
The Palmetto

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NATURAL COMMUNITIES SEEPAGE COMMUNITIES

by Linda Conway Duever

This is the third in a series of articles describing the Natural Communities defined by the Florida Natural Areas Inventory (FNAI). This classification system must be viewed as a system of mental constructs imposed upon an infinite variety of growing, changing, intergrading, natural environments. Hence, more often than not, a given site will not precisely fit the classic description of the appropriate natural community. By practicing comparing these descriptions to vegetation observed in the field, an interested naturalist should be able to learn to identify plant communities accurately and contribute valuable site information to conservation efforts.

Since seepage communities are relatively poorly documented, FNAI would appreciate additional information on these environments. If you have data, especially species records for a site you can clearly classify as one of the following Natural Communities (specify which!), or comments, please send them to the author at the end of this article.

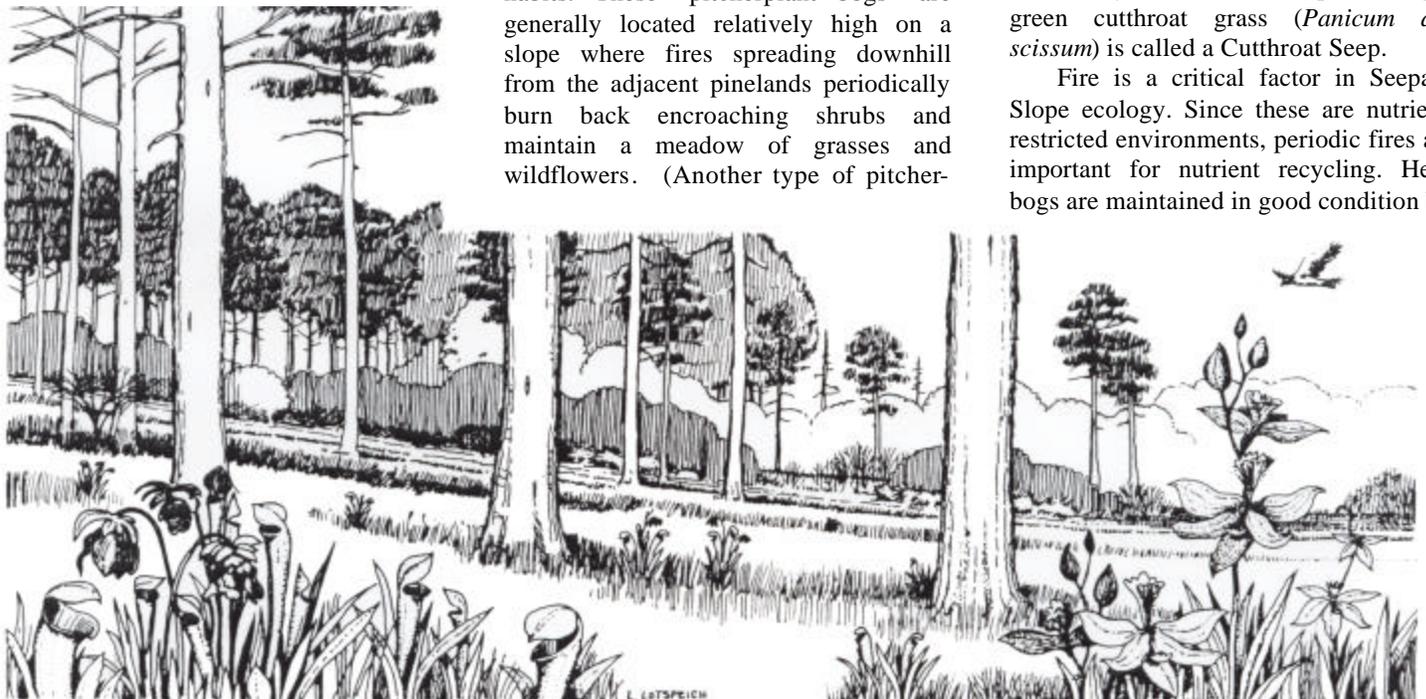
SEEPAGE SLOPES

Where groundwater seeps to the surface along a hillside, an unusual wet upland environment called a Seepage Slope is created. This most often occurs in a Sandhill region where rainwater percolating down through the sand encounters a less permeable soil strata (usually a clayey layer, but sometimes rock or saturated soil). The resultant habitat maybe wet most of the time, but, except for scattered small pools, it is never flooded. The soils are typically acid loamy sands with low nutrient availability.

To compensate for the soil's deficiencies, many plants of the Seepage Herb Bog have developed insectivorous habits. These "pitcherplant bogs" are generally located relatively high on a slope where fires spreading downhill from the adjacent pinelands periodically burn back encroaching shrubs and maintain a meadow of grasses and wildflowers. (Another type of pitcher-

plant bog," which occurs on low-lying flat sites, will be discussed in a future article on Wet Prairies). Farther downslope, where the soil contains more peat and remains damp through all but the most severe droughts, Seepage Shrub Bogs develop. In certain situations where there is a zone of greasy-looking, yellowish sand, a Pinckneya Bog forms an ecotone between the herb bog and a downslope Baygall. Where there is a pine overstory extending down onto the wet part of the slope, the site may be considered a Pond Pine Pocosin or a Slash Pine Pocosin. If there is a significant overstory of white cedar (*Chamaecyparis thyoides* or *C. henryi*?), it is termed a White Cedar Bog. In central Florida, a slash pine (*Pinus elliotii*) community with a dense carpet of bright green cutthroat grass (*Panicum abscissum*) is called a Cutthroat Seep.

Fire is a critical factor in Seepage Slope ecology. Since these are nutrient-restricted environments, periodic fires are important for nutrient recycling. Herb bogs are maintained in good condition by



fires every three to eight years, whereas shrub bogs typically burn no more often than once every 20 to 50 years. After a herb bog has gone unburned for ten years or so, Seepage Shrub Bog species, then Baygall trees, invade. As larger woody plants become established, increased transpiration lowers soil moisture levels. Over a period of years, this dries out the bog and the site is colonized by non-wetland species.

A somewhat reverse process may create new bogs where groundwater levels are raised following the decrease in transpiration when an upslope forest is logged. More often, man's hydrological activities eliminate these communities. Even slight modifications in drainage patterns can alter surface moisture critically; a ditch only eight inches deep can be enough to destroy a bog. Seepage slope areas are frequently convenient places for farm pond construction, so many of them are converted to impoundments or trampled by cattle. And herbicides and plant collectors have seriously reduced the diversity of some sites.

All the above are fairly predictable sorts of human impact, but pitcherplant bogs provide an illustration of how obscure man's effects can be. Soil disturbance apparently promotes hybridization of sarracenias, yielding crosses that are less hardy and require more water than the parent species. These plants could then be among the factors operating to dry out and destroy their own habitat.

Although there are Cutthroat Seeps in Polk and Highlands counties, and some pond pine and pitcherplant communities as far south as Orlando, Seepage Slopes are generally a north Florida community. There is a small concentration in Clay and Putnam counties, but most of them are in the western Panhandle. Even there, they are uncommon and (unlike the Wet Prairie type pitcherplant savannas) seldom larger than a few acres.

It is difficult to list the plant species most characteristic of the Seepage Herb Bog because practically all reports simply lump all "pitcherplant bogs" without distinguishing slopes from savannas, wet pine flatwoods, and deep peat bogs. The experts recognize that there are differences in the vegetation on these different types of sites, but there is little documentation of just which species

prefer which environments. Nevertheless, we can say that wiregrass (*Aristida stricta*) is usually the dominant plant, but pitcherplants (*Sarracenia spp.*) are the most striking component of the flora. Trumpet pitcherplant (*S. flava*) and *white-top pitcherplant (*S. leucophylla*) are the most common species. Hooded pitcherplant (*S. minor*) is fairly abundant in the eastern part of the state, but relatively scarce in the Panhandle. Parrot pitcherplant (*S. psittacina*) is characteristic of open Seepage Slopes, whereas purple pitcherplant (*S. purpurea*) grows in partially shaded spots along the shrub bog interface. The *red-flowered pitcherplant (*S. rubra*), Florida's rarest sarracenia, prefers sunny sites. Other carnivorous plants include sundews (*Drosera spp.*), and butterworts (*Pinguicula spp.*). Dew threads (*Drosera filiformis*) are the most prominent sundews on Seepage Slopes. The Pinguiculas include blue butterwort (*P. caerulea*), yellow butterwort (*P. lutea*), and small butterwort (*P. pumila*). There is usually some sphagnum moss (*Sphagnum spp.*), but clubmosses (*Lycopodium spp.*) are much more abundant. Bogmoss (*Mayaca fluviatilis*) and sedges such as *Fimbristylis autumnalis* and *Rhynchospora spp.* (*R. americana*?) dominate some sites. This is an outstanding habitat for terrestrial orchids. The following species have been recorded from Seepage Slopes: *yellow fringeless orchid (*Platanthera integra*), rose pogonia (*Pogonia ophioglossoides*), pale grass pink (*Calopogon pallidus*), and grass pink (*Calopogon tuberosus*). Rare plants known from Seepage Herb Bogs include *naked-stemmed panic grass (*Panicum nudicaule*), *Drummond's yellow-eyed grass (*Xyris drummondii*), *Harper's yellow-eyed grass (*X. scabrifolia*), *Curtiss' lythrum (*Lythrum curtissii*), veronica dragonhead (*Physotegia veroniciformis*), *Panhandle lily (*Lilium iridollae*), *grass-of-Parnassus (*Parnassia grandiflora*) and *hartwrightia (*Hartwrightia floridana*).

Seepage Shrub Bogs tend to be fairly uniform in appearance, but very variable in species composition. Some are virtually monospecific stands of titi (*Cyrtilla racemiflora*) or buckwheat tree (*Cliftonia monophylla*), whereas others are made up of a diverse array of shrubs. Titi bogs may grow up rapidly on new sites, but it probably takes at least 20 to

40 years for a shrub bog to develop full diversity. Typical shrubs include lyonias (*Lyonia lucida*, *L. ligustrina*), hollies (*Ilex myrtifolia*, *I. coriacea*, *I. cassine*, *I. glabra*, *I. verticillata*), myrtles (*Myrica cerifera*, *M. heterophylla*, *M. inodora*), blueberries (*Vaccinium spp.*), leucothoes (*Leucothoe racemosa*, *L. axillaris*), latherbush (*Clethra alnifolia*), swamp haw (*Viburnum nudum*), red chokeberry (*Sorbus arbutifolia*), and Virginia willow (*Itea virginica*). The shrubs are often heavily entangled with *Smilax laurifolia*. Sphagnum moss, cinnamon fern (*Osmunda cinnamomea*), and Virginia chain fern (*Woodwardia virginica*) are common groundcovers.

Pinckneya (*Pinckneya pubens*), poison sumac (*Rhus vernix*), tuliptree (*Liriodendron tulipifera*), cliftonia, and *Florida anise (*Illicium floridanum*) are especially prominent in the Pinckneya Bog ecotone.

BAYGALL

Baygalls are wetland forests that form at the bases of slopes where constant seepage maintains moisture levels high enough to allow peat accumulation and prevent fire. Whereas there may be some surface peat on Seepage Slopes, oxidation during droughts prevents it from building up to any great depth and fires occur too frequently to permit trees to reach full size. Downslope the situation is different and a band of dense forest develops. FNAI uses the term Baygall specifically for this particular type of environment, but the terms "bayhead" and "baygall" are colloquially used interchangeably for all types of forests dominated by bay trees.

The most classic Baygalls are found along the edges of central Florida's sand ridges. There, where water percolating down from the Scrubs and Sandhills encounters the high groundwater table of the adjacent flatlands, an environment with extraordinarily consistent moisture availability is created. The resultant Baygall grows on a deep layer of acid peat that is virtually always damp, but hardly ever flooded or dry. (This is in sharp contrast to most of Florida's wetlands which are characterized by striking variations in seasonal water levels.) Because their organic soils are valuable for farming, many of these

Baygalls have been cleared, drained, and converted to gladiolus fields and other agricultural lands.

FNAI regards the streamhead bay forests of the Panhandle as Baygalls also, but they are not quite so exemplary. They tend to have a heavy buildup of organic materials within a mineral soil rather than on top of it. This is probably because they are subject to a somewhat more variable moisture regime since they generally receive groundwater intercepted and shunted laterally by an impermeable soil strata and thus do not benefit from the high regional water table that forces seepage in center Florida.

Baygalls are typically very dense forests of upright-growing evergreen trees. Sweet Bay (*Magnolia virginiana*), swamp redbay (*Persea palustris*), and dahoon holly (*Ilex cassine*) are generally the most common species, but loblolly bay (*Gordonia lasianthus*) usually dominates in the northeast part of the state. Red maple (*Acer rubrum*), blackgum (*Nyssa biflora*), and tuliptree are frequent components of the forest. The understory is similar to that of a Seepage Shrub Bog, but the shrub layer tends to be sparse due to shading from the dense evergreen canopy.

BOG

Although almost any damp, peaty environment may be casually called a "bog," and we follow common usage and apply the term to Plant Communities within several different Natural Communities, as an FNAI Natural Community name the term refers specifically to a peat-filled depression. A Bog can be thought of as ecologically similar to a Seepage Slope, but maintained by opposite hydrological processes. Whereas a Seepage Slope is dependent upon water seeping down from an upslope source, a Bog is kept damp by moisture drawn up from below by capillary action. The peat substrate acts as a wick to pull groundwater to the surface. This creates an almost constantly wet, but rarely flooded, environment, which is what distinguishes a Bog from a Basin Swamp, which would occur on an inundated site in a similar topographic setting.

Bogs may have significantly higher nutrient levels than Seepage Slopes, since water moving downslope leaches

nutrients out of slope environments, but deposits them in basins.

The Bog may rest on a continuous mass of peat or consist of floating islands of peat on the surface of a pond. Generally, a Bog begins as a pond, goes through a stage with floating islands, then eventually fills with peat over the course of hundreds of thousands of years. The process begins as debris from plants growing in and around the pond settles to the bottom where lack of oxygen prevents it from decaying. These plant fragments accumulate on the bottom of the pond as peat. Meanwhile, floating plants and trailing stems from shoreline vegetation may begin to cover the water surface, trapping and producing additional debris and interfering with oxygen exchange at the water-air interface so that the aquatic system becomes even more anaerobic. Bog formation may be delayed if the pond dries up and the peat begins to oxidize or the process may be speeded up as air-filled chunks of peat float to the surface following a drought. These "tussocks" or "batteries" form a substrate for more elaborate floating islands, which may undergo succession from bare peat through herb and shrub communities to forest. Eventually, the trees may grow so large and heavy that they force the peat mass to sink to the bottom and the community becomes a swamp with a surface-water-dominated hydrological regime.

The peat islands within Georgia's Okefenokee Swamp are the classic example of the southeastern Bog ecosystem. With Florida, Orange Lake, Lake Lafayette, Lake Apopka, Lake Washington, and Lake Hell'n Blazes are noted for floating islands. Small bogs occur throughout the state.

Bogs are, of course, vulnerable to the same hydrological modifications that threaten other wetlands, but they must be considered especially endangered because their soils are an economically exploitable resource. Limited mining of peat for agricultural and horticultural uses has destroyed a few Florida bogs over the years, but the current interest in large-scale mining of peat for fuel must be regarded as a much more serious threat.

Bog Plant Communities are very similar to those of other acid peat environments. Herb Bog, Shrub Bog, and Temperate Bayhead can be expected to differ from Seepage Bog, Seepage Shrub

Bog, and Baygall only in minor details of species composition. FNAI recognizes the Everglades Bay head exemplified by the "teardrop islands" of Loxahatchee National Wildlife Refuge as a distinct community. These islands have a mixture of tropical and temperate flora dominated by swamp redbay, sweetbay, dahoon holly, and cocoplum (*Chrysobalanus icaco*). In Marshy Bogs, herb Bog species are mixed with marsh species such as pickerelweed (*Pontederia lanceolata*), and water pennywort (*Hydrocotyle umbellata*).

Rare species which might be encountered in Bogs include *water sundew (*Drosera intermedia*), *grass-of-parnassus, *white-top pitcherplant, *red-flowered pitcherplant, *yellow fringeless orchid, *Curtiss' lythrum, and *hartwrightia. All of these grow on open, sunny sites.

*Suzanne Cooper, FNAI Botanist, supplied information on rare species. Those flagged with an asterisk are on the FNAI Special Plant list. Information on populations of these plants should be sent to Suzanne at the Florida Natural Areas Inventory, 254 East Sixth Avenue, Tallahassee, Florida 32303 (904/224-8207).

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