

IV. DESCRIPTION OF THE SAMBI PLANNING AREA

The following description is of the eastern portion of the southeastern coastal plain (BCR 27), referred to hereafter as the SAMBI Area ([Figure 1](#)). The SAMBI area is essentially the same as the South Atlantic Coastal Plain (SACP) Physiographic Area of Partners In Flight, except that portion of Alabama that was formerly in the SACP of SAMBI is now outside the SAMBI area as a result of the formation of the East Gulf Coast Joint Venture (EGCJV, [Figure 3D](#)). The SAMBI Area, consisting of approximately 24.2 million hectares, includes parts of Virginia, North Carolina, South Carolina, Georgia, and Florida. SAMBI is home to the largest forested floodplains outside of the Mississippi Alluvial Plain and includes unique non-alluvial wetlands such as the Great Dismal Swamp, pocosins, and Carolina bays. In addition, the largest remnants of former longleaf pine (*Pinus palustris*) ecosystems, and the best remaining examples of "natural" barrier and sea islands, coastal marsh complexes, and maritime forests and woodlands are found in the SAMBI area. Also present within this region are extensive tidal wetlands and commercial forests. Managed impoundments in coastal areas are important to migrating and wintering dabbling ducks, shorebirds, and waterbirds.

Physical characteristics include a predominantly flat, weakly dissected alluvial plain with active fluvial deposition and shore zone processes along coastlines. Elevation ranges from 0m

increasing towards the fall line to 219m. Major blackwater rivers (with headwaters in the coastal plain) include Chowan, Waccamaw, Satilla, St. Mary's, Suwanee, and St. John's (originating in Peninsular Florida). Major brownwater rivers (with headwaters originating in the Southern Piedmont or Southern Blue Ridge) include the Roanoke, Tar, Neuse, Cape Fear, Pee Dee, Santee-Cooper, Ashepoo-Combahee-Edisto (ACE), Savannah, Ogeechee, Altamaha, and Apalachicola (Chattahoochee and Flint) rivers. Average annual precipitation is 102-152cm except on the Florida Gulf Coast where it is 133-163cm.

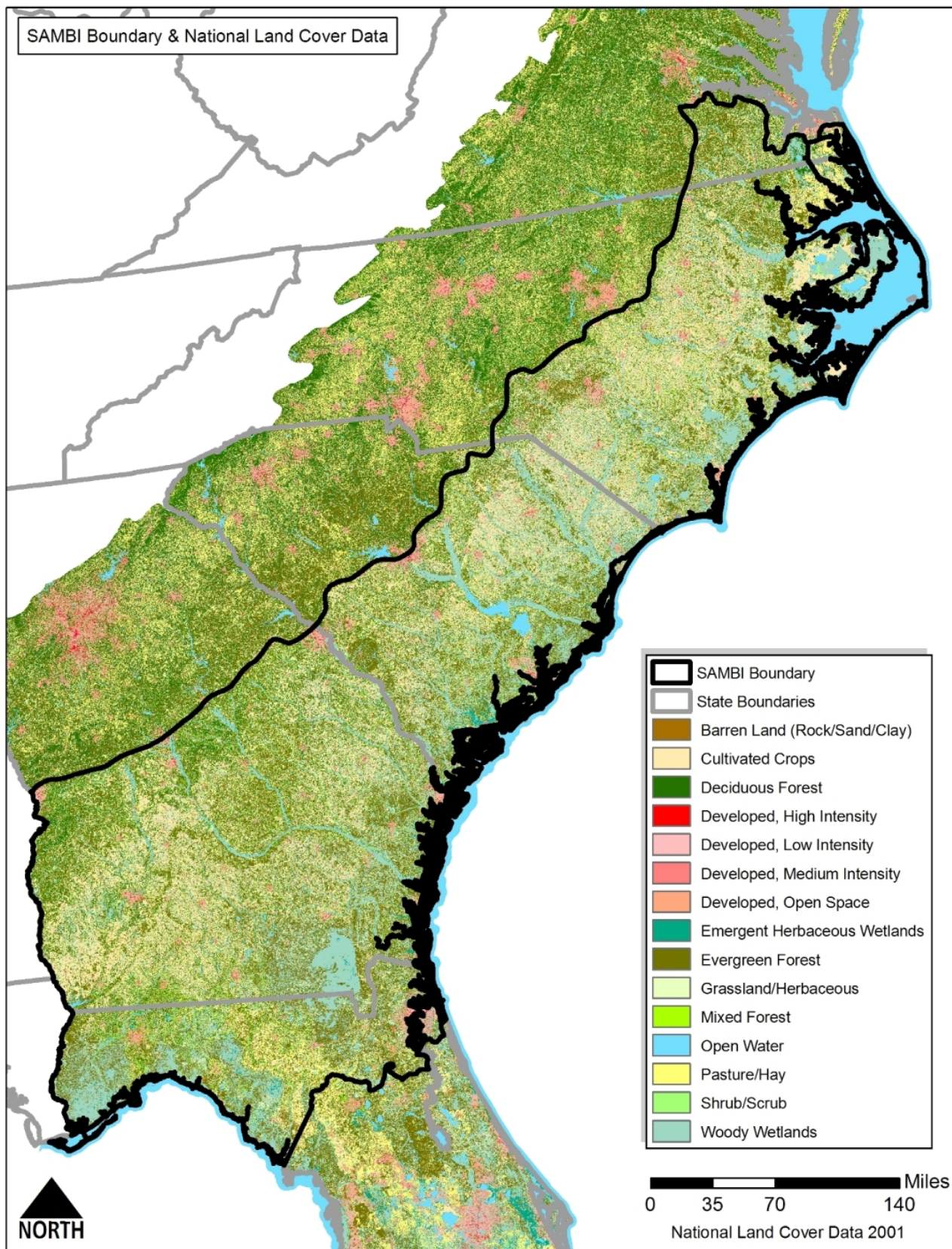


Figure 5. Landcover Types in the SAMBI Planning Area.

Portions of the southern and eastern boundaries of southeastern coastal plain are the Gulf of Mexico and Atlantic Ocean respectively, but the SAMBI planning area extends well offshore to include both the Southeast U.S. Continental Shelf (BCR 77) and the near shore waters of the Gulf of Mexico pelagic BCR (74) ([Figure 2](#)) where the SAMBI planning area is adjacent to these pelagic BCRs. The waters addressed in this plan include all coastal offshore waters adjacent to the terrestrial portion of the SAMBI planning area in the Gulf of Mexico and waters of the Atlantic Ocean that extend to and beyond the Gulf Stream where high priority oceanic birds inhabit.

Land conversion, for both agricultural and urban expansion, has resulted in a 40 percent loss of natural vegetation (closer to 65 percent along some coastlines) in this physiographic area. Potential natural vegetation (i.e., absent frequent disturbances) is referred to as "southern mixed" forests and oak/hickory/pine (*Quercus spp./Carya spp. Pinus spp.*), with intervening southern floodplain forest and pocosins, as well as live oak/sea oats (*Quercus virginiana/Uniola paniculata*) along coastlines. However, disturbances are frequent and therefore, upland forests historically were characterized by open pine (predominantly longleaf) forests. Today, predominant vegetation remains slash pine (*Pinus elliotii*) (Florida) and longleaf pines, with loblolly pine (*Pinus taeda*) becoming common nearer to the Southern Piedmont and the northern portions of the coastal plain (Figure 7). Oak/gum/cypress (*Quercus spp./Nyssa spp./Taxodium spp.*) forest cover type is common along floodplains and prevalent species include laurel oak (*Quercus laurifolia*), water tupelo (*Nyssa aquatica*), swamp tupelo (*Nyssa biflora*), swamp chestnut oak (*Quercus michauxii*), cherrybark oak (*Quercus falcata var. pagodaefolia*), and baldcypress (*Taxodium distichum*). Pond pine (*Pinus serotina*) and Atlantic white cedar (*Chamaecyparis thyoides*) become important within the Lower Coastal Plain, especially in pocosin and other non-alluvial wetland types. Live oak becomes important along coastal areas and frequently is included with other coastal pines and hardwoods in various types of "hammocks."

Within the SAMBI area, fire is the single most important natural driving disturbance force. Natural burns occur over medium to large size areas between natural barriers (e.g., floodplains, other wetlands) with moderate frequency and low intensity. Fires most often occurred during the growing season, in many cases started by lightning, and were essential for supporting numerous plant communities and dependent animals, including many bird species. In addition to fire, hurricanes, tornadoes, and floods are frequent as disturbance agents. Ice storms, though rare, are devastating where they occur. Finally, southern pine beetles are important disturbance agents.

Over 300 bird species occur annually in the SAMBI area as nesting, post nesting dispersers, transients, and /or wintering residents. Among these species, the SAMBI area supports critically important populations for a number of extremely high priority bird species. Species in need of the greatest conservation attention include Henslow's Sparrow (*Ammodramus henslowii*), Wood Stork (*Mycteria americana*), Bachman's Sparrow (*Aimophila aestivalis*), Swallow-tailed Kite (*Elanoides forficatus*), Swainson's

Warbler (*Limnothlypis swainsonii*), Painted Bunting (*Passerina ciris*), Black-Capped Petrel (*Pterodroma hasitata*), Bermuda Petrel (*Pterodroma cahow*), Red-Cockaded Woodpecker (*Picoides borealis*), Southeastern American Kestrel (*Falco sparverius paulus*), Wayne's Black-Throated Green Warbler (*Dendroica virens waynei*), Saltmarsh Sharp-tailed Sparrow (*Ammodramus caudacutus*), Red Knot (*Calidris canutus*), Piping Plover (*Charadrius melodus*), and Snowy Plover (*Charadrius alexandrinus*) (gulf coast). Other priority species also of conservation interest include Florida Sandhill Crane (*Grus canadensis pratensis*), White Ibis (*Eudocimus albus*), Loggerhead Shrike (*Lanius ludovicianus*), Cerulean Warbler (*Dendroica cerulea*), Prothonotary Warbler (*Protonotaria citrea*), Seaside Sparrow (*Ammodramus maritimus*), Brown-Headed Nuthatch (*Sitta pusilla*), American Woodcock, Northern Bobwhite, Common Ground-Dove (*Columbina passerina*), Yellow-Throated Warbler (*Dendroica dominica*), Rusty Blackbird (*Euphagus carolinus*), Black Skimmer (*Rynchops niger*), Least Tern (*Sterna antillarum*), Common Tern (*Sterna hirundo*), Gull-billed Tern (*Sterna nilotica*), Black Rail (*Laterallus jamaicensis*), Peregrine Falcon (*Falco peregrinus*), Bald Eagle (*Haliaeetus leucocephalus*), American Oystercatcher (*Haematopus palliatus*), Red-Throated Loon (*Gavia stellata*), and most migrating and wintering shorebirds and rails, Brant (*Branta bernicla*), American Black Duck (*Anas rubripes*), Lesser Scaup (*Aythya affinis*), Greater Scaup (*Aythya marila*), Tundra Swan (*Cygnus columbianus*), and Wood Duck (*Aix sponsa*).

Description of Habitats

Birds are grouped into 8 priority species-habitat suites for the SAMBI area:

- 1) Grasslands and Associated Habitats
- 2) Managed and Palustrine Emergent Wetlands and Mudflats
- 3) Early-Successional and Shrub-Scrub
- 4) Forested Wetlands
 - Alluvial
 - Pocosins, Carolina Bays, Other Non-Alluvial
- 5) Maritime Communities
 - Maritime Forest / Shrub-scrub
 - Estuarine Emergent Wetlands
 - Beaches and Dunes
 - Open Ocean
- 6) Southern Pine Forests
 - Longleaf / Slash Flatwoods and Savannas and Longleaf Sandhills
 - Mature Loblolly
 - Short-Rotation "Plantation" Pine
- 7) Oak-Hickory / Tulip Poplar / Pine Forests

8) Riparian / Mixed Mesic Hardwoods

For each habitat type, this plan provides the following background discussion:

1) Grasslands and Associated Habitats

Historical grass-dominated ecosystems of the Southeastern coastal plain, east of the tallgrass prairies of Texas and Oklahoma and the coastal prairies of Texas and Louisiana, consisted mostly of relatively small and isolated patches within a forest-dominated landscape, including pitcher plant (*Sarracenia* spp.) bogs, prairies, sedgeland, barrens and glades, savannas, and the Everglades. Despite the loss of native grass-dominated ecosystems over the last two centuries, remnant southeastern grasslands remain centers of biological diversity, with many southeastern endemic species totally dependent upon these ecosystems (DeSelm and Murdock 1993). The uniqueness of grasslands and prairies warrants their restoration and management. Their conservation value is further enhanced because they harbor several federally listed grassland birds.

Also of importance to bird conservation within the region are the longleaf and slash pine savannas formerly found throughout the lower coastal plain and the dry and wet prairies of southern Georgia and northern Florida. Focus here is placed on the grassland component of both sparsely forested savannas and treeless prairies within the coastal plain.

Elsewhere within the coastal plain, the proliferation of pastureland, airfields (both commercial and military), and other "artificially" created grasslands has provided additional grassland bird habitat, offsetting the loss of some historical grasslands. While remnant native grasslands still support the core habitats for more highly vulnerable species (e.g., Henslow's Sparrow, Florida Sandhill Crane), many species also benefit from cropland management and pasturelands. However, even common grassland species such as Eastern Meadowlark (*Sturnella magna*) and Savannah Sparrow (*Passerculus sandwichensis*) are showing strong declining trends due to changes in pasture grasslands (from warm-season to cool-season grasses) and more efficient mowing practices. Priority species associated with these habitats are Henslow's Sparrow, Bachman's Sparrow, Florida Sandhill Crane, Northern Bobwhite, American Woodcock, Loggerhead Shrike, and Barn Owl, Eastern Kingbird (*Tyrannus tyrannus*), and Grasshopper Sparrow (*Ammodramus savannarum*).

2) Managed and Palustrine Emergent Wetlands and Mudflats

One of the most important habitat types within this category are the freshwater marshes, tidal flats, and emergent tidal marshes. Freshwater marshes are important for supporting significant populations of rails, many species of which are increasingly considered vulnerable (Eddleman et al. 1988). Most recently, apparent declines in the continental population of King Rail (*Rallus elegans*) has brought considerable attention to the importance of freshwater marsh ecosystems to this species, as well as other freshwater

marsh species such as Yellow Rail (*Coturnicops novaboracensis*), Black Rail (*Laterallus jamaicensis*), Least Bittern (*Ixobrychus exilis*), and American Bittern (*Botaurus lentiginosus*). Other intertidal mudflats, dredge spoil areas, and managed impoundments are extremely important for shorebirds, waterbirds, and waterfowl on a seasonal basis. There are approximately 40,500ha of existing managed impoundments from southeast North Carolina to north Florida, and these coastal wetlands provide some of the most significant wetland habitats for waterfowl (Gordon et al. 1998), shorebirds (Weber and Haig 1996), and waterbirds (Bildstein et al. 1990). Some of the highest priority species associated with these habitats are Wood Stork, White Ibis, Little Blue Heron (*Egretta caerulea*), Gull-billed Tern (*Sterna nilotica*), Limpkin (*Aramus guarauna*), Stilt Sandpiper (*Calidris himantopus*), Whimbrel (*Numenius phaeopus*), Blue-winged Teal (*Anas discors*), and Northern Pintail (*Anas acuta*).

3) Early Successional and Shrub/Scrub

Early-successional shrub-scrub habitats originate and are maintained by natural disturbance phenomena including grazing by hoofed animals, tornadoes, hurricanes, ice storms, and most notably fire. Elimination of these phenomena has led to the loss of most shrub-scrub habitats, as well as the longleaf pine forests from the Southeast. Historically, the most stable shrub-scrub habitats in the Southeast were those areas subjected to frequent and large-scale disturbance regimes such as fire. Among the most important habitats is the shrub-scrub habitat is characterized by fire-prone vegetation under mature southern pine forests, including longleaf pine-southern scrub oak, wiregrass (*Aristida spp.*), bluestem (*Andropogon spp.*), saw palmetto (*Serenoa repens*), cutthroat grass (*Panicum abscissum*), ferns, gallberry (*Ilex glabra*), as well as pitcher plant bogs and remnant cedar glades. The trend away from large clearcuts on both public land and non-industrial private lands in the South, the trend away from inefficient farming, and still too few efforts to restore natural ecosystem functions in those biotic communities requiring regular disturbance all point to loss of birds dependent on shrub-scrub habitats.

Species of highest concern in these habitats are Bachman's Sparrow, Henslow's Sparrow, Loggerhead Shrike, Prairie Warbler (*Dendroica discolor*), Painted Bunting, Field Sparrow (*Spizella pusilla*), American Woodcock, and Northern Bobwhite.

4) Forested Wetlands (Alluvial and Non-alluvial)

a. Alluvial

Bottomland hardwood forests, alluvial forests, and swamp forests are among those biotic communities in the Southeast adapted to flooded conditions. Various combinations of oaks, especially overcup oak (*Quercus lyrata*), swamp chestnut oak, water oak (*Quercus nigra*), cherrybark oak, willow oak (*Quercus phellos*), Shumard oak (*Quercus shumardii*), water tupelo (gum), swamp tupelo, and baldcypress usually dominate the canopy of mature forests. Cottonwoods (*Populus spp.*), willows (*Salix spp.*), river birch (*Betula nigra*), and elms (*Ulmus spp.*) dominate disturbed sites.

Major recognized wetland forest types within southeastern floodplains are: (1) cottonwood, (2) black willow (*Salix nigra*), (3) overcup oak/water hickory (*Q. lyrata/Carya aquatica*), (4) sweetgum/willow oak (*Liquidambar styraciflua/Q. phellos*), (5) sugarberry/American elm/green ash (*Celtis laevigata/Ulmus alata/Fraxinus pennsylvanica*), (6) eastern sycamore/sweetgum/American elm (*Platanus occidentalis/L. styraciflua/U. alata*), (7) willow oak/water oak/laurel oak, (8) swamp chestnut oak/cherrybark oak, (9) baldcypress, (10) baldcypress/water tupelo, (11) water tupelo/swamp tupelo, and (12) sweetbay/swamp tupelo/red bay (*M. virginiana/N. sylvatica* var. *biflora/Persea borbonia*) (Sharitz and Mitsch 1993).

There has been extensive drainage and conversion of forested wetlands throughout the Southeast, from over 18 million ha before the mid-1800=s to just over 12 million ha in 1985, an overall decline of about 30% (Hefner et al. 1995). Furthermore, Koneff and Royle (2004) calculated a net loss of palustrine forested wetlands in the SAMBI area of approximately 720,500ha from the 1970's through the 1990's. Almost all of the remaining 70% of forested wetland in the Southeast has been cutover at least once and frequently fragmented in the process. This fragmentation has been associated with greater losses of forest-interior and area-sensitive species (e.g., the recently "rediscovered" Ivory-billed Woodpecker in Arkansas and the "presumed extinct" Bachman's Warbler) due to the almost complete elimination of large tracts of mature forest age-classes.

Outside the Mississippi Alluvial Plain, the largest remaining "relatively intact" forested wetland systems are all within the SAMBI area. Protection of existing floodplain forested wetlands within the Roanoke, Winyah Bay (Pee Dee and Waccamaw), Francis Marion National Forest (Santee and Cooper), ACE Basin, Savannah, Altamaha, Lower Suwannee, and Apalachicola rivers should be top priority.

Species in need of conservation attention within the SAMBI area in decreasing order of potential vulnerability include Swallow-tailed Kites, coastal populations of Black-throated Green Warblers, Swainson's Warblers, Rusty Blackbird, and Prothonotary Warblers. In addition, local populations of Cerulean Warblers and Florida Short-tailed Hawks occur as high priority breeding species in this area. Although Yellow-throated Warbler is not as high a priority species, it still warrants attention due to unclear population trends and association with very large and tall trees (fast disappearing from the coastal plain). Other species of importance here are American Woodcock, Louisiana Waterthrush (*Seiurus motacilla*), and Limpkin.

b. Pocosins, Carolina Bays, Other Non-Alluvial

Pocosins are made up of shrub-scrub ("low"), often dominated by pond pine, and forested ("high") dominated by bays, associated wetlands, and associated uplands (from canebrakes to Atlantic white-cedar). These areas are unique to the Southeast and are restricted mainly to Virginia and North Carolina (except for smaller areas in the Winyah Bay area of South Carolina). Seventy percent of an estimated 1.4 million ha of potential pocosin habitat is located in North Carolina (Richardson and Gibbons 1993). However, less than one third of the original area can now be considered intact, with about another one third irrevocably altered (Richardson and Gibbons 1993). In coastal North Carolina, nearly all of the forested wetlands, much of which were pocosin, were converted to non-wetlands uses (e.g., conversion to pine plantations; Hefner et al. 1995). Today, major timber companies own over 40% of pocosin habitats in North Carolina (Sharitz and Gibbons 1982). More dramatically, both canebrake and Atlantic white cedar (the two successional extremes within pocosin situations) have been reduced to one percent of their original pre-settlement occurrence (Frost 1995). Fire suppression led to the decline of canebrake and pond pine, while Atlantic-white cedar, occurring in pocosin areas with low fire frequency (usually over 100 years between fires), was converted for agriculture and timber production.

Carolina Bays are elliptical depressions which occur in a broad band across the SAMBI area. These depressions are remarkably consistent in shape and degree of compass orientation (NW to SE), and are dominated by evergreen shrubs and bay trees. Some bays are less than 50m (162ft) in length, while some approach 8km (5mi) long. Prior to European colonization, there were probably 10,000-20,000 Carolina bays, mainly found in South Carolina. Presently, few Carolina bays can be considered untouched by deleterious human activities. Both pocosins and Carolina bays have been converted to farmlands, pine (principally) or hardwood monocultures, or lost to peat mining. In addition, areas around Carolina bays are highly susceptible to commercial and residential development (Richardson and Gibbons 1993).

Black-throated Green Warblers, Swainson's Warblers, Prothonotary Warblers, and Worm-eating Warblers (*Helmitheros vermivorus*) are among the species requiring attention in non-alluvial wetlands. In addition, Ovenbird (*Seiurus aurocapilla*), American Redstart (*Setophaga ruticilla*), and Black-and-white Warbler (*Mniotilta varia*) are locally important in pocosins and Carolina Bays. All of these species, except Prothonotary Warbler, are apparently isolated from Appalachian population centers. In pond pine dominated pocosins, a number of pine specialists may be supported, including Red-cockaded Woodpecker (*Picoides borealis*), Brown-headed Nuthatch, Red-headed Woodpecker (*Melanerpes erythrocephalus*), and Chuck-will=s-widow (*Caprimulgus carolinensis*). Interestingly, pocosins subject to frequent fire is one of the few habitat types that legitimately support both priority pine specialists (associated with the open pine canopy) and otherwise forested wetland specialists (associated with cane and/or dense shrub layer).

5) Maritime Communities (shrub/scrub and mature forest, estuarine emergent wetlands, beaches and dunes, open ocean)

a. Shrub-Scrub/Mature Forest

Maritime woodlands are found on the leeward side of shrub-scrub thickets or on the bay side of islands. Maritime woodlands are relatively tolerant of salt spray, bright sunlight, wind shear, drought conditions, and nutrient-poor soils. Most sites are dominated by oaks, pines, red bay, and numerous understory shrubs and are referred to as coastal hammocks or temperate broad-leaved evergreen forests, and are considered a part of southern mixed hardwood or temperate hardwood forest types (Platt and Schwartz 1990, Ware et al. 1993). Climax maritime woodlands are characterized by live and laurel oaks with sweetbay (*Magnolia virginica*) as a co-dominant. The presence and dominance of live oaks are indicative of the most advanced successional stage among maritime woodlands. These advanced woodlands are today largely restricted to the Atlantic Coast, especially on the Sea Islands. Alternatively, the presence and dominance of laurel oak, young loblolly, or slash pine is indicative of younger successional stands. Successional scrub-shrub on old stable dunes are frequently dominated by saw palmetto (North Florida Atlantic), yaupon holly (*Ilex vomitoria*), and wax myrtle (*Myrica cerifera*) growing in dense thickets.

Historical maritime communities, comprising about 648,00ha in the Southeast, have undergone dramatic changes since European/African colonization. Native Americans influenced the condition of maritime communities, but the permanent settlements and commerce centers of colonization changed the nature of human interaction in these areas. Today, the extent and rate of recovery of maritime communities from natural disturbances is dependent upon human history (both Native and European/African) as well as dredge and fill beach/dune operations and development pressure.

As of the mid-1970's, less than 10% of maritime landcover was in forest (most remnants now in Sea Islands, N. Florida Atlantic, and Central Gulf). Wetlands made up over 50% of landcover, with smaller percentages in dunes and beaches, rangeland, agriculture, and urban areas. Although loss of coastal wetlands has slowed since the 1970's, development of coastal areas continues, to the detriment of upland maritime woodlands, dunes, and beaches (Culliton et al. 1990, Moore et al. 1993). Development is most obvious along the Florida Atlantic Barrier Islands (over 50% of present lands use) and least obvious among the Sea Islands (less than 10%). Almost all maritime woodlands that have not been removed completely have been altered.

Maritime forest and scrub-shrub habitat is perhaps most important for neotropical migratory landbirds moving to and from their Caribbean and Latin American wintering grounds. However, unpredictable factors (i.e., weather) have made it difficult to quantify the importance of specific areas at any one time. Thus, conservation must be measured in terms of decades with the assumption that all forest patches are potentially important, until better techniques provide resolution of concentration sites.

The highest priority species associated with these habitats are eastern Painted Bunting, Prairie Warbler, Common Ground-Dove, Northern Parula (*Parula americana*), Yellow-throated Warbler, and many transients including Bicknell's Thrush (*Catharus bicknelli*), Kirtland's Warbler (*Dendroica kirtlandii*), Cape May Warbler (*Dendroica tigrina*), Black-throated Blue Warbler (*Dendroica caerulescens*), and Connecticut Warbler (*Oporonis agilis*).

Many nearctic-neotropical migratory landbirds orient southeastward during autumn migration to their tropical (primarily West Indian and South American) wintering areas. The South Atlantic coastline and Peninsular Florida, particularly maritime woodlands, appear to be critically important during this migration. Gulf Coast maritime woodlands are more important than South Atlantic woodlands for most spring migrants, and support large number of autumn migrants as well (Moore and Woodrey 1995).

b. Estuarine Emergent Wetlands

Estuaries, which include tidal flats and emergent wetlands, border maritime woodlands in many areas. Estuaries separate islands from each other or from the mainland and are well known for their importance to commercial fisheries and as environmental filters. In addition, tidal flats are important foraging areas for many migratory and wintering waterbirds, colonial nesting birds, and raptors. Estuarine emergent vegetation provides cover and foraging for a large number of both nesting and wintering species in the SAMBI area.

The most important species associated with these habitats are Nelson's Sharp-tailed Sparrow (*Ammodramus nesloni*), Saltmarsh Sharp-tailed Sparrow, Seaside Sparrow complex (*Ammodramus maritimus*), Black Rail, Yellow Rail, Wood Stork, and Sedge Wren (*Cistothorus platensis*).

c. Beaches and Dunes

Beaches and overwash areas provide important foraging habitat for migratory and wintering shorebirds, resident colonial nesting water birds, and migratory raptors. Beaches above the high tide line and dunes provide nesting habitat specifically for several high priority shorebirds. In addition to avian communities, beaches and dunes are important for federally listed plants and animals including seabeach amaranth (*Amaranthus pumilis*), nesting sea turtles, and oldfield mouse (*Peromyscus polionotus*). The popularity of beaches, particularly during the summer, has resulted in numerous conflicts between beach nesting species and humans. As of the mid-1970's, less than 15% of maritime land cover was in beaches and dunes, and coastal development is accelerating in many areas (Culliton et al. 1990, Moore et al. 1993).

Important species here are American Oystercatcher (*Haematopus palliatus*), Wilson's Plover (*Charadrius wilsonia*), Cuban Snowy Plover, Piping Plover, Red Knot, Least Tern (*Sterna antillarum*), Black Skimmer, and Reddish Egret (*Egretta rufescens*).

d. Open Ocean (Gulf Stream)

Waters within or near the Gulf Stream section paralleling the South Atlantic Coastal Plain constitute the open ocean portion of this physiographic area. These open waters are the major feeding grounds for Black-capped Petrels. In addition, many other species of wholly or partially pelagic birds occur in large numbers as transients or non-breeding residents, such as White-tailed Tropicbird (*Phaethon lepturus*) and Audubon's Shearwater (*Puffinus lherminieri*). Imminent threats at this time appear to be few except for the constant possibility of take from longline fisheries and from oils spills that can result in the death of many pelagic birds. Periodic resurgence of interest in exploration for oil deposits within the outer continental shelf, especially off the North Carolina coast, continues to be cause for concern. Additionally, offshore waters in the Gulf of Mexico that border the planning area are important for Northern Gannet (*Morus bassanus*), Common Loon (*Gavia immer*), and Brown Pelican (*Pelicanus occidentalis*).

This Plan addresses the conservation of pelagic and oceanic seabirds of the Southeast United States Continental Shelf and the waters of the Gulf of Mexico associated with the southeastern coastal plain encompassing much of the Southeast U.S. Continental Shelf (SECS, Pelagic BCR 77) and the near shore waters of the Gulf of Mexico (Pelagic BCR 74) ([Figure 2](#)). The waters addressed in this plan include all coastal offshore waters adjacent to the terrestrial portion of the SAMBI planning area in the Gulf of Mexico and waters of the Atlantic Ocean that extend to and beyond the Gulf Stream where high priority oceanic birds inhabit.

Approximately fifteen species of pelagic seabirds or birds of open water (waterbirds, shorebirds) are considered in this plan ([Table 1](#)). Very little information has been developed relative to goals and objectives for the conservation of pelagic species for pelagic BCRs. However, issues, threats, factors leading to loss of habitat, conservation strategies, inventory and monitoring needs, research needs, and education and outreach needs have been suggested (Kushlan et al. 2002).

Potential threats to both Black-capped and Bermuda Petrels include human encroachment at breeding sites and offshore oil and gas exploration at Gulf Stream foraging sites. A major threat to both petrel species concerns lighted ships and platforms that attract birds at night, leading to collisions with wires or other structures. The documented presence of Bermuda Petrels would seem to require consideration of corrective lighting where conflicts are likely to occur. Increased mercury levels associated with oil spills also poses a potential threat. The Black-capped Petrel seems to be rather exceptional in its high levels of accumulated mercury (Whaling and Lee 1982). The source of mercury appears natural (through food, primarily squid), but effects from an additional increase of mercury through shipping spills or future oil exploration requires investigation.

Other Pelagic Species. -- Other priority species at least for monitoring attention include White-tailed Tropicbirds and Federally threatened Roseate Terns. Caribbean populations of White-tailed Tropicbirds are at least regular in small numbers off the South Atlantic coast and are considered by some authorities as vulnerable where they breed (Lee pers.

comm.). Only 7,000 pairs persist within the West Indies (plus another 2,500 pairs in Bermuda). This number is low for seabirds, particularly for a regionally endemic subspecies. This subspecies appears stable at present, but is greatly reduced from former population levels. Caribbean populations of Audubon's Shearwaters appear to be more secure. Roseate Terns breeding from New York northward become highly pelagic offshore of the South Atlantic Coastal Plain when moving to and from the southern Caribbean Sea and northeastern South America.

6) Southern Pine Forests

a. Longleaf/Slash Flatwoods and Savannas, and Longleaf Sandhills

Southern pine forests, with longleaf pine occurring at least as a co-dominant, covered an estimated 37.3 million ha at the time of European settlement (about 30.4 million ha where longleaf was dominant). Forests stretched from southeast Virginia (where now reduced to a few remnant trees) to east Texas, interrupted only by major floodplain forested wetlands and occasional prairies (Frost 1993). Along or near coastlines slight shifts in hydrology and salinity favor slash pine over longleaf in flatwoods and savannas, but for all practical purposes, bird species responding more to age and structural characteristics than dominant pine species (though longleaf is still preferred where site conditions allow). Pre-settlement estimates place longleaf dominated forests at 52% of all uplands and 36% of the entire southeastern landscape. By the 1930's, most of the 37.2 million ha had been cut, with about two thirds regenerated to other pine species or converted to other land uses (Crocker 1987, Walker 1991, Frost 1993).

Today, less than 3% of the original longleaf (less than 2% of the southeastern landscape) forests remain. If systems drastically altered by fire suppression are excluded, less than 1% (or 272,970ha) remain (Frost 1993). The conversion of many natural pine and hardwood stands to short-rotation pine plantation (mostly loblolly or slash) during this century has resulted in an almost complete elimination of functioning longleaf pine ecosystems, as well as the breakup of large stands of forested wetlands discussed earlier (Crocker 1987, Ware et al. 1993). The loss of longleaf pine ecosystems has led to the rarity and endangerment of at least 70 plant taxa, particularly in the Coastal Plain and Florida peninsula but also in the Southern Piedmont and other physiographic areas in the Southeast (Noss et al. 1995). Among vertebrate animals, the future successful conservation of flatwoods salamander (*Ambystoma cingulatum*), gopher frog (*Rana capito*), eastern indigo snake (*Drymarchon corais couperi*), gopher tortoise (*Gopherus polyphemus*), coastal plain fox squirrel (*Sciurus niger*) populations, and many other species may well depend in part on the restoration of longleaf pine ecosystems and the reinstitution of fire as a management tool.

Unlike other temperate forest ecosystems, the high level of biodiversity found in natural longleaf pine forests is mostly restricted to one structural layer, that is, the condition of the ground layer. Frequent growing-season fires are essential for maintaining the density of bunch grasses (principally wiregrasses in the east and bluestems towards the west), forbs, and vines, while keeping the shrub layer to a minimum over a burning cycle of a

few years (Frost 1993). In turn, it is this ground layer composition that supports many of the plant and animal species unique to longleaf pine ecosystems.

Priority species within the southern pine forests include the Red-cockaded Woodpecker, Bachman's Sparrow, Henslow's Sparrow (savannas/flatwoods), Brown-headed Nuthatch, Prairie Warbler (sandhills/scrub oak, GA, NC), southeastern American Kestrel (savannas/sandhills/sand pine-scrub oak), Loggerhead Shrike (savannas), Northern Bobwhite, and Red-headed Woodpecker.

b. Mature Loblolly

Although longleaf pine is ecologically the most important of the southern pines within the coastal plain, other species have replaced the longleaf as more economically important. In the SAMBI area, faster growing slash and loblolly pines are of more economic importance.

Loblolly pine is an excellent natural invader of disturbed sites and today is the most frequent pine found in old field successional stages. Even in areas where longleaf is still a numerically important species, disturbance and fire suppression during the last two centuries have led to an increase of loblolly pine (e.g., most population and area goals in the longleaf discussion take into account the prevalence and use in many areas of loblolly, even for Red-cockaded Woodpeckers). Nevertheless, small patches of mature loblolly pines prior to European settlement may have played important roles for some species and certainly are important today (e.g., Swallow-tailed Kite nest requirements under Forest Wetlands section).

High priority species for this habitat association is the same as for longleaf pine, with the addition of Field Sparrow.

c. Short-Rotation "Plantation" Pine

On private industrial lands in the SAMBI area, short-rotation pine can be important as an early-successional habitat. Short-rotation pine plantations are composed of either slash or loblolly pine. Depending on management emphasis, some "older" short-rotational pine stands may be managed to also support some otherwise hardwood dependent species. Although not as important as regularly burned late successional pine, high densities of clearcuts on private industrial lands likely support many early-successional species (principally Northern Bobwhite, Bachman's and Field Sparrows, Prairie Warbler, and, in northeastern North Carolina and southeastern Virginia, breeding Henslow's Sparrows). In addition, edges and riparian streamside management zones may support transients. Pine canopies with a hardwood midstory and understory may provide marginal to suitable habitat for other priority species such as Wood Thrush (*Hylocichla mustelina*) and Hooded Warbler (*Geothlypis nelsoni*).

7) Oak Hickory/Tulip Poplar/Pine Forests

Although some literature suggests that extensive upland hardwood-pine mixed forests existed at least north of the Savannah River within the SAMBI area, it is generally recognized today that upland hardwoods prior to European colonization were restricted to sites where fires were infrequent. Two major types of forests are recognized: (1) turkey oak (*Quercus laevis*) and other scrub oak dominated stands in protected sandhill sites and (2) southern mixed mesic forests generally along protected bluffs and ravines.

Turkey/other scrub oak stands do not appear to support any high priority birds within the SAMBI area that are not already dependent on longleaf sandhills and are not discussed further here. Southern mixed mesic forests, though very local, are important centers of regional biodiversity and provide high quality habitats for several priority hardwood species, at least locally. Species of concern in this habitat association include Wood Thrush, Hooded Warbler, and Chuck-will's-widow.

8) Riparian/Mixed Mesic Hardwoods (Southern Mixed, Hammocks)

The term riparian refers to streamside areas. In the present context, riparian habitats include bottomlands and all palustrine wetlands in the coastal plain. However, riparian forests may be dominated by tree and shrub species more typical of uplands throughout southeastern interior physiographic areas and locally in the coastal physiographic areas (forested wetlands in narrow floodplains, loess bluff oak/hickory and mixed mesic hardwoods). In many situations, upland riparian habitats are as important as wetland habitats to both aquatic and terrestrial fauna associated with streams and rivers, especially in those lands where there is high topographic relief or circumvented soils.

Hammocks are best defined as narrow bands of vegetation confined to slopes between upland sand/clayhill pinelands and bottomlands, with species composition determined by relative moisture retention and fire frequency. Hydric stands are distinguished from other forested wetlands by very intermittent flooding and some fire. High humidity and a consequent low frequency of fire distinguish hydric stands from mesic and xeric hammocks (Vince et al. 1989). Hydric hammocks provide important habitats for many species of wildlife, including Swallow-tailed Kite and black bear (*Ursus americanus*). Located near fire-maintained longleaf pine and xeric scrub ecosystems, xeric hammocks are subject to the highest fire frequency, but retain enough moisture to support stands of sizable oaks and other hardwoods.

Mixed mesic hardwoods collectively are important within the coastal plain from North Carolina to Texas. These forests are referred to or included within southern mixed mesic hardwood forests, southern mixed hardwood forests, southern hardwood forests, temperate hardwood forests, temperate broad-leaved forests and mesic hammocks (Platt and Schwartz 1990, Hamel 1992a, Ware et al. 1993). Mixed mesic forests presently reach their greatest development within the Florida panhandle and adjacent to southwestern Georgia and Peninsular Florida.

In areas draining into the Apalachicola River, mesic hammocks are characterized by the codominance of southern magnolia (*Magnolia grandiflora*) and American beech (*Fagus grandifolia*). These mesic hammocks certainly constitute the most important of

southeastern riparian woodlands by supporting a number of locally occurring endemic species, such as Florida yew (*Taxus floridana*) and Florida torreya (*Torreya taxifolia*) along the Apalachicola Bluffs, as well as birds and other animals more characteristic of forested wetlands.

Priority species within riparian/mixed mesic hardwood habitat include Swainson's Warbler, Kentucky Warbler, Acadian Flycatcher, Louisiana Waterthrush, and other transients. In most physiographic areas where the highly vulnerable Cerulean Warbler and the usually rare Swainson's Warbler are found, they are mostly restricted to (and are certainly most common in) riparian habitats within largely forested landscapes. Acadian Flycatcher and Louisiana Waterthrush are always more common and widespread than the two warbler species above, but still consistently become rare away from riparian habitats in most physiographic areas.