

Wolves Around the World



The
Global
Status
of the
Gray Wolf

October 2000



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ABOUT DEFENDERS OF WILDLIFE

Defenders of Wildlife is a leading nonprofit conservation organization recognized as one of the nation's most progressive advocates for wildlife and its habitat. Defenders uses education, litigation, research and promotion of conservation policies to protect wild animals and plants in their natural communities. Known for its effective leadership on endangered species issues, Defenders also advocates new approaches to wildlife conservation that protect species before they become endangered. Founded in 1947, Defenders of Wildlife is a 501(c)(3) membership organization headquartered in Washington, D.C., and has more than 380,000 members and supporters.

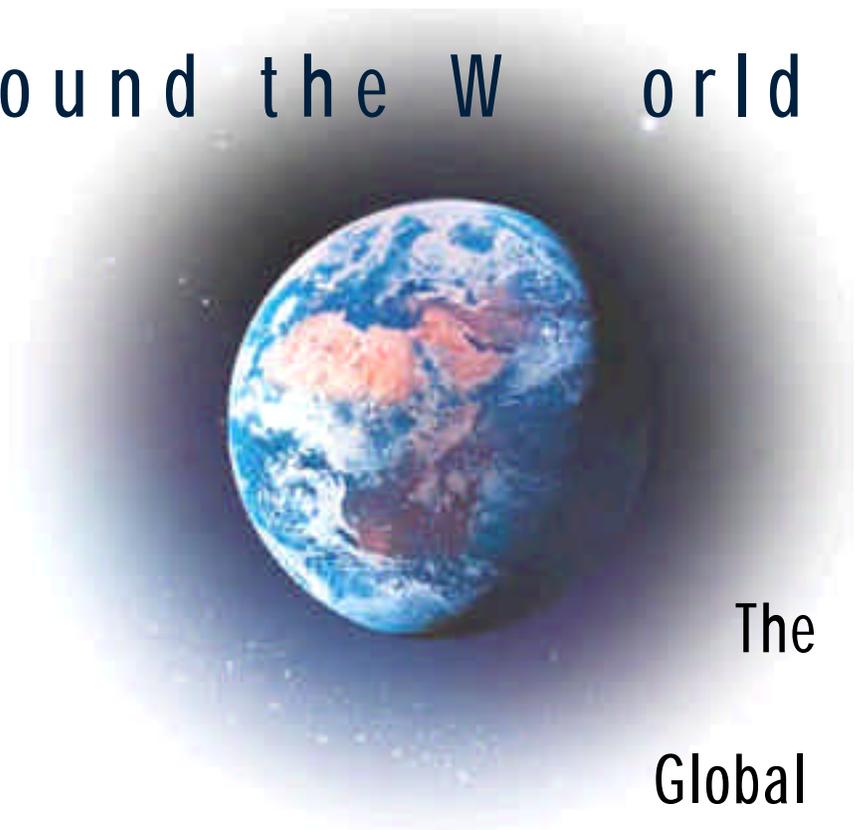
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Foreword

“Wolves Around the World: The Global Status of the Gray Wolf”

is an expanded version of a popular article that appeared in DEFENDERS magazine in the fall of 1998. This report reviews the natural history of wolves and summarizes the available information on wolf populations and protections worldwide.

But it is more than a status report. It lays out the challenges facing wolf managers and cites examples of how they are being met throughout the world.

“Wolves Around the World” concludes with a basic truth about wolves: Concerned citizens all over the world are the gray wolf’s best hope for a sustainable future. (Fortunately, Defenders of Wildlife and many other organizations in the United States and abroad have made wolf conservation a priority (see the appendix for a worldwide listing of these groups).

SECTION ONE

The World of the Gray Wolf

The story of the gray wolf begins more than 50 million years ago in the form of a primitive, weasel-like carnivore called a miacid. These animals varied from the size of a gopher to the bulk of a dog and traced their evolutionary origins back to even more primitive insect-eating mammals. From the miacids sprang creatures that eventually diverged into felines on the one hand and canines on the other more than 20 million years ago.

Several wolf-like canines arose more than 2 million years ago, making them more or less evolutionary contemporaries of humankind's earliest known ancestors. One of the earlier wolf species was the dire wolf (*Canis dirus*). The dire wolf was larger than the gray wolf (*Canis lupus*), which appeared about a million years ago. The two species coexisted until the dire wolf vanished with the disappearance of its prey species about 10,000 years ago.

Gray wolves apparently originated in Eurasia and arrived in North America 750,000 years ago. Eventually, the species roamed most of the Northern Hemisphere, the greatest natural range

of any mammal other than *Homo sapiens*.

Historically, the only nonhuman mammal with a more extensive range was the lion, which until 10,000 years ago occupied the same regions as the wolf as well as Africa and northern South America. The wide range of the wolf, from heated deserts in Arabia to arctic wastes in remote Greenland, testifies to the species adaptability.

Estimates of historic wolf numbers vary widely. About 5,000 years ago, as many as 2 million wolves may have ranged from what is now south-central Mexico, the Arabian peninsula and the Gangetic Plain of India to the frozen wastes of Siberia, Alaska and arctic Canada.

Species Variation

The gray wolf is a highly variable species. Taxonomists once listed 24 subspecies in the Western Hemisphere, including three now extinct. However, new studies based on genetics and morphology suggest that only three to six subspecies ever existed in North America. The Old World was once home to nine subspecies, but two native to Japan are extinct. Individual

wolves differ from one another a great deal in size, shape and color. This genetic variation is reflected in the domestic dog which evolved from the wolf. The variability of the gray wolf seems most pronounced in Eurasia, where size, shape and color shift dramatically from north to south. The Russian gray wolf is almost twice the size of the subspecies found on the Arabian peninsula (*Canis lupus arabs*) and weighs much more, averaging around 110 pounds compared to 40 pounds for Saudi Arabia's small desert wolves. The heaviest gray wolf on record in the United States, shot by a hunter in 1939 near the 70-Mile River in east-central Alaska, weighed 175 pounds.

Color varies greatly depending on the subspecies. Most gray wolves tend to be a grizzled gray-brown, but approximately a third of northern gray wolves are black, while the arctic wolf found in northern Canada is creamy white. The smaller desert wolves of the Middle East and south-central Asia tend to be dun-colored, with pronounced white patches and golden brown or rufous backs and flanks.

Wolf variation has led to scientific disputes about the classification of some populations. For example, the red wolf (*Canis rufus*) is the only living wolf that most authorities currently classify as a species separate from *Canis lupus*. Some biologists believe it should be listed as a subspecies of gray wolf. Some consider it a hybrid, the product of wolves and coyotes interbreeding. Another species, the Ethiopian wolf (*Canis simensis*), may actually be a jackal or a species derived from a gray wolf ancestor.

Wolves and Humans

Evidence from surviving primitive hunting societies indicates that wolves lived in harmony with early human cultures. Inuits and American plains Indians, for example, had no antipathy toward wolves and even studied them to learn hunting techniques. However, once agriculture and livestock breeding became widespread, ignorance, superstition and the human imagination transformed the wolf into a rapacious, blood-thirsty beast, a competitor instead of a companion, a threat to civilized human society. The ancient Greek historian Plutarch wrote that Athens put bounties on wolves as early as 600 B.C. "The Athenians of old were great enemies to wolves because their country was better for pasture than tillage," wrote Plutarch in his life of Solon. "He that caught a he-wolf was to have five drachmas; he that took a she-wolf one; and the former sum, as Demetrius the Phalerian asserts, was the value of an ox, the latter of a sheep."

By the Middle Ages the wolf was almost universally vilified in the Eastern Hemisphere and the long process of extermination was under way. The canine that could adapt to so many natural environments across wide reaches of the globe was hard-put to survive humanity's commitment to its destruction. By the mid-20th century, wolf populations had been reduced to tattered remnants in much of their former range. In many places the species was shot, trapped and poisoned to the brink of extinction. In some cases wolf populations were destroyed to the last animal. Two subspecies of Japanese wolves — including *Canis hadophilax*, which some authori-

ties consider a distinct species — were wiped out early in the 20th century.

Most European countries annihilated their wolf populations with hunting and habitat destruction. In France, for instance, wolves were vilified after a pair of wolf-dog hybrids killed and ate 64 people, mostly children, near Gevaudan, between 1764 and 1767. An examination of the skeletons of the two animals by C. H. D. Clarke, former head of the wildlife branch of the Ontario Ministry of Natural Resources, revealed that both were most likely “wolf-dog crosses with hybrid vigor.” By the early 19th century, only a few packs held out in remote areas in the French Alps. With the exception of Italy, Spain and Portugal, wolves were eliminated in all of western Europe by around 1955.

British colonists in North America developed an early antipathy for wolves, particularly as the wolf’s natural prey was slaughtered and wolves turned to killing livestock. Bounties were put on wolves in some British colonies by the 1630s. After the American Revolution, George Washington’s correspondence with British agriculturists included his complaints about wolf depredations on Virginia livestock. During the 19th century, ranchers in the West launched private efforts to wipe out wolves and other predators that, as in the East, turned to killing livestock once uncontrolled hunting wiped out natural prey species. Early in the 20th century, the federal government began to fund and even undertake efforts to exterminate wolves, coyotes and other predators, systematically destroying the animals in the lower 48 states. By 1960, occupied wolf range in the contiguous states had

been reduced to the country on the Mexican border, northern Minnesota and Isle Royale in Lake Superior. Even Yellowstone National Park did not escape the efforts of “wolfers,” as professional wolf hunters were sometimes called. Park officials say Yellowstone’s last wild wolves were trapped and killed in 1926.

Biologists today estimate the global gray wolf population at no more than 200,000 animals spread across at least 58 countries. Experts do not agree on wolf numbers in some individual nations. Most population estimates are based on scats, wolf kills and tracks. Elusive creatures by nature, few wild wolves are ever sighted, let alone counted, even by experienced field researchers. In countries such as Afghanistan, constant warfare makes wolf studies and population estimates impossible. Data for some nations are more than ten years old.

In the last two decades in some countries, *Canis lupus* has made a remarkable recovery. This is particularly true in the United States and in some European nations. The comeback has been brought about largely by active conservation efforts, better management policies and heightened public concern. Gray wolf reintroductions in Yellowstone National Park, central Idaho and Arizona, and red wolf reintroduction in North Carolina are serving as models for other nations. However, wolf prospects are less promising in parts of the world where superstition, prejudice and ignorance still place the wolf on the most-wanted list, as in Russia.

According to L. David Mech, a senior scientist with the U.S. Geological Survey in St. Paul, Minnesota, wolves can maintain viable popula-

tions while losing 30 to 50 percent of their number in a given area every year. But the animals are sinking under a combination of pressures in various nations. Heavy, uncontrolled hunting is a problem in some areas, but wolves probably could survive this hazard were it not compounded by habitat loss and degradation.

Natural History

Wolves need large areas in which to hunt and raise young, but their territories vary in size on the basis of prey availability and abundance. In Minnesota, where deer are plentiful, wolf packs need territories no larger than 50 to 100 square miles, whereas interior Alaskan wolves that feed on moose, caribou and Dall sheep often maintain territories in excess of 800 square miles. Mech, while studying arctic wolves on Ellesmere Island in northern Canada, found that one pack covered 1,000 square miles in six weeks while hunting muskoxen and snowshoe hares.

In some areas, such as the northern Great Lakes region, average wolf density can be as high as 111 wolves per 1,000 square miles. "In all of North America," says wolf expert Todd Fuller of the University of Massachusetts Department of Forestry and Wildlife Management, "92 percent of the variation in wolf density is directly accounted for by the variation in ungulate biomass."

Studies in North America have found that wolf packs probably kill on average the equivalent of five to eight moose or 15 to 18 deer per wolf per year. Most studies indicate that such predation rates in general do not contribute to a reduction in ungulate populations except when combined with severe weather, disease and heavy sport-hunting.

Wolves are born into packs that vary in size from four to 30 depending on the availability and type of prey. Unverified reports from Russia describe packs of up to 50 wolves. Each pack defends a territory against intrusion by other wolves. Up to half of all young wolves leave natal (birth) packs between the ages of one and two years to find mates and establish territories and packs of their own. Some adult wolves also disperse, especially if prey animals in their home range become chronically depleted. Dispersers may account for five to 20 percent of an established population in early winter.

Most dispersers end up joining packs either in adjacent territories or no more than 50 to 100 miles away, but some go great distances. One radio-colored wolf in Canada traveled 550 miles before finding a new home. Dispersers keep populations genetically healthy and help combat the effects of inbreeding. However, as human needs continue to mushroom and wildlands continue to contract, many wolf populations outside Canada, Alaska and Russia may end up isolated in tiny patches of wilderness, cut off from other packs and condemned to slow extinction from inbreeding, disease and mounting conflicts with humans.

Uncertain Future

The fate of the wolf, along with that of all other large predators, will be determined by how much prime habitat can be spared from humanity's growing ecological footprint. Already, human beings have expropriated more than half the world's accessible freshwater, a figure that may reach 70 percent by 2025 when more than

8 billion people will crowd the planet. Moreover, unless agronomists can foster a second Green Revolution, enabling farmers to grow more food on the same amount of land or raise more livestock on less land, future food needs will most likely be met at the expense of the world's remaining wildlands. By some estimates, the world is losing 30,000 acres of forest every minute to logging, fuel-wood collectors and agriculture. Increasingly, human needs are bumping into resource limitations, a trend that threatens to leave *Canis lupus* in limbo.

Only 23 of the 58 countries that report wolves provide the animals with some form of protection, and a mere handful have adequate nationwide

management plans. Recent reports of increases in wolf numbers in northern and central Europe and parts of Russia probably can be credited not to sound management but to the animal's innate resourcefulness and in some cases to an increase in prey. In most countries where they live, wolves face an uphill struggle for survival. Wolf management is plagued by disagreements over strategies, and public opinion on legalized wolf hunting varies a great deal and often is polarized. This polarization makes rational management plans harder to design and implement as scientists find themselves trapped between people who want no wolves killed for any reason and those who demand a legal hunting season with no limits.

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SECTION TWO

The Status of Wolves Around the World

NORTH AMERICA

North America is home to more wolves than any other continent — an estimated 55,000 in Canada, by far the largest number in any single country, and some 11,000 in the United States, mostly in Alaska.

Canada

With only 30 million people spread out over 3.5 million square miles — only nine people per square mile — Canada offers plenty of space for wolves and the animals they hunt. A survey of Canadian provinces suggests that wolf populations are stable, although exceptions exist. Predator control programs destroyed many wolves in the past, but provincial officials report that most wolf control is now handled indirectly through sport hunting and trapping seasons on wolves. However, according to a number of wolf biologists, the situation in Canada is far from satisfactory and merits further investigation. (Defenders has begun to gather specific data on wolf populations and control practices in each of the Canadian provinces for a separate report on

wolves in Canada.)

Canada, unlike the United States, lacks a protective federal endangered species law. If protected U.S. wolves cross the border into Canada, they can be killed with impunity. And many Canadian wildlife authorities, for example in the provinces of Ontario, Alberta and Saskatchewan, still regard wolves as vermin to be exterminated wherever found. Consequently, wolves can be hunted virtually year-round in most of Canada. Furthermore, nothing more than a regular big-game license is required to kill a wolf in Canada. Some 2,000 wolf skins were exported from the Northwest Territories in 1997, according to wolf biologist Paul Paquet. Many wolves killed by recreational hunters go unreported each year.

The provinces are still authorized to use poisons, such as strychnine and Compound 1080, against predators, including wolves. However, use has been minimal for years. According to provincial wildlife officials, action is taken against wolves only when individual animals pose a threat to livestock, and then poisons are used only as a last resort when attempts to shoot

or trap the animals fail. Private use of deadly poisons, such as Compound 1080, also persists in some areas under government permits, but this activity also is minimal.

The Yukon’s population of 4,500 wolves is stable, although trappers and hunters kill about 175 to 200 yearly during legal seasons. Most trapping permits are held by native communities.

The massacre of 500 to 700 wolves in a single small area of the Northwest Territories just north of Fond-du-Lac, Saskatchewan caused a sensation in the winter of 1997-98. The hunters ran entire packs to exhaustion, then shot them or ran over them. “Where is the sport in this kind of hunting?” asks Scott Harvey, a wildlife conservation officer at Stony Rapids in northern Saskatchewan. “It is slaughter, pure and simple.”

Biologists are concerned about the sustainability of such harvests because Northwest Territories officials have not carried out a proper wolf population survey in decades. “Ethics aside,” Paquet told a *Toronto Globe and Mail* reporter, “if you don’t have good information and you make a mistake, it can be a disaster for wildlife populations.”

The long-term ecological and evolutionary effects of hunting on wolves are understood only dimly. Ecologists worry about the cumulative, or community, effects of killing top predators such as wolves. Culling wolves, even in small numbers, may reverberate throughout the ecosystem. “There is a top-down effect that occurs when apex predators are removed from a natural system, or their influence is altered,” Paquet says. “And we don’t understand these interlinkages. In this context, there are many areas in Canada

where wolves and the ecological systems they live in are not doing well.”

Despite the intensity of the kill, wolves in the Northwest Territories and Nunavut are not thought to be in danger. This vast expanse has some 10,000 wolves in relatively stable populations. But authorities acknowledge that over-hunting may be depleting populations in some areas.

British Columbia has a healthy, stable population of 8,000 wolves. Hunting and trapping in

Table 3. Gray Wolf Populations in Canada

PROVINCE	POPULATION ESTIMATE
Yukon.....	4,500
Northwest Territories and Nunavut.....	10,000
British Columbia.....	8,000
Alberta.....	6,000
Saskatchewan.....	4,300
Manitoba.....	4,000
Ontario (averaged from estimates of 8,000-10,000)	9,000
Quebec.....	6,000
New Brunswick.....	0
Nova Scotia.....	0
Prince Edward Island.....	0
Newfoundland (Labrador).....	3,000
Total.....	55,000

Source: International Wolf Center, Ely, Minnesota, September, 1998.

the far northern areas runs from August 1 to June 15 and in the south from September 1 to March 30 with a bag limit of three wolves. The animals are protected in national parks and in some provincial parks. In the last decade, about 750 wolves have been killed yearly, mostly by hunters.

Up to 6,000 wolves roam Alberta, and the

number is increasing in the north. In the southern part of the province, south of Calgary, biologists suspect that a significant number of wolves was wiped out in one hunting season, 1994-5. Wolves also continue to be killed on sight in southern Alberta creating dysfunctional packs that end up feeding disproportionately on livestock. A legal hunting season from September 1 to June 1 accounts for up to 200 wolves shot or trapped, but these numbers include only those animals reported to authorities. Wolves are protected in Alberta's national and provincial parks. Unfortunately, the Trans Canada Highway and Canadian Pacific Railway transect two of the province's national parks, Banff and Yoho. Accidents involving wolves and vehicles and trains passing through the parks are decimating wolf populations.

Saskatchewan reports a stable population of 4,300 wolves, with hunters and trappers taking 150 to 200 yearly. Wolves are protected in national and provincial parks. But again, recreational hunters in some areas may be taking more wolves than populations can tolerate.

Manitoba's population of 4,000 wolves is stable. Hunting is permitted throughout the province, except in national parks, from late August to June 1. Hunters and registered trappers kill fewer than 300 yearly. Ranchers and farmers have a legal right to shoot problem wolves but reportedly kill fewer than two dozen yearly.

Ontario has 8,000 to 10,000 wolves, a population that biologists believe is stable. Wolves are still found in 80 percent of their historic range in Ontario, but they receive full protection only in two crown game reserves and in Algonquin

Provincial Park. The wolves of Algonquin draw more than 100,000 people per year to participate in park-sponsored outings to hear wolves howl. Should these wolves venture beyond park boundaries, however, they are fair game for hunters.

In areas where hunting is allowed, pressure is thought to be minimal with few wolves shot. About 600 are trapped for furs every year. Ontario has no government control program, and hunting from aircraft and use of poison are banned.

Quebec's 6,000 wolves are protected in provincial and national parks, but in other areas hunting and trapping may be increasing. Provincial officials allow trappers to target a small population in the Laurentide Provincial Reserve in central Quebec, but this trapping is opposed by conservationists and wildlife biologists who believe it is not sustainable. The Laurentide wolves number only about 30, and trapping could wipe them out.

Labrador, the mainland section of Newfoundland, has some 3,000 wolves, but no protected habitat for them. By some reports, 30 to 40 wolves are killed yearly there by trappers. Wolves once inhabited the island of Newfoundland but were eradicated there around the turn of the century. Biologists suspect that wolves may soon recolonize the island by swimming across the narrow Strait of Belle Isle.

Greenland

Greenland boasts the world's northernmost population of wolves. Although hunters and trappers eliminated the wolf from Greenland by the early 1930s, the northern part of this massive

ice-entombed island was recolonized in 1978 by two wolves from Ellesmere Island. Since then, the wolf population has climbed to some 100 individuals. The wolf is now completely protected in Greenland, and illegal trapping or hunting has not been a problem.

The United States

Only Alaska has ample habitat for wolves. Like Canada, Alaska permits the hunting and trapping of wolves, and some 1,000 wolves are killed annually out of a population estimated at as many as 8,800. Although logging threatens the Alexander Archipelago wolf of the southeastern panhandle, the predator control programs that destroyed many Alaskan wolves in the past have become more limited. Defenders of Wildlife, for example, spurred a campaign in the early 1990s that stopped the use of aircraft in Alaska wolf control and limited aircraft use in sport hunting. In 1999, however, the state legislature reinstated land-and-shoot aerial hunting.

In the lower 48 states, wolves have been listed under the Endangered Species Act since 1973 and are making a comeback (see Table 3). Once persecuted to the brink of extinction, the gray wolf is now an immensely popular poster species for conservation. Wolves have dispersed from Minnesota into neighboring Wisconsin and Michigan. Isle Royale National Park in Michigan's Lake Superior now has 29 wolves, the most recorded since 1981. Wolves from Canada have recolonized parts of Montana and Idaho. Moreover, highly publicized reintroduction programs in Yellowstone National Park, central Idaho, Arizona and New Mexico have won wide-

spread public acceptance. A compensation trust fund set up by Defenders of Wildlife to reimburse ranchers who lose livestock to wolves has helped dampen opposition to wolf reintroductions in the northern Rockies and the Southwest.

In 1998, the U.S. Fish and Wildlife Service (FWS) released 11 Mexican wolves from holding pens in the Apache National Forest in Arizona. These animals belong to a small subspecies that historically ranged across the Southwest and Mexico and stands out as the rarest and most genetically distinct subspecies of gray wolf in North America. But the reintroduction ran into unexpected trouble. Between March and November, 1998, five of the 11 released wolves were killed. Another was shot by a camper who claimed it had attacked his dog. One is missing and presumed dead. Five have been recaptured for breeding purposes.

"The biggest challenge for reintroduced Mexican wolves will be learning how to survive in the wild after a life in captivity," says David Parsons, former FWS Mexican wolf recovery leader. "Some will make it and some will not. I don't expect illegal killing to preclude recovery."

Some, including Nancy Kaufman, director of FWS's Southwest region, believe the killings are part of a conspiracy to sabotage the reintroduction process. FWS is offering a \$10,000 reward and Defenders of Wildlife is matching it for information leading to the arrest and conviction of those responsible. As of this writing, two individuals are awaiting prosecution.

Meanwhile, more wolves were released into Apache National Forest in a second attempt to get the Mexican wolf back into its native envi-

ronment.

Despite the initial setback, Parsons is excited about the future of the Mexican wolf. “As a result of the ongoing effort, we expect to reestablish a viable population of 100 or more wolves in Arizona and New Mexico by the year 2006,” he says.

In early 1999, federal biologists moved nine

forests of Maine, Vermont, New York and New Hampshire for suitable habitat and sufficient prey for wolves. Defenders is educating people throughout the Northeast about the role of the wolf in the wild and bringing together biologists and stakeholders to explore and resolve the social and biological issues that must be addressed before a sound wolf recovery plan can be formulated.

Defenders of Wildlife also is working for wolf restoration and recolonization in appropriate areas of the Pacific Northwest and southern Rockies. In December, 1999, Defenders released *Places for Wolves: A Blueprint for Restoration and Recovery in the Lower 48 States*, a report detailing a science-based vision for wolf recovery in all ecological regions in which they originally occurred. (The report is available at www.wolfrecovery.org). In July, 2000, FWS revealed a vision of its own in the form of a wolf reclassification proposal that would reduce protection and limit future recovery efforts for gray wolves. Under the proposal, only the reintroduced wolf populations in Yellowstone National Park, central Idaho and the southern Arizona-New Mexico borderlands would retain their current level of protection under the Endangered Species Act. Throughout the rest of their range, FWS would drop wolves from endangered to threatened status, a change that would allow citizens to kill wolves they believe are threatening their livestock. In California and Nevada, likely states for wolves to move into from the Pacific Northwest and Rockies, wolves would have no federally protected status at all. As for future recovery plans, while FWS still intends to complete a plan for

Table 2. Gray Wolf Populations in the United States

STATE	POPULATION ESTIMATE
Alaska.....	5,227-8,060
Arizona.....	22
Central Idaho.....	141
Greater Yellowstone.....	118
Isle Royale.....	29
Michigan.....	216
Minnesota.....	2,445
Northwest Montana.....	63
Wisconsin.....	250
Total	11,287

Sources: U.S. Fish and Wildlife Service 1999-2000 surveys

Note: The Red Wolf (*Canis rufus*) is not included because it is a separate species from *Canis lupus*. As of 1999, there were up to 100 red wolves roaming North Carolina

more Mexican wolves into rural Arizona in preparation for their release in the Apache National Forest. Parsons was intending to keep the wolves in acclimation pens in the forest for up to two months to see how they were coping with the environment. Since then, wolf releases in Arizona and New Mexico have continued, and more than 30 Mexican wolves are living there in the wild.

In the Northeast, FWS is evaluating the

the Northeast, the proposal makes it clear that no federal wolf recovery plans will be developed for the Pacific Northwest, southern Rockies and other promising areas. As this report goes to press, the future of wolves in the lower 48 states hangs in the balance as FWS weighs public opinion on its wolf reclassification proposal.

Mexico

Wolf sightings are still reported in Mexico, but scientists have not documented any since several were captured for breeding purposes in the 1970s. The Mexican government has announced plans to reintroduce the Mexican wolf, known as El Lobo, along the U.S. border.

According to Alberto Aldama, a wolf expert with the Director General of Wild Flora, Mexican authorities are planning to release two captive-bred wolf packs into the wild by the end of the year 2000. "One group will be released in the State of Coahuila, west of Sierra Madre Oriental," Aldama says, "while the other will be released in the State of Chihuahua, east of Sierra Madre Occidental." Both of these areas are along the U.S. border. The wolves will be managed as a cross-border population, and Mexican authorities are cooperating with the U.S. Fish and Wildlife Service to ensure proper monitoring and management.

Aldama reports that the government is meeting with local landowners in an effort to build support for the reintroduction program and to arrive at a consensus on how to manage the wolves. "We are working with three conservation groups — Naturalia, Profauna and Coahuila A.C.," he says. The public-relations campaign

seems to be working. Except for some ranchers and the cattlemen's association, most people support the proposed reintroductions. "So far we don't have a compensation fund set up to reimburse ranchers for wolf-killed livestock," Aldama says, "but we hope to be able to follow the example of Defenders of Wildlife and establish one by the time of the release date."

EUROPE, RUSSIA AND THE NEAR AND MIDDLE EAST

Europe

Despite encouraging recoveries in some areas, the future of Europe's wolves is anything but secure. Although wolves have increased during the last decade to about 15,000 animals scattered across Europe, they continue to suffer from relentless persecution and habitat loss. Russia has an estimated 30,000 to 40,000 wolves, the largest population outside Canada. But since Russia stretches across 12 time zones and encompasses 6.5 million square miles, the wolf population is not large relative to available habitat.

The biggest West European population — 2,000 — is in Spain. However, Spanish wolves and those in next-door Portugal, are not faring well. Spanish wolves are classified as game animals and can be hunted legally during the open season, usually three or four months in autumn and winter. They have little real protection. Even out of season, they are constantly harassed and killed by sheep herders and farmers. Wolf mortality from hunting, both legal and illegal, seems to be rising. Every year, on average, about 700 wolves are killed. Whether such a mortality rate is sustainable is unknown.

Habitat destruction is the wolf's other enemy. Since much of Spain consists of settlements, farms and pastureland, the nation offers fewer and fewer wild places where the wolf can thrive in relative seclusion. Once found throughout the Iberian peninsula, the wolf now is confined to remote areas of the Cantabrian Mountains and to some agricultural pockets.

With prey animals at a premium, many wolf packs must resort to preying on domestic sheep, goats and cows. Some packs even subsist on garbage. In 1989, the only year for which reliable data are available, wolf depredations on livestock cost the government about \$1 million in payments to producers. Public sentiment runs strongly against the wolf throughout the country, although some contend that the wolf does not deserve such treatment. "Most wolves are not killed because they cause damage," insists Spanish wolf expert Luis Mariano Barrientos. "It's from prejudice and persecution. The wolf kill in this country is a national disgrace, a barbarity."

Wolf populations in Portugal, although protected, seem to be declining because of persecution and habitat destruction. Although wolves roam about 7,800 square miles of the country, they are concentrated mostly in remote northern areas. Portugal's prime wolf region is Montesinho National Park in the northwest corner of the country. Three packs there are being monitored by field biologist Luis Miguel Moreira.

The future of Portugal's wolves, like that of Spanish wolves, probably depends on how much suitable habitat can be shielded from development and human population pressures. It also

depends to a great extent upon whether Portugal can reintroduce viable populations of such prey species as red and roe deer and wild boars. Since hunters also want these game animals back in natural ecosystems, some hope lies in the possibility that the interests of hunters and wolf conservationists will coincide to rebuild ungulate populations.

So far, conservation efforts in Spain and Portugal have been feeble. Virtually no money is being made available by the Spanish government for studies that could yield practical suggestions for managing and safeguarding remnant populations. Without management plans and public support, the wolf's future on the Iberian peninsula is not bright. However, this outlook could change dramatically if management plans are worked out and if the majority of the public comes to support wolf conservation.

Italy may be showing the way to innovative management ideas. Wolves have been fully protected under Italian law since 1976 and their populations seem to be increasing. The animals have even been sighted on the outskirts of Rome. However, Italian wolves feed on cattle and sheep, forcing regional governments to shell out about \$2 million yearly in compensation to livestock owners. Because Italy's prime wolf habitat is small and shrinking, wolf biologist Luigi Boitani, professor of animal biology at the University of Rome, is convinced that the only way to manage the country's wolves in the long run is to legalize wolf culls and institute "a zoning system of various protection levels." Under such a system, says Boitani, "wolves could be hunted in some zones, such as sheep farming areas, while afforded full

protection in others, such as national parks.” In addition, Boitani has created a “wolf bank” in Abruzzo National Park, an attempt to build a wolf reserve in which feral dogs are removed to prevent interbreeding with wolves. In this way he hopes to keep the wolf gene pool pure for restocking. “Thanks to this bank,” Boitani says, “we hope to preserve 95 percent of the wolf’s genetic variability for at least a century.”

Disperser wolves from Italy have established packs in France. The last native French wolf was shot in 1954. The country has up to 15 wolves, and they seem to be expanding their range. Wolves also have moved from Italy into Switzerland, much to the consternation of wildlife authorities, since the country has no management plan in place. They are now working on one.

Wolves were wiped out in the British Isles several centuries ago. Some wolf enthusiasts have advocated reintroduction in part of the Scottish highlands. However, the reintroduction proposal is vehemently opposed by sheep producers and deer hunters. It has yet to be adopted by the government, and no official study has been initiated to ascertain whether reintroduction of wolves in Scotland is feasible.

Wolves in Scandinavia are faring much better now than they have historically. Sweden and Norway share a cross-border wolf population of 50 to 70 individuals, with roughly a third of them denning in Norway and the rest in Sweden. Sweden’s wolves have had full protection since 1969, Norway’s since 1972. Today, the shared wolf population is expanding its range and increasing in number.

Sweden’s Environmental Protection Agency (EPA) can issue a license allowing individuals to kill problem wolves, but during the past decade only one wolf was taken under this provision. Meanwhile, wolves in Sweden seem to be winning the public relations battle. Thanks to a private conservation group called Svenska Rovdjursforeningen (Swedish Carnivore Association), public opinion about the wolf is changing. According to a comprehensive survey carried out in 1998 under EPA supervision, two thirds of all respondents are willing to accept a wolf population twice as big as the current one (up to about 150 individuals), while 40 percent are willing to accept a population of at least 500 wolves. This is a breakthrough for the wolf because the animal traditionally has been viewed as a dangerous predator that needs to be controlled.

Finland has around 140 wolves. They have been protected since 1994 except in the reindeer-husbandry area of the far north, where wolves can be hunted from November 1 to March 30.

Although generally increasing in number, wolves in Eastern Europe and Russia still face many threats. Poland is at least attempting to deal with them. Conservationist protests led the Polish government in 1998 to end wolf hunting in the last three provinces where it was still legal. Polish wolves are now fully protected by law and their numbers are stable or perhaps increasing. But game managers and hunters would like to see hunting reopened. In some areas poaching is a problem and Polish wolves that wander into neighboring Belarus, Ukraine or Slovakia are legally killed. Bounties and uncontrolled hunting

threaten to eliminate the wolf in Belarus.

“Our biggest challenge is to produce a national strategy for wolf management and conservation,” says Henryk Okarma, a wolf expert with the Institute of Nature Conservation in Krakow. “But we also need to improve our system of compensation so that farmers who have lost livestock to wolf predation can be reimbursed in a more timely fashion. And we must start effective education programs aimed at the public and specific stakeholder groups.” At present, compensation for Polish livestock losses to wolves can take years.

Two private conservation groups in Poland — the Workshop for All Beings and the Association for Nature WOLF — work tirelessly for wolf protection and habitat conservation. They are largely responsible for the turnaround in public opinion regarding the wolf. Recent surveys show that most Poles want wolves back in the environment.

Such is not the case in Poland’s southern neighbor, Slovakia. Here the wolf is still hunted. Although biologists estimate the wolf population in Slovakia at 350 to 450, conservationists working to protect the wolf put the figure at no more than 250 and declining. “There are two main reasons for this,” says environmental activist Maria Hudakova, a member of the WOLF Forest Protection Movement based in Tulcik. “First, around 150 wolves are killed by hunters every year. In 1995-96 just under 160 wolves were killed, the highest number in one year in the entire century. The second serious problem facing wolves in Slovakia is the accelerating loss of their forest environment and habitat fragmenta-

tion by the mushrooming network of logging roads. Close to 70 percent of the forested area of the country is scarred by clearcuts and in some areas, as in eastern Slovakia’s beech-fir forests, 90 percent has been crisscrossed with clearcuts.”

For Hudakova and her colleagues, the fight to save the wolf means saving the country’s remaining forest lands from the bulldozer and chainsaw. “In the last two years we have concentrated our efforts on billing the wolf as the savior of the forest,” she explains, “but at the same time, the wolf cannot exist without the forest.” WOLF is waging two public campaigns — one to conserve the wolf and other large predators and the other to save the country’s dwindling forests. Activists recently blockaded a logging road in an effort to prevent clearcutting in the Polana Biosphere Reserve in central Slovakia.

Meanwhile, the legal status of the wolf in Slovakia remains muddled. The Ministry of Environment insists that the wolf is a protected species, while the Ministry of Land Management claims it can be hunted as a game animal. An appeal to the Supreme Court brought no resolution, only a ruling that hunters should not be fined for killing wolves.

“WOLF is now trying to mobilize public opinion in favor of saving the wolf and its habitat,” Hudakova says. “Eventually we hope to establish 52 forest conservation groups in the country, at least one in each major forest region.”

The few wolves next door in the Czech Republic are not faring much better, despite year-round legal protection. According to wolf biologist Petr Koubek of the Institute of Vertebrate Biology in Brno, the country had five

wolves as of September, 1998, all dispersers from Slovakia. So far, the Czech Republic has no management plan for wolves and the public has shown little interest in bringing them back. In 1996-97, 18 wolves were killed, wiping out the nation's then entire resident population.

According to Koubek, if the wolf is to survive and thrive in the Czech Republic, the country needs a management plan and more public support.

Romania's wolves, living in the Carpathian Mountains, also face mounting pressures from hunting, proliferation of summer homes and destruction of forests by logging enterprises. Although the country has about 2,500 wolves, mostly west of the old Soviet boundary, a prime winter wolf pelt currently brings the equivalent of two month's wages. Such a high price could stimulate widespread hunting and quickly decimate the population. With 50,000 hunters roaming the country, the number of wolves killed every year, although unknown, is thought to be increasing.

According to Ovidiu Ionescu, a wolf expert working with the Romanian Ministry of the Environment, little information on the status of the country's wolves is available and there is not much money for study of the animals. The first wild wolf was not radio-collared until 1994, with assistance from Diane Boyd, the U.S. biologist who conducted the initial field study on the Canadian wolves that recolonized Montana in the early 1980s. Since then, Ionescu and Christoph Promberger, a wolf biologist with the Munich Wildlife Society, have studied 20 wolf packs in a 1,200-square-mile area of the

Carpathians. They hope to be able to make sound recommendations to the government regarding measures needed to safeguard Romania's wolves and other large predators. Romania's wolves have enjoyed complete legal protection since August, 1996, but they are constantly poached and the country has no management plan. The one encouraging fact is that the public in general is favorably disposed toward wolves. According to wolf biologist Annette Mertens, who works with the Carpathian Large Carnivore Project, it would not be difficult to build widespread support for a national management plan.

Bulgaria has 800 to 1,000 wolves, but they are suffering from very heavy hunting pressure. Every year some 300 to 500 are killed. With bounties on wolves running the equivalent of \$15 per head during a dire economic time, more hunters are going after them.

In Croatia, wolves have been protected since 1995, but poaching remains a problem in some areas, according to wolf specialist Djuro Huber. He reports that a national wolf management plan is being prepared. "This plan will regulate wolf protection according to zones," Huber says. "It will allow us to better manage our remaining wolf population."

Russia

Russia, which has the largest wolf population outside Canada and an abundance of prime wolf habitat, has been at war with its wolves for centuries. Since the end of the Second World War, wolf numbers have fluctuated wildly, from under 20,000 in the early 1970s to the current high of

30,000 to 40,000. “Wolf numbers in Russia have followed a predator-prey pattern, with the wolf as prey,” says Nikita Ovsianikov, a senior research scientist with Moscow’s Pacific Institute of Geography, part of the Russian Academy of Sciences. Under the Soviet system, wolves were considered vermin to be ruthlessly exterminated. Between 1925 and 1992, some 1.5 million wolves were slaughtered in the former Soviet Union at a total cost of around \$300 million — about \$200 per wolf, paid out mostly to bounty hunters, farmers and corrupt government officials.

Not much has changed since the disintegration of the Soviet empire in 1991-92. Although the systematic hunting of wolves stands at an all-time low — mostly because of the poor economy and because of lack of fuel for the aircraft used in hunting — the animal’s status is no better than it was under the Soviet system. “The wolf is considered a harmful animal that needs to be hunted year-round by all effective means possible,” Ovsianikov says. “Although a federally funded bounty system no longer exists, many local hunting associations and even some federally funded regional conservation agencies provide special funding for the hunting of wolves.” Poison and traps are still used.

As Russia’s economy continues to deteriorate, Ovsianikov and other wolf experts fear the advent of a wildlife holocaust. In parts of Siberia, poaching of bears, antelope, wild sheep and goats, Siberian tigers and snow leopards has reached alarming proportions. And increasingly, the wolf is also at risk. At the same time, huge swaths of Siberia’s evergreen forests are being

stripped away by large-scale logging operations. In 1995, timber across 12,000 square miles was being felled as fast as possible by 90 forest enterprises. Most of the timber is destined for China, South Korea and Japan.

“Wolf management in Russia has failed,” Ovsianikov insists. “Instead, the animal is demonized. No one can predict how wolves will fare in Russia in the near future, despite some population increases in the far north and in part of European Russia.”

Ovsianikov is not optimistic about the Russian wolf’s prospects. “The Russian Academy of Sciences has no money to study wolves,” he says. “We do it mostly on enthusiasm. Yet solid research is needed if the country is to successfully manage its wolves.” The time has come, he concludes, “for Russia to call a cease-fire with its wolves.”

Unfortunately, a cease-fire is unlikely. Instead, the Russian Agriculture Ministry announced plans in August, 1998, to kill 15,000 wolves over the next few years in an effort to “control this pest,” as one official put it. In other words, possibly up to half the Russian wolf population will be shot or poisoned. In some areas, wolves will be eliminated completely, with unknown consequences for the ecosystems they inhabit. The ministry is allocating \$10 million a year for the slaughter.

Unlike some other European nations, Russia lacks private conservation groups to work on behalf of the environment in general and wolves in particular. An organized network of conservationists and biologists was held together under the old Soviet Academy of Sciences, but it has

disappeared with the breakup of the Soviet Union.

The Near and Middle East

Wolves in the Near and Middle East are also under the gun — shot by hunters, stressed by lack of suitable prey and pushed out of prime habitat by land development, particularly agriculture. Biologists estimate that the wolf population in this region totals no more than 3,000. There could be up to 1,000 wolves in Iran, but no population studies have been carried out in recent years.

Populations in Israel and Saudi Arabia, although small, are thought to be relatively stable. Israel has given legal protection to its wolves since 1954, the only country in the region to do so. Saudi Arabia, where some 600 to 700 small desert wolves wander over the remote interior, does not protect them. Iyad Nader, director of the King Khalid Wildlife Research Center in Riyadh, declares: “Wolves can be hunted legally by any means, anytime, anywhere — by firearms, trapping or poisoning.” Shepherds kill wolves whenever they see them. So far, efforts of Nader and his colleagues to place the wolf on the list of protected animals have failed. The research center has launched a public-awareness campaign to build support for wolf conservation.

Jordan has some 200 wolves and Lebanon reports disperser wolves from Israel. Syria has 300 wolves in three separate populations — in the Golan Heights, in the southern part of the country near Jordan and in the northeast along the border with Turkey. Resident wolves live in Turkey’s mountainous eastern region along the

border with Iraq and Iran. Armed Kurdish guerrillas and bandits make field research too dangerous in this area, so the status and exact numbers of these wolves remain unknown.

Outside of Israel, Middle Eastern wolf populations are not expected to increase soon, if ever. In these severe landscapes, population pressures and eroded habitat limit the number of wolves, and hunting continues to take a deadly toll on wolves and prey alike.

ASIA

China, Mongolia and the Central Asian Republics

In 1900, Central Asia, Afghanistan, Mongolia and western China had an estimated 100,000 wolves. Today only Mongolia has a significant number, roughly 30,000. Elsewhere, the wolf is in retreat as forests are obliterated by agriculture and rolling grasslands (steppes) are trodden underfoot by millions of domestic grazing animals. Not counting Siberia, Asia may have 50,000 wolves. But with 3.6 billion people, it has less and less room for wildlife.

Because the economies of the five newly independent Central Asian republics of Turkmenistan, Uzbekistan, Tajikistan, Kyrgyzstan and Kazakhstan are in tatters, poaching of formerly protected species is reaching epidemic proportions. Wolves are being killed along with many prey species, including saiga antelope, blue sheep, ibexes, musk deer, Mongolian gazelles and goral sheep. The triple threats of hunting, reduction in prey animals and loss of prime habitat have driven remaining wolf packs into the most inaccessible areas. Civil war and an increase in subsistence hunting in Tajikistan have

confined the country's once numerous wolves to remote enclaves in the Pamir Mountains. And since they "compete" with local hunters for game, they are shot on sight.

Although they carry bounties on their heads, Kazakstan's wolves number around 9,000, the most in decades. Hunting pressures have been easing because hunters, suffering from falling incomes in a deteriorating economy, cannot afford the ammunition needed to kill wolves.

Wolves may be increasing in Uzbekistan and Kyrgyzstan because of diminished hunting pressures, according to Sergey Pole of Kazakstan's Anti-Plague Institute. Current population estimates are not available, but old Soviet-era data suggest that up to 3,000 wolves live in Kyrgyzstan and as many as 1,000 in Uzbekistan. Bounty systems, however, persist in both countries and wolves are routinely shot, trapped and poisoned.

Turkmenistan may have wolves, but no data are available regarding their current status. Heavy hunting pressure in the past decade is thought to have eliminated most wolves from their former range, making the wolf's future in Turkmenistan doubtful.

A decade-old statistic puts the wolf population of Afghanistan at 1,000. However, no more than a few hundred may have survived the nation's years of constant warfare and civil strife.

The estimated 6,000 wolves of western and northern China are protected by law from hunting and trapping. The population is considered relatively stable except in far western China and Inner Mongolia (a part of China that borders Mongolia), where illegal hunting is probably causing a decline. In these two areas and

Mongolia itself, most people make their living by herding sheep, goats, cattle and horses. They also hate wolves, since the predators occasionally feed on livestock. Every year since 1995, Naoki Maruyama, a professor of wildlife conservation at Tokyo Noko University in Japan, and Zhonxing Gao of China's Northeastern Forestry University in Harbin have carried out a joint survey of wolves in Inner Mongolia. According to Maruyama, the wolves in both Mongolia and Inner Mongolia are doing poorly. "They are hunted illegally by the local people," he says, "but even worse, over the course of the last few years, well over 100,000 Mongolian gazelles have been killed for their meat. This is the Inner Mongolian wolf's main prey species." Add the wholesale conversion of grasslands into grazing lands and the future of the wolf in Mongolia and northern China looks bleak.

There is one piece of good news. Maruyama reports that the Daxinganglin Mountains in Inner Mongolia still have a healthy wolf population. In the last two years, Chinese authorities have confiscated firearms throughout the country and in June, 1998, the government announced plans to set aside part of this 100,000-square-mile area as a wildlife reserve for the express purpose of conserving the wolf.

"This is a very positive step toward conserving China's remaining wolf population," says Maruyama. "Since we want to reintroduce the wolf into Japan, where it has been extinct for almost 100 years, Chinese wolves from this region would make excellent candidates for our proposed reintroduction program."

Japan

Japan's lush woodlands — which cover almost the entire interior of the main island, Honshu, and are overrun with Sika deer — cry out for wolves.

Wolves have been extinct in Japan for nearly a century. The small Chinese wolf, ancestor of the Japanese wolf, probably reached the Japanese isles via a land bridge during the last great ice age.

Japan is far from endorsing reintroduction of wolves, but a popular movement led by Professor Naoki Maruyama is trying to change public opinion and foster a climate favorable to wolf recovery. Maruyama is president of the Japan Wolf Association, a proactive conservation group working for reintroductions in Japan.

So far, Maruyama has identified several sites suitable for wolf reintroductions. The first is Nikko National Park, a 347,000-acre wilderness just three hours north of Tokyo. The park's sika deer population has exploded, badly damaging local vegetation. Maruyama believes the prey density could easily support four healthy packs with a total of up to 50 wolves.

The second most suitable place for wolf reintroductions is on the wild Shiretoko Peninsula on Hokkaido, Japan's large northern island. Maruyama is convinced wolves could thrive in Shiretoko National Park, a 98,000-acre wilderness teeming with brown bears, salmon runs and up to 10,000 sika deer.

Maruyama hopes to raise enough money through the Japan Wolf Association to build a wolf visitor center similar in function to the International Wolf Center in Ely, Minnesota. The center would attract tourists to a potential

reintroduction site and educate them about wolves and their environment. Like Ely, the center would also have resident wolves that visitors could see. Maruyama believes that when people meet them, the wolves will sell themselves.

In 1997, Maruyama's efforts were reinforced in a dramatic way by the release of a very popular animated film entitled *Princess Mononoke*. The heroine of the story, which takes place in 15th Century Japan, is *Princess Mononoke*, a teenager raised by a wolf. In league with animals and some sympathetic people, she tries to stop ruthless developers from destroying a forest and its wild creatures. It is a classic story of humankind versus nature. Although the end of the film is inconclusive, the cartoon was a box office success and underscored the positive relations people have with nature. *Princess Mononoke* could be used as a positive symbol for conservation and wolf reintroduction in Japan.

India

India's beleaguered wolves are under assault by illegal hunting, loss of prey species and widespread habitat destruction. India probably has no more than 2,700 wolves, with many packs living in close proximity to rural villages (India has 600,000 villages with fewer than 1,000 inhabitants.)

Although in North America healthy, unprovoked wolves have rarely attacked people, the Old World has a long history of stories of wolf attacks. Many of these tales are not credible, but in India a rash of wolf attacks did occur recently. A combination of exploding human population growth, destruction of wolf habitat and loss of

natural prey is blamed for these well-publicized incidents of wolves preying on people in 1996 and 1997. Most of the “child lifting” was done by one pack that killed or seriously injured 76 children under the age of 10 in crowded Uttar Pradesh State. The children disappeared over a six-month period.

At first the cause of the disappearances was unknown. Residents assumed that a tiger might be to blame, but no tracks were found. Some thought the killing was done by a leopard, wild pigs or even a demon that was punishing ungodly behavior. Finally, by using forensic evidence and analyzing scats and paw prints, Indian biologist Yadvendradev Jhala identified the culprits as wolves. He believes the deaths occurred because the wolves had lost their fear of humans, and the children playing alone in thick cover were easy prey.

Lack of public interest in saving the Indian wolf has long shadowed the species’ future, but the deaths of the children in northern Uttar

Pradesh further darkened the situation. Jhala fears that the wolf cause will now be more difficult than ever to sell to a fearful and angry public. India has no coordinated public effort to save the animal or its habitat. Most Indian wolves live outside wildlife reserves in semi-arid scrub or in agricultural or pastoral areas where they constantly come into conflict with poor rural communities. “Wolves are a protected species in India, but illegal hunting of wolves is common,” Jhala says. “Adults are poisoned and pups routinely smoked out of dens and clubbed to death.”

Small populations of wolves hold out in remote mountainous areas of Pakistan, Bhutan and Nepal. In the late 1980s an estimated 600 wolves lived in northern Pakistan and 500 in Nepal. However, no recent population estimates are available for these countries and the wolf’s status is unknown. The wolf is not afforded legal protection in any of the countries on the Indian subcontinent except India, where the law is not enforced.

SECTION THREE

The Challenges of Wolf Management

For much of history, wolf management has consisted of wholesale slaughter. Wherever wolves were encountered by people, whether in the United States, Europe, Russia, Asia or the Middle East, they generally were trapped, poisoned and shot or were pushed out by habitat loss and elimination of their main prey animals.

In the United States, treatment of the wolf was largely a campaign of extermination as European settlers overran the continent. From 1883 to 1918, for instance, 80,730 wolves were killed in Montana alone by bounty hunters, although this statistic probably lumps coyotes with wolves. In 1915, Congress enacted a law calling for extirpation of wolves on federal lands. Between 1915 and 1942, when the program was terminated, around 25,000 wolves were killed.

By the mid-1930s, U.S. wolves had been eliminated in all but the more remote parts of the nation. By 1960 virtually no wolves survived in the lower 48 states except in the border country near Mexico, in northern Minnesota and on Isle Royale in Lake Superior.

Today wolves are making something of a

comeback in a few states and some countries, but they still face an uphill struggle worldwide. Most nations in which wolves occur do not have workable long-term wolf management strategies. The management of carnivores in general and wolves in particular is proving to be extremely challenging because of the complex biological and social issues involved.

Wolf Management Fundamentals

Wolves, like people, move around a great deal, often claiming new territories. They travel in packs and have specific habitat and prey requirements that must be met if viable populations are to be sustained. But managing wolves is not simply a matter of meeting their biological needs. Wolf managers must also consider the potential for conflict with humans.

According to Todd Fuller, a professor of biology at the University of Massachusetts, successful wolf management comes down to addressing several basic questions: Is the habitat area large enough to support one or more packs?

Wolf Management in Minnesota

Minnesota, with the oldest and largest wolf population in the lower 48 states, is operating under a very proactive federal recovery plan for its estimated 2,500 wolves, spread across 35,000 square miles. A federally administered control program deals with wolves that develop a taste for livestock. Extension agents determine whether livestock were killed by a wolf or by some other animal. The Minnesota Department of Agriculture compensates farmers for losses attributed to wolves. Wolves identified as habitual offenders are killed by professional trappers working for the U.S. Department of Agriculture's Wildlife Services. In 1997, agents killed 216 problem wolves, and the Minnesota Department of Agriculture paid out more than \$46,000 to compensate farmers for livestock killed by wolves.

Like farmers, hunters often have concerns about wolves. A recent study of the effects of wolf predation on white-tailed deer populations in northern Minnesota, however, casts doubt on the contention that wolves reduce the number of deer, moose, elk and other game animals. Data compiled by the Minnesota Department of Natural Resources for a 14-county area of northern Minnesota in the heart of the state's wolf range show that the number of

bucks harvested between 1945 and 1997 remained high even with an expanding wolf population. By 1996, wolves had expanded their range in northern Minnesota.

"If wolves were having a dramatic effect on deer harvest," says Bill Route, a biologist with the International Wolf Center in Ely, Minnesota, "one might expect hunter success to drop significantly during this expansion. Yet overall hunter success in harvesting bucks and antlerless deer did not decrease substantially." Current estimates suggest that the Minnesota deer population, despite increased wolf predation, is stable at roughly 1 million deer.

The original goal of the FWS recovery plan for Minnesota wolves was a healthy population of at least 1,200 to 1,400. With that goal exceeded, FWS would like to delist wolves in Minnesota and turn their management over to the state. The first effort to do so stalled in 1999 when the state legislature and Department of Natural Resources failed to enact an acceptable management plan. In spring 2000, however, a plan was passed by the legislature. Although Defenders and other conservation organizations do not believe this plan provides for ongoing wolf recovery in Minnesota, delisting could be proposed again soon.

What kinds and quantities of prey animals are available? How many wolves can survive sustainably in a given area? What needs to be done to protect wolves? How does the public view wolves and what can be done to help the citizens make informed decisions about wolf recovery and management? The significance of each of these questions is discussed in brief below.

1. Is the habitat area large enough to support one or more packs?

The minimum space required for an average-size pack (four to six wolves) varies from about 25 to 75 square miles, depending on prey density. Small wolf packs may exist on islands of habitat cut off from other packs by agricultural land or urban areas. In northern Wisconsin and central Minnesota, for instance, isolated packs have survived for five to ten years without contact with other wolves. However, Professor Fuller says, the closer packs are, the more chance there is of packs contributing to the overall gene pool and maintaining sufficient genetic diversity.

The isolated wolf packs on Isle Royale in Michigan all stem from one female progenitor and have lost about 50 percent of their genetic variability by inbreeding, genetic drift (random changes due to chance alone) and other mechanisms by which small populations lose genetic diversity. Still, wolves continue to thrive there after 45 years, subsisting mostly on moose, predominantly those older than nine years. Ideally, however, isolated areas should include space for at least two or three wolf packs. This way, disperser wolves can enrich the gene pool by mating

with members of other packs.

2. What kinds and quantities of prey animals are available?

Wolves are highly adaptable hunters, capable of taking advantage of a wide variety of prey animals — from voles and birds to muskoxen and wood bison. However, wolf packs generally target whatever ungulate populations are most abundant and accessible in their territories.

Wolves in Poland, for instance, subsist mainly on red deer (elk), roe deer and wild boars. Those in Minnesota, Wisconsin and Michigan rely mostly on white-tailed deer, with beavers, moose and snowshoe hares secondary choices. Arctic wolves depend on snowshoe hares, voles, caribou and muskoxen. Wolves in Wood Buffalo National Park in Alberta prey primarily on wood bison.

Ungulate densities are crucial to wolf survival. Managers must have some idea of the number and density of key prey species to implement management plans in a rational manner. In most areas with wolf packs, wildlife managers are able to estimate ungulate populations and distribution on an annual basis, taking into consideration hunting pressures, severe weather and outbreaks of disease. Only in a few areas has wolf predation been identified as a factor in the decline of ungulate populations, usually in association with severe winter weather.

3. How many wolves can survive sustainably in a given area?

Wolf populations are directly related to total ungulate biomass in any given area. Biologists use mathematical models to calculate ungulate

biomass and wolf density, but they also recognize some fundamental rules of thumb, as Professor Fuller points out in *Guidelines for Gray Wolf Management in the Northern Great Lakes Region*, published by the International Wolf Center:

“At 12 deer per square mile, an average territory would be about 63 square miles. The area required for two packs would be about 173 square miles. Also remember that ungulate biomass per wolf is highest for heavily exploited or newly protected wolf populations and lowest for unexploited (protected) wolf populations or those where ungulates are heavily harvested by humans. Thus, one would expect more wolves for a given biomass index if the wolves were protected and fewer wolves if they were heavily exploited or newly arrived. . . . There are no data indicating that wolf density would level out even if ungulate density were at very high levels (exceeding 30 deer per square mile).”

The potential interaction between wolves and humans should also be factored into the equation. Studies have shown that where road densities average less than 1.1 miles per square mile and human population densities average less than ten per square mile, wolf populations are more likely to flourish and expand. Where road or human population densities are greater than these values, there will be increased contact and conflict between wolves and humans. Wolves may prey on livestock and kill pets, while humans may impact wolf populations through hunting pressure and vehicle fatalities.

Nevertheless, wolves can survive even in

densely settled areas surrounded by domestic livestock without causing problems. L. David Mech, who has been studying wolves in the wild since the 1950s, reports that one pack in Minnesota has lived for two years in an agricultural area just 90 miles north of St. Paul without killing a single domestic animal. The wolf's ability to survive in such areas depends to a great extent on its own behavior and hunting preferences, the kinds of human activities occurring in wolf range and the attitudes of local residents.

Wildlife managers may assess the potential for conflicts in these areas by using road or human population densities as baseline indicators. Land-use practices and the views of local residents also play important roles in determining how best to manage resident wolf packs. But sooner or later, wolf management comes down to some form of control, and this is when the debate about how to manage wolves often “goes ballistic,” in the words of one biologist.

Many conservation organizations are against state or federal programs that kill livestock-depredating wolves or wolves that move into areas that are not zoned for wolf protection. Others believe that wolves should be allowed to expand their populations and range provided they pose no immediate threat to people and livestock. On the other side, many farmers and ranchers want wolves eliminated from all agricultural or rangeland, without exception. These polarized views make wolf management difficult and volatile.

The public's antipathy to wolf control (e.g., killing the animals when necessary to keep them out of agricultural areas) has, in Mech's words,

“three major negative implications for wolf recovery. First, some people revere wolves so much that, rather than having wolves face control, these people would rather not restore wolves to areas where they would have to be controlled. Because wolves will probably have to be controlled almost everywhere they are restored, this sentiment translates into political pressure against wolf recovery. Second, the anti-wolf public, such as some livestock owners and organizations, intensify their anti-wolf attitudes in reaction to the extremism of the other side. . . . Third, some wolf advocates resort to terrorism and deceptive advertisements. This zealotry intimidates public officials who might otherwise be predisposed toward wolf recovery and can cause them to shun it.”

Whatever the ultimate management plan, deciding how many wolves can or should be allowed to inhabit a given area remains at the core of the debate swirling around wolf reintroductions and management schemes for established populations.

4. What needs to be done to protect wolves?

“Enhanced law enforcement to protect wolves from most types of killing is the most common means of stabilizing or increasing wolf numbers,” Todd Fuller says. Another management measure is imposing limits on human activities in wolf territory, such as bans on the construction of roads and other infrastructure in prime wolf habitat. The Minnesota Department of Natural Resources and the U.S. Forest Service, for instance, have issued guidelines that limit new roads on lands where wolf density is high, unless

other roads are closed. In practical terms this means no net gain in road mileage, or no-net-development effects in forested areas with thriving wolf populations.

Other restrictions also can be initiated, including a ban on snowmobiles in certain wilderness areas and on all human activities within a certain distance of denning sites. Wisconsin’s wolf management policy, for example, puts temporary restrictions on land use within 850 yards of known denning sites. Other solutions being tried include no net change in forest cover caused by logging and other resource-extractive industries; no alteration of wolf habitat by development activities in certain high-density areas; and hunting restrictions, or shortened hunting seasons, for preferred prey species such as deer, moose, caribou and elk. All of these strategies offer managers excellent tools with which to manage wolf populations on a more sustainable basis.

5. How does the public view wolves and what can be done to help the public make informed decisions about wolf recovery and management?

Surveys of public attitudes toward wolves are extremely useful for gauging public opinion and knowledge about the wolf and wolf recovery efforts. Where wolves are already well established, more detailed surveys can provide managers with valuable information about public acceptance of management plans, potential conflicts and the need for more work.

Successful wolf recovery schemes require widespread public support, so people must

understand what is at stake. Also, the views of those opposed to wolf reintroductions or in favor of more controls on established wolf populations need to be taken into account when creating management plans.

This need for inclusion requires that management plans undergo a thorough review process that encourages and facilitates public input. An informed public can be a powerful ally for wolf management plans. Conversely, an uninformed public can be a potent opponent. Above all, the public needs unbiased information based on scientific studies and reliable data rather than

rumors and repetition of misinformation. Much has been learned in recent years about managing top predators such as wolves. Every year, more data are collected, analyzed and applied to wolf management programs. While no one has devised the perfect management plan for maintaining healthy populations of an animal as multifaceted as *Canis lupus*, wildlife managers are learning how to cope with and win the acceptance of the public, whose cooperation and support are the basis for all successful wildlife-management programs. Without public support, or at least tolerance, wolf management will ultimately fail.

SECTION FOUR

The Future of the World's Wolves

Although some 200,000 wolves roam at least 58 countries, all of them in the Northern Hemisphere, the future of the wolf remains uncertain. Only 18 of those nations grant the wolf some form of protection, either fully or partially. The rest do not protect or manage the species at all. And even in countries where wolves are protected, such as China and India, they are still hunted illegally. Broad-based citizen activist movements working for wolf protection and conservation are also nonexistent in most countries.

Fortunately, thanks to the vagaries of wolf distribution, most of the world's wolves — with the exception of those in the former Soviet Union — live in the few nations that do offer some protection and have set up management programs. Moreover, active reintroduction campaigns are under way in Mexico, Japan and the lower 48 states of the United States. In Europe wolves have recolonized France, Switzerland, Austria, Germany and the Czech Republic.

At least in Europe and North America, wolves are making a kind of public relations

comeback as the scientific community and the general public learn more and more about them. The truth is getting out: The wolf is not the ruthless killer of story and myth, but an intelligent, versatile predator at the top of the food chain, filling an important ecological niche and keeping ungulate populations genetically fit by culling the weak and sickly.

The Wolf Conservation Movement

Much of the credit for bringing the truth about wolves to the attention of the public and winning sympathy and support for the species belongs to the citizen action groups and other nongovernmental organizations (NGOs) that have made wolf conservation a rallying cry.

The last several decades have seen a proliferation of pro-wolf groups. The Belgium-based International Wolf Federation now lists organizations in 17 countries, mainly in Europe, working to save the wolf and its habitat. Defenders' own list of pro-wolf groups (Appendix I) includes more than 50 in the United States alone.

Conserving wolves is also now on the agenda of

many wildlife and environmental organizations.

Even in countries such as Slovakia where the wolf is not protected and can be hunted with impunity, popular movements have arisen to advocate wolf protection and permanence in the natural order of things.

To involve and influence politicians and citizens, the save-the-wolf movement employs a variety of strategies:

Public education. To build the public acceptance and understanding that is basis for sustainable wolf management, pro-wolf groups publish and distribute educational materials such as newsletters, brochures and action alerts and present wolf education programs at public events, schools and other venues. Some of the more effective programs, such as the one offered by Colorado-based Mission:Wolf, feature tame “ambassador” wolves. These captive wolves provide participants with the unforgettable experience of coming face to face with a real live wolf.

NGOs also work with journalists to ensure fair and adequate press coverage of wolves and related issues and with local residents in designated and potential wolf recovery areas to prepare them for living with wolves. In all regions of the United States targeted for wolf recovery, for example, Defenders has regional representatives and keeps wolf education booths circulating to provide outreach.

Lobbying. The rules governing lobbying by groups vary from country to country, and it is not encouraged at all by the world’s more oppressive forms of government. In democratic societies, however, lobbying legislators and agency representatives to promote pro-wolf management poli-

cies is an important wolf advocacy strategy.

Lobbying can take many forms such as mass letter-writing campaigns, petitions, demonstrations, personal visits to elected officials, testimony and mailings to key legislators or agency staff. For example, in December, 1999, Defenders of Wildlife released a special report, *Places for Wolves: A Blueprint for Restoration and Long-Term Recovery in the Lower 48 States*. This report calls for a national rather than regional focus on wolf recovery and makes specific management recommendations to FWS. Its primary purposes are to encourage the U.S. Fish and Wildlife Service (FWS) to adopt a comprehensive national wolf strategy and to influence an upcoming decision on wolf reclassification under the Endangered Species Act, but the report also serves as a guide for wolf advocates and wildlife managers

In Europe, Slovakia’s WOLF Forest Protection Movement is working on a number of national lobbying campaigns, including an attempt to get the wolf listed as a protected species that cannot be hunted except to control problem animals that feed on livestock. Thanks in large measure to the efforts of the activist group Nature WOLF, the Polish parliament passed a Protection of Animal Species Act in 1998 granting the wolf total protection in the entire country. “Our top priority now is to stop poaching of wolves and other big predators,” the organization’s president, Sabina Nowak, says, “and to give them effective protection in all areas of Poland.” Nature WOLF is also working with legislators and policy makers to introduce a comprehensive wolf management strategy for areas of the country with wolf populations.

Economic incentives. Wolf opponents have long argued that wolves hurt local economies by killing livestock and by reducing the number of deer, moose and elk available to hunters. Citizen groups counter such economic misinformation with facts: statistics that show how minimal wolf predation on livestock actually is; data that indicate that only under adverse conditions, such as extremely severe winters, do wolves negatively impact ungulate populations. Wolf advocates meet face-to-face with farmers and others opposed to wolf conservation to bring them these facts and involve them in forging a workable strategy for managing wolves.

Some groups let money do the talking. In 1987 when wolves from Canada began to recolonize the northern Rockies, Defenders of Wildlife set up a fund for compensating ranchers for any livestock lost to wolves. Defenders' Wolf Compensation Trust has now paid out more than \$100,000. Experts believe the existence of this fund was one of the most important factors in winning the reintroduction of wolves in Yellowstone and central Idaho in 1995. In addition to a fund to reimburse farmers who have suffered livestock losses from wolf predation, the Polish activist group Nature WOLF published a booklet on how to train guard dogs to keep wolves away from domestic animals and is planning a guard-dog-training program.

Promoting the tourism opportunities wolves bring is another way NGOs help "sell" wolves. Studies have shown that wolves have had a positive effect on tourism-associated industries. Indeed, merchants in communities near Yellowstone National Park attribute a recent eco-

nomical upturn to the return of the wolf to the park. Throughout the world, pro-wolf groups are offering or promoting wolf howling outings and winter wolf tracking excursions and positioning the wolf as an ecotourism attraction.

Several groups fund much-needed wolf research. Grupo Lobo, a small group of 200 Portuguese wolf activists, sponsors field research. A recent study initiated and funded by the group tracked the movements of Portugal's hard-pressed wolf populations in the remote mountainous areas of the country. In 2000, Defenders will hold two week-long strategic planning and modeling workshops, one in the northeastern United States and one in the southern Rockies, to explore the biological and social issues related to wolf recovery in these regions.

Legal action. When all other methods to alter a policy or enforce an existing law or regulation fail, advocacy groups resort to legal action. Defenders of Wildlife, the National Wildlife Federation and the National Audubon Society, for example, countersued agribusiness giant the American Farm Bureau Federation successfully filed suit to have the Yellowstone wolf reintroduction declared illegal. The ruling was overturned by a higher court.

Building partnerships. No one person, agency, group or institution can single-handedly save the wolf. Wolf conservation demands the cooperation of researchers, land managers and other stakeholders, universities, advocacy groups and government officials at all levels and across borders. In Europe, organizations and experts in 17 countries are part of the Large Carnivore Initiative. Partners in this effort coordinated by

the World Wildlife Fund focus on wolves, brown bears, lynxes and wolverines with the goal of supporting and building on existing initiatives and projects and making the most of available resources.

Defenders is taking the first step to launching a similar initiative for North America with Carnivores 2000, a conference to be held in Denver, Colorado, in November, 2000. Capitalizing on the success of wolf conferences it organized in 1996 and 1998, Defenders will host scientists, natural resource agency personnel, educators and advocates at this three-day symposium that will focus on the conservation of wolves and other large predators in North America and abroad. Among the topics of discussion will be Defenders' recommendation that the Department of State negotiate a treaty with Canada and Mexico to provide international protection for wolves and other predators.

The wildlife conservation movement, both in the United States and abroad, has matured a great deal in recent years. The emergence of the internet as a communications tool and the advent of conservation biology with its emphasis on ecosystems rather than single species have had perhaps the greatest impact.

Several years ago Defenders embraced the new technology and set up the GrassRoots Environmental Effectiveness Network (GREEN). GREEN publishes a daily online bulletin covering national and state wildlife and public lands issues and facilitates communication and organizing among activists. An outgrowth of GREEN, the Wolf Information Network (WIN), is administered by Defenders regional representa-

tives to bring the latest wolf news to interested individuals.

To generate paperless action alerts on wolves and other issues, the Defenders Electronic Network (DEN) was introduced in the fall of 1999. Within three months more than 130,000 people had signed up to receive DEN's biweekly e-mail newsletter and use DEN's Action Center which allows subscribers to weigh-in with key decisionmakers on wildlife issues.

Conservation biology has given the pro-wolf movement the broader and more comprehensive and holistic agenda of protecting and conserving ecosystems. Recognizing that without healthy ecosystems gray wolves cannot survive, activists are saving vital habitat for a host of wild creatures great and small.

But the battle has really only just begun. Recent "wolf assassinations" in the southwestern United States are testimony to the continuing need for public acceptance and understanding of wolves and their important role in ecosystem preservation. These killings, which may have been the work of one person and which outraged the conservation community, serve to highlight how the future of the wolf remains controversial and uncertain. Complicated issues such as reintroduction, habitat protection, depredation conflicts, animal damage control and management raise biological, ecological, political and ethical challenges that can only be resolved with the continued investment and involvement of informed and concerned citizens.

If the wolf is to survive and prosper, *Homo sapiens* — the dominant species on the planet — will have to come to terms with the dark side of

human nature. The wolf may be a powerful symbol of wildness, but it cannot be saved on its own. Wolf conservation needs to be measured in the context of protecting ecosystems that already are affected by human activities and that will

have to be managed not only to preserve natural values but also to permit continued human use. In this way, saving the wolf may become part of the process by which we save the quality of our own lives.

APPENDIX

Organizations Working for Wolf Conservation Around the World

BELGIUM

International Wolf Federation

La Froide Fontaine
4577 Outrelouxhe
Belgium
(Consists of 28 associations in 17 countries)

Wolven Opvan - en Studie Centrum Vzw
Hoenderbroekstraat 116
B-3620 Lanaken
Belgium
+32 (0)8 972 2229
<http://gallery.uunet.be/dekinder/index.html>

CANADA

Canadian Centre for Wolf Research

Box 342
Shubenacadie, NS B0N 2H0
Canada
www.wolf.ca.com

Clan des Loups d'Amérique du Nord (C.L.A.N.)

1232 Chute Panet
St-Raymond, QC. G3L4P3

Friends of the Wolf
P.O. Box 21032
Glebe Postal Outlet

Ottawa, Ontario
K1S 5N1 Canada
613-231-1065

Friends of the Wolf - British Columbia

P.O. Box 2983
Vancouver, Main Post Office
Vancouver, B.C.
V6B 3X4 Canada
604-290-9256

Friends of the Wolf - Yukon

P.O. Box 4392
Whitehorse, Yukon Territory
Y1A 3T5 Canada

Haliburton Forest Wolf Centre

RR#1
Haliburton, Ontario
K0M 1S0 Canada
705-754-2198
www.hilburtonforest.com

Northwest Wildlife Preservation Society

PO Box 34129
STN. D
Vancouver, British Columbia V6J 4N3
Canada
<http://persweb.direct.ca/nwps/index.html>

Project Wolf

P.O. Box 48446
 Vancouver, British Columbia
 V7X 1A2 Canada

Wolf Awareness Inc. (Eastern Office)

RR#3
 Ailsa Craig, Ontario
 N0M 1A0 Canada
 519-293-3703
www.empath.on.ca/clupus/

Wolf Awareness Inc. (Western Office)

910 - 15th St. Canmore
 Alberta, Canmore
 T1W 1X3 Canada
 403-678-9633

CHINA

Wildlife Conservation Association of China

Hepingli
 Beijing 100714
 China

DENMARK

Egholm Wolf Center

Eghomvej 42
 DK-4880 Nysted
 Denmark

FRANCE

Les Loups du Gevaudan

Saint-Lucie
 48100 Mariejols
 France

GERMANY

European Wolf Network

Linderhof 2
 82488 Ettal
 Germany

www.tigress.com/wolfd/en/ewn_e.htm

Deutsche Wolfsgemeinschaft (German Wolf Association)

Hopfenhacker 23b
 35418 Buseck
 Germany
www.wolves.de

European Natural Heritage Funde-Euronature

Konstanzer Strasse 22
 78315 Radolfzell
 Germany
 +07732-9272-0
www.euronatur.org/

Friends of the Wolf - Deutschland

Schusterstrasse 27
 79098 Freiburg
 Germany
 (0761) 26786

Gesellschaft zum Schutz der Wolfe**(Organization for the Conservation of the Wolf)**

Blasbacher Str. 55
 35586 Wetzlar
 Germany
www.geocities.com/yosemite/4686/gzsdw.htm

Saarloos Wolfhunde und Tschechoslowakische Wolfshunde (IG Swh & Twh)

Ruth Oesterle
 Plner Str. 28
 14193 Berlin
 Germany
www.wahli.freeservers.com

ISRAEL

Nature Reserve Authority

Wolf Research
P.B. 27, Ortal
Golan Heights 12430
Israel
alwolv@hotmail.com

JAPAN

Japan Wolf Association

c/o Department of Ecoregion Science, Faculty of
Agriculture
Tokyo Noko University
3-5-8 Saiwaicho, Fuchu
Tokyo 183-8509
Japan
www2s.biglobe.ne.jp/~wolfpage/EGindex.html

NORWAY

**Foreningen Vare Rovdyr (Society for the
Protection of Carnivores and Raptors)**

Postboks 17
N-2420 Trysil
Norway

POLAND

**Stowarzyszenie dla Natury Wilk (The
Association for the Wild/Natural Wolf)**

Ul. Gorska 69
43-376 Godziszka
Poland

PORTUGAL

Grupo Lobo

Dep. Zoologia Antropologia
Faculdade Ciencias
Bioco C2 - Camplo Grande
1700 Lisboa
Portugal
globo@fc.ul.pt

Iberian Wolf Recovery Center

CRLI
Apartado 61
2665 Malveira
Portugal

SLOVAKIA

Slovak and Carpathian Wildlife Societies

Tulska 29
Zvolen, Slovakia
findo@fris.sk

WOLF Forest Protection Movement

c.d. 27
082 13 Tulcik
Slovakia
www.wolf.sk

SPAIN

Grupo Ecologista CICONIA

Apartado de Correos 136
49600-Zamora
Espana
980 62 04 73
<http://pagina.de/Ciconia>

SWEDEN

Foreningen Varggruppen (The Wolf Group)

Box 15061, S-104 65
Stockholm
Sweden

**Svenska Rovdjursforeningen (The Swedish
Carnivore Association)**

Box 144
S-793 24 Leksand
Sweden
+46-(0)247-10342
www.rovdjur.w.se

UNITED KINGDOM

The Born Free Foundation**Operation Wolf**

3 Grove House
 Foundry Lane
 Horsham, West Sussex
 RH13 5PL
 United Kingdom

Canid News Wildlife Conservation Research Unit

Department of Zoology, Oxford University
 South Parks Road
 Oxford OX1 3PS
 England

Friends of the Wolf - Great Britain

Delamere, #30 Dommert's Lane
 Frome, Somerset BA11 4JD
 UK
 Tel/Fax: 0373 473 711

UK Wolf Conservation Trust

Butler's Farm
 Beenham, Reading
 Berkshire RG7 5NT
 England
 44 (0) 118 971 3330
www.ukwct.org.uk

The Wolf Society of Great Britain

49 Foxhill Road
 Reading, Berkshire RG1 5QS
 UK
 44 (0) 118 967 7907
www.myinternet.co.uk/wsgb

Wolf Watch UK

5 Delapre Drive
 Banbury
 Oxfordshire OX16 7WP
 England
www.wwuk.org

UNITED STATES

Alaska

Alaska Wildlife Alliance

PO Box 202022
 Anchorage, Alaska 99520
 (907) 277-0897
www.akwildlife.org

Defenders of Wildlife**Alaska Office**

15255 Point Louisa Road
 Juneau, AK 99801
 (907) 789-2328
www.defenders.org

North American Wolf Society

PO Box 82950
 Fairbanks, Alaska 99708

Wolf Song of Alaska

PO Box 110309
 Anchorage, Alaska 99511-0309
www.wolfsongalaska.org/
 (907) 346-3073

Arizona

Defenders of Wildlife**Southwest Office**

PO Box 1901
 Tucson, Arizona 85702
 520-623-9653
www.defenders.org

United States Wolf Refuge & Adoption Center

PO Box 2011
 Chino Valley, Arizona 86323
 602-636-9427

California

California Wolf Center
PO Box 1389
Julian, California 92036
612-234-WOLF (9653)
www.californiawolfcenter.org

Wolf Mountain Sanctuary
PO Box 385
Lucerne Valley, California 92356
www.wolfmountain.com
760-248-7818

Wolves -N-Wildlife
2550 South Mountain Rd.
Fillmore, CA 93015
www.wolvesnwildlife.org

Colorado

Mission: WOLF
PO Box 211
Silver Cliff, Colorado 81249
719-746-2919
www.indra.com/fallline.mw

Sinapu

2260 Baseline Road
Suite 203
Boulder, Colorado 80302
303-447-8655
www.sinapu.org

W.O.L.F.
(Wolves Offered Life and Friendship)
P.O. Box 1544
LaPortt, CO 80535-1544
www.fortnet.org/wolf

Idaho

Defenders of Wildlife
Southern Rockies Office
PMB 217

3355 N. Five Mile Rd.
Boise, Idaho 83713
208-672-1732
www.defenders.org

The Wolf Education and Research Center
PO Box 217
Winchester, Idaho 83555
208-924-6960
www.wolfcenter.org

Wolf Recovery Foundation
PO Box 44236
Boise, Idaho 83711
208-363-0203
www.forwolves.org

Indiana

Red Wolf Sanctuary, Inc.
PO Box 235
Dillsboro, Indiana 47018

Wolf Park — North American Wildlife Park
Foundation
4004 E. 800N
Battle Ground, Indiana 47920
765-567-2265
www.wolfpark.org

Maine

Coalition to Restore the Eastern Wolf
(C.R.E.W.)
P.O. Box 157
Kents Hill, ME 04349

Defenders of Wildlife
Northeast Regional Office
PO Box 468
Kents Hill, ME 04349
207-897-3620
www.defenders.org

Maine Wolf Coalition

190 Water Street
 Hallowell, Maine 04347
<http://home.acadia.net/mainewolf>
 207-622-1161

Massachusetts

RESTORE: The North Woods

PO Box 1099
 Concord, Massachusetts 01742
 978-287-0320
www.restore.org

Wolf Hollow

(North American Wolf Foundation)

114 Essex Road
 Ipswich, Massachusetts 01938
 978-356-0216
www.wolfhollowipswich.com/

Minnesota

Coalition to Protect Predators

44781 Bittner Point Rd.
 Bovey, Minnesota 55709
 218-245-3049

HOWL (Help our Wolves Live)

4600 Emerson Ave. South
 Minneapolis, Minnesota 55409

International Wolf Center

1396 Highway 169
 Ely, Minnesota 55731
 1-800-ELY-WOLF
www.wolf.org

Minnesota Wolf Alliance

PO Box 6351
 Minneapolis, MN 55406
 612-837-1754
www.nnic.com/mnwolves

Wildlife Science Center

5463 W. Broadway Ave
 Forest Lake, MN 55025
 (651) 464-3993
www.wildlifesc@prodigy.net

Missouri

Wild Canid Survival & Research Center

Washington University
 PO Box 760
 Eureka, Missouri 63025
 314-938-5900
www.wolfsanctuary.org

Montana

Defenders of Wildlife

Northern Rockies Office
 Hank needs to get PO Box
 Missoula, Montana 59801
 (406) 549-0761
www.defenders.org

Predator Conservation Alliance

PO Box 6733
 Bozeman, Montana 59771
 (406) 587-3389
www.predatorconservation.org

Preserve Their Dignity

PO Box 183
 Whitefish, Montana 59937

**Wild Sentry: Northern Rockies Ambassador
 Wolf Program**

PO Box 172
 Hamilton, Montana 59840
 (406) 363-7291
www.bitterroot.net/wild

New Hampshire
Loki Clan Wolf Refuge
P.O. Box 1186
Conway, NH 03818
(603) 447-3020
www.nv.com/ipusers/loki-wolves

New Hampshire Wolf Alliance
PO Box 498
Rumney, New Hampshire 03266

New Jersey
Wolf Visions
200 Route 46
Mine Hill, NJ 07803

New Mexico
Candy Kitchen Rescue Ranch
Star Route 2, Box 28
Ramah, New Mexico 87321
505-775-3304
www.inetdesign.com/candykitchen

Mexican Wolf Coalition of New Mexico
207 San Pedro NE
Albuquerque, New Mexico 87108

White Sands Wolf Coalition
PO Box 1347
Alamagordo, NM 88311

Wildlife Education & Research Foundation
PO Box 1423
Gallup, New Mexico 87305

New York
New York Wolf Center
PO Box 654
Cross River, New York 10518
www.nywolf.org

Northeast Ecological Recovery Society
PO Box 1726
Mineola, New York 11501-0902

Timber Wolf Restoration
Northeast Ecological Recovery Society
PO Box 1726
Mineola, New York 11501

North Carolina
Carolina Wolfers Association
435 Fanjoy Road
Statesville, North Carolina 28677

Red Wolf Coalition
PO Box 2318
Kill Devil Hills, North Carolina 27948
redwolf@coastalnet.com

Oregon
White Wolf Sanctuary
PO Box 65
Tidewater, OR 97390

Texas
Chisholm Wolf Foundation
PO Box 190
Dale, Texas 78616

Lobo Restoration Project
PO Box 208
Saint Jo, Texas 76265

Mexican Wolf Coalition of Texas
PO Box 1526
Spring, Texas 77383

North American Wolf Association
23214 Tree Bright
Spring, Texas 77373
281-286-7788
www.nawa.org

Utah

Wolfstock Foundation

PO Box 17847
Holladay, UT 84117

Vermont

National Wildlife Federation

58 State Street
Montpelier, Vermont 05602
www.nwf.org

Wolf and Wild Canid Sanctuary

175 Bliss Road
White River Junction, Vermont 05001
802-295-5378
www.svend.com/wolf

Washington

Wolf Haven International

3111 Offut Lake Road
Tenino, Washington 98589
www.wolfhaven.org

Wolf Justice League

22715 - 287th Place, SE
Maple Valley, Washington 98038
tombeno@oz.net

Wolfstown

P.O. Box 13115
Burton, WA 98013
(206) 463-9113

Wisconsin

Friends of Wolves

5706 - 3 Mile Road
Racine, Wisconsin 53406

Timber Wolf Alliance

Sigurd Olson Environmental Institute
Northland College
Ashland, Wisconsin 54806
twan@northland.edu

Timber Wolf Information Network

Waupaca Field Station
E110 Emmons Creek Road
Waupaca, WI 54981
www.timberwolfinformation.org

Timber Wolf Preservation Society

6669 S. 76th St.
Greendale, WI 53129
414-425-6107

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