



Aucilla Wildlife Management Area (Jefferson County)

Photo by Ann F. Johnson

### **Shrub Bog**

**Description:** Shrub bog consists of dense stands of broadleaved evergreen shrubs, vines, and short trees, one to five meters tall depending on time since fire, with or without an overstory of scattered pine or bay trees, growing in mucky soil where water is usually less than a foot deep (Harper 1914; Sharitz and Gibbons 1982). Characteristic shrubs include titi (*Cyrilla racemiflora*), black titi (*Cliftonia monophylla*), fetterbush (*Lyonia lucida*), large gallberry (*Ilex coriacea*), gallberry (*I. glabra*), wax myrtle (*Myrica cerifera*), and sweet pepperbush (*Clethra alnifolia*), often laced together with laurel greenbrier (*Smilax laurifolia*). Other shrubs that may be present include red chokeberry (*Photinia pyrifolia*), Virginia willow (*Itea virginica*), swamp doghobble (*Leucothoe racemosa*), and myrtle dahoon (*Ilex cassine* var. *myrtifolia*). Taller pines, either pond (*Pinus serotina*), slash (*P. elliottii*), or loblolly (*P. taeda*), may be present. Dense clumps of slash pine may be present in long unburned stands. Other occasional trees that may extend above the shrub layer are loblolly bay (*Gordonia lasianthus*), sweetbay (*Magnolia virginiana*), swamp bay (*Persea palustris*), pond cypress (*Taxodium ascendens*), and stunted red maple (*Acer rubrum*). Herbs are sparse and patchy, confined to sunny openings, and often include tenangle pipewort (*Eriocaulon decangulare*), Virginia chain fern (*Woodwardia virginica*), and pitcher plants (*Sarracenia* spp.). Small areas of open water have floating bladderworts (*Utricularia* spp.).

Shrub bog is found on the border of swamps, in streamhead drainages, and in flat, poorly drained areas between rivers. It often forms the border between the mesic or wet flatwoods communities and dome swamp, basin swamp, or hydric hammock communities. Shrub bog may cover large portions of low-lying areas in the coastal plain known as “bays” (e.g., San Pedro Bay in Madison and Taylor counties and Bradwell Bay in the Apalachicola National Forest). Soils of shrub bogs frequently have an organic muck layer of varying depth at the surface underlain by sand or loamy sands (Coultas 1977). Characteristic soil series include Rutledge, Donovan, Surrency, and Lynn Haven depressional (USFS 1984; Johnstone et al. 2004). Sphagnum moss (*Sphagnum* spp.) is common on the ground surface.

**Characteristic Set of Species:** titi, black titi, sweet pepperbush, fetterbush, large gallberry, laurel greenbrier, pond pine, slash pine

**Rare Species:** Among rare plants, primrose-flowered butterwort (*Pinguicula primuliflora*) is found along streams through shrub bogs. Panhandle lily (*Lilium iridollae*), hummingbird flower (*Macranthera flammaea*), and white-top pitcherplant (*Sarracenia leucophylla*) are found along the edges of shrub bogs in upper stream drainages within upland pine communities in the western Florida Panhandle. Two shrubs, dwarf witch-alder (*Fothergilla gardenii*) and bog spicebush (*Lindera subcoriacea*), which are widespread in the southeast but rare in Florida, are found at the edges of shrub bogs in the western Panhandle. The rare Florida endemic, Chapman’s rhododendron (*Rhododendron chapmanii*) is found along the borders of titi-dominated shrub bogs in the central Panhandle.

Rare animals found in shrub bog include two species of frogs found along upper reaches of sandhill streams in the western Panhandle, the endemic Florida bog frog (*Rana okaloosae*) and the pine barrens treefrog (*Hyla andersonii*; Means and Longden 1976). Extensive shrub bogs provide large acreages of inaccessible natural habitat important for Panhandle populations of the Florida black bear (*Ursus americanus floridanus*).

**Range:** North of Florida, shrub bogs range from North Carolina through the lower portions of the Atlantic coastal plain to the Okefenokee Swamp in Georgia. In this region they are often referred to as “pocosins,” an Algonquin word meaning “swamp on a hill” (Richardson et al. 1981), and they have been the subject of numerous studies (Kologiski 1977; Christensen et al. 1981; Sharitz and Gibbons 1982; Loftin 1998). Although they share many species with Florida shrub bogs, the more northern shrub bogs have different dominant species and physical characteristics. West of Florida, shrub bogs occur in the lower coastal plain of Alabama and Mississippi (NatureServe 2008). In Florida, shrub bogs range throughout the state except for extreme southern Florida. The most extensive shrub bogs are found from the St. Mary’s River on the Georgia border south through the Pinhook Swamp portion of Osceola National Forest and John M. Bethea State Forest (Columbia and Baker counties; Lynch and Baker 1988) to Mallory Swamp in Lafayette County (Johnstone et al 2004) and westward to the Alabama border.

**Natural Processes:** Fires starting in the surrounding pinelands burn to the edges of shrub bogs, but burn through them only during drought periods, probably on the order of every 10-20 years (Loftin 1998). The shrubs and bay trees respond to fire by re-sprouting, either from root crowns or rhizomes. During droughts the peat may become

dry enough to burn completely, killing the shrubs and producing a mosaic of open water areas and sedge-dominated marshes alternating with shrub bogs (Christensen et al. 1981).

Several lines of evidence indicate that shrub bog species have invaded bordering wet prairies and wet flatwoods in the absence of frequent fire. Aerial photographs from the 1930s to 1950s often show a light-colored band of grasses around swamps and shrub bogs in the Panhandle that is replaced by dense shrub vegetation on current aerials (Hess 2007). Senescent wiregrass (*Aristida stricta* var. *beyrichiana*) can occasionally be found among titi shrubs in shrub bogs where it is too shady for wiregrass to have originated. Coultas et al. (1979), in sampling soils and vegetation along a transect through a titi swamp in the Apalachicola National Forest, found cut longleaf pine stumps indicating that black titi had invaded about 60 meters into adjacent pine flatwoods vegetation, presumably since the beginning of fire suppression in the 1930s, developing in the process a layer of peat eight inches deep. Drewa et al. (2002a) noted that shrubs along transects from flatwoods to shrub bog in Florida and Louisiana have broader tolerance limits along the moisture gradient than do herbs, with shrubs tending to extend from both the drier and wetter ends of the transect into the middle. They suggest that relatively frequent fire is the primary factor preventing incursion of shrubs into herbaceous zones.

**Community Variations:** Variants of shrub bogs occur in particular physiographic situations. These include areas along seepage streams in steeply dissected topography in the Panhandle that are dominated by Florida anise (*Illicium floridanum*). Another example is an unusual area in Osceola National Forest dominated by the northern shrub, willow herb (*Decodon verticillatus*).

**Associated Communities:** Shrub bog differs from baygall in lacking a closed canopy or subcanopy of bay trees (swamp bay, loblolly bay, sweetbay). It can be distinguished from recently burned baygall in lacking a large re-sprouting component of bay trees and burned tree stumps. Although it may share many species with wet flatwoods, it differs in usually having few or no slash or longleaf pines and in the presence of a thicker peat layer on the soil surface. It differs from basin, dome, and floodplain swamps in lacking a canopy of hydrophytic trees, such as pond cypress, swamp tupelo (*Nyssa sylvatica* var. *biflora*), and red maple. It differs from wet prairie and seepage slope in the dominance of shrubby, instead of graminoid species. The presence of remnant clumps of wiregrass can be used to distinguish a shrub-invaded wet prairie or seepage slope from a natural shrub bog, since light-loving wiregrass would not be able to become established or maintain itself in a natural shrub bog community.

**Management Considerations:** Physical disturbance in the form of logging, ditching, and planting of pine plantations can favor the spread of shrub bogs at the expense of dome and basin swamps, as well as wet prairies. Historical sources may aid in determining the original extent of shrub bogs in a disturbed landscape, and allow a distinction to be made between natural shrub bog and fire-excluded seepage slope and wet prairie. At Aucilla Wildlife Management Area, for example, historical sources (i.e., 1949 aerial photography, General Land Office surveyors' notes from the mid-1800s and a 1907 soil survey) were used to produce a geo-referenced vegetation map of the pre-disturbance landscape. Similar techniques have been used to map the original natural extent of shrub bog in other areas in North Florida (Kindell 1997; Johnstone et al. 2004).

Frequent growing season fire in the surrounding pinelands is needed to prevent shrub bog species, particularly black titi, from encroaching on surrounding grassy wet flatwoods, seepage slopes and wet prairies. Once shrubs have expanded into former herbaceous areas, they may be difficult to remove using fire alone. Drewa et al. (2002b) found that shrub stem density along a savanna-shrub bog gradient did not decrease even with two growing season fires two years apart. Dormant season fires in the same sites actually increased shrub stem density along the gradient, particularly in species resprouting from root crowns.

Swamp bay, a major component of some shrub bogs, is susceptible to Laurel Wilt Disease, which is caused by a fungus spread by an exotic wood-boring ambrosia beetle (*Xyleborus glabratus*). As of 2009, the infestation had spread to 20 counties in north Florida (USFS 2009). There is no known means of treating diseased trees or controlling the spread of the disease, although root-flare injections of propiconazole have recently shown promise of providing temporary protection of individual trees (Mayfield, III et al. 2008). Wood or mulch from areas with infected trees should not be transported to avoid creating new centers of infection.

**Exemplary Sites:** Bradwell Bay Wilderness Area, Apalachicola National Forest (Wakulla County), Mallory Swamp Restoration Area (Suwannee River Water Management District; Lafayette County), Aucilla Wildlife Management Area (Jefferson and Taylor counties), Pinhook Swamp in Osceola National Forest (Baker and Columbia counties)

**Global and State Rank:** G4/S3

**Crosswalk and Synonyms:**

SCS	22/Shrub Bog
Myers and Ewel	Freshwater Swamp Forests – titi swamps
FLUCCS	614/Titi Swamps

Other synonyms: scrub-shrub (Okefenokee NWR), shrub swamp (in part; FLUCCS), bay (Harper 1914), titi swamp (Clewell 1986)

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