

Heartleaf Pond

Heartleaf pond was designated as a Certified Vernal Pool in 1996 and is one of over sixty Certified Vernal Pools in the Town of Concord.

What is a Vernal Pool?

Vernal pools are seasonally wet depressions that provide unique wildlife habitats. Also known as ephemeral pools, autumnal pools, and temporary woodland ponds, they typically fill with water in the autumn or winter due to rainfall and rising groundwater, and generally remain ponded through the spring into the summer. Because of low oxygen levels and periodic drying, vernal pools don't support breeding populations of fish, which prey heavily on amphibian eggs and larvae. Some species that use vernal pools rely exclusively on this fish-free habitat, and have evolved life cycles to adapt to the ephemeral nature of vernal pools. Such species are known as obligate vernal pool species and include the "mole" or ambystomid salamanders such as spotted salamander, blue-spotted salamander, and marbled salamander, as well as wood frog and the eastern spadefoot toad. Fairy shrimp are small crustaceans that live only in vernal pools. Other species which commonly use vernal pools, but don't necessarily require them to survive, such as the spring peeper or American toad, are known as facultative vernal pool species.

What Vernal Pool Species are in Heartleaf Pond?

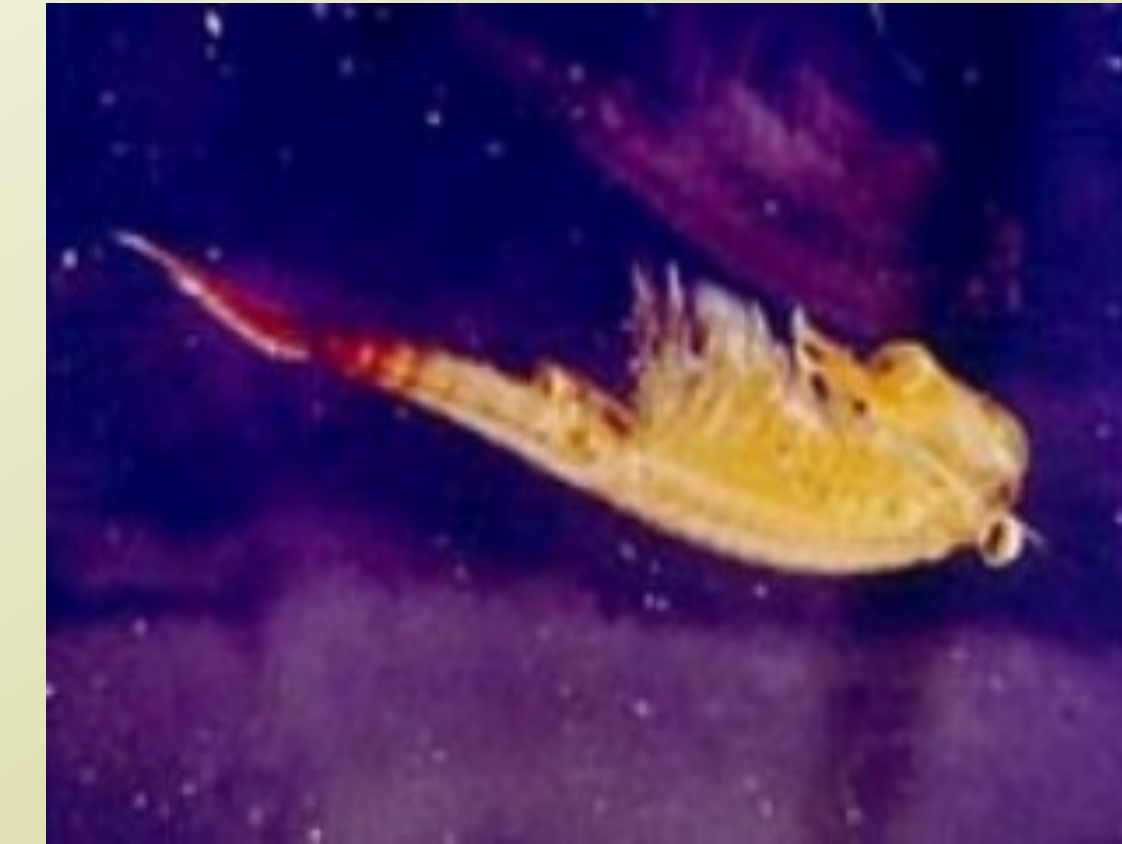
When Heartleaf Pond was certified as a vernal pool in 1996, wood frogs, blue-spotted salamanders and spring peepers were observed and evidence of these species was used in the certification process. These are just the species documented at the time of certification, it is possible that additional vernal pool species are present today.



Wood frog; Obligate vernal pool species

Wood frog

In early spring, sometimes before the ice has even melted, wood frogs make their way to vernal pools where they lay their eggs. The distinctive "quacking" sound made by the male wood frog is often the first sign of a vernal pool. The female wood frog will lay up to 3,000 eggs each and often form large egg masses which float to the surface of the pool and hatch into tadpoles within a few weeks. The tadpoles will spend the next 2-4 months feeding on algae and plant matter until they develop into froglets and shift their diet to small insects and invertebrates. During the winter, wood frogs will hibernate under stumps, logs, or leaf litter where they freeze almost completely solid until thawing out in the spring and returning to a vernal pool (their cells are kept alive by an infusion of glucose produced in the fall). Most wood frogs will return to the same pool each year.



Fairy shrimp; Obligate vernal pool species



Spotted salamander; Obligate vernal pool species

How Does a Vernal Pool Become Certified?

In Massachusetts, vernal pool certification is administered by the Massachusetts Division of Fisheries and Wildlife Natural Heritage and Endangered Species program (NHESP). Observations of suspected vernal pool habitat are submitted to NHESP by individuals, scientists, resource managers, or other interested parties to determine if the pool meets the biological and physical criteria to become a certified vernal pool. Different methods can be used to certify a pool depending on what species are found. In all cases, evidence must be shown that there is no permanently flowing outlet and no reproducing fish population. Other observations like the egg masses photographed below, wood frog choruses, or mated pairs of certain species are needed to meet the biological criteria for certification. **Be sure to obtain property owner permission to evaluate and certify a vernal pool.**



Spring peeper; Facultative vernal pool species

Spring Peeper

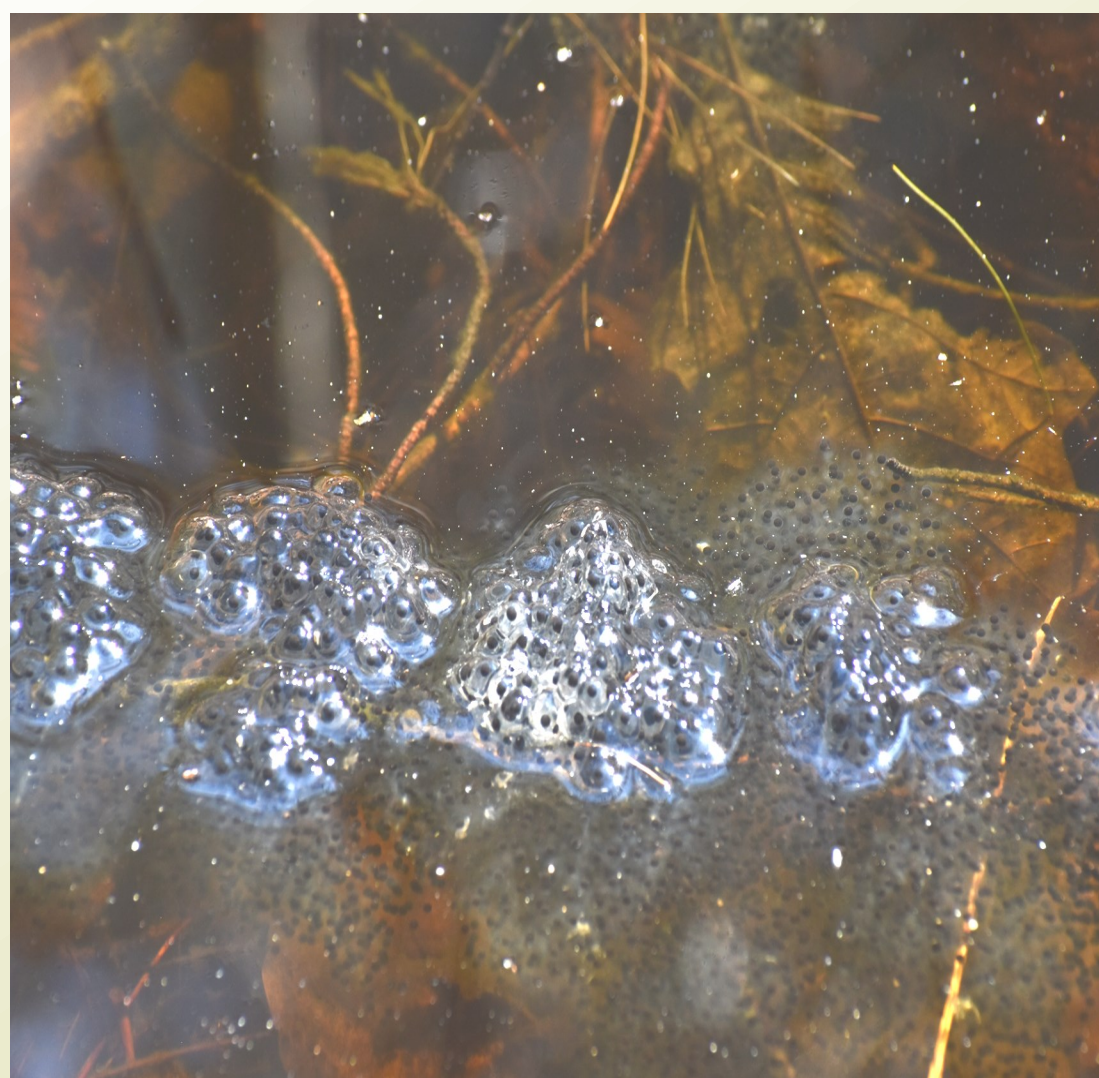
Spring peepers, whose name comes from their signature high-pitched calls of the male spring peeper which can be heard from late February through May, depending on temperatures. Female spring peepers use vernal pools and other wetland habitats to lay their eggs and can lay up to one thousand eggs per year. The eggs attach to plant material and shallow water and hatch into tadpoles within a few days. Tadpoles will feed on algae in the water until they develop into froglets late in the summer and their diet shifts to small insects. During the winter, spring peepers hibernate under logs, loose bark or buried into the soil.



Blandings turtle; A state listed threatened species under the MA Endangered Species Act and sometimes found at vernal pools



Wood turtle; A state listed species of special concern under the MA Endangered Species Act and sometimes found at vernal pools



These salamander egg mass photographed at Heartleaf Pond are evidence of breeding activity of an obligate vernal pool species and also indicate that there is no predatory fish population. The absence of predatory fish is such a critical piece of the vernal pool puzzle because these species have adapted to lay eggs in a "fishless" environment. If predatory fish were present they would feed on the eggs, drastically reducing or completely eliminating the number of eggs that successfully hatch into salamanders or tadpoles.



Blue-spotted salamander; Obligate vernal pool species

Blue-spotted salamander

Adult blue-spotted salamanders emerge from hibernation during the first rainy nights of spring and travel to vernal pools to breed. After mating, the female lays her eggs. These are encased in a jelly like substance and are attached to the submerged stems of plants. After several weeks, the larvae hatch. At first, these larvae eat only planktonic animals. As they grow in size, they eat aquatic worms, insect larvae, and small crustaceans. The larvae are preyed upon by both adult and larval aquatic insects, marbled salamander larvae and turtles. By late summer, the transformed juvenile salamanders will leave the pool to begin their terrestrial lives in the upland forests near the vernal pool. Blue-spotted salamanders are a state listed, threatened rare species.

Are Vernal Pools Protected?

Statewide, certified vernal pools receive protection under the Massachusetts Wetlands Protection Act, Surface Water Quality Standards, Environmental Title 5 & Forest Cutting Practices Act Regulations when certain activities are proposed near the pool and the pool meets various other criteria. In Concord, all certified vernal pools receive additional protection under the Concord Wetlands Protection Bylaw.

One of the best ways to protect a vernal pool is to have it certified. Throughout many parts of the year vernal pools are dry, making these habitats easily missed during the planning process for any development or changes in land use. Vernal pools, and the species that need them to survive, are extremely sensitive to outside pressures and having a record of these habitats can help ensure they remain intact and undisturbed.

Because of the vernal pool's unique features and diverse habitat, we ask that you remain on the BFRT, properly dispose of unwanted trash or debris, and enjoy the frog croaks and spring peeper calls of Heartleaf Pond from afar.