

COASTAL PLAIN SEMIPERMANENT IMPOUNDMENT (SANDHILLS MIRE SUBTYPE)

Concept: Coastal Plain Semipermanent Impoundment communities are ponded wetlands produced by beaver dams or by long-established man-made dams that produce similar ponds. They include drained impoundments whose vegetation remains distinct from other floodplain communities. The Sandhills Mire Subtype covers drained impoundments of the Sandhills Region, where woody vegetation has become abundant over the herbaceous layer in a deep muck substrate.

Distinguishing Features: Coastal Plain Semipermanent Impoundment communities are distinguished by occurrence in the Coastal Plain in active or recently drained beaver ponds or in artificial ponds that have a similar environment and vegetation. Drained beaver ponds are treated as Semipermanent Impoundments until they become more similar to another floodplain or streamhead community.

The Sandhills Marsh Subtype is distinguished from the Sandhills Mire Subtype by having only a limited woody component. The Sandhills Mire Subtype has a well-developed shrub layer and often trees. However, the differences in herbaceous flora that once were thought to distinguish the two do not appear to work well. Of the species listed in earlier versions of the 4th Approximation as characterizing the Sandhills Mire Subtype — *Carex mitchelliana*, *Carex howei*, *Carex stricta*, *Glyceria obtusa*, *Leersia oryzoides*, *Dichantherium scabriusculum*, *Peltandra virginica*, *Dichantherium dichotomum*, *Dulichium arundinaceum*, *Hypericum virginicum*, *Lycopus cokeri*, *Eupatorium resinosum*, *Carex atlantica* and *Lorinseria areolata* — most can be found in examples of the Sandhills Marsh Subtype.

Both the Sandhills Marsh and Sandhills Mire Subtypes have substantial floristic differences distinguishing them from the Typic Marsh Subtype. Species indicative of the Typic Marsh Subtype and not known in the Sandhills Marsh include most *Pericaria* spp., *Typha latifolia*, *Leersia hexandra*, *Saururus cernuus*, *Cladium jamaicense*, *Sacciolepis striata*, *Scleria muhlenbergii*, and *Rhynchospora macrostachya*. Most of the species listed above, especially those of highly acidic, bog-like environments, do not occur at all in the Typic Marsh Subtype. Species indicative of the Sandhills Mire Subtype include *Eriocaulon decangulare*, *Carex glaucescens*, *Carex howei*, *Carex atlantica*, numerous other *Carex* species, *Orontium aquaticum*, *Eupatorium resinosum*, *Lycopus cokeri*, *Xyris* spp., *Sphagnum* spp., and numerous others.

Synonyms: *Nyssa biflora* - *Alnus serrulata* / *Carex* (*mitchelliana*, *atlantica* ssp. *capillacea*, *stricta*) - *Glyceria obtusa* - *Peltandra virginica* Shrubland [Provisional] (CEGL004800).
Ecological Systems: Atlantic Coastal Plain Blackwater Stream Floodplain Forest (CES203.247).

Sites: The Sandhills Mire Subtype occurs on floodplains of streams in the Sandhills Region. This subtype typically occurs in the beds of ponds that have been drained for some years.

Soils: Typical soils of Sandhills streams are Bibb and Johnston (Typic Fluvaquent and Cumulic Humaquept). These soils are generally high in organic matter and are kept constantly saturated by the seepage of water from the adjacent porous soils. As such, they may be changed less by

impoundment than most, but presumably become more anoxic. Over time, accumulated organic matter rather than transported mineral sediment tends to fill the Sandhills ponds.

Hydrology: The Sandhills Mire Subtype tends to be unflooded but permanently saturated. Minor stream flooding may occur but is rare.

Vegetation: Vegetation of the Sandhills Mire Subtype is an open woodland or shrubland with a well-developed herbaceous layer beneath. *Acer rubrum* and *Nyssa biflora* are the dominant trees, with the latter young or having survived through the life of the pond. Shrubs typically are *Alnus serrulata*, *Viburnum nudum*, *Cyrilla racemiflora*, and *Arundinaria tecta* but may also include *Clethra alnifolia*, *Lyonia lucida*, *Morella caroliniana*, and *Ilex glabra*. *Smilax laurifolia* and *Smilax walteri* are often present. The herb layer is dense to moderate. *Sphagnum* is often extensive. Herbs that are dominant or abundant fairly frequent (Hall 2005) include *Leersia oryzoides*, *Carex howei*, *Carex atlantica*, *Carex mitchelliana*, *Carex glaucescens*, *Carex lonchocarpa*, *Scirpus cyperinus*, *Glyceria obtusa*, *Dichanthelium scabriusculum*, and *Dichanthelium dichotomum* var. *dichotomum*. Other species less frequently abundant include *Dulichium arundinaceum*, *Carex stricta*, *Andropogon glomeratus*, *Rhynchospora stenophylla*, other *Rhynchospora* spp., *Peltandra virginica*, *Xyris fimbriata*, *Xyris iridifolia*, *Eriocaulon decangulare*, *Iris virginica*, and *Sparganium americanum*. Other fairly frequent species include *Orontium aquaticum*, *Eupatorium resinosum*, *Lycopus cokeri*, *Sarracenia flava*, *Drosera* spp., *Carex debilis*, and *Woodwardia virginica*. A great diversity of additional species occur in at least a few examples.

Range and Abundance: Ranked G2?. This community has only been documented on Fort Bragg, but may potentially be found anywhere in the Sandhills Region. Similar communities could possibly occur in South Carolina.

Associations and Patterns: It is common for beaver ponds of the Open Water Subtype and Sandhills Mire Subtype to occur interspersed with reaches of Sandhills Streamhead Swamp and Streamhead Pocosin along the streams. Ponds sometimes are single and sometimes are in complexes with multiple active and abandoned dams, with multiple patches of Open Water and Sandhills Mire Subtype. But other ponds or complexes may consist entirely of the Sandhills Mire Subtype. They are often bordered by Streamhead Pocosin but can be bordered by upland communities.

Variation: Three variants are recognized, based on Hall (2005):

1. Typic Variant, which remains quite heterogeneous;
2. Bog Variant, which appears to occur where adjacent Sandhill Seeps feed acidic seepage water into the mire, and seep plants mix with those of the mire;
3. Tussock Sedge Variant, strongly dominated by *Carex stricta*, to the exclusion of most other herbaceous species.

Hall (2005) suggested recognition of several additional types, most of which are more similar to each other than are these. Also distinct in Hall (2005) were those dominated by *Dichanthelium scabriusculum* and *Dichanthelium dichotomum*, as opposed to the more typical mixed vegetation. These need more study but appear to result from excessive sediment washing into a drained pond,

and so may not be a natural variant. The three variants appear to be very distinct, perhaps more than the Typic Variant is from the Sandhills Marsh Subtype, at least in flora.

Dynamics: See the more extensive discussion of general beaver pond dynamics under the Open Water Subtype.

The Sandhills Mire Subtype, as currently defined, appears to succeed from the Sandhills Marsh Subtype or from a bare drained pond bed that had been open water. This successional stage can last for several decades, until a tree canopy and shrub layer characteristic of other community types develops.

Lee Gerald (personal comm. 1990s) described the successional trend of Sandhills beaver ponds: Sphagnum comes in quickly in drained ponds, and sedge-grass vegetation develops on this. Shrubs and trees, especially *Acer rubrum*, *Alnus serrulata*, and *Cyrilla racemiflora*, invade the marsh over the space of 10-20 years, starting from the head of the pond and the edges. *Nyssa biflora*, persisting through the impoundment or newly established, along with *Acer rubrum*, tends to dominate the drained pond bed, with herbaceous cover beneath. This presumably represents the Sandhills Mire Subtype. Former ponds remained hardwood dominated and did not return to Streamhead Pocosin after 40 years, but it is unclear when, or if, they became Sandhills Streamhead Swamp rather than remaining as the Sandhills Mire Subtype.

Comments: The classification of the Sandhills Marsh and Sandhills Mire subtypes needs further consideration and possible revision. The Sandhills Mire Subtype was based on quantitative data on drained ponds on Fort Bragg (Hall 2005), but comparable data are not available elsewhere in the Sandhills. There were believed to be significant floristic differences between the mires of Fort Bragg and ponds elsewhere, but the relationship between those floristic differences and the successional stages of drained ponds remains unclear. Accumulation of species lists for ponds in the Sandhills Game Land indicates that the floristic differences between these areas are not strong and now appear to be less than the variation among ponds within each area. Since both early and late successional stages must occur in both places, the distinction needs to be clarified to be either a structural/successional one, or a more useful floristic split needs to be identified.

A different subtype name may be warranted. The term mire, implying an organic-soil wetland with flora of boggy character, applies well to both subtypes, perhaps better to the herbaceous, earlier successional subtype called Sandhills Marsh Subtype here.

See the Typic Marsh Subtype and other subtypes for general comments and references on beaver ponds, landscape diversity, and ecosystem services. Because Sandhills beaver ponds accumulate more organic matter, and are less subject to erosion by severe floods, they may be even more important in sequestering carbon.

References:

Hall, S.P. 2005. A quantitative analysis and classification of the habitats of *Neonympha mitchelli francisci* at Fort Bragg and Camp Mackall. Report to Endangered Species Branch, Fort Bragg. Contract No. W912747—04-P0324