Wolf Restoration in the Adirondacks?

The Questions of Local Residents

BY ANGIE HODGSON

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COVER PHOTOS
Top left: Bill Weber/WCS
Top right: Liza Graham/WCS
Bottom: Art Wolfe

This issues paper was prepared by Angie Hodgson, M.S., North America Program Assistant for the Wildlife Conservation Society. Her research has included field studies of mammal and bird predators in California, New Mexico and the Adirondacks.

Foreword

Few creatures evoke more powerful feelings than the wolf. For many people, the species is a spiritual totem, a vital symbol of all that is good in wild nature; for others it is the consummate predator, combining strength, endurance, intelligence and cooperation in the pursuit of elusive prey. Still others see the wolf as a direct threat to humans and domesticated animals, and its reintroduction as a symbol of unwanted government intervention.

Earlier this year, I sat on a hill above Yellowstone's Lamar Valley and watched for nearly two hours as a pack of wolves ran down a herd of elk, played along the riverbank in apparent celebration, and then fed peacefully until sundown. In twenty-five years as a conservation professional, including many years in Africa, it was among my peak wildlife experiences. It also left me convinced that the return of the wolf to Yellowstone is unquestionably for the good: for the ecosystem, for the wildlife community, and for the American people.

I believe that we should do everything possible to help wolves re-occupy their former range wherever possible, including the forests of my native northeastern U.S. Yet we owe it to ourselves and to the wolves to not just follow our hearts, but also use our heads: to consider whether wolf recovery in a particular area is biologically, culturally and politically feasible.

One area proposed for wolf reintroduction in the northeastern U.S. is New York's vast Adirondack Park. Covered with mixed hardwood forest, interspersed with thousands of lakes and wetlands, the Adirondacks occupy more than six million acres of mountainous terrain in northern New York. The region includes a 50,000 acre tract of old-growth forest and the largest roadless area east of the Mississippi, yet it is also home to nearly 130,000 people. In fact, while 43% of the land is state-owned, more than half of the Adirondack Park remains in private hands. The result is a century-old experiment in the complexities of multiple-use management that has yielded more successes than failures.

The Wildlife Conservation Society (WCS) supports more than 260 projects in 53 countries around the world. In the Adirondacks, we have been working with a variety of partners -- private landowners, public agencies, commercial timber companies, local conservation groups, and independent researchers -- to better understand key issues and reduce remaining conflicts over land and wildlife management. Over the past year, a proposal to reintroduce wolves to the Adirondacks has emerged as one of the most exciting, and potentially divisive, issues confronting the region.

This WCS Working Paper attempts to provide an objective, comprehensive review of issues concerning the potential for wolf recovery in the Adirondack Park. It draws on the best available published information on wolf behavior and ecology, as well as the growing experience with wolf reintroduction in other parts of the U.S. More importantly, it responds to the concerns of a broad range of Adirondack residents who would be most directly affected by the wolf's return. These concerns are compiled and addressed in a very open, accessible format by author and Adirondack researcher Angie Hodgson. The Wildlife Conservation Society is very proud of this effort and we hope that it helps to inform and advance the debate over wolf recovery and reintroduction in the Adirondacks.

Bill Weber — *Director, North America Program*

WCS Working Paper Series

The Wildlife Conservation Society (formerly the New York Zoological Society and its field division, Wildlife Conservation International) has been dedicated to understanding and protecting the earth's wildlife and ecosystems since 1895. The Wildlife Conservation Society (WCS) has the largest field-based research staff of any international conservation organization, and currently operates more than 250 field projects in over 50 countries throughout Africa, Asia, Central America, South America, and North America. WCS scientists have conducted pioneering, long-term field studies; played direct roles in establishing over 100 national parks and reserves; trained conservation professionals in developing countries; helped to strengthen the local institutions in which they work; and contributed key ideas to on-going debates about resource management and conservation.

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Jenkins, Jerry (1997) Hardwood Regeneration Failure in the Adirondacks: Preliminary Studies of Incidence and Severity. *WCS Working Paper No. 9* (59 pp.)

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Acknowledgments

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For the preparation of this report I am indebted to the participants of the Oswegatchie Roundtable and the residents of the Adirondack region for their honest and insightful conversations. I would like to offer special thanks to Jim Frenette, Lloyd Moore and Don Potter for their help in introducing me to many Adirondack residents who took the time to share their concerns and questions with me.

Thanks to Dennis Faulknham and Dave Smith, Region 6 DEC, for providing me with technical information about wildlife populations and wildlife management policies in the Adirondack Region.

Figure 1.1, showing the potential for natural wolf recovery in the Northeast, was prepared and provided by Dr. Dan Harrison and Ted Chapin, University of Maine.

A special thank you to Doug Smith for taking the time to answer my questions about beaver biology, wolf biology and the Yellowstone wolf reintroduction program, and to Mike Phillips for providing me with technical information on the Yellowstone, Central Idaho and North Carolina wolf reintroduction programs.

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Introduction and Methods

The idea for this paper evolved from the discussions of the Oswegatchie Roundtable, a group of local Adirondack landowners, government agency personnel, timber company representatives and conservation organizations and researchers, that meets informally to consider issues affecting the Northwest Adirondacks. During the past year, discussions about wolves and the potential for wolf recovery have received increased attention in the Adirondack region: a national conference about wolves was held in Albany, an opinion survey reported that many Adirondack residents support wolf recovery, local newspapers have written stories and printed Letters to the Editor and local town and county governments have voted on wolf resolutions. Some people have praised wolf recovery, others are adamantly against it. The debate over wolf recovery in the Northeast will ultimately be joined by voices from the national sphere, but central to all of this activity are the residents of the Adirondacks, many of whom have concerns and opinions about the recovery of wolves and questions to which they would like answers.

The goal of this paper is to 1) present many of the Adirondack concerns and questions about wolves, and 2) to provide summarized information to help answer some of the questions. It is based on discussions with Adirondack residents - including environmentalists, land owners, hunters, farmers, business people, timber companies, local government officials, and land managers - who in turn provided us with their questions and concerns. Where there appears to be a wealth of information already available, we have included preliminary answers that help to address local questions, but many questions have been referred to future research.

It is our hope that bringing these concerns to the forefront will lead to a more open and informed discussion among everyone and provide an objective basis for looking at the feasibility of wolf recovery in the Adirondacks.

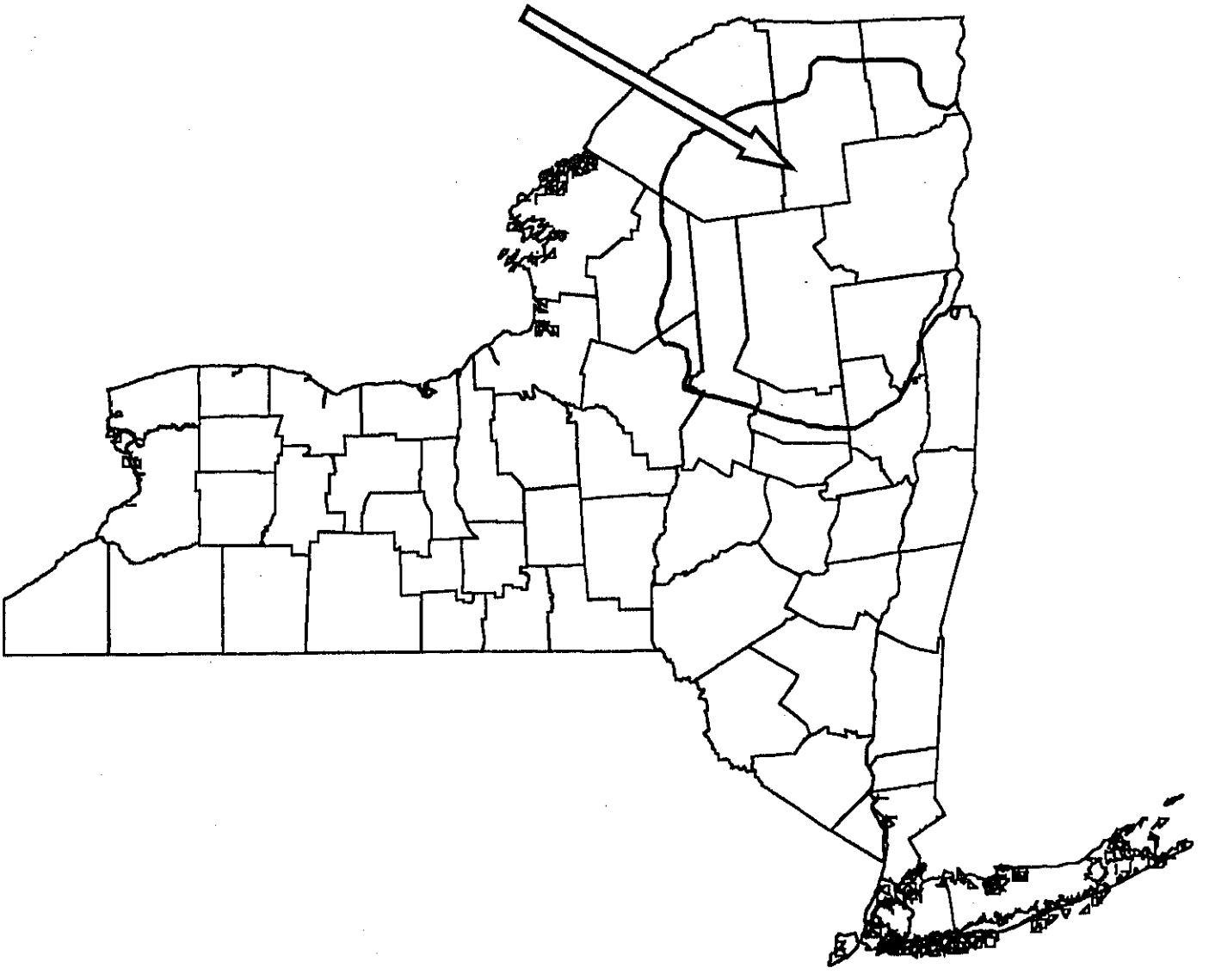
Organization of this Issues Paper

1) Questions have been organized under 13 chapter topics and following each question is a summary of information that is currently available to begin to answer the question.

2) Gray text boxes outline particular concerns and questions of Adirondack residents which can not be fully addressed by available information and which will require further research and inquiry.

3) At the end of each chapter is a list of Information Sources where details and data presented in the chapter can be found.

The Adirondack Park



Executive Summary

Wolves have returned to some of their former range in the lower 48 states by one of two processes: wolves have dispersed naturally from populations in Minnesota and Canada and established new populations in Wisconsin and Michigan, and wolves have been reintroduced by humans in North Carolina, Yellowstone and central Idaho, and soon in Arizona. In each place biologists and decision makers have examined many of the same issues - Is there a prey base that can support wolves? Are local communities tolerant of the presence of wolves? Will wolves have any negative impacts on local communities or local ecosystems? Will they have positive impacts?

With the successful recovery of wolf populations in other parts of the country, many look to the Northeast and the Adirondacks as the next potential home of the gray wolf. The conservation organization Defenders of Wildlife is slated to begin a feasibility study of the potential for wolf recovery in the Adirondacks in the near future and other groups are proposing to ask the federal government to study the feasibility of wolf recovery in all of the northeastern states. Much has been learned about wolves and wolf recovery from similar studies completed before previous wolf reintroductions but still there are biological, political, geographical and sociological conditions unique to the Adirondacks which require an objective look at this region, its inhabitants and the potential for wolf recovery.

The Adirondack Region and Wolf Recovery

Many of the most widely discussed issues surrounding wolf recovery in the Adirondacks revolve around three major themes: Can wolves be integrated into the Adirondack region's unique mix of public and private lands? Is there sufficient prey to support a viable and potentially isolated population of wolves? How would wolves interact with or affect current Adirondack wildlife populations, specifically deer, beaver and coyote populations?

A Unique Mix of Public and Private Land. The Adirondack State Park is a 6 million acre mix of state and private land and home to 130,000 people. All of the public land (about 40% of the park area) is protected by one of the strongest land preservation laws in the country. The "Forever Wild" law, established by the New York State Constitution in 1894, prohibits the cutting of trees on public land within the Adirondack Park and the lease or sale of these lands by the state. In addition, private lands within the park are under the jurisdiction of the Adirondack Park Agency and are subject to development and land-use regulations designed to preserve the integrity of the Adirondack wilderness.

Wolves have recovered and do reside with few human-wolf conflicts in areas with a mix of public and private land ownership, such as Minnesota, Wisconsin and Michigan. The land-use patterns and land-use laws in the Adirondack Park, however, have given rise to unique situations that could influence the potential for wolf recovery, including the following:

Much of the state land has been off limits to logging for 100 years and now contains mature forest - a habitat type not preferred by deer. There are higher deer densities, and therefore a better wolf prey base, on private lands within and on the periphery of the Adirondack Park, largely due to the greater amount of early successional forest in these areas.

The mix of state and private lands within the Adirondack Park, with no federal lands raises questions about which agencies would have jurisdiction over a wolf recovery program and who would pay for the program.

Prey Availability. Wolves can survive in an area where there is tolerance by local residents and an available prey base. In the Adirondacks, the primary prey species would be deer. There has never been a complete and rigorous park-wide study of the distribution and density of deer in the Adirondacks, so specifics about deer numbers are unavailable but general trends in deer abundance are known.

The total number of deer in the Adirondacks has declined from highs in the 1950's and 1960's. This was largely due to severe winters in the late 1960's, the maturation of much of the forest habitat, and possibly increased predation by coyotes and black bears. During the same period deer densities in the peripheral regions around the park have greatly increased as farmland has been abandoned. Timber operations and winter feeding on private lands within the Park have kept deer densities higher than densities on public land.

So a complicated scenario emerges. If wolves did once again inhabit the Adirondacks, there would be some prey available on public lands, but most agree that prey densities are higher on private lands and beyond the Park boundary. Most large private land owners in the Adirondacks lease their lands to hunting clubs and use the revenue from lease agreements to help pay state property taxes. Hunting leases are long-standing relationships between private land owners and hunting clubs, and the clubs are usually allowed to build cabins on leased lands, they are given access to gated areas and they are allowed to enhance the resident deer population through winter feeding programs. Many hunting club members have reservations about a potential reintroduction of the wolf, because it is another deer predator that may reduce herd densities on the lands that they lease. Likewise, private land owners are hesitant to support proposals that they feel could lead to the loss of hunting club lessees, because they depend on lease revenues to help relieve their tax burdens.

In the absence of human intervention, the deer population in northern New York could support wolves. The questions that remain, however, include: Is there enough suitable habitat in northern New York to maintain a viable isolated wolf population in the long term? Will local residents be willing to tolerate wolves on private lands both within and on the periphery of the park? If not, would those who support wolf recovery also support control programs in areas where wolves are not welcome?

Coyote - Wolf Interactions in the Adirondacks. The coyote began to expand its range into New York in the 1920's and became well established in the Adirondacks in the 1940's and 1950's. Today Adirondack coyotes are large (regularly weighing 40 pounds, with some individuals reaching 70 pounds), prey primarily on deer and exhibit a pack structure. This situation leads to two often asked questions. First, if the Adirondacks are already home to one large, deer eating, pack forming dog-like predator, does it need wolves? Second, what would the relationship be between the relatively small eastern timber wolf (50 - 70 lbs. in Algonquin Park) and the eastern coyote?

One scenario would be that the eastern timber wolf would outcompete the eastern coyote and, therefore, the predation pressure on deer in the Adirondacks would remain nearly the same. A second scenario is that wolves would not outcompete coyotes, and competition for food and hybridization between wolves and coyotes could occur.

Some other often discussed issues included:

Why do people want wolves? - Wolves were once part of the Adirondack ecosystem and were eliminated by human hunting and control programs, so some feel it is our duty to return this species to its native habitat and thereby restore ecological balance and preserve the wild nature of the Adirondack Park. Others believe that wolves could be an important tourism attraction and economic benefit to the region.

Is it necessary to restore wolf populations if they are not endangered globally? - The wolf has been eliminated from 1/3 of its former range but 65,000 - 70,000 wolves still reside in Minnesota, Canada and Alaska.

Would wolves stay only on wild public lands? - Wolves are capable of dispersing great distances (500+ miles) and previous reintroductions have shown that they do not always remain in the area where they are introduced. In North Carolina, Minnesota, and Yellowstone flexible management plans allow the US Fish and Wildlife Service (or in some instances private landowners) to control or eliminate wolves that come into conflict with humans.

Would a wolf population in the Adirondacks ever be connected to other wild populations, and if not, would it be viable in the long term? - Estimates of prey abundance and available habitat show that in the absence of severe weather conditions and aggressive competition from other predators, 100 - 200 wolves may be able to inhabit the Adirondacks. Preliminary analysis of the amount of suitable habitat available in the area, however, shows that it is only about half that recommended by the US Fish and Wildlife Service as necessary to maintain long-term viability.

Do wolves hurt humans? - The U.S. Fish and Wildlife Service reports that there has never been a documented human death or serious injury caused by a healthy wild wolf since records began to be kept in the late 1800's.

Have wolves and coyotes hybridized and are coyotes in the Adirondacks already part wolf? - Genetic tests have shown that wolves in Minnesota and southeastern Canada have hybridized with coyotes. This is probably due to habitat changes that have favored the establishment of coyote populations in areas that were once exclusively occupied by wolves.

Where have wolves been reintroduced? - Red wolves have been successfully reintroduced to North Carolina and gray wolves have been reintroduced to Yellowstone National Park and central Idaho.

Who is in charge of wolf reintroduction?- The U.S. Fish and Wildlife Service has been the primary agency in charge of past reintroductions. All reintroductions, however, have been done on federal lands. Since the Adirondack Park consists of state and private land, involvement by and permits from the New York Department of Environmental Conservation would be required.

Are wolves compatible with the mix of public and private lands found in the Adirondacks? - The pattern of land ownership in the Adirondack park is much different than that found in the Yellowstone area and central Idaho, where 76% and 99%, respectively, of the land is federally owned. However, the pattern of land ownership may be quite similar to that found in Minnesota, where wolves have always resided and Wisconsin and Michigan, where wolves have recently re-established themselves.

What effect will wolves have on beaver populations? Beaver are an important secondary prey for wolves in many areas, often on a seasonal basis. Beaver are eaten by wolves most often in April and May. In Minnesota, beaver accounted for 20 - 47% of the prey taken by wolves in April and May but less then 10% of prey taken during the remaining months of the year. In Algonquin, beaver constitute 30% of the wolf annual diet. Beaver populations are mainly limited by habitat availability and wolves are not thought to have a great influence over beaver numbers.

Do wolves kill livestock? Wolves do prey occasionally on livestock but a very small fraction of the total number of livestock found within wolf range is lost to predation each year. For example, last year (1996) in Minnesota 74 of 232,000 cattle and 21 of 16,000 sheep were killed by a population of about 2200 wolves. During the first two years following wolf reintroduction in central Idaho and Yellowstone, wolves killed 20 sheep and 3 cows.

Would the costs associated with wolf reintroduction be offset by economic benefits to the region? Costs of wolf reintroduction The National Park Service budget for the management and monitoring of wolves during the first three years of the Yellowstone recovery program was about $335,000 annually. The average annual cost for red wolf reintroduction in North Carolina from 1986-1995 was about $285,000. Cattle losses in Yellowstone during the first two years following wolf reintroduction amounted to just over $2000 (paid for by a Defenders of Wildlife compensation fund). A potential Adirondack cost that is difficult to calculate at this time is loss of hunter revenue because of reduced prey numbers, though in other areas where wolves reside there has been no apparent loss of hunter revenue. Benefits of wolf reintroduction Wolves are a charismatic species that many people will travel and pay to see. In Algonquin Park, four public wolf howls per year attract 7,780 visitors to the park. In Minnesota, tourist expenditures attributable to the presence of the International Wolf Center in Ely, MN are calculated to be $725,000 per year. Challenges to developing wolf tourism in the Adirondacks include the difficult task of seeing wildlife in the Adirondack wooded landscape and the cost of establishing interpretive exhibits or programs devoted to wolves in the region.

Would there be changes in land and hunting regulations? In North Carolina, Yellowstone and central Idaho, wolves have been reintroduced as experimental/non-essential populations, therefore no legal limits to farming, logging or hunting can be imposed on private lands.

1. Wolf Reintroduction in the Adirondacks

Why do people want wolves in the Adirondacks?

People support the reintroduction of wolves to the Adirondack Park for many reasons. Some of those most commonly expressed included:

- the reintroduction of wolves would restore a natural part of the ecosystem and ensure maintenance of a natural ecological balance in the Adirondack Park
- the presence of wolves will give a truly wild character to the wilderness of the Adirondacks
- the Adirondack Park was established to preserve the cultural and natural heritage of the northern New York region, therefore, re-establishment of a wolf population would result in the protection of an important part of our natural heritage for future generations
- reintroducing wolves to the Adirondacks would finally undo a wrong that was perpetrated when wolves were eliminated by humans in the late 1800's
- the reintroduction of wolves would provide many with a chance to see or hear a wolf in the wild in New York
- the reintroduction of wolves would increase tourism expenditures and be an economic benefit to the Adirondack region
- many people have great affection for wolves and would feel better knowing that wild wolves again roamed the Adirondacks

Why are people opposed to wolves in the Adirondacks?

Some of the most commonly expressed reasons for opposing the reintroduction of wolves to the Adirondacks included:

- wolves would deplete the deer population
- there would not be enough prey available to sustain a viable population of wolves
- wolves would kill livestock and result in economic losses for area farmers
- wolves would harm humans

- the reintroduction of wolves is only the first step in a plan to eventually eliminate hunting from the Adirondacks

- a reintroduction of wolves would result in more Park regulations and/or the purchase of more land by the state

- reintroduction of wolves could lead to other cascading ecosystem changes (e.g. increases or decreases in other Adirondack animal and plant populations

- the reintroduction of wolves would be an expensive project paid for by taxpayers or hunters

- money and resources invested in the reintroduction of wolves could be better spent on other ecological problems currently found in the Adirondacks

Is reintroduction the only way to restore a population of wolves to the Adirondacks or can the wolf population recover on its own?

In March, 1997, a Wildlife Conservation Society report entitled An Assessment of Potential Habitat for Eastern Timber Wolves in the Northeastern United States and Connectivity with Occupied Habitat in Southeastern Canada by Dr. Dan Harrison and Theodore Chapin provided the first assessment of the potential for *natural* wolf recovery in New England and New York. A Geographical Information System (GIS) was used to map all of the areas in New York and New England that met the established criteria for core wolf habitat and dispersal habitat (Figure 1.1) and then an assessment was made about the potential for wolves to disperse into these areas from eastern Canada. Criteria for potential core wolf habitat and potential dispersal habitat were established after long term research on wolves in the Midwest. Those studies have shown that core wolf habitat is most likely to be in forested areas with road density less than 1 mile of road per mile^2 (0.7 km of road/km^2) and human density less than 10 humans per mile^2 (4 humans/km^2). Potential dispersal habitat is defined similarly except the criteria for human density is relaxed to include areas with human density up to 26 humans per mile^2 (10 humans/km^2).

Currently, there is a population of wolves in Quebec approximately 45 miles from potential core wolf habitat in Maine and another population in Laurentides Provincial Park approximately 90 miles from core wolf habitat in Maine. The nearest Canadian population of wolves to potential core wolf habitat in the Adirondack region of New York occurs about 140 miles away in southern Ontario.

Figure 1.1 shows that the potential for dispersal of wolves from Canada to Maine may be greater then the potential for them to disperse into New York. Two corridors of land with low human and road densities link potential wolf habitat in Maine with the current wolf range in Quebec. In contrast, the Adirondacks appear to be surrounded by areas with higher population and road

densities, including a four-lane highway on the Canadian side of the St. Lawrence River. Table 1.1 shows the total amounts of potential core and dispersal habitat that were identified in each state in New England and New York. For this preliminary analysis, no information on prey availability was included in the criteria for determining potential habitat.

Criteria for determining potential wolf core and dispersal habitat are dependent on the tolerance of humans for wolves. If residents of the Northeast are more tolerant then residents of the Midwest it is possible that wolves could move through or inhabit areas that were not identified in this study. Likewise, if residents of the Northeast are less tolerant of wolves then residents of the Midwest, wolves may not be able to inhabit or move through the areas that were identified. The ultimate factors determining the feasibility of wolves once again inhabiting the Northeast will depend on availability of adequate prey and the political and social acceptability of wolves. As a first step this study has shown that the potential for natural recovery of wolf populations is probably greater in Maine then in New York, but now biologists must look at the corridors that were identified to see if they may actually facilitate animal movements.

Table 1.1. The estimated amount of potential wolf habitat found in 7 Northeastern states (table from Harrison and Chapin, 1997).

Region	**Potential Core Habitat[1] (miles^2)**	**Potential Dispersal Habitat[2] (miles^2)**	**Total Potential Habitat (miles^2)**
Maine	17264	1793	19057
New York	5710	2130	7840
New Hampshire	1793	477	2270
Vermont	965	559	1524
Massachusetts	20	40	60
Connecticut	0	0	0
Rhode Island	0	0	0

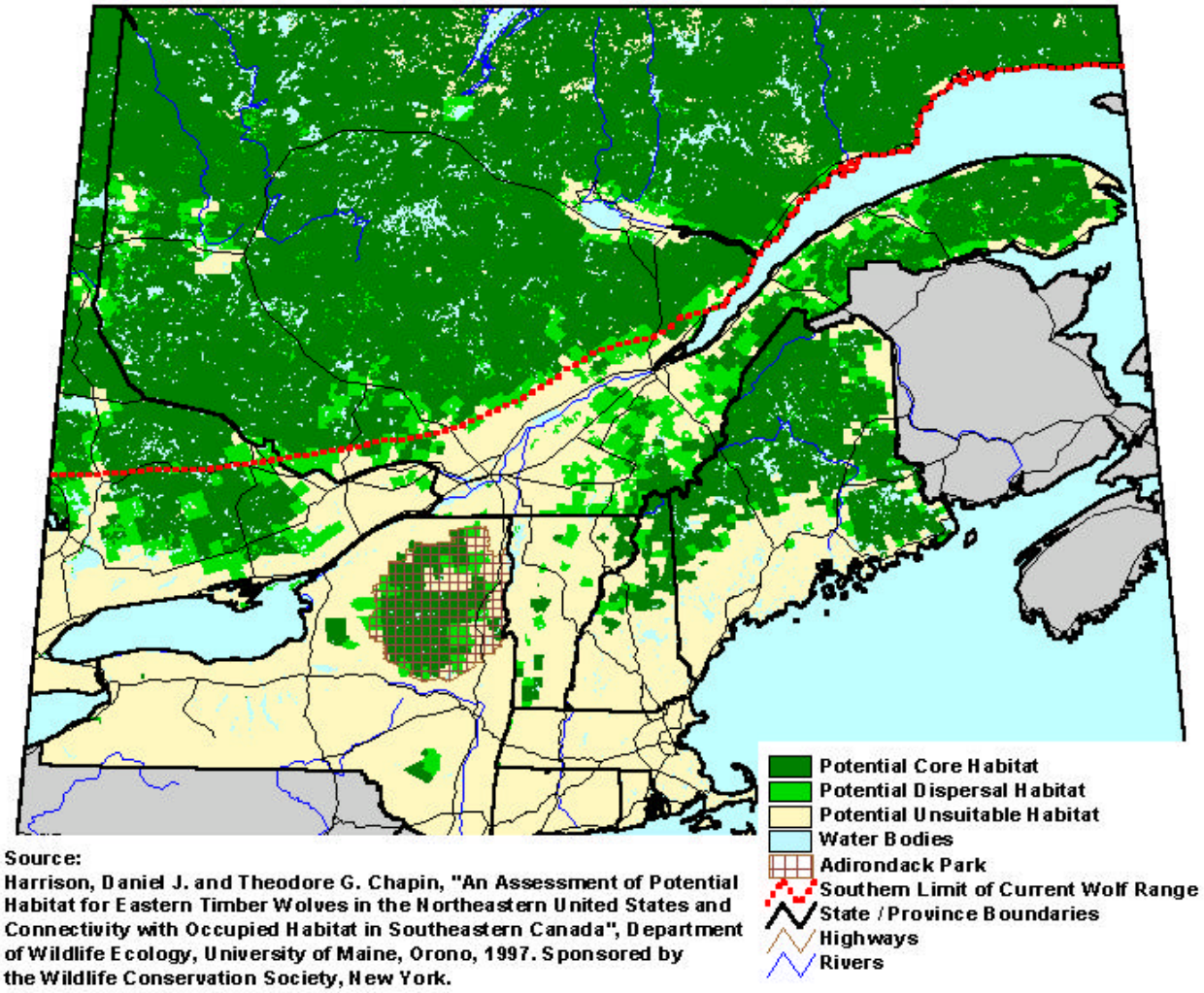
[1] Criteria for potential core wolf habitat - 1) forested and 2) less then 1 mile of road per mile^2 and 3) less then 10 humans per mile^2

[2] Criteria for potential core wolf habitat - 1) forested and 2) less then 1 mile of road per mile^2 and 3) greater than 10 but less then 26 humans per mile^2

Information Sources

Harrison, D.J. and T.G Chapin. 1997. An assessment of potential habitat for eastern timber wolves in the northeastern United States and connectivity with occupied habitat in southeastern Canada. Working Paper No. 7, Wildlife Conservation Society, Bronx, NY.

Figure 1.1 (opposite page). Distribution of potential core and dispersal wolf habitat for eastern timber wolves in northeastern North America. Criteria for potential core habitat: 1) forested, 2) less then 1 mile of road per mile^2 (0.7 km road/km^2) and 3) less then 10 humans per mile^2 (4 humans/km^2). Criteria for potential dispersal habitat: 1) forested, 2) less then 1 mile of read per mile^2 (0.7 km road/km^2) and 3) greater than 10 but less then 26 humans per mile^2 (10 humans/km (0.7 km road/km^2).



Source:
Harrison, Daniel J. and Theodore G. Chapin, "An Assessment of Potential Habitat for Eastern Timber Wolves in the Northeastern United States and Connectivity with Occupied Habitat in Southeastern Canada", Department of Wildlife Ecology, University of Maine, Orono, 1997. Sponsored by the Wildlife Conservation Society, New York.

2. Wolves in the Adirondacks

What is the historic range of the wolf in the United States?

As recently as 150 years ago, wolves were found in all of the lower 48 states and they occupied any habitat where large hoofed prey (moose, elk, deer, bison, mountain sheep) were present, including Eastern forests, the Great Plains, Western mountains and Southwestern deserts. The availability of food was the main factor determining the suitability of habitat for wolves.

Why are wolves gone from much of their historic range?

Because wolves were perceived as a threat to livestock, the first government sponsored wolf control program began in colonial Massachusetts in 1630. During the following three centuries, wolf control programs spread throughout the U.S.. Direct killing of wolves by humans and indirect "take" of wolves through habitat alteration and depletion of prey populations led to the decline of the wolf throughout the lower 48 states. Wolves are thought to have been eliminated from the Northeast by 1900. By 1960, the only remaining breeding wolf populations in the lower 48 states occurred in northeastern Minnesota and on Isle Royale in Lake Superior.

Why were humans able to kill off the wolf within almost all of its range in the lower 48 states but they were not able to eliminate coyotes, even though efforts were often just as great (and continue today) to remove this predator? There may be a number of contributing factors including: 1) The more structured social system of the wolf may make them less resilient to large reductions in their populations. Research has shown that if greater then 35% of a wolf population is killed off every year the total population will decline. 2) Coyotes have been shown to produce larger litters when their numbers are reduced in an area. Therefore, they are better able to compensate or "bounce back" from a human caused reduction in their numbers 3) Coyotes are not as reliant on larger prey such as deer, and therefore are able to survive on a more varied diet of smaller mammals, fruits and vegetation if prey species were depleted by overhunting.

Are gray wolves endangered?

The gray wolf is not endangered globally. There are approximately 60,000+ wolves in Canada, 5000-8000 in Alaska and 2400 in Minnesota, Wisconsin and Michigan. Wolves, however, have been exterminated from approximately one-third of their former range in North America (Figure 2.1). In the U.S. wolves are listed as federally Endangered under the Endangered Species Act in

every one of the lower 48 states, except for Minnesota where they are listed as threatened. Therefore, the US Fish and Wildlife Service is charged under the Endangered Species Act with devising a plan for the eventual recovery of each subspecies of wolf which once inhabited the lower 48 states, including the Northern Rocky Mountain Gray Wolf, the Eastern Timber Wolf and the Mexican Wolf.

Were wolves historically found in the Adirondacks?

Wolves were historically found throughout the New York but wolves and humans came into conflict almost immediately after the first colonist stepped ashore. Early settlers on Long Island perceived the wolf as a threat to their livestock and wolves were exterminated from Long Island in the 1600's. By the mid-1800's the eastern timber wolf was only found in the northern mountainous areas of New York and the last confirmed wolf in New York State was killed in the Adirondacks in the 1890's.

What was the historic population of wolves in the Adirondacks?

Historically, wolf density was largely based on the availability of food (see biology section of this paper for a more detailed discussion of this topic). In areas of the Northeast where deer densities were higher, wolf densities would have been higher. Deer achieve their highest densities in areas with abundant early successional forest and/or human created edge. For example, the density of deer in some suburban communities in New Jersey may be as high as 50 deer per mile^2. The pre-lumbering forest in the Adirondacks was largely a mix of various mature or old growth forest types not considered good habitat for deer. Natural disturbances such as blowdowns and fire created periodic forest openings but the total amount of forest in early successional stages was probably small. Therefore, by today's standards, deer densities in the Adirondacks were probably low, but moose were also found in the Park. Therefore, an estimate of both historic deer and moose densities would be needed to estimate historic wolf density..

Are there currently wolves in the Adirondacks?

There has not been an officially confirmed wolf in the Adirondacks since the 1890's, but potential sightings of wolves continue to be reported by some hunters, trappers and residents. In addition, large coyotes (50 - 70 lb.) are periodically killed in the Adirondacks and there currently exists a potential for the misidentification of a large coyote as a wolf or vice versa.

Many supporters of wolf reintroduction point out that this animal was removed from almost all of its range in the lower 48 states because of direct killing and depletion of prey by humans. In a time of expansive development and shrinking natural habitats throughout much of our country, it may be our duty to preserve as many native species as possible. The Adirondacks are already a unique repository of our cultural and natural heritage, protected and regulated by New York laws. The wolf would be one more piece of our heritage preserved there.

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Figure 2.1. Approximate former (black line) and current (gray line) southern limit of the gray wolf(Canis lupus) range in North America

3. Questions About Wolf Biology

Note:

Wolves still range over a large geographic area in North America, though their range is very limited south of Canada. Wolf behavior and biology is influenced by the habitat in which they are found and the types of prey that are available to them. To understand wolf biology, as it pertains to a potential reintroduction to the Adirondacks, it is best to look at the biology of wolf populations in areas which have similar habitat and prey species. Therefore, though much research has been done on the biology of wolves in the arctic and mountainous regions of Alaska and Canada, this information is largely excluded from the following discussion. Instead, *information available from studies of wolves in southeastern Canada and the Great Lakes region of the U.S. is used whenever possible to answer the questions below*.

Do wolves hurt humans?

The U.S. Fish and Wildlife Service reports that there has never been a documented human death or serious injury caused by healthy wild wolf since records began to be kept in the late 1800's. In contrast, several humans are killed by domestic dogs, pet wolves or wolf-dog hybrids each year.

What do wolves look like and what do they weigh?

Wolves are the largest members of the dog family (canidae) which includes 35 species worldwide such as foxes, the coyote and the domestic dog. Wolves can measure 4.5 to 6.5 feet long, from nose to tip of tail, and stand 26 - 32 inches high at the shoulder. The coat color of wolves can vary greatly and includes cream, reddish, gray and black. In Minnesota and southern Ontario, most wolves are reported to be gray but black wolves are also present.

Adult male gray wolves generally weigh 60 - 120 pounds and females weigh 50 - 95 pounds. The weight of the wolf varies across its range. The largest recorded wolf was found in Alaska (adult male = 175 pounds). The smallest wolves in North America are the eastern timber wolves of Algonquin Park in Eastern Ontario where males average 65 pounds and females 53 pounds. Adult male wolves in Yellowstone National Park weigh 100 - 120 pounds and adult female wolves weigh 90 - 95 pounds.

How does the size of a wolf compare to that of a coyote?

Adirondack trappers and biologists have reported that eastern coyotes may often weigh up to 40 pounds, with some adults reaching 50 to 60 pounds. There have also been reports of 70 pound coyotes in the Adirondacks. The weight of coyotes in eastern Ontario usually ranges from 29 - 40 pounds for males and 26 - 33 pounds for females. Western coyotes are known to be smaller then those found in the east. The average weight of coyotes in the Yellowstone Park area is 25 pounds.

How many wolves are in a pack and are these wolves related?

Most wolf packs usually consist of 2 - 8 wolves, though larger packs of up to 21 wolves have been observed. The average wolf pack size in Algonquin was 6 members but may range as high as 13. A wolf pack usually consists of a breeding pair, their pups from that year and possibly some other adult wolves which are often related. About half the members of a typical wolf pack are pups. Lone wolves or wolf pairs without territories are also present in any wolf population and they may comprise anywhere from 2 - 29 % of the total population.

Do all wolves breed and how many pups are born per year?

In Minnesota, wolf packs usually have only one breeding female (the alpha female) though there may be other females in the pack of breeding age that do not breed. Some large wolf packs in Canada and Alaska may have more than one female who gives birth to pups each year, but this is rare for wolf packs in the Midwest. Wolf packs in Yellowstone have recently been found to have more than one breeding female. The breeding female has a single litter of pups during mid- to late-April. The average number of wolf pups per litter is 4 - 7.

What type of habitat will wolves live in?

Historically wolves occupied many types of habitat which contained hoofed prey that they could eat, including deer, elk, moose, bison and mountain sheep. The type of vegetation present made little difference in their ability to survive. In much of wolf range, den sites are usually located in forests but no studies have found that den sites are a scarce or limiting resource. Den sites in Minnesota are usually ground excavations, but other types of dens such as hollow logs, caves or old beaver lodges have been used. Beginning in mid- May, wolves move pups to rendezvous sites, which they use until October. A wolf pack may use up to 10 rendezvous sites in a year and these sites are usually associated with a nearby food source.

How large a territory do wolves occupy?

The average territory size for a pack of wolves who feed primarily on white-tailed deer in Minnesota and Wisconsin is 42 - 100 miles^2, but territory size may range up to 200 miles^2. The average territory size for wolf packs in Algonquin who feed on deer, moose and beaver is 58 miles^2. Almost all of the variation in territory size is due to deer density. Fuller (1989) presented the following formula to predict wolf pack territory size based on deer density:

Territory Size = 110.7 - 3.98 x deer density

Therefore, if deer density is 10 deer/mile^2 then wolf pack territory size will be approximately 71 miles^2. There is usually little overlap in pack territories.

Do wolves ever move outside their territories?

There are two types of movements that wolves may make away from their territories. A temporary excursion occurs when a wolf leaves its territory but returns at a later time. A dispersal occurs when a wolf leaves its territory but does not return because it either dies or settles elsewhere. Most forays and dispersals are made alone. In Minnesota, temporary excursions away from the territory were made by 1 - 20 % of adults and 0 - 30 % of yearlings in any month. Pups may begin dispersing from where they were born when they reach 9 - 12 months old, but over half of the wolves that permanently disperse do so between 1 and 2 years of age. Yearlings and pups in Minnesota often disperse from October through March.

How far will wolves move outside of their territories or disperse?

In Minnesota, temporary excursions away from the territory averaged 10.6 miles and ranged from 3 - 66 miles. Dispersing wolves may move a few miles from where they were born or they may disperse 50-100 miles. One wolf from Minnesota is known to have dispersed 550 miles.

In a recently re-established population of wolves in Wisconsin the average dispersal distance was 71 miles and the longest dispersal movement was recorded for a yearling female that traveled 300 miles from north-central Wisconsin to southern Ontario.

Released wolves in Yellowstone settled an average of 15 miles from their acclimation pens but some individuals traveled up to 125 miles from their pens. Wolves in central Idaho settled at an average of 50 miles from their release sites (see Reintroduction chapter for a description of different methods of release used in Yellowstone and central Idaho.)

Wolves are known to be capable of dispersing large distances. If wolves were reintroduced to the Adirondacks would they be allowed to disperse on to private lands in the park? on to private lands outside the park? on to all public lands? See chapter on Chapter 5, *Wolf Reintroductions,* for information on how this problem is being handled in North Carolina, Yellowstone and central Idaho.

Will wolves live close to humans? Do wolves need "Wilderness"?

The only limits to wolf distribution and density are the amount of hoofed animals available to eat and the tolerance of humans to their presence. Wolves are often associated with wilderness areas with low human and road densities. Therefore, human density and road density are key criteria used in determining potentially suitable habitat for wolves. Wolves do not choose to live only in wilderness areas, but it is in these areas that wolves are not subject to human caused mortality. Road density is a limiting factor to wolf range expansion chiefly because roads allow access for people who may deliberately or accidentally kill wolves (while hunting). In addition, where there are greater densities of roads there is an increased chance of wolf deaths caused by collisions with vehicles and major highways may be barriers to wolf dispersal.

Minnesota

In Minnesota, wolves usually occur where road and human density are low. Most wolves occur in areas with less than 1 mile of road per mile^2 (0.7 km/km^2) and a human population density of less then 10 humans per mile^2 (4 humans/km^2). However, wolves can live wherever suitable prey is found and wherever they are protected from human caused mortality. A breeding pack of wolves now lives within 60 miles of Minneapolis, in an area surrounded by agriculture. As the wolf population in Minnesota continues to increase, wolves have dispersed south of Minneapolis, and into intensely farmed agricultural land in North and South Dakota, where there is little forest cover. Wolves in Minnesota are increasingly settling in semi-wilderness areas and contending with highways, traffic, human residences and habitat fragmentation

Wisconsin

A look at where wolves re-established themselves recently in Northern Wisconsin is instructive when trying to guess where wolves would potentially settle if reintroduced to the Adirondacks. Much of northern Wisconsin is covered in second growth forest. Land ownership is a mix of public and private, and the region includes two National Forests. The largest wilderness area in the state is 31 mile^2 and is itself divided into three parts by roads. Essentially, there are no large roadless areas in Wisconsin. Wolves began moving into Wisconsin from Minnesota in the 1970's. A recent analysis of preferred wolf habitat (Mladenoff et al. 1997) was conducted using a Geographical Information System (GIS). The known locations of radio-collared wolves in 14 packs in northern Wisconsin from 1979 to 1993 were mapped. This exercise showed that the

recovering wolf population tended to avoid agricultural areas and deciduous forest and favored conifer or mixed conifer-deciduous forest. Public lands, and in particular county forests that often contained an abundance of early successional forest, were preferred and private lands were avoided. Nearly all wolves occurred in areas where road densities were less than 0.72 miles of road per mile^2.

Deer densities in most areas in northern Wisconsin are greater than those commonly reported for the Adirondacks. County forests, where wolves are often found, are heavily managed for timber production and therefore include forest in early successional stages that is preferred by deer. In habitat with less available natural prey, would wolves still exhibit an avoidance of agricultural areas?

What do wolves eat?

In North America, large hoofed animals including white-tailed deer, mule deer, moose, caribou, elk, Dall sheep, bighorn sheep and bison are the primary food eaten by wolves. Even when alternate prey are available, hoofed animals usually constitute 75% of the wolf diet throughout the year. Beaver can provide a major alternative food source in the spring and summer months (April - August) and are usually more important in the wolf diet if beaver numbers are high relative to the deer population. In Minnesota the eastern timber wolf feeds primarily on white-tailed deer, beaver and snowshoe hare and in southeast Ontario the primary prey are moose, white-tailed deer and beaver.

In Minnesota, Fuller (1989) analyzed 2,386 adult and pup wolf droppings (scats) collected on trails and at den sites throughout the year in an area that contained no moose (Table 3.1). Deer were the most important food source and made up 45-91% of the diet during each month of the year. From April - October, an average of 7.2 fawns and 4.5 adult deer were consumed per wolf and from November - March an average of 3.8 fawns and 3.3 adults were consumed per wolf. The annual consumption of deer per wolf in Minnesota was 11 fawns and 7.8 adults or 18 deer per wolf per year. Of the deer taken during June and July, 32 - 69 % were fawns. Beaver constituted a high percentage of the wolf diet only in the spring. In the summer (June - July) the importance of beaver diminished and deer become more prevalent in the diet of wolves.

Even though small food items, such as rodents or berries are eaten by wolves, and therefore present in many of their droppings, the amount of food these items provide to a wolf is small. An individual wolf needs to eat a certain amount of biomass each year to survive. By comparing the percentage of biomass each type of prey provides to the overall diet of a wolf, it can easily be seen that deer provide the greatest amount of food for wolves (Table 3.2).

In Algonquin Provincial Park the diet of wolves has shifted dramatically over a 30 year period. In 1962, wolves ate 80 percent deer, 15 percent moose and 7 percent beaver. In 1992, their diet

consisted of 30 percent deer, 30 percent moose and 33 percent beaver. No evidence of fruit has been found in the diet of Algonquin wolves (data from Theberge et al. 1996a).

Table 3.1. The percent of adult and juvenile wolf droppings (scats) collected on trails or at den sites which contained the food items listed (from Fuller 1989). Dropping were collected in an area where deer were the only hoofed prey available (i.e. no moose).

	Percent of Wolf Droppings in which Food Item Occurred		
Food Item	Spring (April - May)	Summer (June - July)	Fall and Winter
Deer	45 - 71%	49 - 91 %	56 - 90 %
Beaver	20 - 47 %	2 - 5 %	3 - 22 %
Snowshoe Hare	5 - 8 %	2 - 9 %	4 - 8 %
Other mammals	1 - 2 %	2 - 8 %	1 - 5 %
Vegetation or Fruit	less than 1%	4 - 52 % *(see below)	1 - 20 %

* This high occurrence of fruit in the diet was due to a small sample of pup scats from a rendezvous site that had a high percentage of raspberries in them.

Table 3.2. The percent of yearly biomass eaten by a wolf population that consisted of the following prey items. For example, for some wolf groups 98% of the biomass eaten in a year consisted of deer (from Fuller 1989). Dropping were collected in an area where deer were the only hoofed prey available (i.e. no moose).

Food Item	% of yearly biomass
Deer	79 - 98 %
Beaver	0 - 19 %
Snowshoe Hare	2 - 3 %

What do coyotes in the Adirondacks eat?

Coyotes are known to eat nearly any animal, insects and fruits. However, research has shown that deer account for 70 - 80 % of the diet of coyotes in the Adirondacks.

How fast will a population of wolves increase?

If adequate food is available and wolves are protected from human caused mortality, wolf populations can increase by 15 - 46 % per year. If an average of 35% or more of a population of wolves dies per year, the wolf population will start to decline. If less than 35% of the population dies per year, the population will probably be maintained at its current level or increase.

Do wolves have any enemies? What are the current causes of death for wolves?

Natural causes of wolf death include starvation, accidents, disease and fighting between individuals. Human related causes of wolf mortality include legal and illegal shooting and trapping, incidental trapping, depredation control and vehicle accidents. Causes of death for wolves studied in Minnesota (1980 - 1986), Wisconsin (1979 - 1991) and Algonquin Park (1987 - 1994) are reported below (Table 3.3).

Table 3.3. The cause of death for wolves in Minnesota, Wisconsin and Algonquin Park.

	% of Deaths Attributed to Cause		
Cause of Death	Minnesota[1] (1980 - 1986)	Wisconsin[2] (1979 - 1991)	Algonquin Park[3] (1987-1994)
Shot	30 %	52 %	34 %
Killed by humans (unspecified cause)	21 %	10 %	---
Snared	12 %	---	21%
Hit by vehicle	11 %	---	5%
Killed by other wolves	10 %	10 %	3%
Depredation complaint	6 %	---	---
Disease	2 % (pneumonia)	13 % (canine parvovirus)	16 % (rabies) 8% (cap. myopathy)
Starved	---	---	11%
Unknown/Accident	8 %	24 %	3%

[1]Minnesota data from Fuller (1989)
[2]Wisconsin data from Wydeven (1995)
[3]Algonquin data from Theberge, J.B. et al. (1996a)

Do wolves have rabies?

Rare occurrences of rabies have been reported in some wolf populations, but little information exists about its effect on the population. Wolves are not considered a primary vector for rabies and probably most often contract the disease from arctic fox and red fox. Most cases of rabies in

wolves have been found in the arctic region and in Ontario. Since 1960 there have been 15 confirmed cases of rabies in Ontario. There has never been a documented case of rabies affecting a wild wolf in Minnesota, Wisconsin or Michigan, where about 2400 wild wolves now live.

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4. Wolf Genetics

What is the difference between a species and a subspecies?

The science of taxonomy attempts to group plants and animals into different hierarchies of classification based on similarities and differences in individual appearance and behavior. The term species is one of the most basic levels of classification. All the individual animals within a species can naturally interbreed with each other, but they are unable to breed and produce viable offspring with individuals from other species. For example, otters are not able to breed with mink. There are sometimes exceptions to this rule and these exceptions often arise when one species expands its distribution into the range of a closely related species. On some occasions these species may mate and produce viable offspring known as hybrids. This has occurred in the Midwest and Southern Canada, where coyotes have hybridized with eastern timber wolves.

The term subspecies is generally used to describe a geographically distinct population within a species. Individuals within a subspecies are usually thought to be more similar to each other in body size, body shape, behavior and genetics than they are to other members of the species. Members of different subspecies, however, are able to successfully breed and reproduce with one another. For example, Alaskan gray wolves can breed with Ontario eastern timber wolves.

What species and subspecies of wolf was once found in the Adirondacks?

Debate continues about the number of species and subspecies of wolves that originally inhabited North America. The classification presently accepted by the U.S. Fish and Wildlife Service recognizes two species of wolf in North America, the gray wolf *(Canis lupus)* and the red wolf *(Canis rufus).* The gray wolf is further divided into 24 subspecies. Under this classification scheme the wolves that once inhabited the Adirondacks are thought to have been of the subspecies *Canis lupus lycaon*, or more commonly known as the eastern timber wolf. The range of the eastern timber wolf stretched from northeast Minnesota across the Great Lakes and southeast Canada, east to the Atlantic Ocean and south toTennessee and North Carolina (see figure 4.2).

A recent study of gray wolf taxonomy in North America, however, divides the gray wolf into only 5 subspecies, as indicated in Figure 4.1. This proposed reclassification is presented by Nowak and Federoff (1995) who based their classification on the measured skull characteristics of approximately 600 adult male gray wolves. Under the new classification scheme most of the original 24 subspecies have been consolidated into one or two new subspecies occupying larger geographical areas, but the range of the eastern timber wolf *(Canis lupus lycaon)* has been reduced so that it only includes populations that are currently, or were once found, in southeast Canada, New England, New York and possibly as far south as Tennessee and North Carolina. Under this classification scheme the eastern timber wolf is currently extinct in the United States (see Figure 4.1).
Figure 4.1

Figure 4.1. Distribution of wolf species and subspecies in North America (chart from Nowak 1996)

Gray Wolf - 1. Canis lupus arctos (Arctic Wolf) , 2. Canis lupus baileyi (Mexican Wolf),
3. Canis lupus lycaon (Eastern Timber Wolf), 4. Canis lupus nubilis
5. Canis lupus occidentalis
Red Wolf - 6. Canis rufus

What is the importance of the number of recognized wolf species and subspecies?

To protect the full array of genetic diversity found throughout the range of a species, the Endangered Species Act allows for the protection of distinct species, subspecies and populations of an organism. This has given the US Fish and Wildlife Service the flexibility to only list those populations of a species in a particular geographic area that they feel are vulnerable, and to design recovery and management plans that address the concerns of a particular geographic area.

Currently, the classification officially used by the US Fish and Wildlife Service is the earlier version which recognizes 24 subspecies of gray wolves. Based on this classification a recovery plan for the eastern timber wolf *(Canis lupus lycaon)* was written, which outlined criteria for its eventual removal from the list of endangered species. Figure 4.2 shows the area recognized as the current range of the eastern timber wolf. Under the recovery plan the eastern timber wolf will be declared recovered in this range when

> an isolated population of at least 200 wolves is established greater then 200 miles from Minnesota and sustained for at least five years.
>
> or
>
> a population of at least 100 wolves is established within 100 miles of Minnesota (i.e. in the states of Wisconsin and Michigan) and sustained for at least five years.

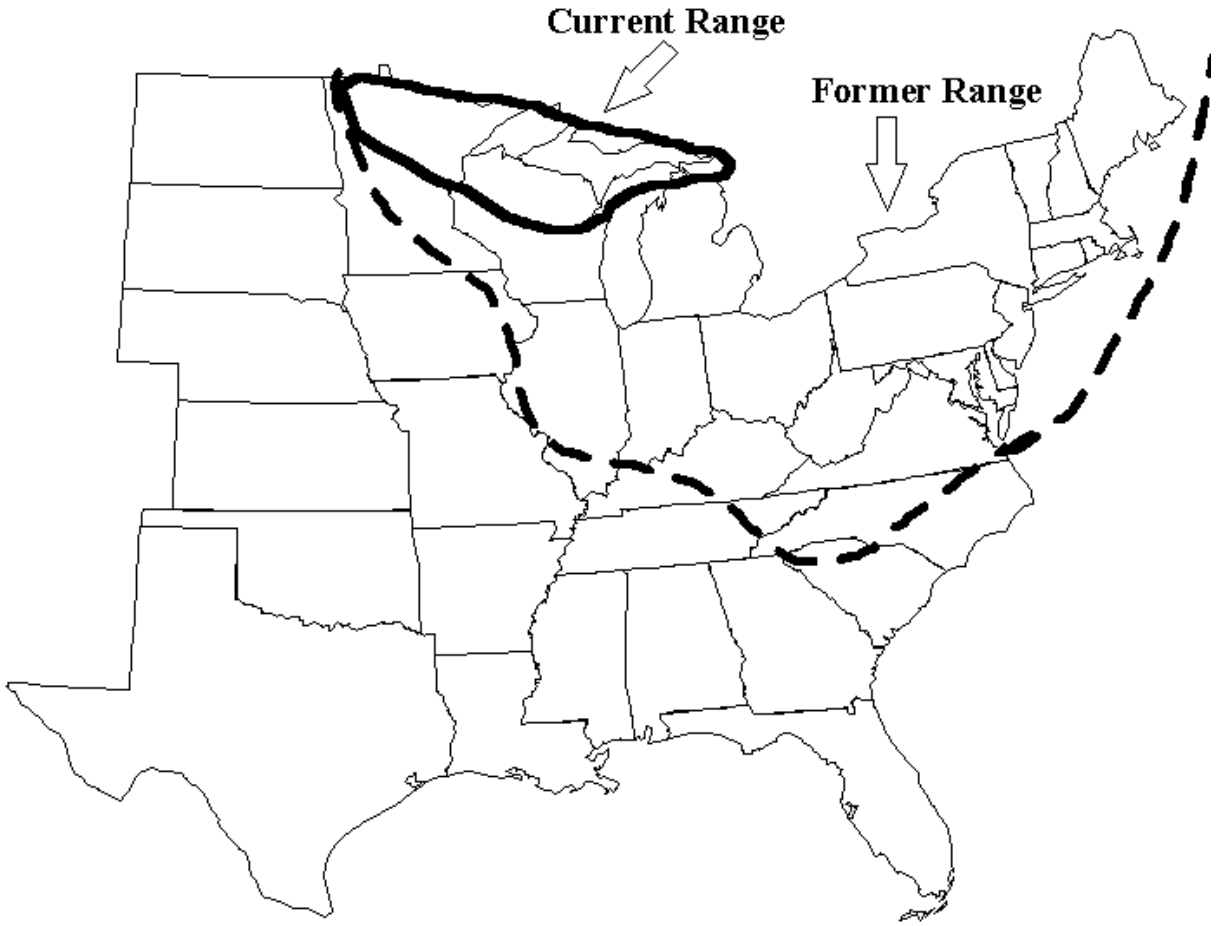
The estimated population of wolves in northern Minnesota is currently 2200. There are 160-180 wolves in Wisconsin and Michigan and it is expected that the recovery criteria for the eastern timber wolf will be achieved by the year 1998. When the species has been declared “recovered” it will be removed from the Federal endangered species list and shall remain removed from this list as long as population levels do not fall below those identified in the recovery plan.

If the new subspecies classification proposed by Nowak is accepted by the US Fish and Wildlife Service, the range of the eastern timber wolf *(Canis lupus lycaon)* would no longer include the wolves currently found in Minnesota, Wisconsin and Michigan. Those populations of wolves would be grouped with the Rocky Mountain wolves that currently occupy northwestern Montana, central Idaho and Yellowstone. Within the newly proposed range of the eastern timber wolf (*Canis lupus lycaon*) the only wolf populations that remain in North America would be in southern Ontario and Quebec, and the subspecies would be extinct in the U.S. Therefore, the U.S. Fish and Wildlife Service may have more of an incentive to develop a plan for the recovery of wolves in the northeastern U.S.

Has the wolf hybridized with coyotes?

In Minnesota and southeastern Canada, gray wolves are often found to contain mitochondrial DNA that is similar to that found in coyotes, suggesting hybridization between these two species.

Figure 4.2. Former (dotted line) and current (solid line) range of the Eastern Timber Wolf in the U.S. (using the US Fish and wildlife classification system).



Hybridization is thought to be common in southeastern Canada, where all wolves sampled

contained some coyote-like DNA. Hybridization between coyotes and gray wolves has (so far) only been found to occur in Minnesota and southeastern Canada and is probably partially the result of recent habitat changes that have favored the establishment of coyote populations in areas that were once exclusively occupied by wolves.

Hybridization between coyotes and red wolves in the southeastern U.S. was extensive during the early 1900's after human persecution and destruction of habitat forced red wolves into marginal habitats where they bred with coyotes. This was one factor which threatened the extinction of red wolves in the wild.

If wolves in Canada already contain some of the DNA of coyotes, many people wonder why a distinction needs to be made between these wolves and the coyotes that currently reside in the Adirondacks?

In defense of the uniqueness of wolves, Theberge et al. (1996) indicate that though the wolves in Algonquin do possess coyote genes, their behavior is still different from that of coyotes in southeastern Canada. The average pack size (6 wolves) and the average territory size (58 miles^2) of Algonquin wolves is larger then that of the eastern coyote, and the calls of wolves and coyotes are distinct from one another. One of the principal means, however, of distinguishing wolves and coyotes has been foraging habits. Southeastern Canadian wolves feed largely on moose, deer and beaver. Recent evidence in the Adirondacks indicate that deer constitute a major part of the coyote diet and beaver may also be a food source for coyotes. Is the coyote diet in the Adirondacks becoming more like that of the wolf in southeastern Canada?

Can the wolf hybridize with dogs?

Wolves and dogs can interbreed and produce hybrid offspring. The development of a wolf-dog hybrid is unpredictable, however, so its chances of surviving and reproducing in the wild are questionable. Dogs reach sexual maturity between 6 - 8 months of age, while wolves do not reach sexual maturity until 2-4 years of age. A wolf-dog hybrid may reach sexual maturity anywhere between these two extremes. Similarly, a female dog has two estrous cycles per year, whereas a female wolf has one precisely timed estrous cycle per year in February or March. A wolf-dog hybrid may have one or two estrous cycles per year.

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5. Wolf Reintroductions

Where have wolf re-introductions occurred?

For at least 35 years, biologists have been interested in reintroducing wolves to areas where they were once found but are not currently present. Two early attempts to reintroduce wolves to Alaska and Michigan were unsuccessful. In 1960 two pairs of wolves were introduced to a small island (Coronation Island, 28.5 mile^2) in the Alexander Archipelago of southeast Alaska. The wolves increased to 13 individuals by 1964 but caused a drastic decline in deer density on the small island. By 1968 the wolf population had declined to 1 due to a lack of food and wolves were presumed to be extinct on the island by the early 1970's.

In 1974, four wolves were released in Michigan's upper peninsula to determine if wild wolves that were moved to a new area would remain in that area. Within 8 months all the wolves were dead; three were shot and one was killed by an automobile.

Three recent reintroductions of wolves in North Carolina, central Idaho and Yellowstone National Park have been more successful. Wild wolves continue to roam at each of these three reintroduction sites and few negative impacts to the ecosystem or to the human residents have been observed. The goal of each of these projects was the same, to return wolves to the wild, but local logistics and resources required that different approaches be used in each case. These differences are detailed in the questions below. A fourth wolf reintroduction is scheduled to begin next year in the Southwest, where the Mexican wolf is to be returned to a site in the Blue Range Mountains on the Arizona-New Mexico border.

Why were wolves reintroduced?

<u>North Carolina</u>

When the population of a species reaches a level that is so critically low that it is in danger of imminent extinction, then one of the only possible alternatives for saving the species is to capture the remaining individuals, breed them in zoos and other facilities, and eventually reintroduce the offspring back into the wild. This method has been used to save such critically endangered species as the California Condor, the Black-Footed Ferret and the Red Wolf.

The red wolf *(Canis rufus)* is a separate species from the gray wolf *(Canis lupus)*, which once roamed the Southeastern U.S. from Pennsylvania south to Florida and west to the Mississippi River Valley and east Texas (see Figure 4.1). A study of the distribution of red wolves in the early 1970's revealed that they were very rare and that many red wolves were hybridizing with coyotes. To save the species from extinction, the last few wild red wolves were captured in Texas and Louisiana from 1973 to 1977 and placed in captivity. Only 17 of the 240 animals captured were

determined to be pure red wolves (the others were wolf-coyote hybrids) and over the next 10 years these animals were bred to increase the numbers in captivity. In 1987, the first captive red wolves were returned to part of their former range in North Carolina.

Central Idaho and Yellowstone

Though the gray wolf species is not endangered globally, they have been exterminated from approximately one-third of their former range. For recovery of the Northern Rocky Mountain Gray Wolf subspecies it was determined that the most efficient and feasible method was reintroduction of gray wolves into central Idaho and Yellowstone National Park.

What level of protection do reintroduced wolves receive?

Wolves reintroduced in North Carolina, central Idaho and Yellowstone were designated as "Experimental/Non-essential" populations under the Endangered Species Act, meaning that *no legal action could be taken to limit activities such as farming, logging or hunting because of the presence of wolves*. In 1982, an amendment to the Endangered Species Act created the Experimental/Non-Essential designation to encourage cooperation among stakeholders likely to be affected by reintroduction efforts. The Experimental/Non-Essential relaxes many of the restrictions on land use and human activity that are often associated with the presence of an Endangered Species. This rule allows most conflicts between humans and wolves to be resolved in a manner that does not change or restrict traditional rural lifestyles. A summary of what this designation has meant for previous reintroduction efforts is given below.

North Carolina
If local landowners suspect that a wolf has been involved in the killing of livestock they are required to contact the U.S. Fish and Wildlife Service or state conservation officers. These agencies are then responsible for capturing or killing any animals involved in livestock killings. Sportsmen that unintentionally kill a wolf during normal trapping or hunting activities are not prosecuted for the taking of an endangered species and anyone is allowed to kill a wolf in self defense (though there has never been a documented case of a healthy wild wolf attacking and seriously injuring a human).

Yellowstone and Central Idaho
On lands within the experimental recovery areas, landowners are allowed to scare away wolves in any manner that does not injure the wolf. All wolves that attack livestock are immediately trapped by Animal Damage Control trappers but if livestock owners see a wolf directly attacking livestock, they are legally allowed to kill the wolf. Again, any person attacked by a wolf is legally allowed to kill the wolf in self defense. There are no land-use restrictions on any private lands where wolves are found, even around den sites. On Federal lands, human activity is restricted from April 15 to June 30 within 1 mile of active den sites.

Who is in charge of wolf reintroduction?

As stated in the Final Environmental Impact Statement for reintroduction of wolves to Central Idaho and Yellowstone (1994), "The U.S. Fish and Wildlife Service is the primary agency responsible for the recovery and conservation of endangered species in the U.S., including the gray wolf." Therefore, in all attempts to recover an endangered species, the US Fish and Wildlife Service will play a significant role but the agency may work in collaboration with other state and federal agencies and private organizations in the design, management and monitoring of any reintroduction effort.

North Carolina

Management and monitoring of wolf reintroductions in North Carolina are the responsibility of the U.S. Fish and Wildlife Service.

Central Idaho and Yellowstone

The US Fish and Wildlife Service (USFWS), in consultation with the National Park Service and the US Department of Agriculture Forest Service, prepared the Final Environmental Impact Statement (EIS) on wolf reintroduction to central Idaho and Yellowstone National Park. In Idaho the management and monitoring of reintroduced wolves is the responsibility of the Nez Perce Tribe and the USFWS. Wolves in Idaho have remained largely on land managed by the US Forest Service. The Idaho State Legislature has prohibited the Idaho Department of Fish and Game from becoming involved in wolf management in that state. Wolves in Yellowstone National Park are monitored by the National Park Service biologists. Montana law protects wolves but there has been limited involvement by the state game officials. Wyoming law classifies wolves as predators and therefore prevents the Wyoming Game and Fish Department from becoming actively involved in management of wolves.

Previous wolf reintroductions have all occurred on federal lands. Since there is no federal land in the Adirondacks, any potential reintroduction would require the involvement and approval of the New York Department of Environmental Conservation. In addition, under current law, the New York DEC would be primarily responsible for managing any wolves in New York.

Where do reintroduced wolves come from?

North Carolina

Captive red wolves were bred in zoos and their offspring were used for reintroduction efforts that began in 1987. Currently, there are approximately 180 red wolves that remain in captivity at zoo breeding facilities.

Central Idaho and Yellowstone

Wild gray wolves from Canada were used for reintroduction efforts in central Idaho and Yellowstone. Biologists agreed that wolves used for reintroduction should come from a mountainous area where deer and elk were the primary prey, to closely match the conditions that wolves would face at reintroduction sites. In 1995, 29 wolves were captured in Alberta and reintroduced into central Idaho (15 wolves) and Yellowstone (14 wolves). In 1996, 37 wolves were captured in British Columbia and reintroduced in central Idaho (20 wolves) and Yellowstone (17 wolves).

How are wolves reintroduced?

A “soft release” method, where wolves are first placed in acclimation pens before being released to the wild, was used for wolf reintroduction in North Carolina and Yellowstone. A “hard release” method, where wolves are immediately released at the reintroduction site, was used in central Idaho.

North Carolina

Wolves scheduled for release in North Carolina were put into 225 meter^2 acclimation pens for anywhere from 2 months to 2 years. Contact with humans was kept to a minimum and wolves were fed meat and also given live prey so that they could practice their hunting techniques.

Yellowstone

Wolves to be released in Yellowstone were put in one acre pens for approximately 3 months in order to acclimate them to the area. During that time they were fed road-killed ungulates. Wolves were released into Yellowstone in March, 1995 and April, 1996. Wolves were allowed to exit the pens at their own pace and some did not leave the pens for about a week.

What has been the fate of reintroduced wolves?

Reintroduced wolves require intensive monitoring to determine movements, reproductive success and survival. Sometimes wolves must be recaptured and returned to captivity if problems arise and for management purposes.

Yellowstone

A total of 31 wolves were brought to Yellowstone National Park during 1995 and 1996. During the first two years of the reintroduction program, 6 litters containing a total of 23 pups were born. At the present time it is known that during the spring of 1997, 11 litters containing 40 - 50 more wolf pups have been born and a more exact count will be available in early winter. At the end of 1997 it is estimated that there will be close to 100 wolves in Yellowstone Park. Since the beginning of the Yellowstone reintroduction program 10 adults and 10 pups have died from a variety of natural and human-related causes. One reintroduced wolf had to be killed because it became a problem for a local rancher and two wolves were returned to captivity after they killed sheep.

Central Idaho

A total of 35 wolves were brought to central Idaho and released during 1995 and 1996. During the first two years of the reintroduction program three known pairs produced pups and four wolves died: one shot, one killed by a mountain lion, one starved and one drowned during an attempt to capture it after the wolf killed 3 calves. Radio contact has been lost with two wolves.

North Carolina

From September, 1987 through March, 1996, 65 wolves were released in northeastern North Carolina. In the first 9 years of this project, a total of 92 wolves have been born in the wild and currently 91% of the free ranging wolves in North Carolina were wild born. Wolf sightings have been reported 455 times in North Carolina since September, 1987.

Intensive management of red wolves in North Carolina has been required. Since September, 1987 wolves have been captured or recaptured 303 times for a variety of reasons including: concern for the health of the wolves, to change radio-collars and to attempt to pair a wolf with another in captivity. In addition, many times the capture of wolves has been needed because they were wandering beyond the relatively small amount of land on which they are allowed to roam, currently about 550,000 acres. In North Carolina, wolves are only allowed to be on National Wildlife Refuge land or on private lands where an agreement with the owner has been reached. Up until December, 1994 a total of 51 wolves had died in the wild from a variety of natural and human causes (Table 5.1).

Table 5.1. Causes of death for captive-bred and wild-born red wolves in North Carolina, 1987-1994 (unpublished data from M. K. Phillips).

Cause of Death	% of Captive-bred Wolf Deaths	% of Wild-born Wolf Deaths
vehicle collision	33.3 %	20 %
killed by wolf	13.8 %	6.6 %
malnutrition and parasitism	19.4 %	46.6 %
drowning	11 %	13.3 %
shot	5.4 %	6.6 %
miscellaneous	16.6 %	6.6 %

Reintroduction of wolves involves intensive monitoring and the need for management activities is increased when wolves are not allowed to disperse naturally where they are reintroduced. In North Carolina, the U.S. Fish and Wildlife Service has needed to recapture most wolves that were released or born in the wild. Up until December, 1994, 71% of released wolves and 83% of wild born wolves required recapture. Some wolves were placed in captivity, others were translocated within the study area. The need to return wolves to captivity or translocate them has been increased because of the relatively small amount of land (about 550,000 acres) that wolves are allowed to be present on in North Carolina (see Section 6) which results in an increased likelihood of wolf-human conflicts. Many recaptures of wolves on private land in North Carolina were done at the request of the landowner and not because wolves were causing any identifiable problems. In the future, agreements may be made to allow wolves to disperse on to more private land in North Carolina, thereby reducing the need to recapture wolves. In Yellowstone and central Idaho, there has been much less need to recapture wolves. In these areas wolves are allowed to disperse beyond National Park or National Forest boundaries and it is hoped that some day regular dispersal between these populations will occur.

The mix of public and private land in the Adirondacks would require widespread cooperation from private landowners for a reintroduction of wolves on public land within the park. Otherwise, an intensive program of animal recapture would be needed to prevent wolves from moving on to private lands and any hope that a wolf population would eventually be connected with existing populations in Canada would be severly diminished.

Are wolves given the same level of protection on private lands and public lands where they have been reintroduced?

In North Carolina, the U.S. Fish and Wildlife Service is required to remove wolves from private lands at the request of any landowner that the Service does not have an agreement with. In the Yellowstone region and Central Idaho, wolves are allowed to be on all public and private lands. Private landowners can only request that wolves be removed if they are documented to be attacking livestock.

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6. Human Population and Land Use Patterns

How does the distribution of public and private lands in the Adirondacks compare to other areas that wolves currently inhabit?

Adirondack Park

Long-term studies in the Great Lakes Region have shown that wolves have rarely been able to survive in areas with road densities greater than 1 mile of road per mile^2 and human densities greater than 10 people per mile^2, largely because of direct and accidental killing of wolves in more populated and accessible areas. As human acceptance of wolves increases, however, they are often moving into more populated areas in this region. Harrison and Chapin (1997) used the Great Lakes Region human population and road density criteria (1 mile of road per mile^2 and 10 people per mile^2) as limiting factors in determining suitable wolf habitat in the Adirondacks. They identified approximately 5700 miles^2 within the Park (61% of the Park area) that has human population and road densities at or below the established criteria (see Figure 1.1). The ultimate potential of these habitats to support wolves, however, depends on other factors including prey availability and social and political acceptability.

The Adirondack Park is distinguished from all other federal or state parks by its mix of public and private land (Table 6.1).

Table 6.1. Land Ownership in the Adirondack Park

Land Ownership	Total Acres
Adirondack Park	5.9 million acres
Private Land	3.6 million acres (60%)
State Land	2.4 million acres (40%)
State Land designated as Wilderness	971,096 acres (16% of total Park land)

North Carolina

The current red wolf recovery area consists of two National Wildlife Refuges, U.S. Military Land and North Carolina State Public Holdings (Table 6.2). In addition, agreements which allow wolves to inhabit some private lands have been worked out with private landowners in four counties. Wolves that are known to disperse on to private lands where an agreement has not been reached are removed at the request of the landowner. Of the 44 red wolves currently known to occur in the wild in northeastern North Carolina, 16 are on public lands and 28 are on private lands.

Central Idaho and Yellowstone

The US Fish and Wildlife Service identified two Primary Analysis Areas (PAA) that were likely to be impacted by reintroduced wolves in central Idaho and Yellowstone. At the center of each Primary Analysis Area is a large (approximately 12 million acres, or twice the size of the Adirondack Park) contiguous block of federal land. Details of these areas are given in Table 6.3.

Minnesota

Wolves in Minnesota occupy approximately 35,000 miles^2 in the northern part of the state. This area is a mix of public and private lands and includes two National Forests (the Superior National Forest, including the Boundary Waters Canoe Wilderness Area and the Chippewa National Forest), a National Park, as well as numerous state and county forests (Figure 6.1).

Table 6.2. Land ownership within the wolf reintroduction area in North Carolina.

Land Ownership	Total Acres
Public	
National Wildlife Refuge	285,000 acres
US Air Force	45,000 acres
North Carolina Public Holdings	26,500 acres
Private (agreements allowing the presence of wolves)	195,365 acres
Total	551,865 acres

Figure 6.1. Details of wolf range in Minnesota, showing land ownership patterns.

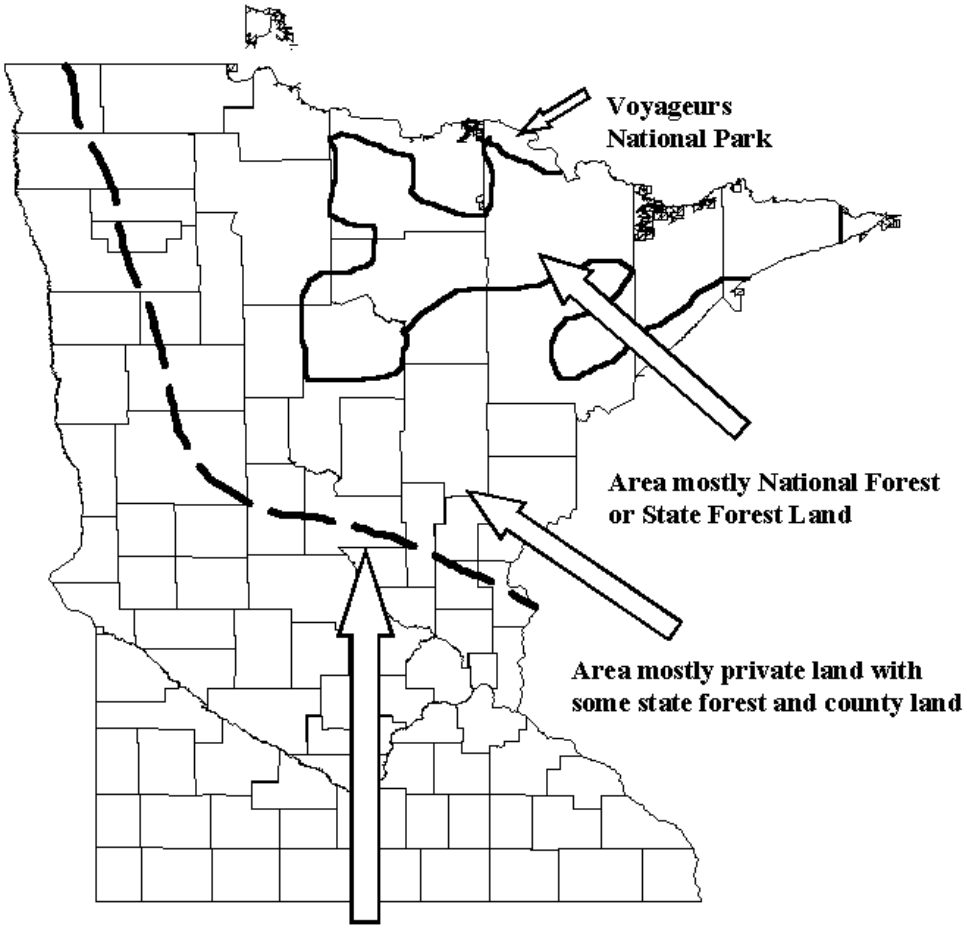


Table 6.3. Land ownership in the central Idaho and Yellowstone wolf reintroduction areas.

	Yellowstone	Central Idaho
Total Land in Analysis Area	25,300 mi^2 (64,800 km^2) or 16 million acres	21,000 mi^2 (53,900 km^2) or 13.3 million acres
Federal Land	76% (12.1 million acres)	99% (13.2 million acres)
Private Land	21% (3.4 million acres)	Trace
% of Federal Land designated National Park, Wilderness or Wildlife Refuge	41% (Yellowstone and Grand Teton - 2.5 million acres)	30%

How does land use in the Adirondacks compare to other areas that wolves currently inhabit?

Adirondacks

Land use was analyzed for counties in and/or near the Adirondack Park, *recognizing that all of these counties may be affected by a wolf reintroduction program, not just the portions that are within the boundary of the park*. Land in the counties of the Adirondack region is 50 - 98 % forested and 31 - 68 % of the forested area could be available or is used for commercial forestry. Counties in the central and eastern portions of the Adirondack Park have large areas of Forest Preserve, while counties on the periphery of the park have more farmland and commercial forest land. Farmland constitutes from 0 - 37 % of the land in each county (Table 6.4, 6.6 and Figure 6.2).

Minnesota

Analysis of land use in the counties within wolf range in Minnesota provides a good comparison for the Adirondack region. Wolves in Minnesota range across a mosaic of federal, state, tribal, county and private lands and human population is scattered throughout. Counties within the wolf range in Minnesota are 57 - 98 % forested, and 47 - 78 % of the forested land in each county is used for commercial forestry. Almost all forest preserve land is found in the most northern counties, which border Canada. Farmland constitutes 0 - 33 % of the area within each county (Table 6.5, 6.6 and Figure 6.2).

North Carolina

More then half of the land currently being used for the red wolf reintroduction project in North Carolina is designated as federal wildlife refuge. The private lands, over which wolves are allowed to range are used as pine plantations, for raising crops, as wildlife conservation areas and for raising livestock.

Yellowstone and Central Idaho

99% of the land in the Central Idaho wolf recovery area is under federal ownership and 30 % of this land is designated as Wilderness. The remaining lands are used for cattle and sheep grazing, recreation and timber production.

76% of the Yellowstone wolf recovery area is under federal ownership and 41 % of federal land is designated as Wilderness or National Park. The remaining federal lands are used for cattle and sheep grazing, recreation and timber production.

Table 6.4. Land use in counties of the Adirondack Region (data from U.S. Bureau of the Census and U.S. Department of Agriculture).

County	% Farmland	% Commercial Forest Land[1]	% Forest Reserve Land[2]	% Other Land Use
Clinton	23	63	8	1
Essex	5	50	39	6
Franklin	13	57	26	16
Fulton	11	50	25	14
Hamilton	0.5	31	67	1.5
Herkimer	18	40	40	2
Jefferson	37	48	2	13
Lewis	21	68	7	4
St. Lawrence	23	64	8	5
Warren	1	61	34	4

[1]Commercial Forest land is defined by the U.S. Forest Service as land capable of producing 1/4 of a cord per acre per year of acceptable quality wood and is not withdrawn from timber harvesting.
[2]Forest Reserve land is not available for timber harvesting.

Table 6.5. Land use in counties in the northern Minnesota wolf range (data from U.S. Bureau of the Census and U.S. Department of Agriculture).

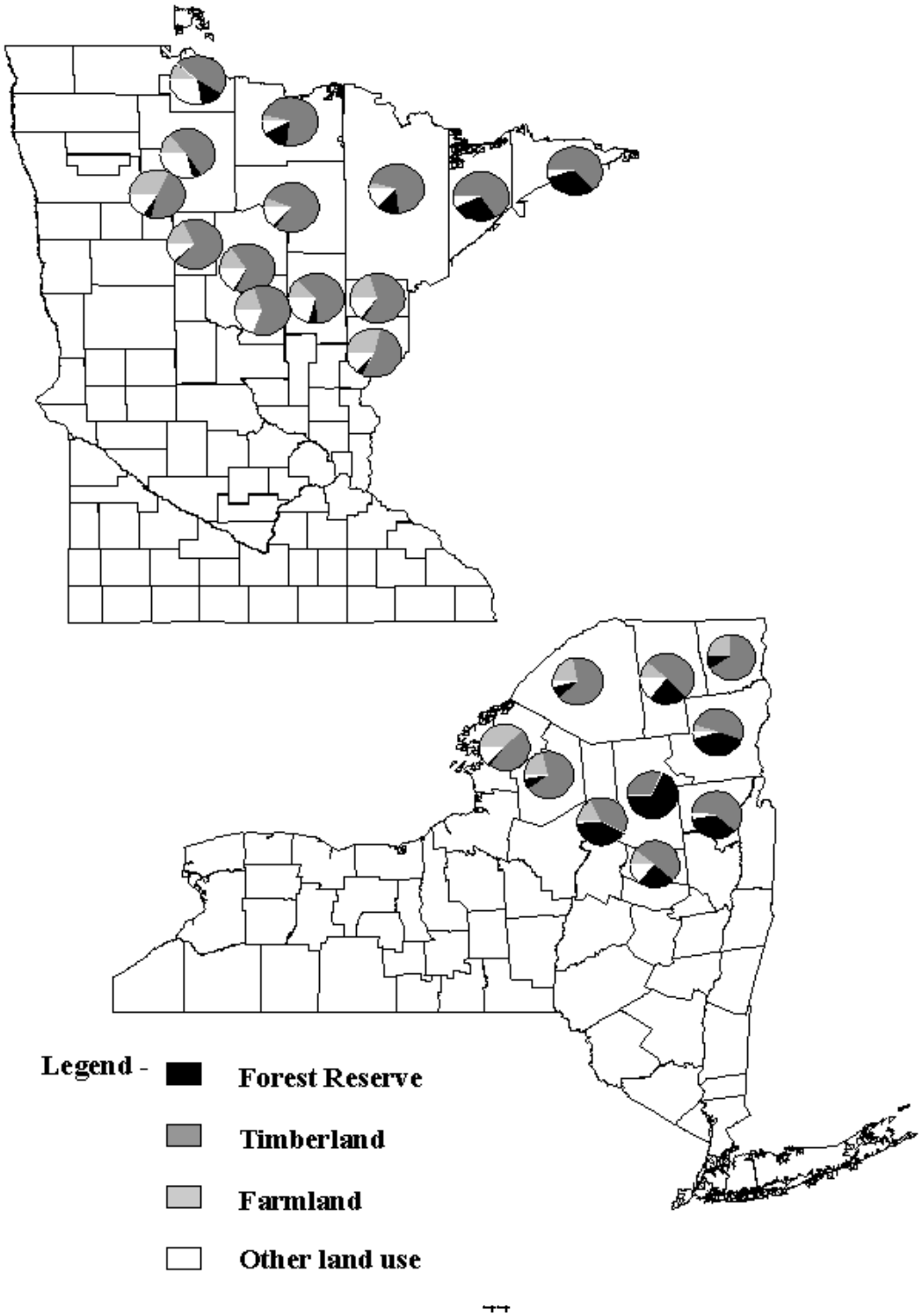
County	% Farmland	% Commercial Forest Land[1]	% Forest Reserve Land[2]	% Other Land Use
Aitkin	14	60	5	21
Beltrami	14	52	5	29
Carlton	21	62	2	15
Cass	16	65	2	17
Clearwater	33	45	5	17
Cook	0	63	32	5
Crow Wing	20	60	0	20
Hubbard	19	67	1	13
Itasca	6	78	2	14
Koochiching	4	72	16	8
Lake	0	65	27	8
Lake of the Woods	12	47	13	28
Pine	29	53	4	14
St. Louis	4	69	13	14

[1]Commercial Forest land is defined by the U.S. Forest Service as land capable of producing 1/4 of a cord per acre per year of acceptable quality wood and is not withdrawn from timber harvesting.
[2]Forest Reserve land is not available for timber harvesting.

Table 6.6. Summary of land use in the Adirondack Region and in Minnesota Wolf Range.

Region	% Farmland	% Commercial Forest Land	% Forest Reserve Land	% Other Land Use
Counties in Adirondack Region	0 - 37 %	31 - 68 %	2 - 67 %	1 - 16 %
Counties in Minnesota wolf range	0 - 33 %	45 - 78 %	0 - 32 %	5 - 29 %

Figure 6.2. Graphs show the portion of each county in different land use categories.



Would commercial forest lands in the Adirondacks provide suitable habitat for wolves?

There are approximately 2.6 million acres of privately owned forest lands in the Adirondack Park. Table 6.7 shows how private forest lands are divided among various types of ownership. About 56% of the private timberlands are in ownerships over 2000 acres. These private lands may have roads through them but they have low resident human populations and many have limited access (gated to the public). Therefore, they could potentially serve as appropriate habitat for wolf populations. In addition, many private forest lands have greater deer densities then public lands (see Chapter 7 for a description of deer densities in the Adirondacks).

Table 6.7. Ownership of private forest lands in the Adirondack Park (data from Hagenstein 1990).

Land Ownership	
Public Owned Forest Land	2.1 million acres
Private Owned Forest Land	2.6 million acres
Private Forest Land in tracts greater than 2000 acres	56%

Owners of Tracts greater than 2000 acres	Percentage of Private Forest Land
Pulp and Paper Companies	29%
Corporate Owners	13%
Other Private Owners	14%

Hunting Camps

An issue that complicates the appropriateness of private forest lands as habitat for wolves is the presence of hunting camps on most of the private forest land. Currently, most owners of commercial timberlands lease these lands to hunting clubs and use the revenue from lease agreements to help pay state property taxes. Taxes on commercial timberlands in New York state are currently twice the rate paid for similar lands in Maine.

Hunting leases are long-standing relationships between private land owners and hunting clubs, and the clubs are usually allowed to build cabins on leased lands, they are given access to gated areas and they are allowed to enhance the resident deer population through winter feeding programs. Both the value of the lease and the ability of a hunting club to attract paying members is often based on the quality of the hunting land. In other words, lands with higher densities of deer are often worth more, both to the land owner and the lessee.

Many hunting club members have reservations about a potential reintroduction of the wolf, because it is another deer predator that may reduce herd densities on the lands that they lease. Likewise, private land owners are hesitant to support proposals that they feel could lead to the loss of hunting club lessees, because they depend on lease revenues to help relieve their tax burdens.

How does the human population of the Adirondacks compare to other areas that wolves currently inhabit?

Long-term studies of wolves in the Great Lakes Region have shown that wolves rarely establish breeding territories in areas with more than 10 people per mile^2. As the wolf population continues to grow in this area, however, an increasing number of wolves are being found in more densely populated areas. Table 6.8 gives comparative information on human population in the Adirondacks and other areas occupied by wolves.

Table 6.8. Patterns of human population in the Adirondacks and in areas that are currently occupied by wolves.

Area	Recovery Area	Approximate Human Population	Average Population Density (people/mile^2)
Adirondacks[1]	6 million acres	120,000	14.1 (range = 3 - 44.7) W. Adirondack[5] = 6.9 (range= 3 - 15.4)
Central Idaho Recovery Area[2]	13.3 million acres	92,400	2.6
Yellowstone Recovery Area[2]	16 million acres	288,000	5.2
Minnesota[3]	22.4 million acres	450,000	12
North Carolina[4]	550,000 acres	---	---

[1]Data from State of New York (1989) and Hosack (1996)
[2]Data from U.S. Fish and Wildlife Service (1994)
[3]Data from U.S. Bureau of the Census and Fuller (1992)
[4]Data from International Wolf Center (1996)
[5]Including the portions of Lewis, St. Lawrence, Hamilton and Herkimer counties within the Adirondack Park

Human density numbers do not give a sense of how the human population is distributed across the landscape. In Central Idaho and Yellowstone the human population is mostly found in a few large communities, generally on the periphery of core wolf range. Most residents recognize that land use and human population density in the Adirondacks are quite unlike what is found in Yellowstone and Central Idaho.

The Adirondack pattern of human settlement, however, may be quite similar to that found in the Great Lakes Region. In this area, the Superior National Forest, the Chippewa National Forest and surrounding state forest lands provide a large block of relatively unpopulated core habitat for wolves in Minnesota (Figure 6.1), but human settlement is scattered relatively evenly throughout the remainder of the Great Lakes wolf range in Minnesota, Wisconsin and Michigan.

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7. Distribution of Deer and Other Potential Wolf Prey Populations

What wolf prey species occur in the Adirondacks?

The Adirondack ecosystem is similar to that found in northern Minnesota, where deer are the primary prey of wolves and beaver are used as a secondary prey species. Minnesota, however, also supports a small moose population (0.05 - 1.4 moose/mile^2 or about 8,500 moose) in the very northern portion of wolf range.

What is the total number of deer and density of deer in the Adirondacks?

There has not been a rigorous scientific study of the density and distribution of deer in the Adirondacks. Currently, estimating the total population or density of deer in the Adirondacks is educated guesswork. Hunters, DEC biologists and university biologists do agree on a few points:

1) deer populations in the central Adirondack region have declined since the 1960's
2) deer populations are greater on privately managed lands then in the forest preserve
3) deer populations are greater outside of the Adirondacks then inside the park

A fairly dramatic change in the distribution of deer in the Adirondacks has occurred in the last 40 years. In the 1950's and 1960's, deer were abundant in the central Adirondacks and more scarce on the periphery of the park. A variety of factors including a maturing Forest Preserve, a series of severe winters and possibly increased predation have caused declines in the central Adirondack deer herds. Today deer densities in the Adirondack region are lowest on public lands in the interior of the park and highest on the periphery of the park.

Some estimates of the deer population and deer densities include:

- Total deer population in the Adirondacks = 65,000
- Deer density = 3 - 5 deer/mile^2 on public land and 10 deer/mile^2 on private land

The authority of the DEC to manage deer in the northern region of New York, including the Adirondacks, was taken away by the legislature in the 1970's. This action removed DEC authority to maximize the harvest of deer by eliminating their ability to authorize an antlerless deer season. In addition, the Forever Wild designation of the Adirondack state forests forbids the cutting of trees and thereby limits the ability of the DEC to specifically improve habitat for deer, labor-intensive surveys of deer densities in the Adirondacks have not been a high priorty for DEC staff. All official estimates of deer densities in the Adirondacks have not been a high priority for DEC staff. All official estimates of deer densities are based on hunter harvest information, which can be biased by hunter effort and accessibility of land. Hunter harvest information can be very informative in showing trends in population density, but it is often difficult to calculate actual densities. In addition, hunter harvest information is summarized for deer management units or towns. Within each deer management unit or town in the Adirondacks there is a mix of public and private lands so there is no accurate way of assessing deer densities of land under different types of ownership

Deer hunting is an integral part of the culture of the Adirondacks. Much private time and money has been spent building hunting camps on leased lands and in feeding deer on private lands. Estimates of deer densities are a widely debated topic in this region. Many Adirondack hunters have been witness to declining deer densities since the 1950's and they are suspect of DEC estimates of deer densities. Many feel that there are areas on state land that may be almost devoid of deer.

The bottom line of this controversy is:

- Hunters and residents of the Adirondacks have perceived a decline (sometimes drastic) in deer densities in the central Adirondacks since the 1950's.

- DEC estimates of deer densities are very rough, harvest-based and not sensitive enough to determine varying deer densities on public vs. private land.

- Estimating prey availability must be an integral part of any feasibility study looking at the possibility of reintroduction of wolves into the Adirondacks. Will a feasibility study include a new comprehensive study of deer density in the Adirondacks? Will there be an effort to determine deer densities based on land ownership (private land versus public land)? If current DEC estimates are used in any feasibility study, they may be dismissed by many Adirondack hunters and residents, who have always been suspect of these numbers.

How does deer density in the Adirondacks compare with other areas where wolves occur?

The estimated average Adirondack deer density is lower then the average deer density in the wolf range of Minnesota and Wisconsin (Table 7.1) and higher then the average deer density in Algonquin Park, Ontario. Algonquin, however, contains a sizable moose population (Table 7.1). Deer densities are known to fluctuate dramatically, especially after a series of severe winters or as habitat changes and becomes either more or less suitable. For example, in Quebec during 1974 - 1976 deer populations were in sharp decline and the estimated average density during this time was only 1 deer per mile^2, as compared to the more recent estimate of 7.7 deer per mile^2. In addition, deer densities in Algonquin Park during the 1960's were at an all time high of approximately 12 deer per mile^2 (deer were considered to be chronically overpopulated at this level), but then crashed and became locally extinct by 1980. Wolves were present in both Quebec and Algonquin during deer population decreases and increases.

Table 7.1. Estimated density of deer in the Adirondacks and in other states and regions where gray wolves occur.

State or Region	Estimated deer (or other hoofed mammal) density[1]
Adirondacks	Public land: 3 - 5 deer/mile^2 Private land: 10 deer/mile^2
Minnesota	Average: 17.5 deer /mile^2 Range: 12.5 - 20 deer/mile^2
Wisconsin	Average: 20 deer/mile^2 Range: 6 - 30 deer/mile^2
Algonquin, Ontario	Deer: 1 deer/mile^2 (park deer herd of 2000-3000) [2]Moose: 1 moose/mile^2 (= 6 deer/mile^2)
Papineau-Labelle Reserve, Laurentides Region, Quebec	Deer: 7.7 deer/mile^2 Moose: 1.5 moose/mile^2 (= 9 deer/mile^2)

[1]Estimates may change from year to year, especially after a severe winter.
[2]When estimating prey availability for wolves, biologists often use the conversion factor that one moose = 6 deer. Wolves most kill six times as many deer in order to gain the same amount of food as from one moose.

What were the historic deer densities in the Adirondacks?

Deer achieve their highest densities in areas with abundant early successional forest and human created edge. For example, the density of deer in some suburban communities in New Jersey is estimated to be over 50 deer per mile^2. The pre-lumbering forest in the Adirondacks was largely a mix of various mature or old growth forest types that are not considered good habitat for deer. Natural disturbances such as blowdowns and fire created periodic forest openings, but the total amount of forest in early successional stages was probably small. Therefore, by today's standards, deer densities in the Adirondacks prior to the lumbering era were probably low.

Intensive logging in the late 1800's created more secondary vegetation for deer, but overhunting reportedly decimated deer herds in the Adirondacks by the early 1900's. Following the turn of the century an abundance of early successional forest in the Adirondacks and reduced hunting pressure allowed deer herds to increase once again until they reached their highest population densities in the 1950's - 1960's.

A combination of factors may be preventing deer densities from once again reaching the high population levels that were seen in the 1950's. Most importantly, the maturing Adirondack forest is providing less good browse habitat for deer. Other factors limiting deer densities include periodic severe winters and possibly predation by coyotes and black bears.

How does deer density within the Adirondacks compare with deer density outside of the park?

It is common knowledge among wildlife biologists and hunters in the Adirondacks that deer density is lower in the Adirondack Park then in most areas in the state that are outside of the park. New York DEC has the most comprehensive data concerning trends in deer abundance on a statewide basis. Annual buck take and total deer take are reported by county, town and Deer Management Unit. Population estimates for deer in New York are based largely on hunter take. These estimates can often be skewed by factors such as hunter effort, but they are nevertheless useful in looking at population trends.

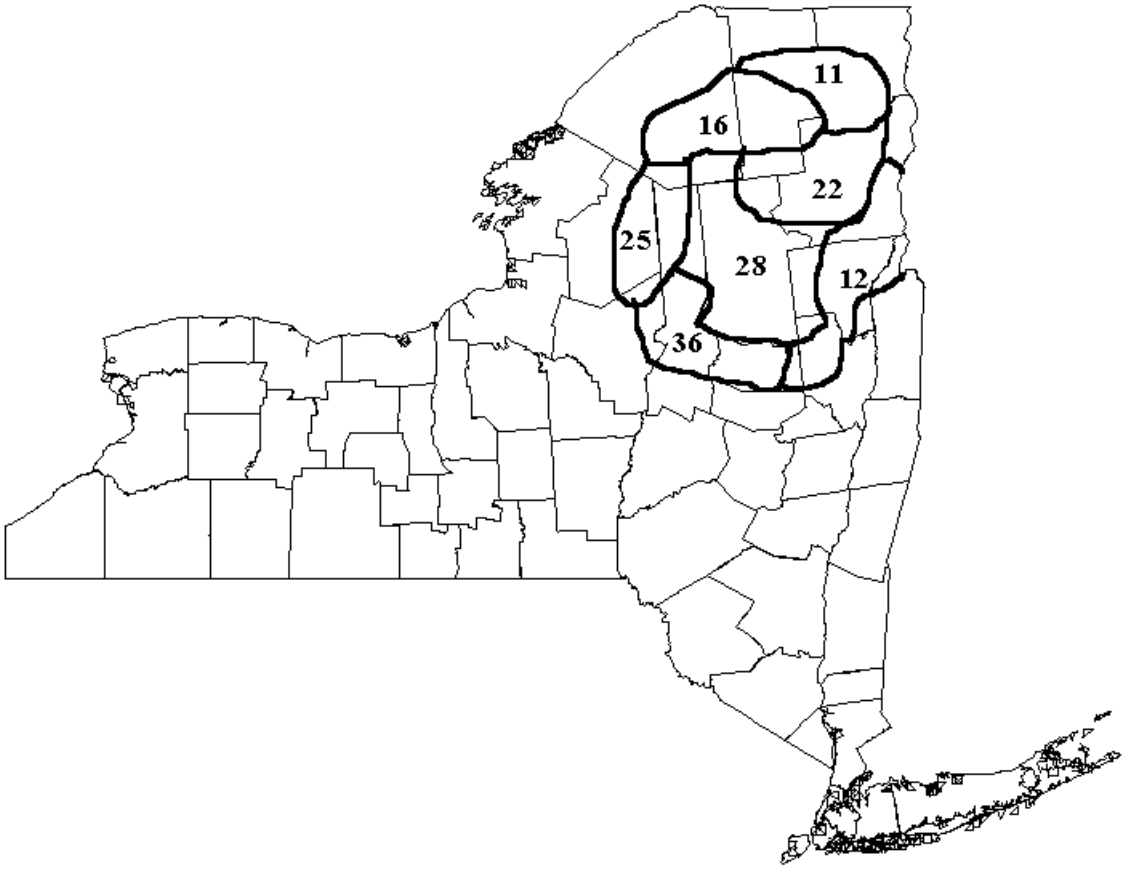
If wolves were to return to New York, they would have the fewest conflicts with humans if they remained in areas that were the least densely settled. In the Adirondack region, areas with the lowest human density fall largely within Deer Management Units 11, 12, 16, 22, and 28 (Figure 7.1). In 1995 these Deer Management Units had some of the lowest buck take per square mile estimates (0.4 - 1.4 bucks per mile^2) of anywhere in the state of New York (Table 7.2). In contrast the Deer Management Units immediately adjacent to the Adirondack Park had buck takes that were 2 - 7 times greater than in the Deer Management Units largely within the park boundaries (Table 7.2). Outside of the Adirondack region, the only other Deer Management Units with an estimated buck take

per mile^2 less than 1 were DMU 1 (Long Island), DMU 50 (Rockland County), near New York City, and DMU 96 which includes the city of Rochester.

Table 7.2. Buck Take, Total Deer Take and Buck Take per mile^2 for Deer Management Units within and adjacent to the Adirodack Park (data from the New York Department of Environmental Conservation. (See Figure 7.1 for location of Deer Management Units.)

Deer Management Unit	Buck Take	Total Deer Take	Buck Take per mile^2
Deer Management Units mostly within the Adirondack Park Boundaries			
11	474	578	0.5
12	1267	1292	0.9
16	1892	1936	1.4
22	531	534	0.4
25	1255	1289	1.5
28	1494	1516	0.5
36	853	874	0.9
Deer Management Units Adjacent to the Adirondack Park Boundaries			
10	1004	1274	1.0
13	3447	4369	2.2
14	1584	1999	2.0
15	2039	2776	3.0
19	269	328	1.6
32	577	826	1.0
34	618	626	2.1
35	3071	3169	1.8

Figure 7.1. Approximate location of Deer Management Units 11, 12, 16, 22, 25 28 and 36 in the Adirondack region of northern New York.



Do deer in the Adirondacks make annual migrations to winter deer yards?

There are traditional deer yards in the Adirondacks, such as the Moose River Plains, that are used by many of the deer living on state lands. Deer on private lands may not make annual migrations because browse regrowth after timber cutting and supplemental feeding provide deer with enough winter forage.

Large migrations of deer are known to occur in Southeast Canada. In Algonquin Park, Ontario, about 2000 - 3000 deer, almost the entire Algonquin deer herd, annually migrate from the park to 3 small deer yards (200 km^2) located just outside the park. Wolves in Algonquin follow deer to wintering yards. In contrast, in the Papineau-Labelle Reserve in Quebec, approximately 4500 deer annually migrate to three wintering yards just outside the reserve but wolves in this area remain on their territories and do not follow migrating herds. It is thought that enough deer remain within the reserve during the winter to sustain the wolves. Similarly, wolves in Yellowstone have not followed migrating elk as they move to winter yards outside of the park boundaries.

What is the density of beavers in the Adirondacks?

One conservative estimate of the beaver population in the Adirondacks places animal numbers at approximately 50,000 (Kogut, 1990) or about 5 beaver per $mile^2$ (2 beaver/km^2). An average beaver colony contains 6 beaver, therefore there are approximately 0.9 colonies per $mile^2$ (0.3 colonies/km^2). The average density of beavers in North America is often 1-2 colonies/$mile^2$.

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8. The Effect of Wolf Predation on Deer and Other Prey Populations

Note:
Understanding how wolf predation affects prey populations is a complex problem that depends on many factors including 1) the ability of the prey to recover from wolf predation losses and 2) the number of alternate wolf prey sources that are available. Though knowledge of predator-prey systems has increased tremendously in the last 20 years, the complex nature of these interactions makes it difficult to precisely predict how prey populations will respond to wolf predation. The problem of predicting the effect of one predator on a prey population is made even more difficult if there are alternate prey available or if there are other predators utilizing the same prey. For example, when the deer population began to decline in Algonquin Park, wolves started to prey more heavily on moose and beaver. Therefore, wolf populations were able to remain fairly stable even though populations of their preferred prey crashed. In the Adirondacks, understanding how wolves could impact deer populations requires knowledge of the amount of browse currently available for deer, the impact of coyotes and black bears on current deer populations, and the potential use of beaver as an alternate prey source.

How many deer will a wolf eat per year?

Studies of wolves in Alaska, western Canada, Minnesota and Michigan have shown that a wolf needs to eat an average of 4.4 - 15.4 pounds of food per day. To meet these food requirements in areas where deer are the primary prey, an individual wolf will kill an average of 15 - 18 deer per year or approximately 1.5 deer per month. The yearly consumption of deer per wolf in Minnesota was 11 fawns and 7.8 adults or 18.8 deer per wolf per year. The highest consumption rate of fawns occurs in June, when each wolf will kill an average of 2.8 fawns during that month. In all other months, the consumption rate per wolf of adults and fawns is less than 1 adult and 1 fawn per month.

Do wolves prefer to prey on a specific sex or age of deer?

The percentage of deer of a specific sex or age in the diet of a wolf is somewhat dependent on the availability of the different sex and age groups of deer in the wild. Wolves do have the ability to kill adult male deer in prime condition but the number that they kill is usually dependent on the availability of younger deer or deer in poorer condition. If many fawns are available, such as in June and July, then the percentage of adult deer killed will be less. However, if starvation during a severe winter has decreased

the proportion of young or old deer in the population, then wolves will prey more often on adult deer of prime breeding age.

A good example of how deer availability can affect wolf prey selection is demonstrated by a study conducted in the Laurentides region of Quebec. Wolf diet was studied in this area during a period of low deer density (1974-1976) and a period of relatively high deer density (1980-1984). When deer were scarce, 88% of the wolf diet consisted of prime-age deer (2.5 - 6.5 years old), presumably because these deer made up the greatest proportion of the herd that remained. When deer became more abundant, 72 % of wolf diet consisted of fawns while 38 % consisted of adult deer. Of the adult deer killed during this period, 52% were prime-age, 24 % were yearlings and 24% were old deer (greater than 7.5 years).

Two studies were conducted in Minnesota (Mech and Frenzel 1971 and Fritts and Mech 1981) and two in Ontario (Kolenosky 1972 and Pimlott et al 1969) which attempted to determine what sex and age class of white-tail deer were usually killed by wolves (Table 8.1). In all studies, fawns were taken nearly in proportion to their availability in the area. Similarly, adult deer (1 - 7 years old) were also taken nearly in proportion to their availability in all studies except for in northwestern Minnesota. Both studies in Minnesota found that old deer (greater than 7 years old) were killed more often then their availability. In Ontario, old deer were killed nearly in proportion to their availability in the population.

Greater winter predation on bucks has been reported. After the fall rut, bucks may be in poorer condition going into winter than female adult deer and therefore more vulnerable to wolf predation. Of adult deer killed by wolves in Algonquin Park, 57% were bucks (Pimlott et al. 1967) and in northeastern Minnesota 71% were bucks (Mech and Frenzel 1971). However, in a more recent study Fuller (1989) found that 60% of deer carcasses found in the winter were does.

Table 8.1. The percentage of juvenile, adult and old deer killed by wolves and found in the total population in two areas in Minnesota and two areas in Ontario (table from Vales and Peek, 1995).

Location	% of juvenile deer (<1 year old)		% of adult deer (1 - 7 years old)		% of old deer (> 7 years old)	
	in the diet of wolves	in the population	in the diet of wolves	in the population	in the diet of wolves	in the population
NE Minnesota[1]	17	26	68	73	15	1
NE Minnesota[2]	34	33	35	62	31	6
E Ontario[3]	30	35	65	63	5	2
W Ontario[4]	17	20	61	52	22	28

[1]Data from Mech and Frenzel (1971)
[2]Data from Fritts and Mech (1981)
[3]Data from Kolenosky (1972)
[4]Data from Pimlott et al. (1969)

To say that wolves *only* eat sick or old deer is not true. In his book, The Wolf : The Ecology and Behavior of an Endangered Species, biologist L. David Mech (1970, p. 261-262) provides a good description of the process of prey selection by wolves:

> Although wolf predation generally selects out the young, old, sick, weak, injured, and diseased members of prey populations, one must be very careful to avoid the conclusion that wolves perform such services deliberately, intentionally, or purposely.

> It is absurd to think that a wild wolf would turn down any available prey, especially a large, fat, prime individual. As is true with most predators, the wolf is an opportunist. Whatever meat is available the animal will eat, including refuse, carrion, bait and fresh prey. There is no reason to believe that the wolf would purposely refuse to eat prime, healthy animals and choose only the inferior ones.
>
> However, there is good reason to believe that the wolf has no choice in the matter. The predator takes whatever it can catch. If the wolf could capture prime, healthy prey, it certainly would. But most of the time it cannot. It happens that all the prey species of the wolf are well equipped with superb detection, defense, and escape systems. As long as these systems are in good working order, a prey animal is usually safe from wolf attack. When they become defective, however, the individual is doomed if wolves frequent its range. The same is also true for an animal in which these systems have not yet fully developed -- unless it is protected adequately by another animal in which they are operating normally.

Wolves are not able to catch every deer that they chase. The keen senses and swiftness of healthy adult deer allow them to escape from the majority of attacks by wolves and the digestive tract of the wolf is adapted to a feast and famine way of life. Therefore, by chance, wolves are more likely to catch old, sick or young animals that they pursue. The proportion of these types of animals in a population may decline, however, such as following a severe winter. Then wolves may be more likely to feed on prime animals, just because these animals make up the largest percentage of the population.

The wolf would not be the only predator on deer in the Adirondacks. Currently, coyotes prey largely on deer, and black bears prey on newly born deer. Therefore, it is likely that many of the old, sick and young deer are already being culled from the Adirondack deer herd. Predicting prey selection by wolves is further complicated by the presence of these two competing predators.

How many wolves could the Adirondacks support? What can be predicted about wolves based on deer densities?

The density of deer is a major determinant of wolf density, wolf distribution, reproduction rates, territory sizes and pup survival. The interactions between wolves and their main prey are often complicated. Interactions are influenced by many factors including the amount and type of alternate prey available, habitat conditions, winter weather and hunting. The dependence of wolves on deer allows estimation of many important factors such as wolf density, rate of increase, pup survival, and territory size. The following formulas (Fuller 1989,1995) are useful for predicting the wolf-deer relationship in a given area:

Note:

None of the following formulas incorporate loss of deer to other predators. A large number of deer may be taken annually by coyotes in the Park, and an unknown number of newly born deer are eaten by black bears each year. To truly calculate the impact of wolves on the deer herd in the Adirondacks, an understanding of the impacts of coyote and black bear on deer is needed, as well as more information on the potential interactions between these predators and wolves. For example, will wolves displace coyotes in the Adirondacks and therefore the annual number of deer killed by predators will remain the same?

W = number of wolves per 1000 miles^2
U = number of ungulates per mile^2
P = potential rate of increase for the ungulate population (often between 1.1 (slow growing population) and 1.5 (fast growing population)), this variable estimates the rate that a population would grow in the absence of predation and hunting, the severity of winter can cause variation in this parameter from year to year
S = hunter harvest/mile^2
K= annual ungulate kill/wolf

In the Adirondacks, estimated values for these parameters are:

U = 3 - 5 deer per mile^2 on public land, 10 deer per mile^2 on private land
S = DMU's in the Adirondacks had a take of about 0.4 - 1.4 deer/mile^2
K = wolves kill an average of 15 - 18 deer per year
W = if we assume that there are approximately 5700 miles^2 of suitable habitat in the Adirondacks, then 20 wolves per 1000 miles^2 equals a total population of 114 wolves and 40 wolves per 1000 miles^2 equals a total population of 228 wolves.

To calculate the potential wolf density (W=wolves per 1000 miles^2) that an ungulate population could support:

$$W = \frac{[U(P - 1) - S]}{K} \times 1000$$

For example, if we estimate that 1) there is an average of 5 deer/mile^2 in the Adirondacks (U=5), 2) the population is growing at a medium rate (P=1.3), 3) that hunter take is 1 deer/mile^2 (S=1) and 4) wolves kill 20 deer per year (K=20), then the Adirondacks could support 25 wolves per 1000 miles^2, or about 140 wolves. Table 8.2 shows estimates of the density of wolves that could be supported in the Adirondacks, given varying densities of deer, deer rate of increase and yearly deer kill by wolves.

Table 8.2. Estimates of the number of wolves per 1000 miles^2 of suitable habitat that could be supported given a range Adirondack estimates of deer density, rate of increase and hunter harvest. Deer density - estimates of 3,5, and 10 deer per mile^2 were used: 3 deer per mile^2 is an estimate for deer densities on public lands, 10 deer per mile^2 is an estimate for deer density on private lands. Hunter Harvest - the four DMU which constitute most of the Adirondacks had hunter harvests of 0.4 - 1.4 deer per mile^2; an estimate of 1.0 deer per mile^2 is used for this analysis. Yearly deer kill per wolf - an estimate of 20 is used for analysis.

Deer per mile^2	Potential Rate of Increase for Deer	Hunter Harvest per mile^2	Yearly Deer Kill per Wolf	Wolves per 1000 mile^2
3	1.2	1	20	0
5	1.2	1	20	0
10	1.2	1	20	50
3	1.3	1	20	0
5	1.3	1	20	25
10	1.3	1	20	100
3	1.4	1	20	10
5	1.4	1	20	50
10	1.4	1	20	150

To calculate the density of deer needed to support a given wolf density and hunter harvest:

$$U = \frac{S}{P - 1} + \frac{K \times W}{1000 \times (P-1)}$$

Table 8.3 shows the estimated density of deer that would be needed to support a given density of wolves and a given level of deer harvest.

Table 8.3. Estimates of the density of deer needed to support a specific density of wolves and a hunter harvest of 1 deer per mile^2. Yearly deer kill per wolf - an estimate of 20 was used for analysis. Potential wolf density - estimates of 20 and 40 wolves per 1000 mile^2 are used. If it is assumed that there are approximately 5700 mile^2 of suitable habitat available in the Adirondacks then these densities would equal a total of 114 or 228 wolves in the region.

Hunter Harvest per mile^2	Deer rate of increase	Wolves per 1000 mile^2	Yearly Deer Kill per Wolf	Required Deer per mile^2
1	1.2	20	20	7
1	1.3	20	20	4.7
1	1.4	20	20	3.5
1	1.2	40	20	9
1	1.3	40	20	6
1	1.4	40	20	4.5

In summary, the previous calculations were made assuming that all potential wolf habitat within the Adirondacks (public and private land) could be used by wolves. These data indicate especially in years when the deer herd growth rate is slow or P = 1.2, (i.e. in a severe winter year), public lands alone, with a deer density of only 3 - 5 deer per mile^2, may not be able to sustain wolves and maintain the current hunter harvest and deer density.

Can wolves limit or deplete a deer population?

All available research shows that the number of wolves in an unexploited population is almost solely dependent on the number of deer (or other hoofed mammals) available. As deer populations decline so will a wolf population but there may be a 3 - 5 year lag before a decline in the wolf population, density or reproductive rates would be seen.

Alternatively, if habitat availability and quality limit the deer population at a specific density called carrying capacity, wolf populations will not continue to grow beyond that carrying capacity. The relationship between wolves and deer may be more complex, however, if wolves have alternate prey (such as moose) that they can switch to if deer densities decline. Under these circumstances the wolf population may remain high and may have a detrimental affect on declining deer numbers.

Wolves alone have not caused declines in any non-island ungulate populations in North America. However, wolves may have been instrumental in further limiting the number of deer (or other hoofed mammals) when factors such as severe winters had already reduced populations. In the late 1960's and early 1970's, several severe winters in Minnesota and a decline in deer habitat (due to the aging of the Superior National Forest) led to a decline in the deer population. When deer numbers reached low population levels, wolves increased the rate of decline in the deer herd, leading to a near extinction of the deer population in the central portion of the Forest. Wolves probably also slowed the recovery of the deer herd. However, the deer population has since recovered from these lows even with the continued presence of wolves. Between 1972 and 1988 the density of moose and deer increased, even as the population of wolves increased from about 750 wolves in 1972 to 1750 wolves in 1988. Hunter harvest of white-tailed deer within the wolf range in Minnesota has increased from a low of 1 deer per mile^2 in 1972 to 2 deer per mile^2 in 1988.

Deer populations in Ontario and Quebec also declined sharply in the 1970's, after a series of bad winters. In Quebec, wolves continued to feed on deer even though they were scarce and a decline in the deer population did not lead to a similar decline in the wolf population. This was partly because wolves were able to switch to feeding largely on moose and beaver. Some decline in wolf numbers probably occurred later when deer were nearly extinct in the region. However, mild winters and stricter hunting regulations led to a rebound in the deer population even in the continued presence of wolves. By the mid-1980's deer were considered abundant in the region. In addition, the deer population in Ontario has been increasing since the mid-1980's, though it is not back to the 1960's level yet and wolves have switched their diet in this region to include a larger proportion of moose and beaver.

The only known rapid decline in deer numbers that was solely caused by wolves occurred in 1960 on small Coronation Island in southeastern Alaska. After wolves were reintroduced to this very small island (28.5 mile^2, 73 km^2), black-tailed deer became extinct within four years.

How important are beaver to wolves?

Wolves are able to catch and prey on beaver. The importance of beaver as a food for wolves often depends on the availability of deer. In Minnesota, where wolves prey primarily on deer, beaver are only seasonally important. During one study (Fuller, 1989) beaver accounted for 20 - 47 % of the prey taken by wolves during April and May. In the remainder of the year, however, they usually accounted for less than 10 % of the prey taken during any one month. Snowshoe hare always accounted for less than 10 % of the prey taken in any month.

In Algonquin Park, where the deer density has declined sharply during the past 30 years, beaver are an important prey species throughout the year and account for about 30% of the prey taken in the winter and the summer. During the winter, most beaver carcasses were found along the edge of ice-free rivers. There were 15 observed attempts by wolves to dig into beaver houses during the winter but none were successful.

Will wolves control overabundant animal populations?

In areas where both wolves and beavers occur, wolves do not have a great influence on beaver numbers. Beaver populations are most limited by habitat availability. In addition deer populations are influenced by a variety of factors including the amount and quality of available habitat, hunter harvest, predation and the severity of the winter. It is unlikely that predation would significantly affect overall population levels if there is an abundance of high quality habitat and winters are not severe.

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9. Interactions Between Wolves and Other Wildlife

How do wolves interact with coyotes?

The accepted rule is that coyotes and wolves do not mix well. There are many places where wolves are known to kill coyotes, but there are also some instances where wolves appear to be very tolerable to the presence of coyotes. Avoidance of wolf packs by coyotes has been reported in Yellowstone, Minnesota, Alberta and some parts of Manitoba. In Minnesota and Alaska, coyotes are more abundant in areas where wolves are not abundant or absent. In contrast, coyotes in Riding Mountain National Park, Manitoba, frequently follow wolves and scavenge their prey. Abundance of prey probably contributes to the amount of aggression displayed, but there have been few studies of competition between wolves and coyotes.

Yellowstone

In Yellowstone National Park, the impact of wolves on coyotes has been quite dramatic. Before the reintroduction of wolves to Yellowstone, coyotes had been studied in the park for five years. During this time the areas used and the boundaries of coyote territories remained stable. Since the reintroduction of wolves, coyote territories have shifted so that they are now using areas where wolves have not yet settled. Pup production has declined and pack size has decreased. In addition, 25 carcasses of wolf killed coyotes have been found and it is estimated that about 75 coyotes have been directly killed by wolves. Most coyotes are killed when they attempt to scavenge an elk at a wolf kill site. It is predicted that if current trends continue, coyote populations in the park will decline in some areas.

North Carolina

During the red wolf reintroduction program in North Carolina the major question has been *not* whether wolves and coyotes will act aggressively towards one another, but rather will wolves and coyotes interbreed. Extensive interbreeding between red wolves and coyotes in their historic range had resulted in many wolf-coyote hybrids and few pure red wolves. At the red wolf reintroduction site in North Carolina, coyotes are rare. From 1987 to 1994, the area was trapped extensively in an effort to recapture red wolves. During that time 109 wolves were caught but only three coyotes. In addition, during these years, only three wolves were seen consorting with coyotes. One male wolf bred with a female coyote and produced three pups.

Many questions still remain about how coyotes and reintroduced wolves would interact in the Adirondacks. In Yellowstone and other areas, wolves are dominant over coyotes and often kill them. The size and behavior of the eastern coyotes in the Adirondacks, however, may lead to a more complex relationship between wolves and coyotes. Eastern coyotes in the Adirondacks are often nearly the same size as the eastern timber wolves of Algonquin, and Adirondack coyotes are known to prey mostly on deer. In addition, wolves and coyotes have been known to interbreed in parts of Minnesota and southeastern Canada, but the frequency of this interbreeding is not known.

Many questions regarding the prospective relationship between coyotes and deer in the Adirondacks will require further study:

- Will wolves kill coyotes and therefore reduce the coyote population?
- Will the presence of wolves cause coyotes to switch their food preferences so that they prey less on deer?
- Will wolves and coyotes interbreed in the Adirondacks?

Will wolves and other predators (such as coyotes, bobcats, fishers, black bears) compete for the same prey?

Wolves have been known to kill coyotes, mountain lions, lynx and black bears. In addition, wolves compete with these predators for food. The biological opinion expressed in the Final Environmental Impact Statement on the reintroduction of wolves to Yellowstone predicted that the overall effect of wolves on other aspects of the ecological community (including predators other then coyotes) would be slight.

What would be the predicted interactions between wolves and predators other then coyotes in the Adirondacks? How does black bear predation on newborn fawns affect the deer population in the Adirondacks and would an increased level of fawn predation by wolves negatively affect overall deer population levels?

Will wolves reduce beaver populations?

Beaver can be an important food for wolves in areas where they are abundant, however, beaver have a great ability to reproduce, and wolves have never been documented to effect overall beaver populations. Currently, beaver numbers are most limited by the availability of habitat and historically they were limited by intensive and prolonged trapping.

Will wolves change the ecosystem dynamics in the Adirondacks and result in population increases or decreases of other species?

Wolves might decrease the total number of deer and slow the current natural recovery of moose. Coyotes and possibly bears might suffer because of increased competition. Overall ecosystem impacts are largely unknown, however, and little has been reported on the interactions between wolves and other wildlife.

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10. Wolf Predation on Livestock and Pets

When do wolves kill livestock?

The availability of natural prey may be influential in determining how often wolves will turn to livestock as potential prey. To illustrate this, during the winter of 1995 - 1996 an estimated 40% of the deer population was killed by severe winter conditions in Minnesota. During April and May, 1996, wolf-livestock conflicts were noticeably below average, presumably due to the abundant supply of deer carcasses and weakened deer available as food. After May, however, reports of wolves killing livestock increased considerably because the surviving deer herd was now made up of mostly adult deer which were less vulnerable to predation.

Three animal husbandry factors were identified as leading to an increased probability of wolves killing livestock:

1) leaving livestock carcasses near farmyards or in pastures during winter and spring
2) allowing calving on pasture land
3) allowing livestock access to large wooded areas

How does the distribution of farmland and number of livestock in the Adirondack region compare with other areas within U.S. wolf range?

The amount and distribution of farmland in the Adirondack region is similar to that found in the Great Lakes Region of the Midwest (Figure 10.1). Land is more heavily used for farming at the periphery of the 1) current wolf range in the Midwest *and* 2) the potential wolf range in the Adirondack region. The counties in and around the Adirondack Park have about 370,000 cattle and 8000 sheep. Within the Minnesota wolf range there are an estimated 232,000 cattle and 16,000 sheep. Table 10.1 shows that counties on the periphery of the Adirondack park contain many more cattle and sheep then those counties which are entirely or mostly within the boundaries of the park (Hamilton, Warren, Essex and Fulton).

Table 10.1. Number of cattle and sheep in New York counties within or near the Adirondack Park (data from the U.S. Department of Agriculture).

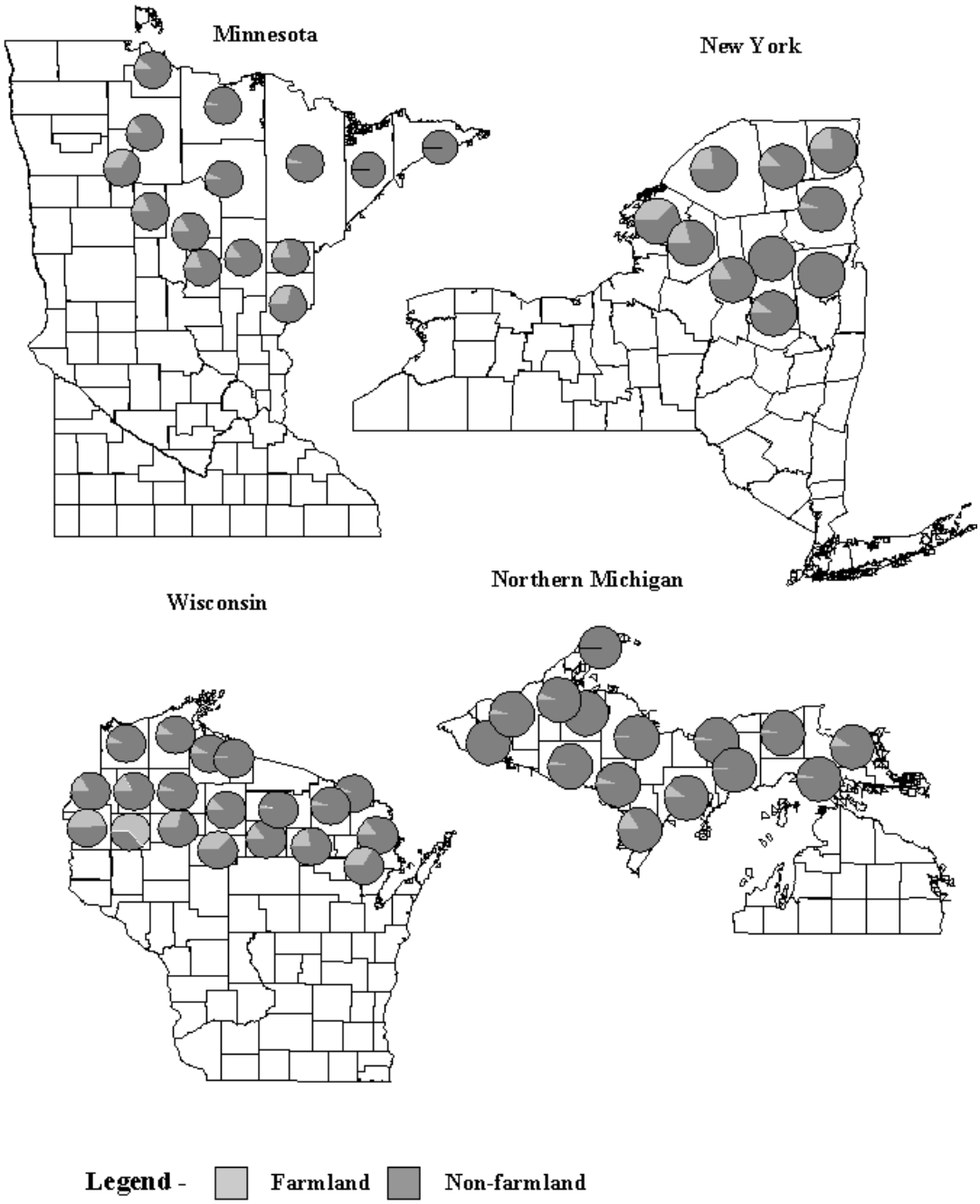
New York County	Cattle	Sheep
Clinton	34554	817
Essex	6551	177
Franklin	32980	948
Fulton	7884	428
Hamilton	0	0
Herkimer	39322	729
Jefferson	62774	823
Lewis	48448	423
Oneida	52585	1448
St. Lawrence	81978	2180
Warren	489	Not Available
Total	367565	7973
(Minnesota Wolf Range Totals)	(232,000)	(16,000)

Are people compensated for domestic livestock loss?

Minnesota

All claims of livestock loss are investigated by the Minnesota Department of Agriculture and by the U.S. Department of Agriculture Animal Damage Control to determine the number of losses attributed to wolves. Farmers are compensated at market value for livestock losses based on the Minnesota Department of Agriculture loss verification. The Minnesota Department of Agriculture verification criteria for livestock kills are more liberal then those used by the Animal Damage Control. Therefore the number of livestock losses compensated by the state of Minnesota is usually greater than the number verified by the USDA (Table 10.3). From 1978 - 1996 compensation payments have ranged from $14,444 to $43,664 per year. The responsibility for determining market value of livestock

Figure 10.1. Percentage of each county within the Great Lakes wolf range and the Adirondack Region that is farmland



is given to the local University of Minnesota Agricultural Extension Service county extension agent. The maximum value that can be claimed per animal is $400. Residents are not compensated for the loss of pets.

Wisconsin
A state administered fund also pays for livestock losses in Wisconsin. As the population of wolves has increased, this fund has paid an average of $1,200 per year during recent years.

Yellowstone and Central Idaho
A private fund administered by the Defenders of Wildlife compensates farmers for any livestock losses that are the result of depredation by re-introduced wolves in Yellowstone National Park and Central Idaho. In the Yellowstone region, this fund has compensated livestock owners for $2,186 in losses.

How much livestock could be lost to wolf predation?

Minnesota
Since 1976, the number of farms in Minnesota wolf range has decreased and the wolf population has increased. In 1979, there were approximately 12,300 farms within wolf range in Minnesota and 29 complaints involving livestock were received; 15 complaints were verified and 12 farms lost livestock (excluding dogs) to wolves. In 1996, there were about 7,200 farms within wolf range in Minnesota: 134 complaints were received, 99 were verified and 42 farms lost livestock to wolf predation. From 1987 - 1989, less than 1% of farms in wolf range had verified domestic livestock attacks (0.51% or 35 out of 6,800 farms). Depredation is seasonal with 83% of all verified wolf complaints occurring from May through September.

To get a more accurate picture of the interactions between wolves and livestock in Minnesota, it is useful to look at the impact of wolves on livestock for a year when the wolf population was still relatively low, as well as analyzing the current impact with high wolf populations. The claimed, verified and compensated domestic animal losses in 1979, when the wolf population was estimated to be 1200 and 1996, when the wolf population was estimated to be 2200, are shown in Table 10.2. It is estimated that the number of livestock actually lost to wolf predation is somewhere between the number claimed by farmers and the number verified.

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Table 10.2. The U.S. Department of Agriculture Animal Damage Control statistics from Minnesota showing the number livestock 1) claimed to be killed by wolves, 2) verified as killed by wolves by the ADC and 3) compensated by the Minnesota livestock depredation fund, for 1979 and 1996. Numbers in parenthesis show the total number of cows, sheep and turkeys that were within Minnesota wolf range during 1979 and 1996. Wolf population estimates in Minnesota during these two years were as follows: 1979 - 1200 wolves and 1996 - 2200 wolves.

	1979 (1200 wolves)			**1996 (2200 wolves)**		
Livestock	**claimed**	**verified**	**compensated**	**claimed**	**verified**	**compensated**
Adult cows	7	5	9 (234,000)*	13	7	6 (232,000)*
Yearling cows	0	0	0	5	5	3
calves	98	12	48	115	62	68
sheep	1	1	23 (91,000)*	35	21	20 (16,000)*
goats	0	0	2	0	0	0
horses	0	0	0	3	1	2
turkeys	0	0	0	1612	1612	1599 (650,000)*
geese	0	0	0	2	2	0
chickens	3	1	0	0	0	0
ducks	0	0	5	0	0	0
dogs	1	1	NA	11	10	NA

*numbers in parentheses show total number of cows, sheep or turkeys within wolf range during 1979 or 1996.

Yellowstone and Central Idaho
Wolves were re-introduced to Yellowstone National Park and central Idaho in 1995. Before the 1997 breeding season, there are 43 wolves roaming wild in Yellowstone and about 40 wolves in central Idaho. During the first two years after re-introduction wolves attacked 20 sheep and 3 cows in Idaho and the Yellowstone region.

Wisconsin
In the 1970's wolves began to disperse from source populations in Minnesota to naturally recolonize northern Wisconsin. The population remained below 30 wolves for much of the 1980's but began to increase in the last 6 years. Last year in Wisconsin (1996), there were an estimated 99 wolves. From 1980 through 1995 there were 15 livestock killed by wolves reported in Wisconsin.

North Carolina
Since red wolves were reintroduced to northeast North Carolina and the Great Smoky Mountains National Park in 1987, there has been only one confirmed livestock loss attributed to them. Currently there are between 40 and 70 free-ranging wild red wolves.

The number of farms within the current U.S. wolf range that have had livestock killed by wolves has remained very low. In the Adirondack region, however, the highest deer densities are found on the periphery of the park, in areas with the greatest number of livestock. Would the potential for wolves killing livestock be increased in areas on the periphery of the Adirondacks because wolves would be drawn to these areas due to higher deer populations?

How often do wolves kill pets?

In Minnesota, the number of dogs verified killed by wolves between 1979 - 1996 has varied from 1 to 11 per year. This is probably an underestimate of the number of actual wolf-dog interactions, since it is expected that not all owners reported attacks on dogs. Nevertheless, only a small fraction of the estimated 68,000 households owning dogs within the range of wolves in Minnesota reported any attacks.

In Minnesota, wolves are reported to display little fear of humans or buildings when preying on dogs. With the exception of two instances, wolf attacks on dogs occurred within about 100 yards of the owner's house. Four fatal attacks on dogs occurred while dogs were chained. Because of the great human attachment to dogs and because almost all dogs were killed in the yards of their owners, wolves attacking dogs can lead to anti-wolf sentiments.

Since wolves were released in Yellowstone in 1995, there has been only one reported killing of a dog by a wolf.

How well does the wolf compensation program work?

The most common complaints by farmers about the wolf depredation compensation program in Minnesota is that 1) livestock value limits are too low, 2) the livestock market value at the time of loss was paid instead of projected value at market time and 3) no compensation was paid for missing livestock at farms with verified losses. Another criticism of the program was that there was no incentive for farmers to improve husbandry practices. Some have suggested that payments be withheld when correctable husbandry practices seem responsible for wolf depredations.

A concern of farmers near the Adirondacks was that compensation for livestock losses at market value does not compensate farmers for loss of time, including time that has already been invested in the care of the livestock and time that will be needed to acquire replacement livestock. An analogy that was made by one Adirondack farmer was that losing livestock to wolves and being compensated is like having your car totaled in an accident and getting insurance money. It is not something that people like to have happen.

Are wolves that attack livestock killed or removed?

Minnesota

Currently, the US Department of Agriculture has been responsible for investigating and mitigating wolf attacks in Minnesota. Since 1978, when the federal status of the wolf was changed from Endangered to Threatened in Minnesota, state and federal authorities have had the right to kill wolves that are known to have preyed on livestock (except in extreme northeastern Minnesota which has been designated a wolf sanctuary). Traps are set for wolves following nearly all confirmed livestock attacks and wolves are usually killed by euthanasia after trapping. From 1986 - 1996, the wolf control program trapped between 31 and 175 wolves per year. Almost all of these wolves (85% - 100%) were euthanized.

Some non-capture methods of wolf control, such as light-siren devices, guard dogs and taste-aversion conditioning were tried with limited success in Minnesota. The effectiveness of these methods often depended on the husbandry practices among farms and the openness of pasture areas.

Wisconsin and Michigan
Wolves that kill livestock in Wisconsin or Michigan cannot be killed by federal or state agencies because the wolf is still listed as endangered in these states.

Yellowstone and Central Idaho
In Yellowstone and Central Idaho, ranchers may scare off wolves by any non-lethal method if they are seen near livestock. If a wolf kills livestock it is trapped and relocated. If the same wolf kills livestock a second time it is trapped and put into captivity or killed.

What is the effectiveness of the wolf control program in Minnesota?

For the wolf range as a whole, it was hard to determine whether the trapping and removal of wolves was an effective means of controlling wolf depredation on livestock. Wolf depredation at some farms stopped even if few or no wolves were caught, but continued at other farms despite regular removal of wolves. The trapping and removal of wolves probably had its greatest value in stopping the most serious problem wolves, for example those involved in the nightly surplus killing of sheep and turkeys. One probable, but unmeasurable, benefit of the wolf control program in Minnesota was a likely reduction in the number of wolves illegally killed by humans attempting to control a perceived problem on their own.

Would wolves leave the Adirondack Park to prey on livestock?

In three instances wolves that were released in Yellowstone National Park have traveled outside of the park and killed livestock or pets. One male killed 2 sheep about 25 miles north of the park. The wolf was trapped and returned to the park but within a week he traveled about 60 miles back to the same ranch and attacked another sheep. The wolf was then killed by federal agents. A nearby colony of captive wolves may have been attracting wild wolves to the area. A female wolf also killed 8 ewes and 2 lambs about 30 miles northeast of the park. One dog was killed by Yellowstone wolves about 25 miles northeast of the park.

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11. Economic Consequences of Reintroducing Wolves to the Adirondacks

How much does wolf reintroduction cost?

Wolf restoration is no longer in the "trial and error" phase where it began with the first red wolf reintroductions in 1987. During the past 10 years, reintroduction techniques and management protocols have been developed and refined and there is now a group of experienced professionals available to provide expertise for future reintroduction projects. All of these factors should allow for reduced costs in future wolf recovery efforts.

The total cost of wolf reintroduction is difficult to estimate because it includes the costs of equipment, travel and employee time incurred by many agencies, including the U.S. Fish and Wildlife Service, the National Park Service and other federal agencies, Canadian provincial and state agencies and zoos. Furthermore, estimates of costs often do not include those associated with support building and education programs paid for by a host of non-profit organizations.

For a potential Adirondack reintroduction program there would be two types of costs directly associated with bringing wolves to the area: 1) the costs associated with the trapping of wild wolves (probably in Canada) and the transport, acclimation and care of those animals up until release and 2) the costs associated with the management and monitoring of released wolves.

North Carolina

The average annual U.S. Fish and Wildlife Service management costs for the red wolf reintroduction project in North Carolina between 1986-1996 were about $285,000.

Yellowstone and Central Idaho

Up until the time wolves were released in 1995, the real costs estimated by the U.S. Fish and Wildlife Service associated with wolf reintroduction in Idaho and Yellowstone totaled $735,000. However, in 1996, wolf reintroduction costs were greatly under budget and totaled only $267,000 for the two areas (Bangs 1996). These costs were associated with the trapping, transport and acclimation of wild wolves. The wolf recovery program in Yellowstone and Central Idaho is currently under budget and ahead of schedule.

The Yellowstone National Park annual budget for the management of wolves after reintroduction into the Park has averaged about $335,000 per year. In the future no new wolves should need to be introduced to the park so management costs will be reduced.

The implementation of a credible monitoring program for the growing population of wolves currently in the park is estimated to cost about $200,000 annually and the implementation a monitoring program in addition to a research program designed to learn more about behavior of reintroduced wolves is estimated to cost about $300,000 annually.

Most of the costs for previous reintroduction efforts have been paid for by the federal government. In the Adirondacks, where there is no federal land, would the federal government still pay for reintroduction costs?

Could there be lost hunter revenue?

Minnesota

The wolf population in Minnesota grew from 750 wolves in 1972 to 1750 wolves in 1988. During this same period the harvest of white-tailed deer within the wolf range increased from 1 deer per mile^2 in 1972 to 2 deer per mile^2 in 1988. Therefore, there has probably been an increase in hunter revenue at the same time that wolf populations were increasing in northern Minnesota.

Yellowstone and Central Idaho

The recovery of a wolf population was predicted to result in a reduced number of big game animals available for hunting. Fewer big game animals would translate to a reduced number of hunters and hunter days spent in the field. Following the establishment of a recovered population of 100 wolves in Yellowstone, a 5 - 30 % reduction in some elk, deer, moose and bison populations is predicted. The associated losses of hunting opportunities in the Greater Yellowstone Area could translate into an estimated loss of hunter revenues of $206,000 to $414,000. A recovered population of 100 wolves in Idaho was predicted to necessitate a 396-594 reduction in cow elk harvest in order to maintain the current cow-bull ratio. The reduced harvest of elk in central Idaho could result in loss of hunter revenues totaling $570,000 to $850,000.

During the first two years of the wolf reintroduction program in Yellowstone, there has been no observed decrease in the number of hunters in the area. The estimates of lost hunter revenue that were calculated for the Final Environmental Impact Statement on the reintroduction of wolves to Yellowstone and Central Idaho are just that, estimates. The actual decrease or increase in hunter numbers and revenue remains to be seen.

What could the economic loss to farmers be?

Minnesota

The population of wolves in Minnesota increased from approximately 1200 to 2300 between 1978 and 1996. During this period the compensation payments paid for loss of livestock ranged from $14,444 to $43,664.

Yellowstone and Central Idaho

Table 11.1 lists the total cattle, sheep and livestock value that is expected to be lost each year as the total population nears 100 in Yellowstone and 100 in Central Idaho.

Table 11.1. Estimated losses of cattle, sheep and livestock value in the Yellowstone and Central Idaho recovery areas, as the total population of wolves in each area nears 100 wolves.

	Yellowstone	Central Idaho
Estimated Cattle Loss per year	1 - 32	1-17
Estimated Sheep Loss per year	17 - 100	32 - 92
Estimated Total Yearly Livestock Value Lost	$1,888 - 30,470	$2,923 - 18,503

During the first two years of the wolf reintroduction program in Yellowstone no cows and 10 sheep have been killed by wolves.

Northwestern Montana

In the 1980's wolves began to disperse south from Canada and naturally recolonize northwestern Montana near Glacier National Park. In 1992, there was an estimated population of 59 wolves in the area. From 1980 to 1993, wolves were confirmed to have killed livestock 7 times resulting in the loss of 12 sheep and 17 cattle. The Animal Damage Control suspected that wolves may have been involved in the killing of another 29 sheep and 34 cattle. The total value of livestock confirmed and presumed lost to wolves from 1980 - 1993 was $38,764.

North Carolina

There has only been one confirmed killing of livestock in North Carolina since wolves were reintroduced in 1987.

Will there be an increase in tourist revenues associated with wolf reintroduction?

Yellowstone and Central Idaho

During the first two years of the wolf reintroduction program in Yellowstone, a total of 8,000-10,000 people saw wolves. Visitation at the Northeast entrance to the park, which is the closest entrance to areas where wolves can be viewed consistently, increased during these years, while visitation at other gates in the park declined some. Businesses near the Northeast entrance reported great increases in business during the first two years after the reintroduction.

To prepare the Final Environmental Impact Statement for reintroduction of wolves to Yellowstone and Central Idaho, a survey was conducted of residents of Montana, Idaho and Wyoming and residents from outside of this three state region. People were asked if they would visit the Yellowstone or Central Idaho area more if wolves were present. Based on responses to this question it was estimated that residents of Montana, Idaho and Wyoming would increase their visitation to Yellowstone by 10.4% and to central Idaho by 1.9%. For those living outside of this three state region, visitation to Yellowstone would increase 4.8% and visitation to central Idaho would increase 8.2%. The total increase in visitor expenditures for the Yellowstone area was predicted to be $23 million and there was not enough information about average expenditure in the Idaho area to calculate the total increase in visitor expenditures. A small sample size limited the validity of this survey, but its estimate that visitation in the region would increase appears to be true for northern Yellowstone.

Minnesota

The International Wolf Center opened in Ely, MN in 1993. This town is one of the gateways to the Boundary Waters Canoe Area and is near the core wolf range in northern Minnesota. The International Wolf Center (IWC) offers wolf interpretive and educational programs and allows visitors to see live wolves within their captive facilities. A study of the economic impacts of the IWC on Ely's economy showed that most visitors to the area came because of the town's close proximity to the lakes and forests of the Boundary Water's Canoe Area. About 24% of the visitors to the area (or approximately 11,000 people), however, indicated that the presence of the International Wolf Center influenced their decision to visit Ely. The tourists who came to Ely to visit the Wolf Center tended to travel shorter distances and spend fewer nights in Ely then other tourists in the area. Tourists who were influenced by the presence of the wolf center were less likely to have

visited the Ely area previously than other tourists, so the Wolf Center may be serving an important role in bringing new people to the area that would not otherwise have visited. Total tourist expenditures attributable to the presence of the IWC were calculated to be $725,000 and the Wolf Center had an additional $1.5 million dollar impact through the hiring of employees, purchasing maintenance and heating supplies and buying local goods for sale in the gift shop.

Algonquin Park, Ontario

Since 1963, Algonquin Park has sponsored "wolf howls" for the public in August. This program has been very popular and in 1994 four howls were attended by a total of 7,780 people. Though no dollar figures are available, these programs are likely to bring a substantial amount of money into the community during the time that they are held.

- Unlike Yellowstone, with its open landscape and good viewpoints, the Adirondacks are heavily forested with limited opportunities to actually see wolves. Many lifelong residents of the Adirondacks have only seen the relatively abundant coyote 2 or 3 times in their lives.

- Most increases in tourism in northern Minnesota have been the direct result of the presence of the International Wolf Center, which provides education programs, interpretive displays and viewing of captive wolves for the public.

How can the potential economic benefits of wolf recovery in the Adirondacks be calculated? How could the local economy benefit most from the presence of wolves (e.g. guided tours, ecotourism, New York wolf center)?

Will there be less damage caused by beavers?

Though wolves are known to prey on beavers, they have never been shown to control beaver populations in areas where they both occur.

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12. Land Regulations Associated with the Reintroduction or Protection of Wolf Populations

Will new regulations/restrictions be imposed on private lands where wolves may settle?

There have been no major land use restrictions anywhere where wolves occur or have been reintroduced. Even in Minnesota, where wolves have been a threatened species since 1977, there have been no new land use restrictions imposed to protect or enhance wolf habitat. In North Carolina, the Yellowstone Region and Central Idaho, wolves have been reintroduced as experimental/non-essential populations; therefore no legal action limiting activities such as farming, logging or hunting can be implemented on private lands.

When wolves were reintroduced to Yellowstone and Central Idaho as non-essential/experimental populations, the only land-use restrictions that agencies needed to implement were:

> Restriction of human disturbance in the immediate vicinity of active den sites between April 1 and June 30. This restriction would only be implemented if the number of breeding pairs dropped to 5 or fewer.
>
> Restrictions on the use of toxic M-44 (cyanide shell) coyote control methods by the Animal Damage Control agency

If wolves had not been reintroduced as an experimental population but as an endangered species, more restrictions would probably have been imposed such as:

> Restrictions on livestock grazing in areas frequented by wolves, where it was determined that wolves would be in danger of being shot for killing cattle
>
> Some year round road closures in sensitive areas

Will there be restrictions on new road building?

The Eastern Timber Wolf Recovery plan suggests that roads within wolf range should be maintained at a density below 1 road per mile^2 where possible. On federal lands in Minnesota, an attempt is made to keep road density below a threshold of 1 road mile per mile^2 in areas where there is active logging. If new roads need to be built, old roads no longer actively used for logging are closed.

Will the state attempt to buy more wolf habitat?

There are no written recommendations to buy additional land for wolves in either the Eastern Timber Wolf Recovery Plan or in the Final Environmental Impact Statement on the reintroduction of wolves to Yellowstone and central Idaho. The red wolf reintroduction site in North Carolina is currently the only place where wolves are prevented from dispersing naturally on to other private and public lands and where agreements with private landowners are necessary. Private land agreements made with the US Fish and Wildlife Service give permission for wolves to inhabit private lands near the reintroduction site and for the Fish and Wildlife Service to enter private lands to monitor wolves. If an agreement cannot be reached, however, landowners may request that any wolves seen on the private land be removed by the Fish and Wildlife Service. Wolves are currently allowed on about 195,000 acres of private land in North Carolina. Four types of agreements are used: Memorandum of Understanding (MOU), Lease, Partner's Agreement and verbal agreement. The MOU, Lease and Partner's Agreement require official documentation. The Lease and the Partner's Agreement have provisions for monetary compensation.

The relative abundance of state land, designated as Forever Wild, that is found in the Adirondacks is viewed with varying degrees of regard and disdain by local residents. Many see the public lands in the Adirondacks as an asset that provides free recreation including camping, hiking, hunting, skiing, canoeing and wildlife viewing and that helps to sustain the local economy by attracting tourism dollars. Others dislike state held land and the Forever Wild designation because they feel that it diminishes the power of Adirondack residents to manage the Adirondacks and it removes business opportunities by locking up natural resources. Local timber mills do not like to see an increase in state owned land in New York because it potentially removes nearby timber resources from the market and results in haveing to ship timber from greater distances to keep their mills in operation.

Proposals for greater state ownership of land in the Adirondacks are a threat to some and an opportunity for others. Battles over state ownership and the Forever Wild designation have been fought in the park since its inception in the late 1800's and Adirondack residents are well versed in these issues.

The wolf is a large predator requiring large land areas. Though there is no precedence for land acquisition for wolves, many of those already embittered by land battles in this region may only see the wolf as one more reason for the state to gain more control over or buy private lands. provides more early successional forest habitat where deer thrive.

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13. Hunting Regulations

Where can wolves be legally hunted?

Wolves are listed as Endangered or Threatened under the Endangered Species Act in all of the lower 48 states, therefore they can not be legally hunted or trapped. When the time comes that they are no longer Threatened, states could consider re-opening wolf hunting seasons. It is legal to hunt and trap wolves in most parts of Canada and Alaska. In Ontario, hunting or trapping of wolves is illegal in Algonquin Park, but outside of the park boundaries anyone purchasing a small game license may kill as many wolves as they want.

Have there been any reductions of deer hunting limits (or other hoofed mammals) in areas that wolves inhabit?

No new rules governing deer (or other hoofed mammal) hunting have been imposed in North Carolina, the Yellowstone region, Idaho or Minnesota. Alligator River National Wildlife Refuge in North Carolina, the site for red wolf reintroductions, is the only wildlife refuge that allows the hunting of deer with hounds. In North Carolina, the Yellowstone Region and Central Idaho, wolves have been reintroduced as experimental/non-essential populations, therefore no legal action limiting activities such as farming, logging or hunting can be taken on private lands.

Have there been any restrictions on coyote hunting or trapping in areas that wolves inhabit?

The presence of wolves has caused no changes in rules governing trapping in North Carolina, the Yellowstone region, Idaho or Minnesota. Since 1987, large portions of northern Wisconsin have been closed to coyote hunting during the firearm deer season in order to protect a recovering and expanding wolf population.

Is the proposal to reintroduce wolves to the Adirondacks only a first step towards a larger goal of eliminating hunting from the Adirondacks?

There are animal welfare groups in this country who do call for the elimination of hunting. However, most of the groups in favor of the recovery of wolves in the Northeast have never advocated the elimination of hunting. Most conservationists have always known that hunters can be a powerful allies in their work to preserve wild places. Articles in environmental magazines recently have made a call for a new alliance between hunters and other recreational users of wild lands to halt the sprawl of development that threatens to take over many of our wild places.

In any debate, there are individuals and groups involved whose ideas and views fall along the entire range of the political spectrum. In the debate over wolf recovery there are many groups that support the reintroduction or recovery of wolves, but the processes by which these groups would like to move forward can be quite different. For example, most pro-wolf groups have never advocated any restrictions on hunting. A few, more radical groups, feel that the only way to truly have wild wolf populations is to eliminate human deer hunting. Therefore, all-encompassing statements such as, “No one who supports the reintroduction of wolves would support the elimination of hunting,” are not true. However, most environmental groups and individuals who support wolf recovery also support the continuation of hunting as part of our American culture and many Adirondack hunters also support wolf recovery.

Information Sources

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