

Taxonomy as destiny. Conflicting phylogenetic trees and conservation priorities in Canadian chorus frogs

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Amphibians are the most threatened terrestrial vertebrate class in the world, with up to 1/3 of extant species at risk of extinction, and many populations undergoing precipitous declines. Among the species with declining populations are the trilling chorus frogs in Ontario and Quebec. The current status of chorus frogs in Canada remains problematic in terms of taxonomy and evolutionary affinities, with obvious consequences for management decisions and conservation prioritization. They have been characterized based on morphology, call playback, and mitochondrial DNA sequences, but these varying approaches have led to disparate conclusions. Recent mtDNA work suggests two disjunct populations of boreal chorus frogs (*Pseudacris maculata*), one in western Canada and the other in southwestern Quebec and southern Ontario, with a putative (as yet uncharacterized) contact zone in SW Ontario between *P. maculata* and western chorus frogs (*P. triseriata*). We lack data on evolutionary affinities and phylogeography across the entire Canadian range of *P. maculata*, as well as on the extent of hybridization (if any) and location of the contact zone between *triseriata* and *maculata*. We address this data deficit by surveying a panel of 1000s of nuclear Single Nucleotide Polymorphisms (SNPs) and mitochondrial DNA sequences from both species with samples spanning the entire distribution of both taxa from the Northwest Territories and Alberta through to Quebec, with particular focus on the contact zone. Consonant with previous studies we found mtDNA haplotypes for both boreal and western chorus frogs in Ontario and Quebec, although western chorus frog haplotypes appear to extend further north than previously indicated. However, patterns for our nuclear SNPs were discordant and we found the most compelling evidence for only two clusters, one corresponding to Alberta and Northwest Territories, and the other to all individuals in Ontario and Quebec. We cannot assert with any confidence what evolutionary forces or historical factors might have produced these patterns until we sample across the USA portion

of the distributions of these taxa. For now, we recommend maintaining the current two designatable units (DUs) in Ontario and Quebec for conservation, with adjustment to the boundaries between them based on mtDNA patterns. We discuss the implications of such phylogenetic discordance for species concepts and for conservation prioritization in chorus frogs and more generally.