

Let's Look at Foxes: Part 1

By Greg Sykes (greg@grsykes.com)

Many people have wondered about wildlife policies and the factors that go into making the various decisions made by wildlife officials. Instead of the typical Q/A format, this article answers these questions in a narrative using foxes as an example.

A major consideration towards wildlife conservation, which includes helping sick and injured members of a species, is whether or not it is [native](#). For instance, gray foxes (*Urocyon cinereoargenteus*) consist of roughly 16 subspecies and range from northern South America up to most of the forested 48 contiguous United States. They flourished in North American woodlands for hundreds of millennia and their regional ancestry goes back millions of years. Though a canid, gray foxes adapted to climb trees thanks to strong, curved claws. In trees, they avoid wolves, cougars, and other creatures wanting a fox lunch. The omnivorous foxes eat from a broad menu including small mammals such as rodents, birds (including eggs and nestlings), insects, fruits, and nuts and can also find some of their food in trees. In an ecosystem, they are an intermediary predator. The gray fox is a native species to Northern Virginia.

Gray foxes still live in Virginia, but their numbers plummeted over the past several hundred years. This population drop aligns with European settlers arriving and clearing the fox's required forested habitat for farmland and later urban sprawl. This same human activity, including exterminating large predators, made an inviting place for red foxes (*Vulpes vulpes*). Around 1800, red foxes appeared in Mid-Atlantic and southeastern states. These critters cannot climb trees. Their dimensions range widely, averaging around 11 pounds and 3.5 feet long (head to tail), and are slightly larger than gray foxes. Red foxes have approximately 45 subspecies, of which 10 are native to North America; the exact numbers vary according to the taxonomic authority and identification method. While red fox fossils from the Late Pleistocene age were found in Virginia, these animals migrated north as the glaciers receded and were presumed absent from this state until recently. Genetic testing on East Coast red fox populations, including Northern Virginian representatives, show that some are descendants from imported Old World subspecies that escaped from fur farms or fox hunts. Red foxes are still listed as a [Virginia game animal](#) due to controversial fox hunts. However, most of them are northern North American immigrants (subspecies *V. vulpes fulvus*). DNA studies suggest that red fox populations were present, albeit in low numbers, in the Appalachians before European arrival but current evidence show no mass fox migration across from the west. Since red foxes are American and moved south on their own accord, they are generally regarded as a native species although, one way or another, Northern Virginia's red foxes are here because of human activity (*i.e.*, not locally native). People rolled out the red carpet for red foxes! Intelligent and adaptable, red foxes exploited the same deforestation, habitat fragmentation, and urbanization that shrank gray fox populations.

Twenty years ago, KPW had no red foxes. During this time, rabbits hopped through the woods and occasionally a wild turkey's call trilled across the morning air. Once the red foxes moved into the neighborhood, they obliterated these two species. A local stream's name, Rabbit Branch, is a reminder of an animal now gone. Foxes are often the classroom example in stable predator-prey models, where the predator's population increases shortly after the prey levels rise and the predator's numbers drop following a



Figure 1. After mating in the winter, red foxes bear young in the spring. The typical number of kits (cubs or pups) is around five. Foxes make terrific parents and guard the young. While foxes may move their dens even with very young kits, this little fellow explores the outside of an established den complex used over several generations. Active dens with kits strongly smell as fox waste permeates the area.

dip in prey. These relationships evolve over time. Certainly, species like rabbits need a predator to cap their numbers from exploding and ravaging the local flora. In the red fox's case here, an animal blitzed into a new area, causing ecological imbalance. The omnivorous red fox, whose dietary pallet is heavier on meat than that of the grey fox, could decimate rabbit, turkey, and other vulnerable prey populations because the crafty canids found many additional food resources.

Currently, Fairfax County's red foxes lack significant large predators to keep them in check. Even though coyotes dominate foxes in wilderness areas, recent research finds the two species often (but not always) getting along in urban environments. Canine-susceptible diseases, including rabies, distemper (both Old World imports), mange, heartworm, and intestinal worms, are the main factors keeping fox populations in check.

Many times, concerned people who find a mangy fox want to help and treat it. However, [Virginia State Code § 29.1-508.1 Use of drugs on vertebrate wildlife](#) states that to administer medication for disease prevention or treatment to vertebrate wildlife, one must have a permit. Only licensed veterinarians or wildlife rehabilitators working under the direction of a veterinarian may legally treat infected animals in their care with an approved permit from the Virginia Department of Game and Inland Fisheries. The drugs that are often recommended can be fatal if ingested at the wrong dose or by the wrong species, including domestic animals. Foxes with mange also may develop underlying infections as the result of scratching and biting, so treatments are best left to the professionals.



Figure 2. Mange, caused by one of several mite species, is a disease that keeps fox populations in check. This fox shows the beginning stages along its hind quarters and tail. As the infection advances, the animal scratches more and more, which burns energy and opens wounds. Although diseases are part of nature, face to face encounters with any animal suffering from advanced mange or rabies is truly saddening, even for a seasoned biologist.

At first, spotting a red fox—a usually nocturnal species—during daylight hours might be startling and rabid madness is attributed to this atypical behavior. However, urban environments impact organisms in strange ways, such as keeping foxes active through the day. Still, most of their monotone bark-screech calls to mates occur at night.

With this bit of background, [Part 2](#) will look further into the relationship between red foxes and humans.

Further reading:

Fox paleontology:

Kurtén, Björn and Elaine Anderson. 1980. *Pleistocene Mammals of North America*. Columbia University Press. New York, NY. pp. 442.

Gray foxes:

Bozarth, Christine A. et al. 2011. Phylogeography of the gray fox (*Urocyon cinereoargenteus*) in the eastern United States. *Journal of Mammalogy*. 92(2):283-294. <https://academic.oup.com/jmammal/article/92/2/283/863160>

- https://animaldiversity.org/accounts/Urocyon_cinereoargenteus/
- <https://www.dgif.virginia.gov/wildlife/information/eastern-gray-fox/>
- <https://www.fs.fed.us/database/feis/animals/mammal/urci/all.html>

Red foxes:

Kasprowicz, Adrienne E. et al. 2015. Fate of the other redcoat: remnants of colonial British foxes in the eastern United States. *Journal of Mammalogy* 97(1):298–309. <https://academic.oup.com/jmammal/article/97/1/298/2459818>

Statham, Mark J. et al. 2012. The origin of recently established red fox populations in the United States: translocations or natural range expansions? *Journal of Mammalogy* 93(1):52-65. <https://academic.oup.com/jmammal/article/93/1/52/899501>

- https://animaldiversity.org/accounts/Vulpes_vulpes/
- <http://online.sfsu.edu/bholzman/courses/Spring05projects/RedFoxCasey/REdFOxFInal-Casey.htm>
- http://www.liquisearch.com/red_fox/evolution/subspecies

A good summery on predator-prey population dynamics in stable systems:

<https://steemit.com/steemstem/@masterwu/foxes-hunting-bunnies-population-modelling-with-the-predator-prey-equations>

Coyote and fox interactions:

Boissoneault, Lorraine. 2018. Foxes and coyotes are natural enemies. Or are they? *Smithsonian.com* <https://www.smithsonianmag.com/science-nature/foxes-and-coyotes-are-natural-enemies-or-are-they-180968424/>

Mueller, Marcus A. et al. 2018. Coexistence of coyotes (*Canis latrans*) and red foxes (*Vulpes vulpes*) in an urban landscape. *PLoS ONE* 13(1): e0190971. <https://doi.org/10.1371/journal.pone.0190971>

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