

NOTE: At its November 2015 Wildlife Species Assessment Meeting (November 22-26, 2015) COSEWIC considered the document entitled "Western Chorus Frog (*Pseudacris triseriata*) and Boreal Chorus Frog (*P. maculata*): clarification concerning the wildlife species listed under SARA in light of recent taxonomic interpretations" written by J.P. Bogart, E.B. Taylor and R. Boles. COSEWIC subsequently produced its own statement dated November 26, 2015, and it has also been published on the Species at Risk Public Registry (<http://www.sararegistry.gc.ca/default.asp?lang=En&n=B8408428-1>).

**Western Chorus Frog (*Pseudacris triseriata*) and Boreal Chorus Frog (*P. maculata*):
clarification concerning the wildlife species listed under SARA in light of recent taxonomic
interpretations.**

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Preface

This document was produced in response to a request by Environment Canada to clarify recent taxonomic advances on the Western Chorus Frog and Boreal Chorus Frog and their implications for the chorus frogs listed as Threatened under the Species at Risk Act in 2010. COSEWIC will discuss the document at their upcoming meeting on 22-26 November 2015, and it will be proposed to make it available to the public through the Species at Risk Registry.

In 2008, COSEWIC assessed the status of Western Chorus Frog (*Pseudacris triseriata*) in Canada. It assessed the Carolinian population as Not at Risk and the Great Lakes/St. Lawrence – Canadian Shield population as Threatened. The latter population was listed under the *Species at Risk Act* (SARA) in 2010. The geographic distributions of both populations are shown in Figure 1, which is reproduced from COSEWIC’s status report (COSEWIC 2008a).

Some authorities (Crother 2012; Dodd 2013; Frost 2013) have recently allocated chorus frogs in southeastern Ontario and in southwestern Québec (i.e., those frogs in the Great Lakes/St. Lawrence – Canadian Shield population) to a different species, Boreal Chorus Frog (*Pseudacris maculata*), whose range in Canada had been previously limited to the prairie provinces and western Ontario. This revision to the geographic range of both species is based on data from Lemmon et al. (2007) and supplemental genetic data, which identified two genetic lineages within southern Ontario and Québec based on mitochondrial DNA. The genetic lineage found in southeastern Ontario and southwestern Québec corresponded to that of Boreal Chorus Frog, while the lineage from extreme southern Ontario corresponded to Western Chorus Frog (*P. triseriata*), which is also found in the adjacent U.S.A. (see Figure 2).

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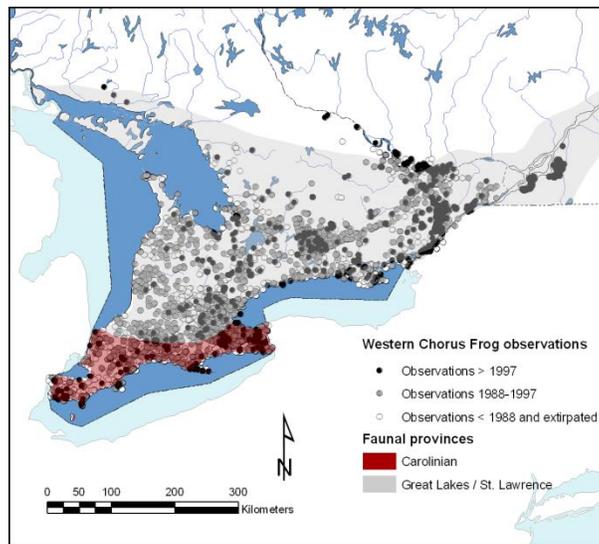


Figure 1. Distribution of Western Chorus Frog (*Pseudacris triseriata*) in Canada as interpreted by COSEWIC in their 2008 assessment. The Carolinian population (pink shading) was assessed as Not at Risk, while the Great Lakes/St. Lawrence – Canadian Shield population (grey shading above the pink) was assessed as Threatened. Source: COSEWIC (2008a).

The findings of Lemmon et al. (2007) were considered in COSEWIC's 2008 assessment. However, COSEWIC argued that the discovery of populations possessing a mitochondrial DNA lineage similar to that of Boreal Chorus Frog was not necessarily sufficient to consider those populations as Boreal Chorus Frogs. Other amphibian species are known to possess multiple distinct mitochondrial DNA lineages, some of which may be similar to completely different species as a result of, for instance, historical hybridization between species. In such situations, changes to the species boundaries may not follow, and other data such as from nuclear DNA, morphology, behaviour, etc, are generally also considered to more fully understand taxonomic relationships. In the case of chorus frogs from southeastern Ontario and southwestern Québec, the mitochondrial DNA evidence was relatively recent in 2008 and corroborating evidence was lacking at that time to support the recognition of Boreal Chorus Frog there. As such, COSEWIC considered it premature to consider the chorus frogs in southeastern Ontario and southwestern Québec to be Boreal Chorus Frog (*P. maculata*). COSEWIC instead retained the taxonomic interpretation from Platz (1989), which considers all chorus frogs in southern Ontario and southwestern Québec as the Western Chorus Frog (*P. triseriata*). Notwithstanding taxonomic uncertainty, COSEWIC did use the geographic distribution of the mitochondrial DNA lineages, in part, to establish the boundary between the two populations for Western Chorus Frog that were assessed, namely the Carolinian population and the Great Lakes/St. Lawrence – Canadian Shield population.

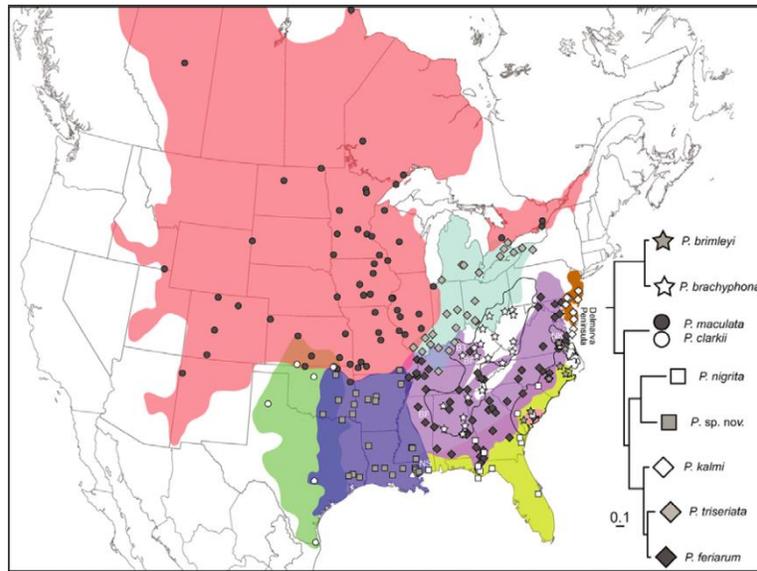


Figure 2. Distribution of genetic lineages of a group of closely related chorus frog species in North America as determined by Lemmon *et al.* (2007) from mitochondrial DNA sequences. The genetic lineage found to be associated with Western Chorus Frogs (*Pseudacris triseriata*) is shown as grey diamonds against a blue-green background that includes southwestern Ontario. The lineage associated with Boreal Chorus Frogs (*P. maculata*) is shown as black dots against the pink background, which is predominantly in the west. Note the presence of the Boreal Chorus Frog-type lineage in a disjunct region in southeastern Ontario and southwestern Québec (shown in pink), an area where Western Chorus Frog had previously been considered to occur. Source: Lemmon *et al.* (2007).

Whatever name is ascribed to them in the literature, chorus frogs within southeastern Ontario and southwestern Quebec are listed under the Act as Threatened. As COSEWIC clarified in a supplement to its assessment (COSEWIC 2008b), the southern boundary of the Great Lakes/St. Lawrence – Canadian Shield population is demarcated explicitly by the Terrestrial Amphibians and Reptiles Faunal Provinces line shown in Figure 4 of COSEWIC’s status report (Figure 1 in this document). The northern boundary extends just beyond the northern boundary of the Great Lakes St. Lawrence Faunal Province, to include a narrow southern fringe of the adjacent Canadian Shield Faunal Province where there are a small number of occurrences (Figure 1). NatureServe (2015), a non-profit organization that provides high-quality scientific expertise for conservation, currently considers the chorus frogs assessed as Threatened by COSEWIC (2008a) to be Boreal Chorus Frog. These frogs have been assigned a NatureServe rank of imperiled (S2) in Québec.

When COSEWIC reassesses the status of the Great Lakes/St. Lawrence – Canadian Shield population, it will take new available chorus frog research into account. For example, recent genetic and acoustic data support the contention that the Great Lakes/St. Lawrence – Canadian

Shield population of chorus frogs is the Boreal Chorus Frog, *P. maculata* (Rogic et al. 2015). A possible outcome of COSEWIC's upcoming reassessment (anticipated around 2017-2018) is the adoption of the name Boreal Chorus Frog for this population. If this occurs, COSEWIC will examine the entire Canadian distribution of that species, which includes large parts of mid-western Canada (see Figure 2), to determine whether population components therein warrant separate status assessments in accordance with COSEWIC guidelines (COSEWIC 2014).

Based on its geographic distribution and other factors, it would be highly unlikely that COSEWIC would assess the entire Canadian distribution of Boreal Chorus Frog as a single unit. In particular, a large distance separates the area in southeastern Ontario and southwestern Québec from the more western portion of the species distribution, likely reflecting different post-glacial histories of chorus frogs in the two regions. They also occupy almost entirely separate Amphibians and Reptiles Faunal Provinces. Consequently, these differences would qualify as both "discrete" and "evolutionarily significant" (COSEWIC 2014). As such it is anticipated that the Great Lakes/St. Lawrence – Canadian Shield population currently listed under SARA would continue to be assessed separately from the mid-western population in Canada.

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