BAY FOREST

Concept: Bay Forests are natural peatland forests and woodlands dominated by *Gordonia lasianthus*, alone or in combination with *Magnolia virginiana* or *Persea palustris*.

Distinguishing Features: Bay Forest is distinguished from Pond Pine Woodland, Peatland Atlantic White Cedar Forest, High Pocosin, and other pocosin communities by canopy dominance of *Gordonia lasianthus*, *Magnolia virginiana*, or *Persea palustris* without an appreciable component of *Pinus serotina* or other species.

Synonyms: *Gordonia lasianthus - Magnolia virginiana - Persea palustris / Sphagnum* spp. Forest (CEGL007044).
Ecological Systems: Atlantic Coastal Plain Peatland Pocosin and Canebrake (CES203.267).

Sites: Bay Forests occur near the edges of domed peatlands, in peat-filled Carolina bays, and in swales in aeolian sand areas or irregular sandy surfaces such as high stream terraces. They may occur on shallow organic deposits or deeper peats with some input of mineral sediment.

Soils:

Hydrology: Sites are permanently or semipermanently saturated. As in Pond Pine Woodland, the water table probably regularly drops to underlying mineral sediment during the dry season, allowing plant roots to reach it (Otte 1981). Water comes from rainwater and sheet flow. Most sheet flow is from pocosins, but there may be limited influx of less oligotrophic water from adjacent areas. There is some evidence for an association with the beginnings of streams draining outward from the peatland.

Vegetation:

Range and Abundance: Ranked G4.

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Associations and Patterns:

Variation:

Dynamics:

Comments:
Magnolia virginiana - Persea palustris / Lyonia lucida Forest (CEGL007049) is an association that is apparently a secondary bay forest, created by removal of the canopy from a Peatland Atlantic White Cedar Forest, Nonriverine Swamp Forest, or Pond Pine Woodland. *Gordonia lasianthus* is not usually a significant tree of these communities.

Bay Forests are generally thought to represent the final stage of succession in Pond Pine Woodlands in the absence of fire, because *Pinus serotina* cannot regenerate in dense unburned vegetation. However, *Gordonia* is quite resilient to fire when large, and readily sprouts after fire when killed. Some fires in Pond Pine Woodland have resulted in death of pond pines and capture of the site by bays, effectively creating a Bay Forest through fire rather than through absence of fire.

Rare species:

References:

BAY FOREST

Sites: Outer parts of domed peatlands on poorly drained interstream flats, and peat-filled Carolina bays and shallow swales. Shallow organic deposits or deeper peats with some input of mineral sediment.

Soils: Shallow Histosols or oligotrophic mineral soils with organic surface layers. Series include Croatan (Typic Medisaprist), Pamlico (Terric Medisaprist), Dorovan (Typic Medisaprist), and undoubtedly others.

Hydrology: Palustrine, seasonally saturated or flooded. It is unclear if hydrology differs from that of Pond Pine Woodland and Peatland Atlantic White Cedar Forest.

Vegetation: Dominated by combinations of Gordonia lasianthus, Magnolia virginiana, and Persea palustris. Pinus serotina, Nyssa biflora, Acer rubrum, Pinus taeda, and Chamaecyparis thyoides may be significant components. The shrub layer is dense to somewhat open, consisting of species such as Lyonia lucida, Cyrilla racemiflora, Lyonia ligustrina, Ilex coriacea, and Ilex cassine.

Dynamics: Like other peatland communities, Bay Forests are wet and nutrient poor, though probably less so than Low Pocosins or High Pocosins.

Bay forests are usually considered a late successional community, replacing Peatland Atlantic White Cedar Forest or Pond Pine Woodland after long absence of fire (Buell and Cain 1943; Kologiski 1977). In large peatlands they may exist with these communities in a mosaic defined by disturbance history, or they may occupy distinct sites which protect them from fire.

Fires may be be expected to be intense in the dense vegetation. Christensen (1988) suggests that shallow peat burns may allow Chamaecyparis or Pinus serotina establishment. However, Bay Forest dominants sprout readily, and in less severe burns may be expected to recover.

Range: Outer and middle Coastal Plain.

Associations: Grades to Pond Pine Woodland, Nonriverine Swamp Forest, Peatland Atlantic White Cedar Forest, or High Pocosin.

Distinguishing Features: Bay Forests are distinguished from Pond Pine Woodland, Peatland Atlantic White Cedar Forest, and Nonriverine Swamp Forest by a canopy dominated by the three bay species. Persea palustris-dominated areas in sandhill streamheads or seepage slopes, small depressions, or barrier islands are not considered Bay Forests but are classified as Streamhead Pocosin, Small Depression Pocosin, and Maritime Shrub Swamp respectively.

Variation: Not well known but presumably varies with wetness, fire, and disturbance history.

Comments: This is a poorly defined, poorly known community type. The name "bay" is applied to many kinds of vegetation, only some of which fit into this type. This makes it difficult to determine what literature applies to this type, and whether applicable studies are really studying the same phenomena.

The environmental associations and successional relationships between this community type and other peatland types are not well known. Bay Forests may be solely a product of fire suppression, or there may be sites which naturally supported them. Snyder (1980) found examples associated with the beginning of stream drainage on the edge of large peat domes. In the absence of definite knowledge, it seems best to consider Bay Forests a community type and to protect them for further study.

Rare Plant Species: None known.

Synonyms:
Evergreen Bay (Kologiski 1977).
SAF 104: Sweetbay-Swamp Tupelo-Redbay.
Bay pocosin (Snyder 1980).

Examples:
Green Swamp, Brunswick and Columbus counties (Kologiski 1977).
Croatan National Forest, Carteret Craven, and Jones counties (Snyder 1980).
Big Colly Bay, Bladen Lakes State Forest, Bladen County.
Salters Lake Carolina Bay, Bladen County.

References: Bennett and Nelson (1990), Christensen (1988), Kologiski (1977), Snyder (1980), Wells and Whitford (1976).

Sample Plant Communities:
Gordonia lasianthus-Persea palustris-Magnolia virginiana/Cyrilla racemiflora-Lyonia lucida/Woodwardia virginica.
Gordonia lasianthus-Acer rubrum/Persea palustris/mixed pocosin shrubs.