obama would seem an unlikely ally in such an effort, and procedural rules for the U.S. Senate could be exercised to prevent such a bill from ever passing.

The ruling might prompt some elected officials to try to amend the Endangered Species Act to minimize the consequences of recovery. Some amendments may be in order. It could be useful to amend the phrase "significant portion of range" to read "significant portion of historical range where habitat remains suitable or can be made so through reasonable means." Granted, such an amendment would create a slippery slope, given the myriad definitions that could be attached to *significant*, *suitable*, and *reasonable* means. However, the vast extent of private land across much of the gray wolf's historical range precludes recovery there. Due to extensive private land in Illinois, for example, the state seems lost to the gray wolf. No reasonable means seem to exist to change that fact. There is no doubt that passage of the Endangered Species Act cleared the way to secure a future for the gray wolf, but it was large tracts of public land, not private land, that allowed that future to be realized.

Rather than gutting or lightly amending the Endangered Species Act, a more likely legislative response to Judge Howell's ruling would be fiscal in nature. Congress could, for example, defund activities by attaching riders to unrelated spending bills. This is the approach that Congress recently used to express disfavor with the USFWS's consideration of listing the greater sage grouse. Or Congress could legislatively delist the wolf as it did in Idaho and Montana. Several legislators are now preparing such a bill.

Wolves will probably always stir deep emotions in us. How one perceives Judge Howell's ruling probably depends more on personal values than facts. Whether it is cause for celebration or regret, it clearly signifies that biological security is not necessarily an adequate threshold for wolf recovery under the Endangered Species Act. It seems that even controversial species must be fairly widespread before federal protections can be lifted, or the USFWS has to adequately explain why more widespread distribution is not possible or necessary to honor the spirit and intent of the act. ■

Mike Phillips has been a Montana state legislator since 2006 and is currently a state senator. For the last 29 years he has worked with threatened and endangered species in the research, management and policy realms. He led the effort to restore the red wolf to northeastern North Carolina and the gray wolf to Yellowstone National Park. He has served on every Mexican Wolf Recovery team convened since 1995, and has directed the Turner Endangered Species Fund since he co-founded the organization with Ted Turner in June 1997.

Looking Toward the Future with an Eye to the Past

by Lori Schmidt, Wolf Curator

As part of the International Wolf Center's wolf care plan, we have chosen to rotate new pups into the Exhibit Pack every four years. Even though the memories of 2012 pups, Luna and Boltz, seem recent, we are heading toward the 2016 pup introduction. The Center maintains wolves as ambassadors to the wild for the purpose of educating our visitors about the physical and behavioral traits of wolves.

One aspect under discussion in the scientific community is genetic variations among wolf populations. In 1989, when we started the resident wolf program at the Center, there were 24 accepted subspecies of wolves in North America. By 1995, due to new analyses of skull measurements, subspecies of the gray wolf in North America have been reclassified to include five subspecies of wolves. To gain more insight into this issue, search the Center's website http://www.wolf.org for the article, "The Scientific Classification of Wolves: *Canis lupus soupus*." For the purpose of this article, we currently recognize five subspecies. These subspecies are the *Canis lupus occidentalis* or northwestern wolf, *Canis lupus arctos* or arctic wolf, *Canis lupus nubilus* or Great Plains wolf, *Canis lupus baileyi* or Mexican wolf, and *Canis lupus lycaon*, the eastern timber wolf.

The Center's captive wolf program has been managing multiple subspecies of wolves since 2000, allowing visitors to the educational facility in Ely, Minnesota, or visitors to our website, to observe the behavioral patterns and physical characteristics of our wolves. In May 2000 the Center first diversified its Exhibit Pack by adding arctic wolves represented by Shadow and Malik. Grizzer, Maya and Nyssa, representing the Great Plains wolves, joined the exhibit in 2004. With the arrival of Aidan and Denali in 2008, both northwestern wolves, the Exhibit Pack contained three of the five subspecies. The natural process of aging warranted the retirement of Shadow from the Exhibit Pack into the Retired Pack in July 2010. We are currently managing two subspecies in the Exhibit Pack: Aidan and Denali are northwestern wolves; Luna and Boltz are Great Plains subspecies.

As we look to the future introduction in 2016, we turn an eye to the past and share many fond memories of Shadow and Malik's time in the exhibit. Their unique white pelage, representative of arctic wolves, drew the attention of many visitors, and the pair bonding of Maya and Shadow proved the point that scientists often make—regardless of the subspecies, a wolf is a wolf is a wolf. ■

Nancy Gibson

Captive born Shadow and Malik as they neared one month of age; note the white guard hairs are just starting to appear on their heads and legs.

Nancy Gibson

Wild, two-month-old arctic pups photographed on Ellesmere Island, Canada; note white guard hair already present.

Kelly Godfrey

During the winter of 2005, even though the Center's wolves are spayed and neutered, Shadow chose Maya to be the dominant female and display a behavior called parallel gait.

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Jen Webb—Finding Strength in a Time of Personal Tragedy

By Darcy Berus

Photo courtesy of Jen Webb

Anyone who sees Jen Webb's five wolf tattoos can tell she loves wolves. They'll hear excitement in her voice when she talks about her discovery of the International Wolf Center. She said, "I was surfing online and found what I thought was an amazing place and all you do to teach people about this misunderstood creature."

On the phone from her Pennsylvania home, Jen shared with me why she's been a member of the International Wolf Center since 2006. "I've always had a passion and fascination for these beautiful animals…I would give anything to see a wolf in person and take a picture of one, but traveling is an issue for me. That's why I haven't been able to visit (the International Wolf Center's Interpretive Center in Ely)."

Not long ago, Jen experienced the tragic loss of Rich, her husband of 22 years. In her search for strength, she looked for ways to get up each morning and face the day. "I needed to be a part of something positive and latch onto it …something to help me focus," she said. After seeing the Center's *CrowdRise* online fundraising drive for a new "Wolf Wagon" for the Wolf Care program, she decided to create her own *CrowdRise* campaign to boost the effort. "I was hoping not only to meet my goal, but I wanted to help in whatever way I can… It gave me something positive to be involved with."

Jen's campaign was a huge success! She not only exceeded her goal—so far, over $1,600 and counting—but she is regaining her personal strength and positive spirit.

"You take a lot of things for granted. You figure there's always tomorrow. But I've come to see that it's not always true. And then it takes time to heal. It was important for me to get involved. I want to give and help wolves, however I can."

Thank you, Jen, for reaching out to the International Wolf Center and letting your dedication to our mission help you in your personal recovery journey. We are touched by your story and are grateful for your generous, enduring spirit. ■


Arven Briem

Wolves Return to Denmark: A Long Journey, An Even Longer Time

by Tracy O'Connell

Merete Prior writes from Denmark about the arrival of wolves in her country. She spent a week with International Wolf Center staff in the Northwest Territories, and has remained a friend of the Center through the years. She notes that Denmark had not been home to wolves in the wild for several decades. The last wolf was killed in 1813. Nearly 200 years later, in October 2012, a wild wolf was observed in Jylland, also called Jutland, the Danish mainland that shares a border with northern Germany. The animal died a month later from an infection in the chest which had caused a buildup of fluid in the lungs, according to an autopsy. It showed no sign of rabies, distemper or parvovirus infections.

With the help of German scientists from the Senckenberg Forschungsinstitut und Naturmuseum, a major science museum in Frankfurt, and DNA tests, the Danish scientist Liselotte Westley Andersen verified that this wolf originated from the Mielkeler pack in Sachsen, the easternmost part of Germany. The wolf was born in 2009 and had traveled around 850 kilometers (more than 528 miles) to the northern part of Jylland called Thy, home to a national park, as well as diverse landscapes including beaches and farms.

DNA samples and photos now show that wolves have spread to several parts of Jylland, and that at least eleven wolves have been in Denmark, all males. They come from Germany, Poland and the Baltic countries, and some have traveled over 900 miles (more than 1448 kilometers).

As in many other countries, Prior notes, the return of wolves has provoked discussion among the Danes. The population is polarized: those who do not want the wolf, typically hunters and farmers who claim the country is too small for a


Wikimedia Commons/Jens Buurgaard Nielsen

Tved Klitplantage in Thy National Park, Denmark: Evidence shows that wolves from Germany, Poland and the Baltic countries have traveled hundreds of miles to the diverse landscapes of this national park in Denmark.

large predator and that the wildlife will suffer; and those who welcome the wolf as a long-lost inhabitant of the country and a tribute to the diversity of nature.

The Danish government has agreed on a management plan for wolves which states that it is illegal to hunt them and forbidden to destroy the areas where wolves have established themselves. Denmark is committed to follow the European Union rules which dictate strong protection of wolves, while paying compensation to farmers who lose livestock to wolf attacks. It has basically adopted the same rules as Sweden, where two men were sentenced to two years in prison last September for killing a wolf. Meanwhile, farmers are investigating new measures, such as various kinds of fences and the use of guard dogs, to protect livestock, especially sheep.

Elsewhere in the World…

SLOVENIA:

Wolf OR-7 made waves throughout the world's media for his wide-ranging travels from his native Oregon pack to California and back to Oregon, spawning a movie and fan club. Now he has a counterpart in Europe—Slavc, a wolf collared in 2011 in southern Slovenia, which has traveled 2,000 kilometers (more than 1,242 miles) to Italy. Slavc stayed with his natal pack from his June collaring into December, then headed north. His travels were tracked by Slovenian biologist Hubert Potočnik, who gave the play-by-play in an interview last August with Henry Nicholls for the online news site theguardian.com.

Concerned that Slavc would be shot by people confusing him with a stray dog because of his collar, Potočnik reached out to the media with information throughout his trek. He reports Slavc crossed two major motorways in the early days, using underpasses and overpasses to navigate traffic. He swam the Drava River, a tributary to the Danube, at a place that was 280 meters (more than 900 feet) wide, where there were no bridges. He crossed the Austrian Alps where the lowest pass was 2,600 meters (more than 8,500 feet) and the snow would have been about six meters (more than 19 feet) deep at the time.

Nicholls notes, "Slavc was one of an estimated 4,000 wolves living on the Balkan peninsula of south-eastern Europe. This most urbanized, industrialized and farmed continent on Earth is now home to some 12,000 wolves, 17,000 brown bears and 9,000 Eurasian lynx."

If it was a mate Slavc sought, the trip paid off. In early 2012 he passed through Italy's Lessinia Natural Regional Park in the province of Verona. Biologists there had seen video footage of a female wolf, judging by its posture when it urinated. Slavc kept going, however, and tarried for a while farther north, in a region of vineyards and greenhouses, where he is believed to have killed the only domestic livestock he hunted on this trip. Then he backtracked to the regional park, depicted online as a verdant wonderland of 10,000 hectares (more than 24,500 acres). Here he met the she-wolf, now dubbed Juliet, in tribute to the Shakespearean character of that region whose story did not end as well. Park rangers confirmed the prints of two canids together in the snow. The pair produced litters in 2013 and 2014; the 2014 litter had seven pups.

THE UNITED KINGDOM:

A plan to re-introduce now-departed species into the UK, described by British environmental activist George Monbiot in his book, *Feral*, has been set back by a government plan to subject species not now present in the landscape at least some of the time, to eradication and control. The re-wilding plan has the support of the John Muir Trust, which sees ecotourism among the advantages, and millionaire Paul Lister, who wants to introduce bears and wolves to what he envisions to be an enclosed 50,000 acre area (more than 20,234 hectares) which encompasses his estate in Sutherland, as well as other land. Other species that would be similarly barred by the government's proposed ruling: the lynx, European beaver, brown bear, spotted hyena, lion, wolverine and blue stag beetle. "Some would be widely welcomed; others not at all, but it's clear that a debate about which species we might bring back is one that many people in this country want to have, but that the government wants to terminate," in the words of James Delingpole, himself vocal in opposition to the re-wilding proposal, writing in the UK's Breitbart online news service.

CHINA:

It was widely reported last August that a pack of starving wolves attacked a farming community in rural China near the Mongolian border, injuring six people, some severely. Some sources claimed the wolves were after the village's sheep population, and only attacked humans who were defending the flocks. *Editors note:* International Wolf *has no independent confirmation of the alleged attacks on humans or whether the wolves were rabid*

ROMANIA:

In an article last June, freelance journalist Luke-Dale Harris described the way the public's popular conception of wolves as bad animals causes them to be singled out more than lynx or bear for public hatred. "The wolf is a demonic image that corrupts, destroys innocence, and makes victims of the small ones," a theater producer tells him of the villain in the classic children's play, *The Goat with Three Kids*. "He feels the smell of blood and flesh. He goes on high rocks and howls at the moon. All of this makes us think of him like of a demon." Harris contends Romanian media "take a similar approach," noting, "Stories of the grisliest wolf attacks are splashed all over…and feature sensationalist headlines."

INDIA:

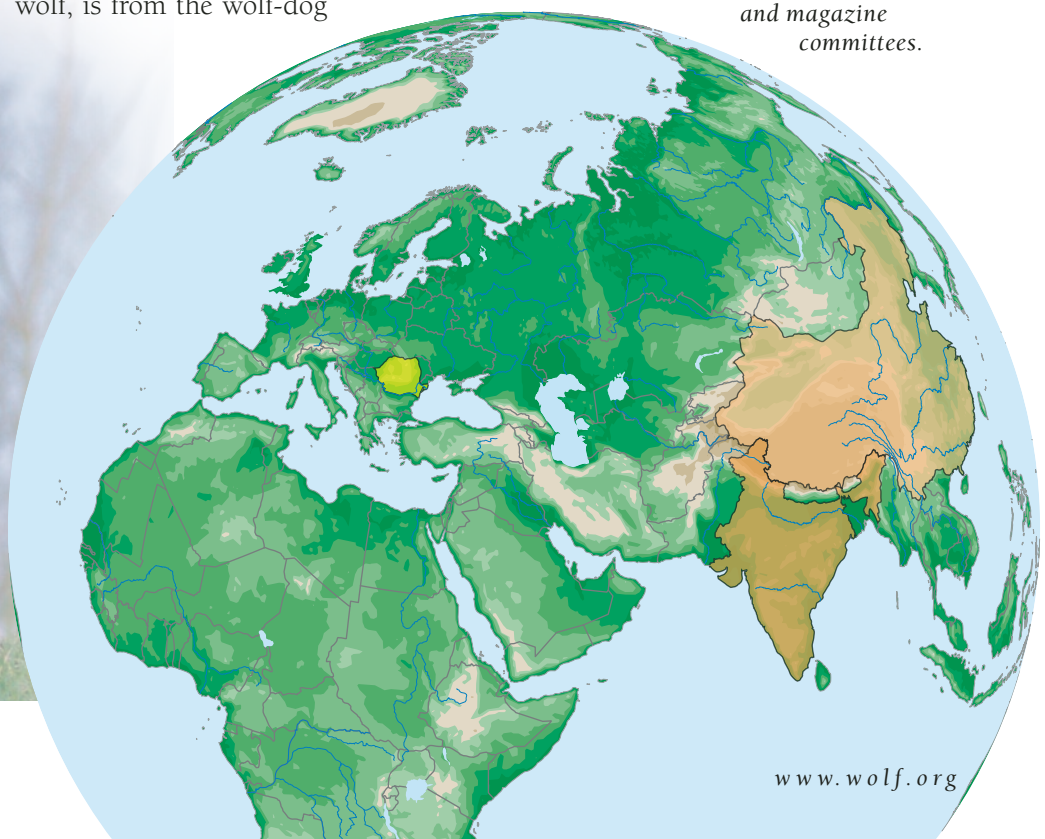
The nation's first-ever attempt at counting its wolf population aims to do so by documenting howls. "Every wolf howl is unique, just like every tiger has a unique stripe pattern on its body," says Bilal Habib, a scientist at the Wildlife Institute of India and an expert on wolves. Ananda Banerjee, writing in the English-language Indian website *Mint*, notes that there is no well-documented population estimate for wolves anywhere in the Indian subcontinent. The proposed census will be through a means called "capture and recapture," he says, explaining that it is a method commonly used to estimate a species' population. Scientists will record samples of wolf howls in various areas over various seasons, using the formula *Total = original number tagged x total recaptured ÷ number tagged on recapture*.

Banerjee addresses the challenges of protecting the wolf in India, citing that nation as the cradle of wolf evolution in which a proposed three species exist, two of which—the Indian and Himalayan wolves—are unique to the subcontinent. The third, the Tibetan wolf, is from the wolf-dog clade, or ancestry, that is found across the rest of Eurasia and North America. He notes that human population pressure will continue to exert demands on wolf habitat, as the treeless grasslands are considered by the government to be a wasted area and, therefore, not protected as a resource, but rather marked for development.

The goal of protecting wolves is seen as less noble than protecting other species, like the rhino, elephant, lion or tiger, Banerjee explains. Adding to the difficulty of protecting wolves is their need for big tracts of land in which to disperse new populations, which this crowded nation can ill afford. Noting the negative views of wolves because of their depredation of livestock, Banerjee draws attention to the positive myths that have grown up around these animals as indication that their stories can be cast in a more positive light, citing Romulus and Remus, who, according to legend, built Rome after being raised by a wolf, and Mowgli in Rudyard Kipling's *The Jungle Book*, whose extraordinary talents are credited to his being raised by wolves in the jungle. ■

Tracy O'Connell is associate professor emerita of marketing communications at the University of Wisconsin-River Falls and a member of the International Wolf Center's communications and magazine committees.


George Hughes



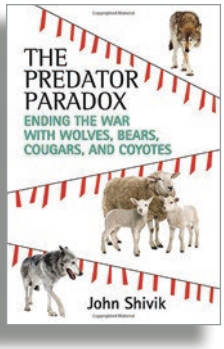
Book Review

Excitement, Entertainment, Learning Can Be Shared

by Nancy jo Tubbs

Adults can gain insight into key predator research and the pathway for the migration of imperiled species, while kids can become inspired to care about and work with animals. These awesome animals sometimes frighten, often delight, and always engage readers of all ages.

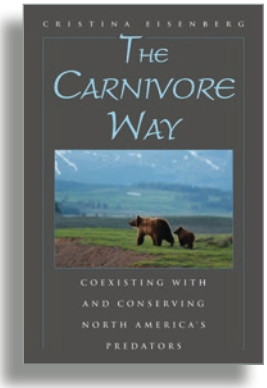
The Predator Paradox: Ending the War with Wolves, Bears, Cougars, and Coyotes. Author John A. Shivik is an even-handed storyteller and experienced researcher who brings into sharp focus the world of "varmints"—wolves, bears, cougars, and coyotes—as well as those who revere, detest, or study them. In short, readable sections, *The Predator Paradox* introduces the insights of key predator researchers and conservationists, including Dave Mech, Diane Boyd, Hank Fischer and Doug Smith. Shivik references a myriad of inside sources. He quotes Richard Nixon signing the 1973 Endangered Species Act, saying, "…nothing is more priceless and more worthy of preservation than the rich array of animal life with which our country has been blessed." Interviewing a widowed grandmother whose small Wisconsin cattle herd lost two head to wolves, Shivik notes, "The dead were cows with calves. The wolves ate her cash income for the whole year. It's not the magnitude of the killing; it's how personal it feels." The second half of the book focuses on the creative fervor and imperfect science of finding methods to deter wolves from taking livestock. Flags, surgical sterilization, fences, artificial scent marking, and relocation projects are detailed in a way that will fascinate anyone who has ever, even for a minute, been intrigued by predator research.



The Predator Paradox: Ending the War with Wolves, Bears, Cougars, and Coyotes

2014. Beacon Press
Written by John Shivik
208 pages

The Carnivore Way: Coexisting with and Conserving North America's Predators. Researcher Christina Eisenberg takes us on a trek from Mexico, north through the Rocky Mountains to Alaska. This potential wild lands corridor, she contends, is essential for the dispersal, breeding, and future survival of our charismatic megafauna: grizzly bears, wolves, lynx, jaguars, cougars and wolverines. Offering a chapter on each one, Eisenberg provides an overview of how science, policy, and environmental ethics promote, or stand in the way of, a pathway for the migration of these imperiled species. Human extraction activities, such as logging, and development of major highways, often interrupt natural corridors, while national parks, wilderness areas and continental-scale conservation efforts support the "carnivore way." Eisenberg aids the lay reader with helpful definitions of biological terminology and offers stories of face-to-face encounters with these provocative predators.



The Carnivore Way: Coexisting with and Conserving North America's Predators

2014. Island Press
Written by Christina Eisenberg
328 pages

Mission: Wolf Rescue. Targeted for kids 10 and older, this 128-page *National Geographic Kids* large paperback by Kitson Jazynka and Daniel Raven-Ellison is irresistible for all ages. Full-page photographs and eye-catching graphics surround readable information and activities that ground children in the basics of wolf behavior and biology. Throughout, they are introduced to engaging observations from professionals who interact with wild animals, including biologists, photographers, veterinarians, and rescue workers. The booklet encourages sensible ways to help wolf populations, and it might well inspire a child's passion to work with animals. Adults could do worse than to share this with a kid and, themselves, become enthralled once again with the world of wolves. ■

Mission: Wolf Rescue

2014. Turtleback Books
Written by Kitson Jazynka and Daniel Raven-Ellison
128 pages

Personal Encounter

The Red Wolves of the Ozarks

by Steve Weems

Early pioneers to the Ozark hills of Carroll County, Arkansas, recounted wolves as being abundant. According to the book *Pioneer Tales* by Cora Pinkley-Call, the earliest European settlers to Carroll County had to continually guard their stock against the threat posed by wolves and other predators. At night wolves would "come and pick up the crumbs from where (the settlers) had eaten" in their primitive pioneer camps. The wolves were often described as large and either reddish-gray or black in color. Biologists say it was the red wolf that was found in Carroll County.

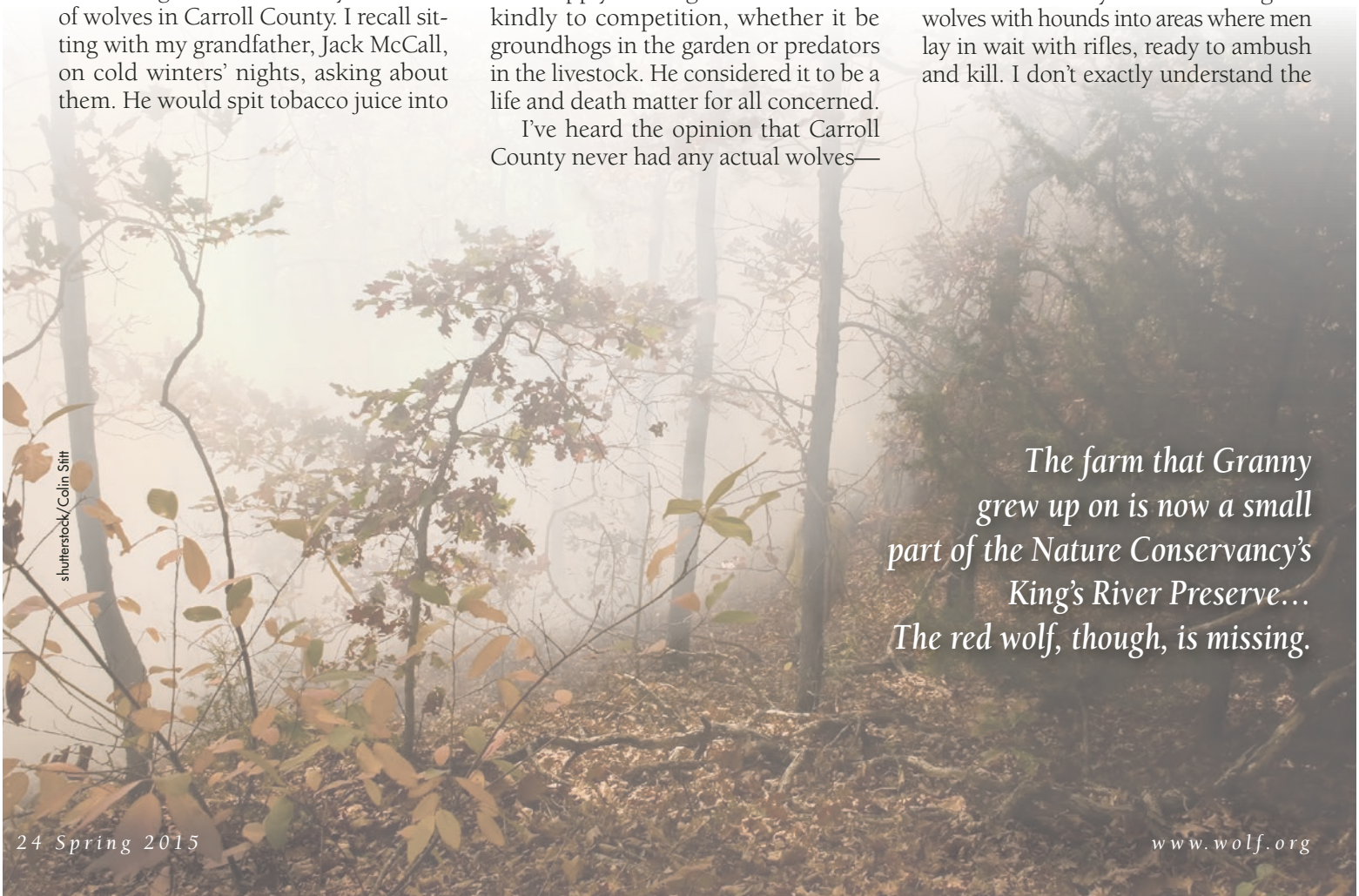
I've long been fascinated by the stories of wolves in Carroll County. I recall sitting with my grandfather, Jack McCall, on cold winters' nights, asking about them. He would spit tobacco juice into a coffee can at his feet, feed the stove another stick of wood, and patiently answer my questions.

In my time Jack McCall was an elderly, compact man in a cowboy hat. He was a lifelong farmer and timber man whose livelihood took place out of doors, tending his livestock and land. At an early age I realized that his life was centered more on the production of food than earning money. Cash was necessary, but you couldn't eat it. And when you have twelve children, like he and Granny, an abundant food supply is critical.

Jack McCall was quick to defend that food supply with a gun. He didn't take kindly to competition, whether it be groundhogs in the garden or predators in the livestock. He considered it to be a life and death matter for all concerned.

I've heard the opinion that Carroll County never had any actual wolves—that the old tales were of coyotes. I've no doubt that Jack McCall would have been surprised by this argument as wolves and coyotes not only look different, they sound different. In his younger days, he killed wolves for the bounty and because they killed sheep. Later, he killed coyotes because they preyed on his chickens and ducks. In his mind the two types of animals were not the same. Wolves were obviously bigger than coyotes, but they also carried themselves differently when they moved. In John Sealander's *A Guide to Arkansas Mammals*, he recounts an Arkansas red wolf specimen tipping the scales at 90 pounds. I've read that out West, pure coyotes seldom weigh more than 30 pounds.

There is a story from the 1930s of McCall men being seen with a horse-drawn wagon piled with the bodies of dead wolves. They'd been running the wolves with hounds into areas where men lay in wait with rifles, ready to ambush and kill. I don't exactly understand the



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The farm that Granny grew up on is now a small part of the Nature Conservancy's King's River Preserve… The red wolf, though, is missing.

intricacies of this hunting method, but it was apparently successful. The hounds would likely have been foxhounds or coonhounds, the traditional athletic, long-eared dogs used for tracking and giving chase in the Ozarks. Though more rare, another type of dog was employed to battle these predators.

When I was young, Granny also told me about wolves, which she indicated were numerous in her childhood. Raised upriver several miles from her future husband in the Mason Bend of Kings River, she saw them only occasionally, but heard them often. Across the river from her family's log house was a high bluff where the wolves would congregate at night and howl. Like other sheep farmers of the time, her father hated wolves. She recalled that circa 1918, he left on a trip, traveling what was considered a great distance. He returned with two massive wolfhounds, dogs powerful enough to hunt and bring down wolves on their own. When the wolves gathered across the river on the bluff, Granny's father would release the wolfhounds.

The farm that Granny grew up on is now a small part of the Nature Conservancy's Kings River Preserve in Carroll County. The preserve protects ten miles of clear, free flowing river and the surrounding acreage for a variety of native species, several quite rare. The red wolf, though, is missing.

The Arkansas Game and Fish Commission says that in the 1940s, Carroll County had one of the largest populations of wolves left in the state, the small farms and woodlands providing good habitat. Each year the number of pure wolves dwindled, as they were hunted by man and interbred with coyotes.

Carroll County continued to offer a $15 bounty on wolves in 1966. In 1967, the U.S. Fish and Wildlife Service listed the red wolf as endangered under the Endangered Species Preservation Act. In 1969 the Arkansas Game and Fish Commission gave wolves protected status. By 1980 the red wolf was officially extinct in the state of Arkansas.

Late in life, Jack McCall, not one for giving a predator an even break, was wistful about the disappearance of the wolves from Arkansas. He wondered if it was man's place to annihilate an entire species. ■

Jack McCall and his hounds

Photo courtesy of Steve Weems

Steve Weems returned to writing motivated by his love of the forests and lore of his native Ozark Mountains. He draws inspiration from deep woodland hikes, clear spring-fed creeks, and the thrill of continually discovering nature's mysteries. His writing is often fueled by the desire to capture the tales of a disappearing culture learned from the elders of his family. He lives with his wife and three children in a deep hollow near Eureka Springs, Arkansas. Murder in the Ozarks *is his first full-length novel.*

Blog/Web site: http://steveweems.com/

Wild Kids

Meet the Pack

International Wolf Center

Grizzer

Grizzer is a Great Plains subspecies of the Gray Wolf *(Canis lupus nubilus)*. He is currently the only wolf in retirement at the International Wolf Center. He was born on May 5, 2004. Grizzer was removed from the Exhibit Pack in March, 2011, after the loss of his littermate, Maya. It was determined that Grizzer had been losing confidence in his status and, without the support of his littermate, he struggled to compete with his younger packmates. Now in the retirement enclosure, he has less stress, but he can still interact with the other wolves through the fences. This winter Grizzer has been alert to the sounds of nearby sled dogs and the ravens perched overhead waiting to steal a scrap of food. Visitors to the Center cannot see Grizzer in the retirement enclosure, but he can be seen through the live wolf cams at www.wolf.org as well as in weekly updates on *YouTube* about all the ambassador wolves at the Center.

Vocabulary

Telemetry The use of electronic equipment to locate a distant source. Researchers use telemetry equipment, such as receivers and antennas, to locate signals emitted from radio collars which have been put on the wolves they are studying.

Biologist A person who studies living organisms, life processes and/or the animal and plant life of a particular place. Biologists also study the relationship of living things to one another.

Canis lupus The scientific name for the gray wolf.

Notes from the Field

Winter is a great time for scientists to track and study wolves, because wolves are easily seen against the white winter snow, especially from an airplane. With the thick summer foliage gone and with the use of radio-telemetry equipment, scientists can track and study radio-collared wolves and their packs.

Radio telemetry works like a radio station, sending out very high frequency (VHF) signals. Wolves are captured and fitted with transmitter collars. When the wolf is released, the transmitter starts sending out VHF signals. When the wolf biologists are in range with an antenna and receiver, they hear the beeping noise emitted from a wolf's collar. Thanks to this technology, wild wolves can be located and studied.

Visitors to the International Wolf Center can learn about tracking, observation, data collection and radio telemetry. They can even try all the radio telemetry equipment outside at the Center. Check our website www.wolf.org to look for radio telemetry classes for kids and adults. ■

Play!

Word Search

Use the Word Bank below to find the words hidden in the puzzle. Words may be found horizontally, vertically, diagonally, forward and backward.

wolf	antenna
telemetry	signal
biologist	research
transmitter	Boltz
radio	Luna
frequency	Aidan
winter	Denali
airplane	Grizzer
receiver	

I	T	T	S	H	G	E	N	R	W	K	F	T	R	X	X	Z	F	L	Q
Y	A	R	M	A	O	U	E	T	X	R	G	U	V	Y	Q	P	V	V	R
Y	U	S	A	Q	L	Z	T	W	R	E	S	E	A	R	C	H	B	L	Z
F	H	M	J	N	Z	C	Y	A	J	C	E	M	M	P	H	X	K	K	Y
R	B	O	B	I	S	C	J	D	S	E	E	N	M	H	K	W	U	R	E
E	G	S	R	Y	K	M	Z	P	K	I	K	K	V	A	S	F	T	C	J
Q	I	G	M	T	N	E	I	H	H	V	N	E	F	N	K	E	P	A	U
U	J	R	B	N	V	U	N	T	H	E	G	C	Y	T	M	P	G	K	A
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N	K	I	V	U	M	B	S	V	H	E	H	J	L	N	H	G	F	T	X
C	S	R	Q	A	A	I	J	Z	H	X	R	E	V	N	B	O	L	T	Z
Y	I	I	M	W	G	V	J	X	U	V	T	M	D	A	S	L	U	N	A
B	R	E	G	O	O	Y	S	K	D	V	G	T	X	M	Y	F	I	S	T
Y	L	V	L	L	R	R	F	D	K	E	R	F	G	T	N	O	T	I	M
D	E	O	B	F	E	J	U	D	C	H	N	Q	H	N	B	W	X	G	E
X	I	T	O	T	N	R	A	D	I	O	L	A	I	D	A	N	T	N	D
B	B	E	N	F	A	I	R	P	L	A	N	E	L	D	O	D	A	A	S
I	Q	I	W	M	X	S	S	V	W	P	Q	U	I	I	A	D	G	L	X
P	W	T	H	Q	Y	M	S	O	D	P	Y	Y	E	F	C	W	O	L	F
F	P	R	I	F	X	M	J	B	J	M	X	F	A	A	E	K	H	P	X

A Look Beyond

The Future Holds Challenges for Washington's Wolves

by Diane Gallegos

After being absent for over 70 years, wolves have been recolonizing in Washington since early 2000 by dispersing from neighboring Idaho, Montana, Oregon and British Columbia. Currently the gray wolf (*Canis lupus*) is listed and protected as endangered in Washington under state law and protected under the federal Endangered Species Act in the western two-thirds of the state. Wolves in the eastern third were removed from federal protection in 2011.

Photo courtesy Wolf Haven International

The Successes

In 2007, in anticipation of wolves' return, the Washington Department of Fish and Wildlife (WDFW) convened a citizens' stakeholder group to develop a recovery and management plan. The Washington Wolf Conservation and Management Plan, adopted in December 2011, serves as the wolf recovery plan for the state. Addressing gray wolf-livestock conflicts is an essential part of the plan. Thanks to a bipartisan effort, the state legislature provided funding for research, training and cost-sharing for nonlethal deterrents, including range riders, fencing, night penning, guarding and herding animals, and the removal of carcasses. In addition to support with nonlethal deterrents, the plan also provides for compensation in the event that producers experience livestock losses, as well as the legal permission for livestock producers in the eastern portion of the state to kill wolves caught in the act of attacking livestock or guarding animals.

The Challenges

Although a great deal of support is available to Washington livestock producers, some have chosen not to participate in nonlethal deterrent programs, research, or compensation, and they are pressuring WDFW to employ intensive lethal management of wolves. Human-caused mortality has been a major cause of losses for Washington's wolves since wolves began recolonizing in the state, including the killing of two breeding females in 2014.

The Future

While wolf recovery continues to have broad public support in Washington, we are at a crossroads. Will we work together to effectively employ current nonlethal tools and support the research needed to develop new methods of protecting livestock, or will we revert to intensive lethal practices of the early 1900s? The state wolf conservation goal is a minimum of 15 successful breeding pairs for three consecutive years in three recovery regions across the state from eastern Washington to the Olympic Peninsula. I believe that with cooperation, collaboration, and innovation Washington can be a leader in a sustainable 21st century wolf management program that protects these apex predators (along with bears and cougars) while continuing to have functioning livestock production. ■

Diane Gallegos has served as the executive director of Wolf Haven International since 2011. She began her career as a field biologist and has served in leadership positions for a number of nonprofit organizations prior to joining the staff at Wolf Haven.

Although a great deal of support is available to Washington livestock producers, some have chosen not to participate in nonlethal deterrent programs, research, or compensation, and they are pressuring WDFW to employ intensive lethal management of wolves… While wolf recovery continues to have broad public support in Washington, we are at a crossroads.

International Wolf Center
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