Forested Seep (Global Rank GNR; State Rank S3)

Overview: Distribution, Abundance, Environmental Setting, Ecological Processes

Forested Seep is a highly localized, small patch natural community that is most often associated with landforms underlain by bedrock or glacial deposits overlying materials through which groundwater can move laterally, ultimately exiting as seepages and springs. This seepage water is usually clean and cold, coalescing into spring runs and headwaters streams that feed and help maintain high water quality in waterbodies downstream.

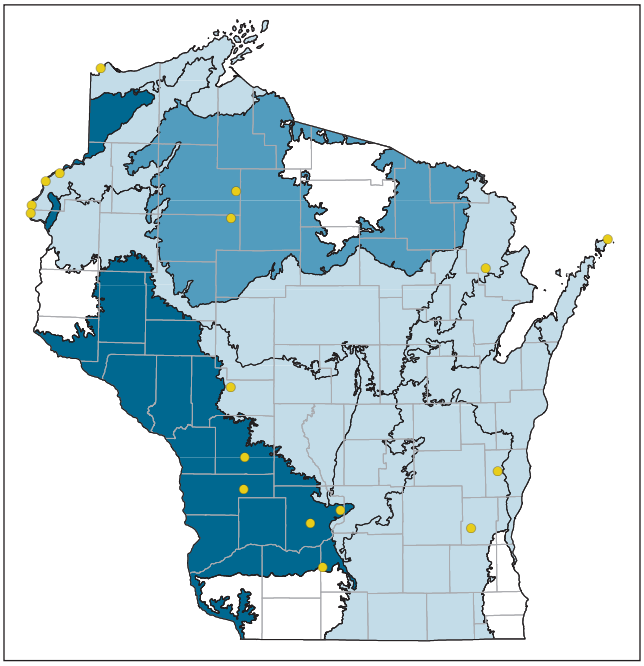
Statewide distribution of seeps is uneven. Many examples occur in draws, gorges, and along toe slopes associated with sandstone bedrock in the highly dissected, unglaciated terrain of the Driftless Area. In glaciated areas, Forested Seep occurs along the bases of bluffs where rivers and streams have cut through deep glacial deposits or underlying bedrock. Glacial landforms supporting this community include end moraine, collapsed outwash, and heads of outwash; this community also occurs on old alluvial terraces that abut bluffs and ridges and also on wave-cut glacio-lacustrine clays bordering lakes Michigan and Superior. In eastern Wisconsin, Forested Seep occurs along the Niagara Escarpment, especially on the west side of the Door Peninsula. On the western and southern margins of the Central Sand Plains Ecological Landscape, they are present along the lower reaches of small streams tributary to the Black and Wisconsin rivers.

Other areas supporting occurrences of this community include the valley of the St. Croix River below its confluence with the Namekagon, along the Menominee River in eastern Marinette County in the Northeast Sands Ecological Landscape, and at scattered locations in the Penokee Iron Range, for example, in association with the Brunsweiler, Marengo, and Potato rivers. Forested Seeps are also found in the valleys of the Kickapoo, Baraboo, Pine, and Kinnickinnic rivers, in gorges within the Blue Hills (Barron and Rusk counties), and in areas such as the Bloomer and Perkinstown end moraines. Seeps are locally important features of the Niagara Escarpment, especially on the Door Peninsula. Seeps also occur on rolling ground moraine, especially along larger rivers such as the Chippewa and Flambeau and some of their tributaries.

Soils are fine-textured, sometimes mucky, and susceptible to damage if treated carelessly. The operation of heavy equipment on the soft, sometimes steeply sloping soils on or near the seepages may result in compaction, rutting, channeling of water, erosion, and direct damage to vegetation. Secondary effects include desiccation of the soils and vegetation, and invasive plants may gain entry to the community. Some spring runs support patches of sand and gravel as the primary substrates.

Most Forested Seep communities are embedded within more extensive mesic or dry-mesic forests, and these may be composed of hardwoods, conifers, or mixes of species. As described here, the concept does not include extensive stands of northern white-cedar-dominated wet-mesic forests, which exist in part as the result of moving, somewhat calcareous

Under a canopy of black ash, yellow birch, and speckled alder, the diverse ground layer of this forested seep is dominated by skunk cabbage. Other important herbs include American golden saxifrage, swamp saxifrage, marsh-marigold, blue marsh violet, and woodland phlox. Moore's (Morris) Creek drainage, Monroe County, Western Coulees and Ridges Ecological Landscape. Photo by Eric Epstein, Wisconsin DNR.



Locations of Forested Seep in Wisconsin. The deeper hues shading the ecological landscape polygons indicate geographic areas of greatest abundance. An absence of color indicates that the community has not (yet) been documented in that ecological landscape. The dots indicate locations where a significant occurrence of this community is present, has been documented, and the data incorporated into the Natural Heritage Inventory database.

groundwater and are sometimes laced with numerous springs and seepages (e.g., the upper reaches of the Bois Brule River in eastern Douglas County).

Community Description: Composition and Structure

The canopy dominants are variable but are most often hardwoods such as black ash (*Fraxinus nigra*), yellow birch (*Betula allegheniensis*), American elm (*Ulmus americana*), red maple (*Acer rubrum*), and northern red oak (*Quercus rubra*). Conifers such as northern white-cedar (*Thuja occidentalis*), white spruce (*Picea glauca*), eastern hemlock (*Tsuga canadensis*), or eastern white pine (*Pinus strobus*) may be present in northern Wisconsin, and eastern hemlock and eastern white pine occur in Driftless Area valleys that experience cold air drainage.

Representative small trees and tall shrubs include mountain maple (*Acer spicatum*), muscle-wood (*Carpinus caroliniana*), speckled alder (*Alnus incana*), elderberry (*Sambucus canadensis*), nannyberry (*Viburnum lentago*), and cranberry viburnum (*V. opulus* ssp. *trilobum*).

Characteristic understory plants may include purple-stem angelica (*Angelica atropurpurea*), skunk-cabbage (*Symplocarpus foetidus*), wild ginger (*Asarum canadense*), silvery spleenwort (*Deparia acrostichoides*), marsh-marigold (*Caltha palustris*), spring-cress (*Cardamine bulbosa*), Pennsylvania bitter-cress (*C. pensylvanica*), American golden saxifrage (*Chrysosplenium americanum*), bulblet bladder fern (*Cystopteris bulbifera*), marsh pennywort (*Hydrocotyle americana*), orange jewelweed (*Impatiens capensis*), yellow jewelweed (*I. pallida*), Canadian clearweed (*Pilea pumila*), marsh mermaid-weed (*Proserpinaca palustris*), swamp saxifrage (*Saxifraga pennsylvanica*), golden ragwort (*Packera aurea*), cut-leaved water-parsnip (*Berula erecta*), and blue marsh violet (*Viola cucullata*).

Well-drained but moist ridges or mounds within seep complexes may support dense patches of showy wildflowers, including those from the spring ephemeral group such as *Claytonia, Dicentra, Enemion,* or *Erythronium*.

Associated graminoid plants include species such as brome-like sedge (*Carex bromoides*), eastern rough sedge (*C. scabrata*), fringed sedge (*C. crinita*), Sprengel's sedge (*C. sprengelii*), and fowl manna grass (*Glyceria striata*).

Rare or restricted (due to specialization or constant moisture needs) floristic associates are drooping sedge (*Carex prasina*), Schweinitz's sedge (*C. schweinitzii*), bog bluegrass (*Poa paludigena*), and the Wisconsin Threatened marsh valerian (*Valeriana uliginosa*). Other rare or uncommon species, such as brook grass (*Catabrosa aquatica*) and tufted hair-grass (*Deschampsia cespitosa*), are possibilities in Forested Seeps but generally inhabit more open spring-fed wetlands, such as Calcareous Fen.

Among the vertebrates of conservation significance associated with this community are the Wisconsin Threatened wood turtle (*Glyptemys insculpta*), Red-shouldered Hawk (*Buteo lineatus*), and Kentucky Warbler (*Geothlypis formosa*). Others of conservation concern are Louisiana Waterthrush (*Parkesia motacilla*), Blue-winged Warbler (*Vermivora cyanoptera*), and Winter Wren (*Troglodytes hiemalis*). Suitability of Forested Seep communities for some of these vertebrates is related to stand size and context, age and closure of the canopy, and condition. Invertebrates associated with seeps include a number of flies with aquatic larvae (Diptera), aquatic beetles (Coleoptera), and small crustaceans (e.g., amphipods).

Conservation and Management Considerations

Effective protection of site hydrology, especially in the immediate proximity of the seepage areas or springs and in the recharge areas necessary to maintain water flow over time, is the essential management concern. Maintaining high quality groundwater is also critical as the introduction of pollutants can lead to the loss of more sensitive organisms inhabiting this community.

Activities that may disrupt hydrology include road and other right-of-way construction, residential or industrial development within the recharge areas, removal of forest cover, and dredging, which may convert a system dependent on flowing, clean, and cold water to one that is characterized by standing, stagnant, warm water. Excessive groundwater withdrawals are already a concern in some parts of Wisconsin.

Invasive plants create problems by outcompeting and overwhelming native species, sometimes significantly reducing floristic diversity. Among the more problematic nonnative and invasive plants known from seep communities are reed canary grass (*Phalaris arundinacea*), creeping-Charlie (*Glechoma hederacea*), moneywort (*Lysimachia nummularia*), and glossy buckthorn (*Rhamnus frangula*). Nonnative watercress (*Nasturtium officinale*) has become the dominant plant in springs and spring runs in some parts of the state.

American basswood, black ash, yellow birch, and speckled alder form a canopy over a diverse herb layer in this complex of spring seeps that feed Moore's (Morris) Creek, a tributary of the upper Kickapoo River in south central Monroe County, Western Coulees and Ridges Ecological Landscape. Photo by Eric Epstein, Wisconsin DNR.

Additional threats to Forested Seep communities may result from logging, grazing, and vehicle use, all of which may result in rutting, channeling of surface water, soil compaction, and the destruction of sensitive vegetation.

Wherever present, the Forested Seep community provides habitat for many species that might otherwise be absent from the adjoining lands. They are fragile, of high ecological significance, and should be identified and given appropriate protection in management plans for surrounding lands.

Additional Information

For additional information on similar natural communities, see the descriptions in this chapter for Northern Wet-mesic Forest and Hemlock Relict, and, in the "Aquatic Features" section, see the brief descriptions/definitions of Springs and Spring Runs, Hard; Springs and Spring Runs, Soft; and Spring Pond. Related U.S. National Vegetation Classification types include CEGL002385 *Symplocarpus foetidus* Herbaceous Vegetation and CEGL002455 *Thuja occidentalis* - (*Larix laricina*) Seepage Forest (Faber-Langendoen 2001).

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For a list of terms used, please visit the **Glossary.**

For a reference list, please visit the **Literature Cited.**