Lithobates palustris LeConte, 1825 — Pickerel frog

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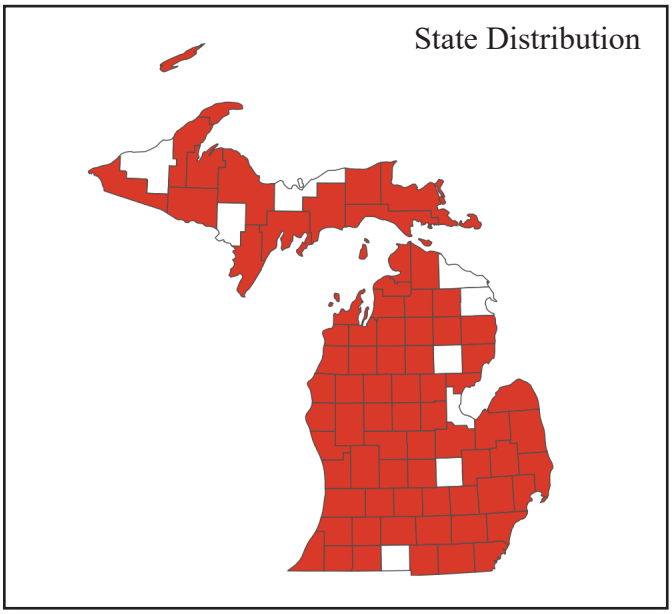
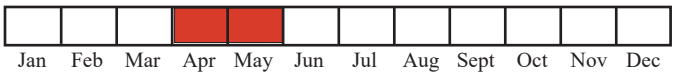


Best Survey Period



Status: State special concern

Global and state rank: G5(Secure) / S3 (Vulnerable)

Family: Ranidae (true frogs)

Synonyms: *Rana palustris* (LeConte, 1825)

Taxonomy: The taxonomy of American frogs in this family (i.e., ranids) is controversial, with three taxonomic and naming arrangements proposed based on current understanding of the evolutionary history of this group. Yuan et al. (2016) proposed a single-genus arrangement, placing all Eurasian *Rana* and *Pseudorana* as well as all American ranids into *Rana*. Che et al. (2007) proposed three genera, largely in agreement with the earlier arrangement by Frost et al. (2006), which recognizes *Pseudorana* in Asia, *Rana* in Eurasia and western North America, and *Lithobates* in the Americas. The three-genus model has been widely accepted in publications for more than 15 years, suggesting relative taxonomic stability. Most recently, Dubois et al. (2021) proposed seven genera which recognize *Pseudorana*, *Rana*, and *Liuhurana* in Eurasia; *Amerana* for the Pacific Coast ranids of North America; *Aquarana* for the bullfrogs and allies; *Boreorana* as a monotypic genus for the wood frog (*Lithobates sylvaticus*); and *Lithobates* for the leopard frogs and allies. This model is still undergoing review and discussion and has not been widely accepted at this time.

Total Range: The pickerel frog has a broad distribution across eastern North America. It can be found from southern Quebec, Ontario, and the Maritimes, southward through New England, in the eastern Appalachian region, in northern Georgia, Alabama, and Mississippi, in southern Michigan, northern and central Indiana, in southern Wisconsin, eastern Iowa, parts of Missouri and eastern Oklahoma, and in parts of Texas (Dodd 2023, NatureServe 2025).

State Distribution: The pickerel frog can be found throughout the state. Pickerel frogs have been reported from most counties in Michigan (Michigan Natural Features Inventory [MNFI] 2025). Observations are more scattered in the Upper Peninsula (Casper et al. 2015), with one record as far north as Keweenaw County. Most observations

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from the Lower Peninsula are from Berrien, Kent, Kalkaska, Manistee, and Oakland counties (MNFI 2025). Given their patchy distribution, pickerel frog populations in Michigan may be small and locally restricted. However, systematic, targeted surveys and monitoring for this species have not been conducted statewide. Potential exists for this species to occur in additional locations in the state.

Recognition: Adult pickerel frogs measure 5.1 - 7.6 cm (2 - 3 in) in body length, with females generally larger than males (Dodd, 2023, Myers et al. 2025). They are light brown or olive green in color with **two parallel rows of dark brown, squarish blotches, often outlined in black, running down the back** in between **two cream-colored dorsolateral folds** (small ridges of skin that run along the sides of the back). Their **upper lip is white**, and the **underside of their hind legs and lower belly or groin area is yellowish or orangish color** (Dodd 2023). The underside of their belly and throat is white. Their breeding call is a short, low-pitched snoring croak (Given 2005, Harding and Mifsud 2017).

The northern leopard frog is similar in appearance but can be distinguished by its dark (black or brown), more rounded (circular to elliptical), dorsal blotches which are usually outlined in white and are distributed irregularly over the back and sides of the body. Its underside is white and lacks yellow coloring on the underside of the legs and groin (Harding and Mifsud 2017). Additionally, the breeding call of the northern leopard frog is a long, rattling snore that contains grunts and clucks (Harding and Mifsud 2017).

Best survey time/phenology: In Michigan, pickerel frogs can be surveyed from early spring through late summer when they are active (Harding and Mifsud 2017). Visual encounter surveys (VES) are recommended, with surveyors searching under logs, rocks, leaf litter and herbaceous vegetation along stream banks, pools, and other moist habitats (Crump and Scott 1994). Surveys are most effective in the morning or early evening when frogs are most active (Crump and Scott 1994, Sargent 2000). These surveys can also be conducted at breeding sites. Larvae can be surveyed during the day at known or potential breeding pools using dip nets (Crouch and Paton 2002).

Individuals can also be detected using breeding call surveys (Crump and Scott 1994, Knutson et al. 2000). These surveys should be conducted from April through the end of May and should begin after sunset and end around midnight (Sargent 2000, Crouch and Paton 2002). Surveyors should listen for males calling at each breeding site for 5-10 minutes, particularly after rainfall, when calling activity is heightened (Crump and Scott 1994, Crouch and Paton 2002). Call surveys should be repeated over multiple nights, especially when air temperatures are cool to moderate; calling typically ceases when temperatures fall below approximately 7.2°C -12.7°C (45°-55°F), so surveys should not occur on colder nights (Sargent 2000).

Habitat: Pickerel frogs inhabit both forested and open wetlands in Michigan, favoring habitats with springs, seeps, slow-moving streams, marshes, ponds, bogs, shrubby/open wet meadows, fens, forested wetlands, and backwater sloughs and swamps (Harding and Mifsud 2017, MNFI 2025). They prefer cool, clear and unpolluted waters, and are often found areas along the margins of aquatic habitats with dense herbaceous vegetation and abundant ground cover such as logs, rocks, and leaf litter (Herrmann et al. 2005, Harding and Mifsud 2017, Myers et al. 2025). Pickerel frogs utilize shallow aquatic habitats, including vernal pools, marshes, roadside ditches, ponds, and floodplain wetlands, for breeding (Brown and Morris 1990, Dodd 2023).

Biology: Pickerel frogs are generally active from April through October in Michigan (Harding and Mifsud 2017). Upon spring emergence, pickerel frogs move to shallow, quiet, warm water for breeding. Pickerel frogs breed annually in spring, typically between April and May in Michigan (Harding and Mifsud 2017). Individuals migrate to breeding sites a few days or weeks before breeding begins

(Dodd 2023). Males will call continually from the same site until they attract a female (Given 2005). During breeding, the male grasps the female from behind with his front arms and externally fertilizes her eggs as she deposits them onto submerged vegetation (Myers et al. 2025). Clutch sizes range from 1,700 to 3,000 eggs that hatch in approximately 11–21 days (Dodd 2023). The larval stage lasts for about 3 months (Myers et al. 2025), and individuals reach sexual maturity 10–13 months after transforming into adults (Meshaka et al. 2012).

After breeding, individuals disperse to sparsely wooded streamside environments, ponds, forested swamps, bogs, fens, or open/shrubby wet meadows where they remain through the summer months (DeGraaf and Rudis 1983, Johnson 1984, Conant and Collins 1991, Redmer and Mierzwa 1994, Harding and Mifsud 2017). Pickerel frogs may become nocturnal during the hot summer months (Harding and Mifsud 2017). In the fall and winter, they overwinter in the mud bottoms of ponds, spring seeps, and other aquatic habitats, but sometimes will remain slightly active during mild winters (DeGraaf and Rudis 1983, Johnson 1984, Green and Pauley 1987, Harding and Mifsud 2017, Myers et al. 2025).

The diet of pickerel frogs appears to vary by age class. Adults feed on insects, spiders, and other invertebrates (Pope 1944, Harding and Mifsud 2017). The tadpoles feed on plant material including algae and detritus (Pope 1944, Harding and Mifsud 2017). Predators of adult pickerel frogs include bald eagles (*Haliaeetus leucocephalus*, State Special Concern), other birds, American bullfrogs (*Lithobates catesbeianeus*), green frogs (*Lithobates clamitans*), snakes, mink (*Mustela vison*), and raccoons (*Procyon lotor*) (Pope 1944, Applegate 1990, Beane 1990). Aquatic predators that may prey on pickerel frog tadpoles include newts (*Notophthalmus viridescens*), other large salamanders, dragonfly (e.g., *Anax* spp.) larvae, predaceous diving water beetles (*Dytiscus* spp.) (Brodie and Formanowicz 1983, Wilbur and Fauth 1990).

Adult pickerel frogs may have skin secretions that are toxic or distasteful to predators (Dickerson 1906, Schaaf and Smith 1970). The pickerel frog's skin contains antimicrobial peptides that protect it from bacteria, viruses, fungi, and parasites (Ladram et al. 2016, Varga et al. 2019). Noxious skin secretions are produced by glands along the dorsolateral folds on the back of the frog as a deterrent against predators (Dodd 2023). While likely distasteful, there is no evidence that these secretions are lethal to predators or humans (Harding and Mifsud 2017).

Conservation/management: Pickerel frog populations face a variety of threats, including habitat loss and fragmentation, wetland degradation, and infectious diseases. Clearcutting eliminates cooler, shaded habitats that are critical for maintaining thermal and moisture conditions for frogs (Patrick et al. 2006). Development has reduced and fragmented upland and aquatic habitats, disrupting seasonal movements and often creating barriers between populations (Nicholls et al. 2017, NatureServe 2025)). Urbanization can also alter hydroperiods and introduce predatory fish species into larval habitats (Rubbo and Kiesecker 2005). Disease is also a threat as larval pickerel frogs may be more susceptible to ranaviruses than larvae of other amphibian species (Hoverman et al. 2010). Human-modified aquatic habitats, such as roadside ditches and retention ponds, can act as corridors for disease transmission between isolated populations, and outbreaks during the breeding season could lead to long-term population declines (Hoverman et al. 2010, Richter et al. 2013).

Management for pickerel frogs in Michigan should emphasize preservation of contiguous forested and open wetlands and upland forests near breeding habitats to ensure population persistence (Kolozsvary & Swihart 1999). Further fragmentation and degradation of existing habitat can be prevented by implementing less intensive forestry practices, preventing alterations to wetland hydroperiods, protecting breeding and overwintering sites, and maintaining vegetated buffers around themto support sufficient and high-quality habitat for population

persistence. Disease monitoring at known breeding sites can help prevent the spread of pathogens that could decimate already vulnerable populations and help conserve known populations.

Comments: The common name comes from its historical use as bait for catching pickerel fish (Harding and Mifsud 2017).

Research needs: Research on post-breeding habitat use and impacts of water pollution and infectious diseases is lacking in Michigan. Studying post-breeding dispersal and overwintering behavior is crucial for identifying habitat needs throughout the active season. Since many of the known pickerel frog populations and habitats are fragmented, more information on population structure is needed to guide efforts to preserve habitat connectivity. The direct impacts of land clearing and water pollution on pickerel frog populations need to be quantified in Michigan to understand how survival and abundance at all life stages could be affected. Emerging diseases, including ranavirus and *Batrachochytrium dendrobatidis* (Bd), pose significant conservation challenges, emphasizing the need for pathogen sampling in pickerel frog populations to inform effective management practices.

Related abstracts: Blanchard's cricket frog, marbled salamander, small-mouthed salamander, spotted turtle, Kirtland's snake, Blanding's turtle, wood turtle, eastern box turtle, eastern fox snake, eastern massasauga, copper-bellied water snake, swamp metalmark, Mitchell's satyr, Poweshiek skipperling, blazing star borer, Culver's root borer, silphium borer moth, regal fern borer, Hine's emerald dragonfly, incurvate emerald, Cerulean warbler, prothonotary warbler, red-shouldered hawk, marsh wren, black tern, yellow rail, king rail, bald eagle, black-crowned night-heron, bog, coastal fen, coastal plain marsh, floodplain forest, Great Lakes marsh, hardwood-conifer swamp, interdunal wetland, intermittent wetland, lakeplain wet prairie, muskeg, northern fen, northern hardwood swamp, northern wet meadow, patterned fen, poor fen, prairie fen, rich conifer swamp, rich tamarack swamp, southern hardwood swamp, southern wet meadow, wet prairie, wet-mesic flatwoods, wet-mesic prairie, wooded dune and swale complex

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