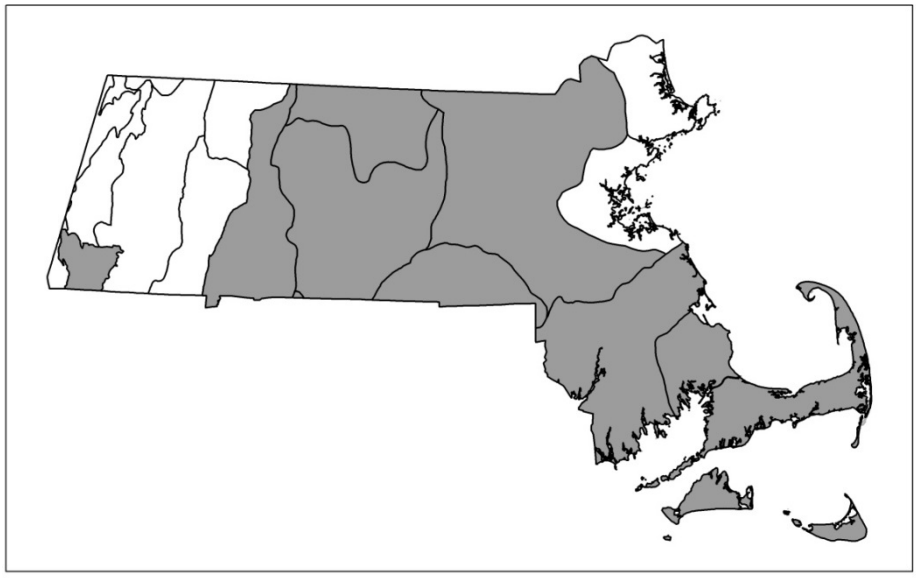
Kettlehole Level Bog

Community Code: CP2B0C1100

State Rank: S2



Concept: A variant of level bogs occurring in kettle depressions in sandy glacial outwash. Vegetation is typically zoned in rings.

Environmental Setting: Kettlehole Level Bogs are a subset of Level Bogs that occur in iceblock depressions (commonly called kettleholes) in sandy glacial outwash. They are typically small (< 3 acres) and round, and they lack inlets and outlets. Kettlehole Level Bogs are peatlands: wetlands with incompletely decomposed plant material (peat) that accumulates when saturated year-round by water that is cool, acidic, poorly oxygenated, and low in nutrients. The peat isolates the vegetation from the water table, making the communities the most acidic (pH range 3 to 4), and nutrient-poor of peatland communities. The word "level" differentiates Massachusetts bogs from the raised bogs of more northern latitudes, where peat becomes so thick that precipitation is the only source of nutrients. Massachusetts' climate is not cold enough to develop raised bogs; the state is at the southern limit of the geographic range of peatlands.

Vegetation Description: Sphagnum moss (*Sphagnum* spp.) is the most common plant in all acidic peatlands, forming a mat that the vascular plants grow on and producing most of the peat that underlies the community. Kettlehole level bogs have similar vegetation to level bogs, except that the vegetation is typically in a ringed zonation pattern. Often the outer wet moat is dominated by a mixture of highbush blueberry (*Vaccinium corymbosum*) and swamp azalea (*Rhododendron viscosum*), bordered to the interior by a ring of rhodora (*Rhododendron canadense*). The mat has a mixture of tall and short shrubs that are predominantly ericaceous (members of the Heath family). Leatherleaf (*Chamaedaphne calyculata*) is dominant. Other typical ericaceous

shrubs include rhodora, sheep laurel (*Kalmia angustifolia*), bog laurel (*Kalmia polifolia*), bog-rosemary (*Andromeda polifolia* var. *glaucophylla*), Labrador tea (*Rhododendron groenlandicum*), and low-growing large and small cranberry (*Vaccinium macrocarpon* and *V. oxycoccos*). Scattered, stunted coniferous trees (primarily tamarack (*Larix laricina*) and black spruce (*Picea mariana*)) occur throughout. A mixture of specialized bog plants grow on the hummocky sphagnum surface, including carnivorous pitcher plants (*Sarracenia purpurea*) and sundews (*Drosera rotundifolia* and *D. intermedia*). Many of the kettlehole bogs observed in the state have drier and more stable sphagnum mats than Level Bogs that are not in kettleholes, and they have abundant bog laurel and three-leaved Solomon's seal (*Maianthemum trifolium*).

Differentiating Occurrences: Natural communities on acidic peatlands all occur on sphagnum peat. The depth, density, and strength of the underlying peat control the structure and composition of each type of peatland community because plants growing on it are isolated from nutrients carried by groundwater. In Level Bogs, the sphagnum peat tends to be deep and well-developed, graminoids may be present but not dominant, and shrubs are dominated by leatherleaf. Kettlehole Level Bogs are a subset of Level Bogs that occur in kettleholes in sandy glacial outwash. They are typically small (<3 acres) and round, and they lack inlets and outlets. Kettlehole Level Bogs have similar vegetation to Level Bogs, except that the vegetation is typically in a ringed zonation pattern. Atlantic White Cedar Bogs have a sparse canopy cover of Atlantic white cedar trees over sphagnum on peat. Acidic Graminoid Fens are dominated by graminoid and herbaceous species and lack extensive shrubs. Spruce-Tamarack Bogs are acidic forested peatlands with an overstory of black spruce and tamarack.

Associated Fauna: Due to the extended periods of saturation, the lack of nutrients, and the high acidity and low oxygen content of the water, acidic peatlands are inhospitable to many animal species. Winged animals and large terrestrial animals can use peatlands as part of their habitat and then move on when conditions are unfavorable. Moose and white-tailed deer use acidic peatlands for browsing and grazing, and their trails are often evident across the peat mat. Bears are attracted to the cranberries and blueberries in season. Many bird species use peatlands for part of the year as nesting or foraging habitat. Massachusetts birds that can be found in acidic peatlands include Swamp and White-tailed Sparrows, Common Yellowthroat, Olive-sided and Alder Flycatchers, Red-winged Blackbirds, and Gray Catbirds. The acidity and low oxygen content of the water in Kettlehole Level Bogs make them poor habitat for most amphibians and reptiles, although some species can breed in the shallow pools that form among the sphagnum hummocks. Many species of dragonflies and damselflies inhabit acidic peatlands, especially where there is adjacent open water.

Public Access: Bog surfaces are damaged by trampling; sites with boardwalks are best suited to visitation.

Threats: Hydrologic alteration and nutrient enrichment from road and lawn runoff. Trampling from humans affects peat mat integrity.

Management Needs: The public should be encouraged to visit only those sites with established boardwalks. Signs need to be posted along boardwalks encouraging visitors to stay off the peat mat. Monitor the impact of salt and other nutrient runoff into bogs, and work to minimize runoff. Remove phragmites where it has become established.

USNVC/NatureServe: Includes *Vaccinium corymbosum*/*Sphagnum* spp. Shrubland; *Picea mariana*/*Kalmia angustifolia*/*Sphagnum* spp. Forest; *Picea mariana*/*Sphagnum* spp. (Lower New England/Northern Piedmont, North Atlantic Coast) Woodland; *Kalmia angustifolia-Chamaedaphne calyculata* (*Picea mariana*)/*Cladina* Dwarf-shrubland.