SANDY PINE SAVANNA (TYPIC SUBTYPE)

**Concept:** Type covers very wet pine/wiregrass savannas of sandy soils, typically high in species richness but with flora consisting mostly of the more widespread savanna species. *Pinus palustris* or *Pinus serotina*, *Aristida stricta*, *Sporobolus pinetorum*, *Ctenium aromaticum*, or other grasses, or *Pleea tenuifolia* typically dominate. Subtype covers the typical examples of most parts of the Coastal Plain, having herb layers dominated by grasses, in which *Pleea tenuifolia* is not dominant or codominant (though it often is present).

**Distinguishing Features:** Sandy Pine Savannas are distinguished from Wet Pine Flatwoods by a more diverse herb layer that includes species indicative of greater wetness. Species in Sandy Pine Savanna but not in Wet Pine Flatwoods include *Andropogon glomeratus*, *Andropogon glaucopsis*, *Osmundastrum (Osmunda) cinnamomeum*, *Anchistea virginica*, *Sarracenia flava*, *Dionaea muscipula*, *Sporobolus (Calamovilfa) brevipilis*, *Sporobolus pinetorum*, and *Ctenium aromaticum*. All plant species of Wet Pine Flatwoods may also occur in Sandy Pine Savanna. Though Wet Pine Flatwoods may naturally have more shrub cover under frequent fire, the amount of shrubs is usually artificially high in both types and is not a good distinguishing feature. Sandy Pine Savanna and Wet Pine Flatwoods can be hard to distinguish in fire-suppressed examples where indicator herbs have become sparse, and may be impossible if no herbs remain, but the presence of even small numbers of the above indicators, if not merely confined to ecotones or wet microsites, indicates this wetter community.

Sandy Pine Savannas are distinguished from Wet Loamy Pine Savanna and Very Wet Loamy Pine Savanna by the soil texture and fertility and by corresponding differences in vegetation. They are typically dominated by *Aristida stricta*, with the other wet savanna grasses (*Sporobolus pinetorum*, *Ctenium aromaticum*, *Muhlenbergia capillaris*) scarce or absent. Otherwise, they are best distinguished by the absence of species indicative of loamy savanna, such as *Eupatorium rotundifolium*, *Bigelowia nudata*, *Chaptalia tomentosa*, *Cirsium virginianum*, *Helianthus heterophyllus*, *Helianthus angustifolius*, *Lysimachia loomisii*, *Polygala ramosa*, *Eryngium integrifolium*, *Eryngium yuccifolium*, *Sporobolus teretifolius*, and additional *Rhynchospora* species. Characteristic herbs such as *Andropogon* sp., *Osmundastrum cinnamomeum*, *Trilisa* spp., *Rhexia alifanus*, *Polygala lutea*, *Dionaea muscipula*, *Xyris caroliniana*, *Zigadenus densus*, *Sarracenia* spp., and *Drosera* spp. are generally present in both, but may be less prominent in loamy savannas.

The Typic Subtype is distinguished from the Rush Featherling Subtype by not having *Pleea tenuifolia* dominant, though the species sometimes is present.

**Synonyms:** Pine Savanna (Wet Spodosol Variant); *Pinus palustris - Pinus serotina / Ctenium aromaticum - Muhlenbergia expansa - Carphephorus odoratissimus* Woodland (CEGL003658). [The NVC name likely will be changed soon, to reflect data indicating that some of these nominal species are not characteristic of this community. ] Ecological Systems: Central Atlantic Coastal Plain Wet Longleaf Pine Savanna and Flatwoods (ES203.265).
Sites: Sandy Pine Savanna occurs on upland flats or terraces, on low rises or shallow depression in relict dune fields or relict beach ridge systems, and on lower parts of Carolina bay rims. It occurs in areas with prolonged seasonal high water tables.

Soils: Soils are sandy Spodosols. The coarse sandy soils are low in nutrient holding capacity. The majority of examples are mapped as the Leon series (Aeric Alaquod), a few as Woodington, Foreston, or other sandy Ultisols. Sandy Pine Savanna and Wet Pine Flatwoods are generally mapped as the same soils, and often cooccur, but presumably the Sandy Pine Savannas represent a wetter phase.

Hydrology: Soils are saturated at or near the surface during wet seasons, though virtually never with surface flooding. These sites are generally downhill and wetter than those of Wet Pine Flatwoods. Hydrology is palustrine, but these sites may not be recognized as wetlands because the sandy soils do not show many of the redoximorphic features used to recognize hydric soils.

Vegetation: Vegetation structure is similar to most longleaf pine communities, with an open woodland to savanna canopy dominated by Pinus palustris, a dense grassy herb layer, and a shrub layer that varies with fire history. The canopy sometimes is codominated by Pinus serotina, though it is not certain if this is natural or is an effect of past logging and altered fire regime.

The dense herb layer is dominated by Aristida stricta. Other wet savanna grasses may or may not be present but are not generally codominant, especially Sporobolus (Calamovilfa) brevipilis, but possibly Sporobolus pinetorum or Ctenium aromaticum. The herb layer has moderate to high species richness in examples in good condition. Species with high constancy in plot data include Schizachyrium scoparium, Andropogon glaucopsis, Andropogon virginicus var. virginicus, Rhynchospora fascicularis var. fascicularis, Rhynchospora plumosa, Rhynchospora baldwiniana, Rhynchospora ciliaris, Rhexia alifanus, Pteridium latiusculum var. pseudocaudatum, Polygala lutea, Osmundastrum cinnamonomeum, Eupatorium pilosum, Trilisa panicula, Xyris ambigua, Xyris caroliniana, Eurybia paludos, Amphiacaron amphiacaron, Sarracenia flava, Drosera capillaris, Dionaea muscipula, Lachnocaulon anceps, Carex striata, Cleistopsis divaricata, Cleistopsis oricamporum, and Zigadenus glaberrimus. Other species with fairly high constancy in plot data (30-50%) include Triantha racemosa, Trilisa odoratissima, Trilisa paniculata, Pityopsis graminifolia, Solidago pulchra, Anichistsa virginica, Carex striata, Liatris spicata var. resinosa, Utricularia subulata, and Sarracenia purpurea. Additional species frequent in other observations include Calopogon pallidus, Sabatia difformis, Stenanthium densum, Rhynchospora pallida, and Rhexia petiolata. Shrubs have low cover in examples with frequent fire, may be dense in less frequently burned examples, and may be diverse. Vaccinium crassifolium, Pyxidanthera barbula, Ilex glabra, Gayussacia frondosa, Persea palustris, Gaylussacia dumosa, Arundinia tecta, Lyonia ligustrina, Rhododendron atlanticum, Kalmia caroliniana, Morella pumila, and Lyonia mariana are frequent and sometimes abundant in plot data. Vaccinium tenellum, Aronia arbutifolia, Cyrilla racemiflora, Hypericum tenuifolium, and Smilax laurifolia also are frequent.

Range and Abundance: The equivalent NVC association is ranked G3, but G2 likely is more appropriate. In North Carolina, this community occurs largely in the outer Coastal Plain from Carteret County southward, with a few examples locally in the Sandhills and on inner Coastal
Plain sand dune areas. It also occurs in northern South Carolina. It has been questionably attributed to Georgia in the NVC, but should be restricted to the range of *Aristida stricta*.

**Associations and Patterns:** Sandy Pine Savannas usually occur on sandy landscapes in mosaics with Wet Pine Flatwoods and Pond Pine Woodland. In these mosaics, a few inches difference in elevation relative to the water table can separate the different communities. Where Wet Pine Flatwoods borders a Pond Pine Woodland or other pocosin community, a wet ecotone may harbor species characteristic of Sandy Pine Savanna in a narrow band.

**Variation:** Examples are variable and often heterogeneous within patches. Given the diversity of herbs, there can be much variation in local species composition in response to microsite differences. No variants are recognized.

**Dynamics:** Dynamics are similar to most longleaf pine communities. Seasonal wetness presumably is responsible for the exclusion of scrub oaks and other upland hardwoods, while wetness and soil infertility are responsible for the near total absence of the Leguminosae so characteristic of Mesic Pine Flatwoods. Invading species in the absence of fire tend to be limited to *Pinus serotina* and shrubs characteristic of pocosins.

Frequent fire is particularly important for preventing shrub invasion in these wetter savannas, which are invaded faster than Wet Pine Flatwoods or Mesic Pine Flatwoods. In many Pond Pine Woodland patches, including those bordered by Sandy Pine Savanna or Wet Pine Flatwoods, small numbers of *Pinus palustris*, patches of uncharacteristic shrubs (*Gaylussacia frondosa, Kalmia carolina, Rhododendron atlanticum*), or remnant individuals of savanna grasses suggest that a savanna once extended farther. Large extents of savanna may have been lost by this encroachment of Pond Pine Woodland with past fire exclusion, even in areas that are now managed with frequent fire. The absence of the shallow organic layer characteristic of Pond Pine Woodlands soils suggests this situation. Cecil Frost (personal communication) believes that it is possible for such organic layers to accumulate within historic time, suggesting that Sandy Pine Savannas may once have extended even further. Given the conservatism of most savanna herbs, and their absence in long term seed banks, it is unclear if restoration of such areas could be accomplished even with very frequent fire or chemical or mechanical removal of shrubs.

Glitzenstein, et al. (2003) suggest, based on fire experiments in South Carolina and Georgia, that communities of wet Spodosols, such as our Wet Pine Flatwoods, may retain substantial shrub cover even with very frequent fire, while wetter savannas are shrubby only with less frequent fire. It is unclear how this principle, if it can be generalized to North Carolina at all, would apply to these wetter Spodosol sites.

**Comments:** Sandy Pine Savannas were not distinguished from Loamy Pine Savannas in the 3rd Approximation, and the distinction was not generally recognized before that time, amid the high species richness and large pool of shared species. However, appreciation of the importance of soil texture as a major influence in general has been borne out by extensive observations, study of rare species, and quantitative analysis (Duncan, Peet, et al. ????, Palmquist, et al. in prep.). Nevertheless, distinction among the different longleaf pine savannas can be subtle, and may be impossible in areas altered by absence of fire.
**Rare species:** *Dionaea muscipula, Lysimachia asperulifolia, Asclepias pedicellata, others*

**References:**
Duncan

Pamquist, et al. in prep.

Peet....