

## The Landscape Genetics of *Canis* species in Ontario: Unraveling Ontario's *Canis*-soup

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*While studying the genetic profiles of a population of eastern Canadian wolves (Canis lupus lycaon) in Algonquin Provincial Park, we found a close similarity to the red wolf (C. rufus). Based on DNA data we have proposed that both the red wolf and eastern Canadian wolf represent an entirely North American-evolved species (C. lycaon) and that coyotes (C. latrans) diverged from this lineage approximately 150,000 years ago. We have developed DNA profiles that allow us to distinguish C. lupus, C. latrans, C. lycaon and C. lycaon/latrans hybrids. Using DNA extracted from teeth of skulls obtained by the Ontario Ministry of Natural Resources we have determined the distribution of these four types of canids in central Ontario in the 1960s, 30-40 years after coyotes reached the area. The Algonquin Park population contained no animals with gray wolf and a 50:50 mixture of lycaon and latrans mitochondrial DNA. To assess the present situation we examined the profiles of 260 animals from central Ontario using DNA from furs, tissues obtained from trappers and blood from live-trapped animals in Algonquin Park. Animals to the south and east of Algonquin Park appear to be mainly lycaon/latrans hybrids and distinct from the animals in the Park. The Park animals contain less coyote DNA but appear to have been subjected to further coyote introgression since the 1960s based on an increase in the proportion of latrans mitochondrial DNA. Animals with lupus mitochondrial DNAs are rare south of Sudbury but predominate in Pukaskwa National Park and the northern Boreal region. In northwestern Ontario and Minnesota there is also a mixture of animals with lupus and lycaon mitochondrial DNAs. Over the Ontario landscape there is a correlation between the density of deer and the presence of lycaon and lycaon/latrans hybrids and absence of lupus.*