Species Status Assessment

Class: Mammalia
Family: Canidae
Scientific Name: *Canis lupus*
Common Name: Wolf

Species synopsis:

Prior to the 19th century wolves ranged across most of North America. The taxonomy of these animals and the species that inhabited NY, is far from settled (Wilson and Reeder 2005) with the potential for recent and/or ancient hybridization contributing to the lack of clarity (vonHoldt et al. 2016). Two widely accepted descriptions based on morphology (Hall 1981, Nowak and Federoff 1996) both agree that the "eastern wolf" is a subspecies of Canis lupus, and that the "red wolf" is a distinct species, Canis rufus. Either or both may have been resident in NY in the past (Chambers et al 2012). Numerous molecular genetic studies have challenged these taxonomies, with 2 recent publications illustrating the ongoing lack of concurrence. Rutledge (2015) proposes the eastern wolf of Algonquin Park as a distinct species, Canis lycaon, but vonHoldt (2016) disagrees, finding that both eastern wolves and red wolves are admixtures of gray wolf and coyote. The current New York endangered species regulations (6 CRR-NY 182.5) specify the gray wolf, Canis lupus. Wilson and Reeder (2005) recently proposed changing the common name from "gray wolf" (as identified in NY's regulations) to "wolf", a convention used throughout this document.

Following a steep decline, the wolf is now established or recolonizing in at least 11 states in the United States including Michigan and Wisconsin, in the east. Wolves are still found throughout much of Canada and Alaska and parts of Montana, and in Wyoming in Yellowstone National Park (Whitaker and Hamilton 1998). Wolves, which occurred in all of New England and in New York (Paradiso and Nowak 1982) were extirpated from the Northeast by 1900. Estimates suggest significant suitable habitat currently exists in NY and New England (Mladenoff and Sickley 1998; Harrison and Chapin 1998).

I. Status

a. Current and Legal Protected Status

i. Federal Endangered **Candidate?** N/A

ii. New York Endangered; SGCN

b. Natural Heritage Program Rank

i. Global G4

ii. New York SX **Tracked by NYNHP?** Watch List

Other Rank:
IUCN Red List — (LC) Least concern

CITIES — Appendix II

The Northern Rocky Mountain Distinct Population Segment is delisted due to recovery, but the Western Great Lakes Distinct Population Segment continues to be listed as Endangered due to court action.

Status Discussion:
The wolf has been extirpated from most of contiguous U.S., including the Northeast, due to human-caused direct mortality. Reintroduced populations have recovered to 1,600 wolves across Montana, Idaho, and Wyoming. Breeding is occurring in Washington and Oregon as well, and dispersers have appeared in California, Utah, and Colorado. Many wolves (tens of thousands) remain in Canada and Alaska and more than 100,000 are in the Palearctic (NatureServe 2013). The Great Lakes population reached 4,500 and the species was delisted in Minnesota and Wisconsin and in the Michigan Upper Peninsula (USFWS 2011).

II. Abundance and Distribution Trends

a. North America

i. Abundance

____ declining ____increasing _____stable __X__ unknown

ii. Distribution:

____ declining ____increasing _____stable __X__ unknown

Time frame considered: _____

b. Regional (e.g., Atlantic Flyway, USFWS Region 5 – Northeast, Watershed, Hydrologic Unit)

i. Abundance

__X__ declining ____increasing ____stable _____unknown

ii. Distribution:

__X__ declining ____increasing ____stable _____unknown

Regional Unit Considered: ___Northeast_____
Time Frame Considered: ____1800s to present_____

c. Adjacent States and Provinces

CONNECTICUT Not Present __X____ No data _____

i. Abundance

____ declining ____ increasing ____ stable ____unknown

ii. Distribution:

____ declining ____ increasing ____ stable ____unknown

Time frame considered: _____
Listing Status: _____Not listed (SX)_____ SGCN? ___Yes___

MASSACHUSETTS **Not Present __X____** **No data _____**

i. **Abundance**

_____ declining _____ increasing _____ stable _____unknown

ii. **Distribution:**

_____ declining _____ increasing _____ stable _____unknown

Time frame considered: _____

Listing Status: _____Not listed (SX)_____ SGCN? __No___

NEW JERSEY **Not Present ___X____** **No data _____**

i. **Abundance**

_____ declining _____ increasing _____ stable _____unknown

ii. **Distribution:**

_____ declining _____ increasing _____ stable _____unknown

Time frame considered: _____

Listing Status: _____Not listed (SX)_____ SGCN? ___No____

ONTARIO **Not Present _____** **No data _____**

i. **Abundance**

_____ declining _____increasing ___X___ stable _____ unknown

ii. **Distribution:**

_____ declining _____increasing ___X___ stable _____ unknown

Time frame considered: _____

Listing Status: _____Not listed (S4)_____

PENNSYLVANIA **Not Present __X____** **No data _____**

i. **Abundance**

_____ declining _____increasing _____stable _____unknown

ii. **Distribution:**

_____ declining _____increasing _____stable _____unknown

Time frame considered: _____

Listing Status: _____Not listed (SX)_____ SGCN? _____

QUEBEC **Not Present _____** **No data _____**

i. **Abundance**

_____ declining _____increasing __X___ stable _____ unknown

ii. **Distribution:**

_____ declining _____increasing ___X___ stable _____ unknown

Time frame considered: _____

Listing Status: _____Not listed (S4)_____

VERMONT **Not Present ___X_____** **No data _____**

i. **Abundance**

_____ declining _____increasing _____stable _____unknown

ii. **Distribution:**

_____ declining _____increasing _____stable _____unknown

Time frame considered: _____

Listing Status: _____Not listed (SX)_____ SGCN? ____Yes____

d. NEW YORK **No data _____**

i. Abundance

____ declining ____ increasing ____ stable _____ unknown

ii. Distribution:

____ declining ____ increasing ____ stable _____ unknown

Time frame considered: ____Extirpated_____

Monitoring in New York.

None

Trends Discussion :

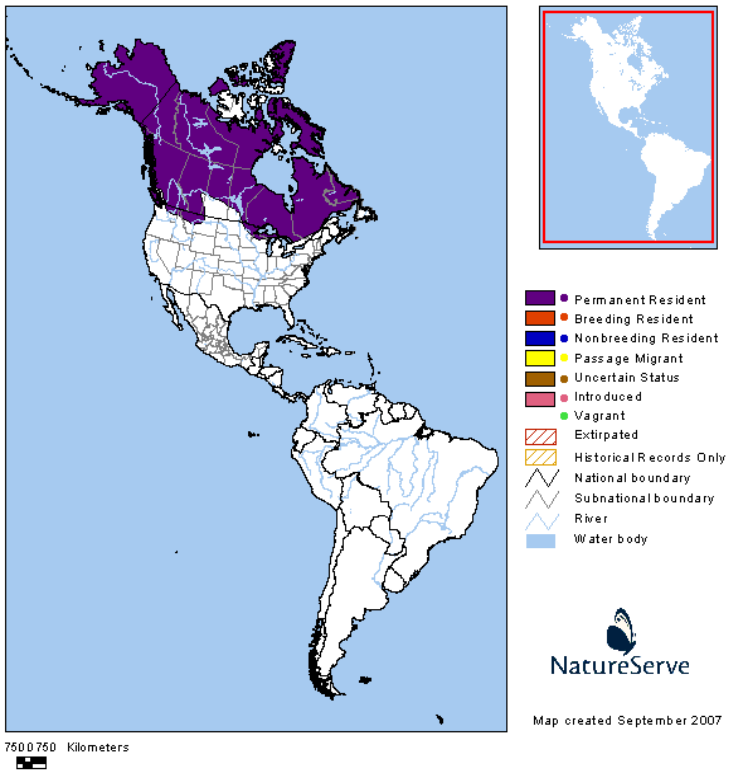

Figure 1. Distribution of the wolf in North America (NatureServe 2012).

III. New York Rarity, if known

Historic	# of Animals	# of Locations	% of State
prior to 1970	_____	_____	_____
prior to 1980	_____	_____	_____
prior to 1990	_____	_____	_____

Details of historic occurrence:

Current	# of Animals	# of Locations	% of State
	_____	_____	_____

Details of current occurrence:

New York's Contribution to Species North American Range:

% of NA Range in New York	Classification of New York Range
____ 100 (endemic)	____ Core
____ 76-99	____ Peripheral
____ 51-75	____ Disjunct
____ 26-50	Distance to core population:
_____ 1-25	_130km___

(Papineau Labelle Wildlife Reserve, Quebec)

IV. Primary Habitat or Community Type

1. Mixed Northern Hardwoods

2. Rocky Outcrop

3. Old Field Managed Grasslands

Habitat or Community Type Trend in New York:

____ Declining __X__ Stable ____ Increasing ____ Unknown

Time frame of decline/increase: _____

Habitat Specialist? _____ Yes __X__ No

Indicator Species? __X__ Yes _____ No

Habitat Discussion:

Wolves are considered to be habitat generalists and usually select habitat to maximize predation success rather than for specific vegetation characteristics per se (e.g., Mech and Boitani 2003). Estimates by Mladenoff and Sickley (1998) and Harrison and Chapin (1998) suggested that 20,000 mi^2 to 25,000 mi^2 of habitat remains in northern New England and 6,000 mi^2 in the Adirondack Park. They based their estimates on road densities, human densities, and available forested habitat. Mladenoff and Sickley (1998) suggested that 20,000 mi^2 of habitat could support 700 to 1,439 wolves. Mech (2006) found that Mladenoff and Sickley's predictive model for wolf recolonization in Wisconsin (and potentially for the Northeast) failed to account for the wolf's adaptability and capacity to colonize areas deemed <50% probable, including 22% of colonized areas with low probability. There is considerable evidence of wolves crossing highways and areas used intensively by humans in both Europe and North America (Merrill and Mech 2000, reviewed by Boitani 2003), suggesting that wolves might be able to successfully navigate the fragmented New England and Adirondack landscape if provided protection from intentional killing.

V. New York Species Demographics and Life History

__X___Breeder in New York

_X_ Summer Resident

_X_ Winter Resident

_____ Anadromous

_____ Non-breeder in New York

_____ Summer Resident

_____ Winter Resident

_____ Catadromous

_____ Migratory only

_____Unknown

Species Demographics and Life History Discussion

Wolves are exceedingly social animals, living in family groups or packs consisting of two to eight members, although packs of up to 21 have been reported (Eastern Timber Wolf Recovery Team 1992). Mech (1970) proposed that the basic component of the pack is the breeding pair, which is formed when a lone male and lone female mate, and the pack of two expands with the addition of the first litter. Between one and two years of age, some offspring will disperse to form new packs and others will mate and increase the size of the current pack. From then on, pack composition is reordered each year (Whitaker and Hamilton 1998). There is a dominance hierarchy within each pack and generally only the dominant pair breed, although there are exceptions (Packard *et al.* 1983).

Pups are born from early April through early May, and under good conditions litter sizes average four to seven (Mech 1970, Fuller 1989). Pups depend on their mother's milk for the first month. The pups first emerge from the den at about three weeks old, and are weaned approximately by week five. At about two months of age, the natal den, which is often a hole in the ground (but may also be a rock crevice, hollow log, under a stump, or some other protected place) is abandoned and the young are moved to one of a series of "rendezvous sites" above ground (Whitaker and Hamilton 1998).

By the time pups are seven to eight months old they are almost fully grown and begin traveling with the adults. Between their first and second years, young wolves may leave to try to find a mate and form a pack. Lone, dispersing wolves have traveled as far as 600 miles in search of a mate or territory (USFWS 2011).

Some offspring will remain with the pack, and others leave the territory as they mature. These individuals become lone wolves and either live nomadically over areas of 1,000 square miles (2,500 km^2) or more, or disperse out of the area, sometimes moving more than 500 miles (800 km) (Fritts 1983). If they find a member of the opposite sex and suitable range that is not already occupied, they may settle into a territory, mate, and begin their own pack (Eastern Timber Wolf Recovery Team 1992).

Wolves mature in their second year, but most do not breed until their third (Whitaker and Hamilton 1998). Mates sometimes form a lifelong bond (USFWS 2011). They can live 13 years and breed past 10 years of age (USFWS 2011).

There are two main periods in the annual lives of wolves: the first, from April to late fall, has them centering around the pups and the natal den and later rendezvous sites; the second period, which consumes the remaining months of the year, has the wolves engaged in maintaining their territory (Whitaker and Hamilton 1998).

Wolves travel over large areas to hunt, as far as 30 miles in a day (USFWS 2011).

VI. Threats:

Human activity associated with roads, vehicles, and houses seems to negatively influence the use of an area by wolves. Conversion of forest habitat to non-forest also negatively affects wolf densities. Wolves cannot survive without adequate prey, adequate protection, and adequate public support (Theberge *et al.* 1996). Connectivity with other wolf packs in the region would likely be important to recovery of wolves in the northeast (Kart *et al.* 2005).

According to Goldman (1944), the reduction of wolf populations in the Unites States was caused by: (1) intensive human settlement of the land, (2) direct contact with domestic livestock, (3) a lack of understanding about the animal's ecology and habits, (4) fears and superstitions about the animals, (5) overzealous control programs designed to exterminate it, and (6) perceived competition for deer and moose.

Once the range was reduced, parasites and disease also may have become more significant mortality factors. This is especially true of heartworm (*Dirofilaria immitis*), canine parvovirus (CPV) and Lyme disease (Goyal *et al.* 1986, Mech1986, Goyal *et al.* 1986, Mech and Fritts 1987, Eastern Timber Wolf Recovery Team 1992).

Development has had a negative effect on wolves. Increased human presence increases the chance of direct killing. Although undocumented, unnatural structures, sounds, and smells might deter wolves from inhabiting an area, and artificial corridors such as paved roads, power lines, and fences along interstate highways and railroads may prevent or minimize dispersal (Eastern Timber Wolf

Recovery Team 1992). Increased human presence also increases the chances of introducing new diseases and parasites to wolves via pets (Mech and Fritts 1987). Reduced prey species abundance and diversity reduce wolf food supply (Eastern Timber Wolf Recovery Team 1992).

Thiel (1985) found that when wolves were persecuted by humans in Wisconsin populations did not persist where road densities exceeded approximately 1km/km2. However, with sufficient protection from human-caused mortality, wolves have been documented persisting at road densities greater than 1km/km2 as public attitudes about wolves shifted (Mech 1989, Fuller et al. 1992, reviewed in Fuller et al. 2003). Thus, protection from hunting and trapping mortality may facilitate viable wolf populations in fragmented habitat with higher human population and road densities.

Wolves readily hybridize with eastern coyotes where they come into contact (e.g., Rutledge et al. 2010, Benson et al. 2012). Hybridization thus may be rampant in New York between recolonizing wolves (which would be at low density) and coyotes (which would be much more abundant).

Are there regulatory mechanisms that protect the species or its habitat in New York?

_____ No ____ Unknown

__X__ Yes

The Adirondack Park was created by the New York State Legislature in 1892. State-owned Forest Preserve comprises 2.6 million acres (42%) and is protected by the state constitution as "forever wild." One million acres of the Forest Preserve is further classified as wilderness.

Although considered extirpated in New York, the wolf is protected by its status as status as state- and federal-listed Endangered, except in those states which have achieved recovery and removed it from the list.

As a state listed endangered species in New York, the gray wolf is protected by Environmental Conservation Law (ECL) section 11-0535 and the New York Code of Rules and Regulations (6 NYCRR Part 182). A permit is required for any proposed project that may result in a take of a species listed as Threatened or Endangered, including, but not limited to, actions that may kill or harm individual animals or result in the adverse modification, degradation or destruction of habitat occupied by the listed species.

Describe knowledge of management/conservation actions that are needed for recovery/conservation, or to eliminate, minimize, or compensate for the identified threats:

Conservation actions following IUCN taxonomy are categorized in the table.

Conservation Actions	
Action Category	**Action**
Species Management	Species reintroduction

The Comprehensive Wildlife Conservation Strategy (NYSDEC 2005) includes recommendations for the following actions for large mammals that have been extirpated in New York.

Habitat research:

___ Conduct biological assessment for species shown to be socially acceptable.

Other actions:

___ Conduct public attitude surveys when decision makers are of the opinion that there is a reasonable chance of public support for the restoration of an extirpated species.

Relocation/ reintroduction:

___ Restore species believed likely to succeed and that are socially acceptable and monitor their progress.

Ecologically sound management includes (1) protection where needed to help restore the wolf to areas of its original range and to preserve a naturally functioning population that can serve as a living museum, as a scientific subject, and as a reservoir to repopulate adjacent areas, (2) depredation control where wolves kill domestic animals, (3) restocking of wolves into suitable areas of their former range when feasible, (4) continued research and monitoring of wolf populations, and (5) provision of adequate prey diversity and numbers through habitat and population management and reintroductions where appropriate (Eastern Timber Wolf Recovery Team 1992).

Wolves have successfully recolonized regions of northern Wisconsin (800) and the Michigan Upper Peninsula (650) with habitat, road and human densities comparable to that of the Adirondack Park. Adirondack residents were evenly split with respect to approving or disapproving of restoring wolves to the Adirondacks: 42% approve, 41% disapprove, 17% neither approved nor disapproved. Statewide, a majority of New York residents (60%) approved, 34% neither approved nor disapproved, and 6% disapproved (Enck and Brown 2000).

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