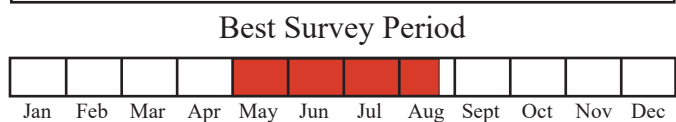
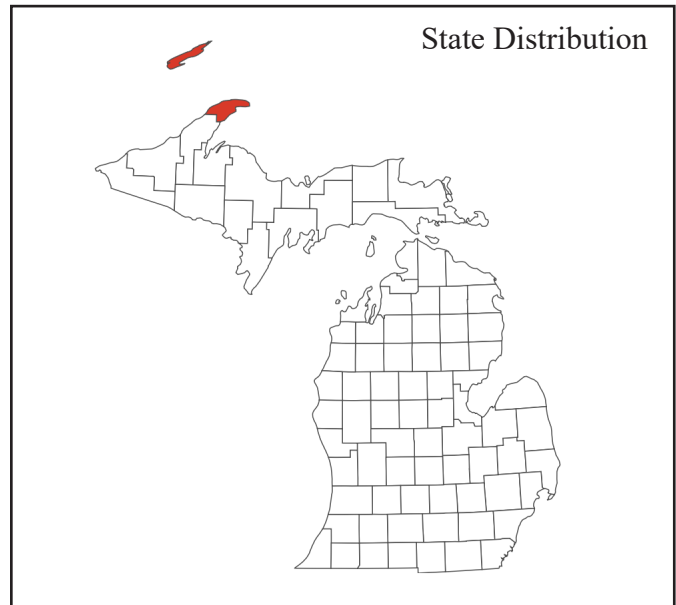




Photo by Nick F, CC BY-NC 4.0



Status: State special concern

Global And State Rank: G5 (Secure) / S1 (Critically imperiled)

Family: Hylidae (treefrogs)

Synonyms: *Chorophilus septentrionalis*, *Chorophilus nigrinus septentrionalis*, *Hyla canadensis*, *Hyla septentrionalis*, *Hylodes maculatus*, *Pseudacris nigrita septentrionalis*, *Pseudacris nigrita maculata*, *Pseudacris septentrionalis*, *Pseudacris triseriata maculata*

Taxonomy: The boreal chorus frog has not been found to be a distinct lineage, but due to morphological and behavioral differences from the western chorus frog, it is recognized as a separate species until data suggest otherwise (Lemmon et al. 2007).

Total Range: The boreal chorus frog is mainly found in the northern and western Lake Superior Basin. In Canada, its range extends from northern Ontario, northeast Alberta to eastern British Columbia. In the United States, the boreal chorus frog resides all throughout Minnesota, Wisconsin, and

Illinois, small populations south to New Mexico, eastern Arizona, and west into Idaho, Utah, and Minnesota (Harding and Mifsud 2017, Sheldon 2022). Disjunct populations have been found in Quebec and other parts of east-central Ontario (Harding and Mifsud 2017).

State Distribution: Little information is available on the distribution of this species in Michigan. Historically, this species has only been documented in Michigan on Isle Royale (MNFI 2026). However, this species has recently been reported from several counties in the western Upper Peninsula including Keweenaw and Houghton counties in the Keweenaw Peninsula (Michigan Herp Atlas 2026) and Gogebic County (Rutherford 2020). Targeted, systematic, and comprehensive surveys have not been conducted for this species across its range in Michigan, and potential exists for this species to occur in additional locations in the state.

Recognition: The boreal chorus frog is a small frog, with adults ranging from 1.9 to 3.9 cm (0.75 to 1.5 in) (Smith 1987). Boreal chorus frogs have moist, **slightly bumpy skin** with the toes extending into expanded pads. They are typically **brown**,



red, tan, as well as gray to olive with a cream or white belly. Some have been found with dark spots on their throat and chest (Harding and Mifsud 2017). This species has a **distinct white or cream-colored stripe along the upper lip that is bordered by a dark stripe that extends from the nostril to the eye and along the side of the body.** The boreal chorus frog **lacks dorsolateral folds** or raised ridges that run along each side of its back. Most individuals have a variation in **three back stripes which are frequently broken up into rows of spots** (Harding and Mifsud 2017). Males, on average, are slightly smaller than females and have a yellowish vocal sac when calling during the breeding season (Harding and Mifsud 2017). The males have a short, rising, scratchy breeding call, similar to the sound made when running a thumbnail down the teeth of a fine-toothed comb. This species has limited climbing ability and tends to hop instead of leap due to its shorter hind limbs.

Tadpoles have round bodies that can be gray or brown on top with some older specimens having a mottled brassy coloration (Harding and Mifsud 2017). They have clear tailfins with dark flecks and an intestinal coil that shows through their bronze belly (Harding and Mifsud 2017). Tadpoles' maximum length prior to metamorphosis is around 3.0 cm (1.2 in) (Smith 1987).

Michigan frogs that are similar in appearance to the boreal chorus frog include the western chorus frog (*Pseudacris triseriata*), spring peeper (*Pseudacris crucifer*), and wood frog (*Lithobates sylvaticus*). The western chorus frog looks almost identical to the boreal chorus frog but has three back stripes that extend from the top of its head down to the back as well as a dark triangular shaped mark or stripe on the top of its head. The spring peeper lacks the lengthwise striping and has an X-shaped mark on its back. Wood frogs also lack the back stripes but have dorsolateral folds or a ridge of skin down each side of the back (Harding and Mifsud 2017). Wood frogs also have a distinctive dark "mask" that extends from the eye through the tympanum (circular eardrum) to the shoulder that is

wider than the dark facial stripe on a boreal chorus frog and does not extend past the shoulder along the side of the body as it does on a boreal chorus frog. All three of these species also have breeding calls that differ from that of the boreal chorus frog.

Best Survey Time/Phenology: The best time to survey for this species is during the breeding season which typically occurs in May. The best way to survey for this species during the breeding season is to listen for males calling in the evening, typically after sunset (Graeter et al. 2013). Frog call survey conditions are optimal on evenings that are over 16°C (60°F) and humid or raining (light rain). Breeding frog call surveys also can be conducted using automated recording devices which can be installed at or near breeding sites and set to record frog calls continuously during the breeding season.

Additional methods can be used to survey for boreal chorus frogs. Visual encounter surveys can be effective for detecting adults in the spring (Graeter et al. 2013), particularly if surveys are conducted during the breeding season and in areas with suitable breeding habitat. Visual encounter surveys, dipnetting (i.e., sweeping a net through an aquatic habitat), and/or trapping (i.e., with aquatic minnow traps) also can be used to survey for boreal chorus frog larvae or tadpoles in the summer (Graeter et al. 2013).

Habitat: Habitat preferences for the boreal chorus frog vary depending on the latitude. In Michigan, this species can be found around the rocky shores of Isle Royale in Lake Superior, as well as in boreal forests, swamps, and bogs (Smith 1987). In the breeding season, this species utilizes areas with grassy meadows, swamps, small shallow ponds (e.g., vernal pools), and other habitats with intermediate hydroperiods with low desiccation risk (Dodd 2023). Breeding sites almost always do not contain fish with rare reports of this species being observed at sites with fish (Dodd 2023). The boreal chorus frog is associated with many forest types including mixed boreal-coniferous forests in the northern parts of its range, mature deciduous forests, mixed



forests, and urban habitats (Browne et al. 2009, Dodd 2023). In the nonbreeding season, the boreal chorus frog inhabits moist forested areas, old fields, or upland grasslands where they can forage in the leaf litter (Dodd 2023).

Biology: The boreal chorus frog phenology and calling activity depends on environmental conditions, elevation, vegetation, and latitude (Dodd 2023). Boreal chorus frogs typically emerge from overwintering in March in lowland areas but may not emerge until May in the mountains and high elevation areas. They remain active until September, October, or even November (even after cold spells) in some areas (NatureServe 2026). In the lowland or low elevation areas, they tend to be most active during the day in early spring and fall, but become nocturnal or crepuscular (i.e., active in the evenings or early mornings) during warmer temperatures in late spring and summer (NatureServe 2026). In the mountains, boreal chorus frogs are most active between late morning and mid-afternoon, although calling activity during the breeding season can extend late into the night (NatureServe 2026).

Calling during the breeding season typically occurs in April and May, usually when air temperatures are above 10°C (50°F) (NatureServe 2026). Ice is not uncommon on breeding sites at the start of the breeding season with hydrology and weekly precipitation being the most common predictors. Calling can continue in June and July and even into August in parts of the species' range (e.g., Manitoba, Colorado), particularly after heavy rains, during flooding events, or at breeding sites in the mountains or at high elevations (Dodd 2023, NatureServe 2026). Calling can be heard on clear, sunny days, but as water temperatures warm, calling is mostly confined to evenings or cloudy, rainy days (Harding and Mifsud 2017).

Males arrive before females and are typically observed calling from grass tussocks. When emergent vegetation is not available, they have been observed calling from the shoreline, open water, cracks within mud, or on land up to 4 m (13 ft) away from

water (Dodd 2023).

In Michigan, the boreal chorus frogs lay their eggs from early May through early July (Smith 1987). Females lay from 500 to 1,500 eggs in several loose, gelatinous clusters that are usually attached to submerged grasses or sticks with around 20 to 300 eggs in each cluster (Harding and Mifsud 2017). Hatching occurs between 3 and 14 days, but it is dependent on water temperature (Harding and Mifsud 2017). It takes a minimum of 55 days for egg and larval development, with metamorphosis beginning as early as June, occurring primarily in July and August, and extending into the fall, particularly in the mountains/higher elevations (Smith 1983, NatureServe 2026). This species can grow to maturity and breed in less than a year (Harding and Mifsud 2017).

It is estimated that around two out of every three boreal chorus frogs at a breeding site are first-year arrivals, with only a small number breeding in multiple years (Dodd 2023). Maturity may not be achieved until the second or third summers for some individuals, especially in northern latitudes or with early onset of cold weather (Dodd 2023, NatureServe 2026). In Colorado, survivorship probability was estimated to be 67-79%, with longevity of 5-7 years (Muths et al. 2016). This species will reach breeding size within 3 years and could live around 2-4 years after reaching sexual maturity (Dodd 2023). Adult survivorship has also been found to be density-dependent, with adult survival decreasing as population size increases (Kissel et al. 2020).

Boreal chorus frogs are opportunistic feeders that consume a variety of small invertebrates, containing mostly insects. Their diet consists of mostly beetles and flies, but other invertebrates such as ants, flies, moths, caterpillars, leaf hoppers, and spiders also are consumed (Dodd 2023). Tadpoles are mostly herbivorous and mainly feed on algae. Froglets feed on tiny prey including mites, midges, and springtails. Causes of mortality for this species include predation, desiccation, winter kill, and nat-



ural death. Predators of this species include snakes, such as garter snakes and ribbon snakes, birds, small mammals, and larger frogs. Large salamanders, snakes, bass, and predaceous invertebrates will consume boreal chorus frog larvae (Dodd 2023).

Although most boreal chorus frogs remain within 20-50 m (66-164 ft) of their breeding sites, they have been reported to move or disperse 183-244 m (600-800 ft) through upland habitats to reach wetland habitats (Spencer 1964, Dodd 2023). Boreal chorus frogs have been recorded to move less than 61 m (200 ft) per day, with a maximum distance of 580 m (0.4 mi) between captures (Dodd 2023). They tend to remain near their breeding sites year-round, spending most of their time hidden beneath logs, rocks, and leaf litter or in burrows (Harding and Mifsud 2017). Boreal chorus frogs have been found to overwinter underground below the frost line in animal burrows, ant mounds, in leaf litter, under rocks, and root channels under decaying stumps (Dodd 2023).

Conservation/Management: Maintaining suitable habitat complexes is critical to conservation of this species. Habitats for boreal chorus frogs should contain a complex, heterogeneous environment of grasses, sedges, tall shrubs, and herbaceous vegetation with low or open canopy cover (Constible et al. 2001, Ouellet et al. 2009). For this species to persist, they require wetlands with high water level recharge that can hold water long enough for tadpoles to metamorphose, don't have fish, and flood annually (Watts et al. 2015). Other major considerations include vegetation, hydrology, and connectivity between wetlands (Scherer et al. 2012). Areas with suitable topography that boreal chorus frogs can traverse, sufficient moisture, and stepping-stone wetlands between occupied wetlands are crucial for facilitating population and genetic connectivity within and among populations of this species (Dodd 2023).

Because amphibians have permeable skin, they are particularly sensitive to changes in water quality

due to changes in pH and pollutants such as pesticides and other chemicals. In breeding ponds in Colorado, it was found that the lethal pH for the boreal chorus frog was 4.8, with 5.2 being the lowest tolerated pH with no mortality (Corn et al. 1989). Decreased abundance of boreal chorus frogs has been found in breeding pools in areas where oil is being extracted and brine is released into the pools (Dodd 2023). In the Williston Basin of North and South Dakota and Montana, chloride concentrations of 123 mg/L decreased larval abundance by 25% (Hossack et al. 2018). When concentrations reached 596 mg/L, larval abundance in breeding ponds was reduced by 75% (Hossack et al. 2018). In agricultural areas, high levels of DDE were present in 10% of chorus frog livers in Iowa as well as 14 other pesticides (Smalling et al. 2015). The presence of these chemicals can have lethal and sublethal effects on these frogs. In areas where this species is present, avoiding or limiting the use of pesticides would benefit this species. Creating or maintaining vegetative buffers around breeding pools and other wetland habitats adjacent to agricultural or developed lands could help reduce chemical runoff into their habitats.

Boreal chorus frogs choose breeding sites that do not contain fish (Amburgey et al. 2014), even though there are rare reports that they have been found to breed in sites with fish. Buxton et al. (2017) found that in ponds where western mosquitofish (*Gambusia affinis*) were present, boreal chorus frogs laid fewer eggs. It has also been reported that fish stocking in areas that this species uses for breeding can cause this species to disappear (Sexton and Phillips 1986). If ponds are created for amphibian species, fish introductions should be avoided or discontinued to avoid further population declines.

Research Needs: The current status, distribution, and abundance of boreal chorus frogs in Michigan is largely unknown. Additional surveys are needed to document new populations, as well as confirm sightings and monitor known extant populations. In Michigan, little is known about their life history



as well as habitat requirements at both the local and landscape scales. Specific factors that are contributing to this species' decline in Michigan also need to be further investigated. More information is needed on the population structure and dynamics for effective conservation and management strategies.

Related Abstracts: boreal forest, mesic northern forest, volcanic bedrock lakeshore, sandstone bedrock lakeshore, wooded dune and swale complex, hardwood-conifer swamp, bog, emergent marsh, Great Lakes marsh, intermittent wetland, northern wet meadow, submergent marsh, mink frog

Selected References

- Amburgey, S., W. C. Funk, M. Murphy, and E. Muths. 2012. Effects of hydroperiod duration on survival, developmental rate, and size at metamorphosis in boreal chorus frog tadpoles (*Pseudacris maculata*). *Herpetologica* 68:456–467.
- Browne, C., C. Paszkowski, L. Foote, and A. Moenting. 2009. The relationship of amphibian abundance to habitat features across spatial scales in the boreal plains. *Ecoscience* 16:209–223.
- Buxton, V. L., M. P. Ward, and J. H. Sperry. 2017. Frog breeding pond selection in response to predators and conspecific cues. *Ethology* 123:397–404.
- Collins, J. T., and T. W. Taggart. 2009. Standard common and current scientific names for North American amphibians, turtles, reptiles & crocodilians. Sixth edition. Center for North American Herpetology, Lawrence, Kansas.
- Constible, J. M., P. T. Gregory, and B. R. Anholt. 2001. Patterns of distribution, relative abundance, and microhabitat use of anurans in a boreal landscape influenced by fire and timber harvest. *Écoscience* 8:462–470.
- Conant, R. and Collins, J.T., 1998. A field guide to reptiles & amphibians of eastern and central North America. Third Ed, Expanded. Houghton Mifflin Company, New York, NY.
- Corn, P. S., W. Stolzenburg, and R. B. Bury. 1989. Acid precipitation studies in Colorado and Wyoming: interim report of surveys of montane amphibians and water chemistry. Page 108 USGS Report.
- Dodd, K. C. 2023. Frogs of the United States and Canada. Johns Hopkins University Press, Baltimore, MD.
- Graeter, G. J., K. A. Buhlmann, L. R. Wilkinson, and J. W. Gibbons, editors. 2013. Inventory and monitoring: recommended techniques for reptiles and amphibians. Partners in Amphibian and Reptile Conservation Technical Publication IM-1, Birmingham, AL.
- Harding, J. H. and D. A. Mifsud. 2017. Amphibians and reptiles of the Great Lakes region. Revised edition. University of Michigan Press, Ann Arbor, MI. 408 pp.
- Holman, J. A. 2012. The amphibians and reptiles of Michigan. Wayne State University Press, Detroit, MI. 291 pp.
- Hossack, B. R., K. L. Smalling, C. W. Anderson, T. M. Preston, I. M. Cozzarelli, and R. Ken Honeycutt. 2018. Effects of persistent energy-related brine contamination on amphibian abundance in national wildlife refuge wetlands. *Biological Conservation* 228:36–43.
- Kissel, A. M., S. Tenan, and E. Muths. 2020. Density dependence and adult survival drive dynamics in two high elevation amphibian populations. *Diversity* 12:478.
- Lemmon, E. M., A. R. Lemmon, J. T. Collins, J. A. Lee-Yaw, and D. C. Cannatella. 2007. Phylogeny-based delimitation of species boundaries and contact zones in the trilling chorus frogs (*Pseu-*



- dacris*). Molecular Phylogenetics and Evolution 44:1068–1082.
- Michigan Herp Atlas. 2026. Boreal chorus frog (*Pseudacris maculata*). <<https://miherpatlas.org/>>. Accessed 27 August 2026.
- Michigan Natural Features Inventory (MNFI). 2026. Michigan Natural Heritage Database, Lansing, MI.
- Muths, E. L., R. D. Scherer, S. M. Amburgey, T. Matthews, A. W. Spencer, and P. S. Corn. 2016. First estimates of the probability of survival in a small-bodied, high-elevation frog (Boreal Chorus Frog, *Pseudacris maculata*), or how historical data can be useful. Canadian Journal of Zoology 94:599–606.
- NatureServe. 2026. NatureServe Network Biodiversity Location Data accessed through NatureServe Explorer [web application]. NatureServe, Arlington, Virginia. <<https://explorer.natureserve.org/>>. Accessed 31 March 2026.
- Ouellet, M., C. Fortin, and M.-J. Grimard. 2009. Distribution and habitat use of the boreal chorus frog (*Pseudacris maculata*) at its extreme north-eastern range limit. Herpetological Conservation and Biology 4(2).
- Rutherford, R. D. 2020. iNaturalist observation: <<https://www.inaturalist.org/observations/37888472>>. Accessed on 27 August 2026.
- Scherer, R., E. Muths, and B. Noon. 2012. The importance of local and landscape-scale processes to the occupancy of wetlands by pond-breeding amphibians. Population Ecology 54:487–498.
- Sheldon, A. B. 2022. Amphibians & reptiles of Minnesota, Wisconsin & Michigan. Second edition. Kollath+Stensaas Publishing, Duluth, MN. 203 pp.
- Sexton, O. J. and C. Phillips. 1986. A qualitative study of fish–amphibian interactions in 3 Missouri ponds. Transactions of the Missouri Academy of Science 86:25–35.
- Smalling, K. L., R. Reeves, E. Muths, M. Vandever, W. A. Battaglin, M. L. Hladik, and C. L. Pierce. 2015. Pesticide concentrations in frog tissue and wetland habitats in a landscape dominated by agriculture. Science of the Total Environment 502:80–90.
- Smith, D. C. 1983. Factors controlling tadpole populations of the chorus frog (*Pseudacris triseriata*) on Isle Royale, Michigan. Ecology 64:501–510.
- Smith, D. C. 1987. Adult recruitment in chorus frogs: effects of size and date at metamorphosis. Ecology 68:344–350.
- Watts, A. G., P. Schlichting, S. Billerman, B. Jesmer, S. Micheletti, M.-J. Fortin, C. Funk, P. Hapeman, E. L. Muths, and M. A. Murphy. 2015. How spatio-temporal habitat connectivity affects amphibian genetic structure. Frontiers in Genetics 6.
- Werner, J. K., B. A. Maxell, P. Hendricks and D. L. Flath. 2004. Amphibians and reptiles of Montana. Mountain Press Publishing Company, Missoula, Montana. 262 pp.

Abstract Citation

Hukill, B. and Y. Lee. 2026. Species Abstract for *Pseudacris maculata* (Boreal chorus frog). Michigan Natural Features Inventory, Lansing, Michigan, USA.

Copyright 2026 Michigan State University Board of Trustees.



Funding for this project was through the Michigan Department of Natural Resources' State Wildlife Grant T-9-T in cooperation with the U.S. Fish and Wildlife Service, Office of Conservation Investment.

