Overview: Distribution, Abundance, Environmental Setting, Ecological Processes

Southern Sedge Meadow is an herb-dominated, minerotrophic wetland community that is most abundant south of the Tension Zone. Outliers are scattered across northern Wisconsin, but there the community is uncommon and of limited extent and supports fewer plant species of mostly southern distribution. Wisconsin’s larger occurrences are situated in poorly drained glaciated terrain, especially on landforms such as till plain, lake plain, and outwash. Sedge Meadows are often associated with lake and stream margins. In southwestern Wisconsin’s unglaciated Driftless Area, sedge meadows occur mostly along larger low gradient rivers and streams. Stands of Southern Sedge Meadow are also present along the upper reaches of some smaller Driftless Area streams, including headwaters areas, where groundwater seepage can be an important water source.

Soils are peats and mucks, which are usually alkaline, especially in regions of the state such as the southeast where the underlying glacial materials are calcareous, in contrast to the more acid peats and tills associated with the boggier habitats found throughout the north and within parts of central Wisconsin. Layers of marl or clay are sometimes present, and in some areas these help maintain saturated conditions throughout the growing season. In some locations sedge meadows have developed on mineral substrates, such as sands or clays, where the water table has remained high. Because they occupy some of the lowest elevations in a landscape, sites supporting sedge meadows may experience cold air drainage and fogs during the growing season and early fall frosts. The wet soils are slow to warm in the spring, retarding vegetation development.

The mosaic of wetland communities within which Southern Sedge Meadow occurred historically included marsh, fen, low prairie, shrub swamp, and lowland forest. Uplands adjoining Southern Sedge Meadow were vegetated with a mixture of prairie, savanna, woodland, and hardwood or mixed forest. Site hydrology, especially under the saturated or partially inundated water levels typically present in spring, is among the major factors that formerly maintained sedge meadow and prevented them from succeeding to communities dominated by woody vegetation. Another key disturbance factor was wildfire, which periodically burned the meadows along with nearby fire-adapted vegetation types such as prairies and savannas. Uplands bordering sedge meadows often supported fire-dependent vegetation such as mesic (tallgrass) prairie, oak savanna, oak woodland, and oak forest, and the fires that formerly maintained those communities sometimes burned the adjacent sedge meadows as well. Severe droughts, especially when prolonged for a period of years, also impacted sedge meadow by allowing for the establishment of shrubs and trees.

Much of the natural vegetation that historically bordered wetlands of all types in densely populated, heavily developed southeastern Wisconsin has been cleared and replaced by cropland, pasture, and residential or industrial areas. In parts of central Wisconsin, however, extensive areas of oak forest (much of it formerly savanna) are still prevalent on the uplands bordering wetlands. Where appropriate, and when not conflicting with other land management needs and goals, the reintroduction of fire would help to partially restore and maintain the mosaic of native communities formerly present in the region.

Many sedge meadows have been ditched or tilled in order to make them more suitable for agricultural uses; others have been inundated by dam and dike construction to enhance certain recreational activities or facilitate the passage of ships. In some areas, wetlands, including sedge meadows, were routinely filled or used as dumps.

Community Description: Composition and Structure

The dominant graminoid is most often tussock sedge (*Carex stricta*), a species that has tremendous influence on the structure and composition of Southern Sedge Meadow by providing microsites upon which other members of the community find suitable growing conditions. Other sedges common in or characteristic of this community are common lake sedge (*Carex lacustris*), water sedge (*C. aquatilis*),...
Sartwell's sedge (Carex sartwellii), lesser panicked sedge (C. diandra), bristly sedge (C. comosa), and bottlebrush sedge (C. hysterica). Blue-joint grass (Calamagrostis canadensis) is a frequent associate and a co-dominant in some sedge meadows. Other grasses occurring in Southern Sedge Meadow are fringed brome (Bromus ciliatus), tall meadow-rue (Thalictrum dasyurum), sensitive fern (Onoclea sensibilis), northern water-horehound (Lycopus uniflorus), panicled aster (Symphyotrichum lanceolatum), shining-leaved aster (S. firmum), southern blue flag (Iris virginica), giant goldenrod (Solidago gigantea), spotted Joe-Pye-weed (Eupatorium maculatum), boneset (E. perfoliatum), great water dock (Rumex orbiculatus), marsh skullcap (Scutellaria galericulata), tufted loose-strife (Lysimachia thyrsiflora), purple-stem angelica (Angelica atropurpurea), meadow anemone (Anemone canadensis), turtlehead (Chelone glabra), swamp milkweed (Asclepias incarnata), swamp thistle (Cirsium muticum), brook lobelia (Lobelia kalmii), lesser purple fringed orchid (Platanthera psycodes), and Michigan lily (Lilium michiganense).

A diverse group of forbs is associated with Southern Sedge Meadow, including marsh bellflower (Campanula aparinoides), marsh fern (Thelypteris palustris), tall meadow-rue (Thalictrum dasyurum), sensitive fern (Onoclea sensibilis), northern water-horehound (Lycopus uniflorus), panicled aster (Symphyotrichum lanceolatum), shining-leaved aster (S. firmum), southern blue flag (Iris virginica), giant goldenrod (Solidago gigantea), spotted Joe-Pye-weed (Eupatorium maculatum), boneset (E. perfoliatum), great water dock (Rumex orbiculatus), marsh skullcap (Scutellaria galericulata), tufted loose-strife (Lysimachia thyrsiflora), purple-stem angelica (Angelica atropurpurea), meadow anemone (Anemone canadensis), turtlehead (Chelone glabra), swamp milkweed (Asclepias incarnata), swamp thistle (Cirsium muticum), brook lobelia (Lobelia kalmii), lesser purple fringed orchid (Platanthera psycodes), and Michigan lily (Lilium michiganense).

The complement of woody plants found in sedge meadows includes many shrubs that dominate or are common in Shrub-carr communities, such as red osier dogwood (Cornus stolonifera), silky dogwood (C. amomum), beaked willow (Salix bebbiana), pussy willow (S. discolor), sandbar willow (S. exigua), meadow willow (S. petiolaris), ninebark (Physocarpus opulifolius), nannyberry (Viburnum lentago), and white meadow-sweet (Spiraea alba). Tree cover is low but may include seedlings and saplings of American elm (Ulmus americana), green ash (Fraxinus pennsylvanica), and others deciduous species. The needle-leaved deciduous conifer tamarack (Larix laricina) is sometimes present.

Among the rare plants associated with Southern Sedge Meadow are snowy campion (Silene nivea), glade mallow (Napaea dioica), nodding rattlesnake-root (Prenanthes crepidinea),adder's tongue (Ophioglossum pusillum), and smooth-sheath sedge (Carex laevivaginata). Some of the more alkaline meadows, especially those that grade into or share groundwater sources with limy springs and/or rich (calcaceous) fen vegetation, support specialists associated with open, high pH plant communities.

Animals of conservation concern inhabiting sedge meadows include American Bittern (Botaurus lentiginosus), Sandhill Crane (Antigone canadensis), Whooping Crane (Grus americana), Sedge Wren (Cistothorus platensis), Northern Harrier (Circus cyaneus), northern cricket frog (Acris crepitans), Blanding's turtle (Emydoidae blandingii), queensnake (Regina septemvittata), eastern massasauga (Sistrurus catenatus catenatus), western ribbon snake (Thamnophis proximus), Butler's garter snake (T. butleri), Baltimore checkerspot (Euphydryas phaeton), and Poweshiek skipperling (Oorisma poweshiek). Notable among the rare invertebrates that have been documented in Southern Sedge Meadow is the globally rare and U.S. Endangered Hines emerald dragonfly (Somatochlor a hineana).

**Conservation and Management Considerations**

As with all wetland communities, protection of site hydrology and function are the paramount conservation concerns. Sedge meadows statewide, but especially in southern Wisconsin, have been ditched, drained, tiled, and grazed to expand areas of cropland and pasture or to create more suitable sites upon which to build homes, businesses, rights-of-way, and other infrastructure. In some areas, periodic wildfire historically played a key role in maintaining herb dominance and the open aspect of sedge meadows. Ditched or tiled stands in which the water table has been significantly lowered are either quickly converted to croplands or are invaded by woody plants, hastening succession to shrub swamp (usually Shrub-carr) or lowland hardwood forest.

Impoundments created by American beaver (Castor canadensis) activity can be problematic. While beaver dams may temporarily increase the local abundance of graminoid-dominated wetlands, they may take the place of riparian forests or shrub swamps, especially swamps composed of speckled alder (Alnus incana), bottomland hardwoods, or lowland conifers. It is desirable to have better basic information on the number, extent, and ecological impacts of these altered riparian areas. Where timber management is geared toward aspen production in or adjacent to stream corridors, beaver populations may quickly grow to levels that will affect wetlands by altering hydrology as flowing waters are converted to series of ponds and lakes.

Sedge meadows that have been subjected to prolonged periods of grazing by domestic livestock may be dominated by monotypic stands of red canary grass (Phalaris arundinacea), a pernicious invasive that can also increase when sedge meadows receive excess sediment and nutrient runoff from surrounding

Tussock sedge and Canada bluejoint grass are the dominant graminoid plants in this sedge meadow bordering the White River in Green Lake County, Southeast Glacial Plains Ecological Landscape. Photo by Eric Epstein, Wisconsin DNR.
uplands. The hooves of livestock can physically break down the sedge tussocks, reducing the availability of key microsites for other native plants and thereby diminishing overall floristic diversity (Werner and Zedler 2002). Grazing compacts soil in the hollows between sedge hummocks, altering drainage patterns and sometimes introducing weed propagules. This type of damage also makes it easier for shrubs to become established, eventually altering stand structure and shading out the more light-demanding native herbs. The absence of periodic wildfire, especially in situations where sedge meadows were integral parts of a vegetation mosaic of fire-dependent natural communities such as prairie, fen, and oak savanna, has also led to increases in woody cover. However, in stands damaged by past grazing, fire alone may not be sufficient to control invasive shrubs once they are established (Middleton 2002a, 2002b, 2004). In such cases, mechanical removal, chemical treatment, or other methods will warrant consideration.

In addition to reed canary grass, invasive plants that can alter, dominate, simplify, or otherwise degrade sedge meadows include common reed (Phalaris australis), narrow-leaved cat-tail (Typha angustifolia), hybrid cat-tail (Typha x glauca), and purple loosestrife (Lythrum salicaria). Exotic shrubs may also be problematic, especially common (Rhamnus cathartica) and glossy (R. frangula) buckthorns and Tartarian (Lonicerata tatarica), Asian fly (L. morrowii), and hybrid Bell's (Lonicerax bella) honeysuckles. Native shrubs such as dogwoods (Cornus spp.), ninebark (Physocarpus opulifolius), and white meadow-sweet may also be serious problems in sedge meadows where the hydrology has been altered or fire has been excluded. Prolonged droughts can also accelerate the spread of woody species. Tree species capable of invading sedge meadows are American elm, box elder (Acer negundo), eastern cottonwood (Populus deltoides), quaking aspen (P. tremuloides), willows, (Salix spp.), and several ashes (Fraxinus spp.).

Protecting and, where needed, restoring wetland hydrology is the key to managing and maintaining diverse, functional sedge meadows. Appropriate management actions may include ditch filling, tile breakage, restoration of stream meanders, use of prescribed fire, cutting, and herbicides to limit the abundance of encroaching woody vegetation, modifying or eliminating dams that maintain artificially elevated water tables, and controlling the quantity and quality of runoff. Runoff carrying excessive amounts of silt, nutrients, herbicides, and pesticides is problematic and ultimately needs to be addressed at the source when possible, but the establishment of buffer areas between wetlands and adjacent croplands, heavily grazed pastures, construction sites, and residential developments can help lessen adverse impacts from these land uses.

Southern Sedge Meadow may grade into Emergent Marsh, Calcareous Fen, Wet-mesic Prairie, Wet Prairie, Tamarack (Rich) Swamp, or Shrub-carr. At some sites, individual wetland components of the vegetation mosaic around sedge meadows can be difficult to tease apart or delineate with precision. From a conservation perspective, the more important considerations are to identify those factors that are affecting and impacting the community, determining the habitat patch size and context needed by the plants and animals inhabiting the meadow and then incorporating that knowledge into development and implementation of a management and monitoring plan that is designed to effectively maintain the sedge meadow and the other communities occupying a given wetland—and the local watershed—over time. It would be useful to perform analyses designed to better assess the economic values provided to society by functional sedge meadows and other wetlands.

Additional Information and References
For related information, see the natural community descriptions for Northern Sedge Meadow, Emergent Marsh, Calcareous Fen, Wet Prairie, Wet-mesic Prairie, Shrub-carr, Alder Thicket, and Southern Hardwood Swamp. Southern Sedge Meadow corresponds most closely to the U.S. Natural Vegetation Classification type CEGL002258 Tussock Sedge - Sedge Species Herbaceous Vegetation (Faber-Langendoen 2001). Also, see “Beaver Meadow” in the “Other Selected Habitats” section of this document.

Also see:
Costello (1936)
Hipp (2008)
Kost and De Steven (2000)
Middleton (2002a)
Middleton (2002b)
Peach and Zedler (2006)
Reuter (1986)
Van der Valk et al. (1999)
Werner and Zedler (2002)