

APPENDIX C. High Priority Habitats – Descriptions and Summary Data

Habitat Restoration/Historic Vegetation Technical Team

The CWCS Habitat Restoration/Historic Vegetation Technical Team was assembled to pull expertise from across the state representing organizations with major management responsibilities. Members reviewed materials through email, attended several technical team meetings, and convened subcommittee meetings.

Team Leader	Title	Agency
Shan Cammack	Wildlife Biologist	Wildlife Resources Division
Team Members		
Tim Beaty	Chief of T&E Species Mgt.	Ft. Stewart and Hunter Army Airfield
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Neal Edmunson	Prescribed Fire Coordinator	Georgia Forestry Commission
Malcom Hodges	Conservation Ecologist	The Nature Conservancy of Georgia
Nathan Klaus	Wildlife Biologist	Wildlife Resources Division
Chuck Rabolli	President	CCR Environmental, Inc.
Cindy Reittinger	Interpretive Specialist	Parks, Recreation, and Historic Sites Division
Vic Van Sant	Regional Supervisor	Wildlife Resources Division
Jim Wentworth	Central Zone Biologist	US Forest Service
Donald Wood	Sr. Wildlife Biologist	MeadWestvaco Corporation
Keith Wooster	State Biologist	National Resources Conservation Service

Technical team members met on September 16, 2003 and June 28, 2004 at the Wildlife Resources Division Headquarters near Social Circle, GA. Ad hoc committee members met throughout the process as needed. Malcolm Hodges played a pivotal role in these discussions. Brett Albanese, Aquatic Zoologist for the Nongame Wildlife & Natural Heritage Section of WRD, provided expertise on aquatic habitats.

Methodology

The task of this technical team was to address the following issues: definition of high priority habitats by ecoregion, assessment of problems affecting high priority habitats in each ecoregion, and identification of habitat restoration techniques and strategies to address these problems. A spreadsheet was developed to track these issues in each ecoregion. Recommendations from this technical team as well as examples of ongoing habitat restoration programs have been incorporated in the body of the CWCS document in Sections IV and V. Summary tables of stressors and management emphases for high priority habitats each ecoregion are found at the end of this appendix.

A list of priority habitats was compiled for each ecoregion from information found in the species technical teams spreadsheets, from discussions among the team members, and from descriptions provided by Wharton (1978) and Mirarchi et al. (2004). The list of high priority habitats is

found at the end of this appendix and in Section IV of the main report (Conservation Landscape Assessments and Conservation Strategies).

A list of the most common stressors affecting high priority habitats was compiled using information from The Nature Conservancy’s ecoregion-based planning process as well as from information from the species-based technical team spreadsheets. These were grouped appropriately in order to keep the working list manageable. This list of stressors or problems is the same as that used by the species teams, and is found in the main body of this report in Section II (Approach and Methods).

Management needs were ranked for each high priority habitat and assessed for each ecoregion. In addition, a table indicating relative priority of statewide habitat management issues was developed and is found in the “Statewide Habitat Management Priorities” section that follows.

A series of Stakeholder Meetings was held across Georgia in the Fall of 2005 to capture a broad representation of perspectives, from state and federal natural resource agencies, private conservation organizations, sportsmen’s groups, planning agencies, land managers, environmental educators, to professional biologists. The goal of these meetings was to reach individuals and groups that are involved in or have knowledgeable about wildlife conservation at the local or regional level. Data on high priority habitat, problems affecting these habitats, and management recommendations were presented at each of these meetings. Participants provided additional input and analysis that is reflected in the recommendations .

Statewide Habitat Management Priorities

The technical team considered the most pressing management actions for priority habitats across the whole state and ranked the top management actions during the spreadsheet analysis. The table below represents the average scores reported by the team.

MANAGEMENT ACTIONS	SA/RV	BR	PD	SP	SCP
Introduce fire at appropriate intervals and season	2	1	2	1	1
Restore hydrology	2	2	2	2	3
Control invasive species	2	2	1	2	2
Restore native species	3	3	3	2	2
Protect from disturbance	1	3	1	2	1

Issues in the table were ranked by relative importance in the region where one is the highest rating and three is the lowest. Of all management themes considered by the team, *Introduce Fire at Appropriate Intervals and Season* and *Protect From Disturbance* ranked the highest.

Recommended Actions and Strategies

The following section is an outline of recommended actions and strategies that address habitat restoration and management needs identified by the technical team and stakeholders.

Address Altered Fire Regimes

- Develop partnerships among agencies to increase capacity to conduct prescribed burning and to identify priority areas in need of better fire management (appropriate timing and frequency). Continue support of the Interagency Burn Team.
- Work with private landowners to encourage prescribed burns in fire-adapted habitats through technical assistance and incentive programs.
- Establish NWCG (National Wildfire Coordinating Group) certification standards for all state and federal practitioners.

Encourage Habitat Protection

- Identify and protect best examples of high priority habitats in each ecoregion through fee-simple acquisition and conservation easements
- Support passage of dedicated land protection funding at the state level

Address Altered Hydrology And Water Quality

- Consider cumulative impacts for water withdrawals and water transfers
- Improve control of stormwater runoff from residential and commercial developments
- Encourage improved monitoring and enforcement of water quality standards to protect aquatic habitats
- Use EPD's list of impaired streams to target restoration funds
- Support and encourage incentive-based habitat restoration projects that reduce livestock impacts on streams, reforest riparian areas, reestablish buffer zones, and stabilize streambanks.

Reduce Impacts from Development

- Work with utility companies and Georgia DOT to site new construction in areas with fewest impacts to high priority habitats

Encourage Improved Management Practices

- Work with USFS, NPS, USFWS, and other public land managers at multiple levels to improve habitat management on all public lands, emphasizing restoration and maintenance of natural habitats and addressing regional conservation needs.
- Couple habitat management and educational outreach programs on public and private conservation lands to provide the public with examples of sound stewardship for all wildlife resources
- Work with NRCS to promote the planting of native species through Farm Bill programs.
- Improve public familiarity with and use of BMPs for agriculture, forestry, and land development practices
- Engage local, regional, and state stakeholders to promote better land use and water use planning

Address Incompatible Recreation

- Exclude ATVs from sensitive areas and minimize their access by controlling illegal use on public lands

Combat Invasive/Alien Species

- Work with gardening groups, nurseries, and major retail corporations to reduce importation of invasive exotic species
- Promote education about exotic species, including identification, effects, and eradication measures
- Work with land management agencies to initiate integrated control measures that focus on early detection and eradication of alien species

Facilitate Monitoring

- Link students and faculty from Georgia colleges who are seeking projects with high priority habitat research needs
- Encourage Adopt-A-Stream to expand long-term monitoring schemes to help with monitoring of high priority streams

Recommendations for Future Work

This effort is seen as one component of an iterative assessment process. The CWCS will be reviewed and revised over the next several years. Items that should be considered for emphasis in the next round of assessments include:

- Using a standardized habitat classification and mapping scheme (e.g., ecological systems) to map high priority habitats.
- Developing and testing methods for linking analysis of priority habitats with analysis of high priority species distributions
- Prioritizing and analyzing each specific management approach for its ability to mitigate threats and improve habitat integrity
- Developing a weighting scheme to assess the relative significance of various habitat stressors

HIGH PRIORITY HABITATS BY ECOREGION

The following definitions are based on input from the habitat restoration & historic vegetation technical team, members of the ecosystem and species technical teams, and information from Wharton (1978) and Mirarchi et al. (2004)

SOUTHWESTERN APPALACHIANS/RIDGE & VALLEY ECOREGIONS

Acidic Meadows Over Sandstone or Shale

Open, grassy habitats over shallow acidic soils; edaphic factors control species composition and diversity. May be moist or dry, depending on topographic setting. These small patch habitats are relatively rare in Georgia.

Calcareous Flatwoods (Hardwood Flats)

Relatively open, flat, shallowly and seasonally wet forested habitats dominated by hardwoods and including rare or uncommon species such as nutmeg hickory and Alabama leatherflower. Shrub and herb diversity is high. A small patch habitat restricted to low-lying areas with clayey calcareous soils.

Calcareous Prairies (Coosa Valley Prairies)

Open grass- and forb-dominated communities over clayey calcareous soils that inhibit growth of woody species. Groundlayer plant species diversity is high, and includes disjunct from midwestern prairies. Includes wet and dry prairie subtypes. These habitats require periodic fire for maintenance.

Canebrakes

Thickets of native river cane found along rivers and creeks under sparse to full tree cover. Canebrakes represent important wildlife habitat for a variety of neotropical birds and insects. These habitats require periodic fire or other form of disturbance for maintenance.

Caves, Rock Shelters, Talus Slopes

These habitats share certain structural characteristics, such as a bedrock component with a variety of microhabitats that provide cover for priority animal species. They are typically embedded in a larger matrix of forest habitats. Caves are unique in their lack of sunlight and vegetation and dependence on outside materials for energy flows. Rock shelters can be found under cliffs (vertical exposures of rock). Talus slopes are accumulations of rock beneath cliffs and steep slopes.

Forested Limestone Slopes and Terraces

This forest type is found at middle elevations along Lookout and Pigeon Mountain. Characterized by submesic hardwood forest, with species composition dependent on aspect and slope position. Includes partially forested limestone ledges along streams.

High Gradient First- and Second-Order Streams

Small, clear, cold, tumbling streams with bedrock riffles and sandy pools. Found at higher elevations and upper ends of steep ravines and slopes. These streams typically experience wide seasonal variations in flow; some receive substantial input from groundwater.

Limestone Glades and Barrens (Cedar Glades)

Open habitats dominated by grasses or forbs, with scattered eastern redcedars and other trees. These habitats contain a large number of endemic plant species. Glades occur on thin, rocky soils, and are typically dominated by forbs; barrens are in areas with deeper soils and are dominated by grasses. The largest and most important area of cedar glades/barrens in Georgia is centered on Chickamauga-Chattanooga National Military Park.

Mesic Hardwood Forests

Mesic forests of bluffs, ravines, and colluvial flats, characterized by a diverse canopy of hardwood species such as yellow poplar, black cherry, white oak, shagbark hickory, northern red oak, bigleaf magnolia, sugar maple, and American beech. Hemlock and loblolly pine may be minor components in some areas. Mature examples are characterized by a rich understory of shrubs and herbaceous plants. This large patch habitat includes a rich mesic hardwood forest subtype found on calcareous soils.

Medium to Large Rivers

Lower gradient streams of valley bottoms, characterized by sandy, silty, or gravelly substrates. Typically surrounded by agricultural lands on the broad, fertile floodplains. Nearly all examples of large river floodplain forest in the Ridge & Valley region have been converted to other types of land cover.

Montane Longleaf Pine-Hardwood Forests

Dry forests composed of longleaf pine and mixed hardwood species, including mountain chestnut oak, southern red oak, and various scrub oaks. Significant examples occur in the Ridge & Valley region near Rome. Nearly all Georgia examples are fire-suppressed and exhibit lower species diversity than corresponding habitats in Alabama.

Oak Woodlands

An uncommon subxeric vegetation type found at higher elevations, oak woodlands are usually surrounded by xeric pine or pine-oak forest. Canopy dominants may include southern red oak, scarlet oak, post oak, and blackjack oak, with persimmon, blackgum, and other hardwood species. Probably maintained by a combination of infrequent fire and edaphic factors. Pigeon and Lookout Mountain contain good but narrow ecotonal examples.

Pine-Oak Woodlands and Forest

Relatively open subxeric to xeric forest or woodland, typically dominated by shortleaf pine, Virginia pine, and post and blackjack oaks, often with a diverse grass and shrub layer. May also include chestnut oak, scarlet oak, and other dry-site hardwood species. Includes typical shortleaf pine-post oak woodlands as well as mixed pine-oak scrub and dry pine-oak forest.

Red Maple/Blackgum Swamps

Nonalluvial or small stream swamp forests dominated by red maple and swamp blackgum. Often found along small low-gradient streams, in shallow depressions, or on wet flats. Often boggy, with a layer of peat, these wetlands have been impacted by construction of drainage ditches.

Sagponds (Isolated Depressional Wetlands)

Depressions formed by subsidence of soil due to groundwater percolation in the underlying rock. Contain a variety of vegetation types from freshwater emergents to swamp forest, depending on hydroperiod and other factors. Forested types are usually dominated by willow oak, swamp blackgum, and red maple. May include disjunct coastal plain species.

Sandstone Barrens and Outcrops

This edaphic habitat type includes sandstone boulders and outcrops of the Appalachian (Cumberland) Plateau as well as scoured sandstone ledges near streams. These open, rocky habitats are typically bordered by Virginia and shortleaf pine, chestnut oak, and a variety of shrubs.

Springs and Spring Runs; Gravelly Seeps

Springs are highly localized points of groundwater discharge that typically feed spring runs, while seeps may be broader or less defined areas of perennial or seasonal flows. The Ridge & Valley region contains a number of high-discharge springs. The waters of springs and associated habitats can be highly variable, depending on hydrology. These perennially cool and clear waters provide important habitat to a number of animal species, particularly salamanders and fish such as the coldwater darter.

Streams

Moderate to low gradient streams running through lower coves and valleys. Riffle, pool, and shoal habitats may be present. Substrates include gravel, pebbles, boulders, and bedrock. Aquatic plants may also be present. Pools are often silt-bottomed. These streams become turbid after rain. These are generally more productive than headwater streams because of limestone valley bottoms.

Underground Streams

Includes streams of all sizes flowing through caves and other underground passages. These aquatic systems are important for rare species such as the Southern cavefish and Tennessee cave salamander.

BLUE RIDGE ECOREGION

Boulderfield Forests

High elevation mesic hardwood forest; dominated by broadleaf deciduous trees, occupying north-facing areas with angular rocks or blocks of rock and little visible soil. Includes rich flora with northern affinities. Typically very mesic, with trees such as yellow buckeye, sweet birch, yellow birch, rosebay rhododendron. A rare community of the Blue Ridge; only a few examples are known.

Canebrakes

Thickets of native river cane found along rivers and creeks under sparse to full tree cover. Canebrakes represent important wildlife habitat for a variety of neotropical birds and insects. These habitats require fire or other form of periodic disturbance for maintenance. Most examples in this ecoregion are small and fire-suppressed.

Caves, Rock Shelters, Talus Slopes

These habitats share characteristics, such as a bedrock component with a variety of microhabitats that provide cover for priority animal species. These habitats are usually embedded in a larger matrix of forest habitats. The Blue Ridge contains relatively few caves; these are typically fracture-type caves rather than solution caves. Rock shelters can be found under cliffs (vertical exposures of rock). Talus slopes are accumulations of rock beneath cliffs and steep slopes.

Floodplain Hardwood Forests

Forested wetlands characterized by a diverse association of deciduous hardwood trees, including both montane and low-elevation species. Generally lacking in the more flood-adapted oaks and hickories prevalent in Piedmont bottomland hardwood forests. Many of these floodplain forests were converted to agricultural uses early in the history of settlement of this region.

Hemlock-Hardwood-White Pine Forests

Mesic and submesic forests dominated by a mixed canopy of hardwoods and hemlock and/or white pine. Hemlock forests are typically found along small to medium streams, in sheltered valleys and ravines. Thickets of rhododendron and mountain laurel frequently form a dense understory, which is important for many neotropical migratory birds. White pine may share dominance with oak-dominated forests in low- to mid-elevation slopes and sheltered low ridges. A serious threat to this forest type is the hemlock woolly adelgid, which is spreading from east to west across the region. A rare subtype of this forest type containing Carolina hemlock is found in scattered locations in the lower Blue Ridge.

High-Elevation Early Successional Habitats

Includes a variety of vegetation types found at high elevations that are maintained by periodic natural or anthropogenic disturbance. Many high priority species are dependent on this habitat type, including the golden-winged warbler, Appalachian Bewick's wren, star-nosed mole, pygmy shrew, and fringed gentian.

High Elevation Forested Heath Thickets

High elevation habitats characterized by dense thickets of ericaceous shrubs under an open canopy of hardwood trees. Herbaceous layer is sparse to patchy. Typical shrubs include huckleberry, mountain laurel, and rosebay rhododendron.

High Elevation Rocky Summits and Shrub Balds

These are small patch habitats typically found only on the highest peaks of the Blue Ridge in association with northern hardwood forest. Characterized by a mosaic of exposed rock and patches of shrub or herb-dominated vegetation. Trees are mostly dwarfed northern red oak.

Shrubs may include Catawba rhododendron, mountain laurel, huckleberry, mountain ash, viburnum, and hawthorn.

Low Elevation Seepy Thickets and Wet Woods

Seasonally inundated or spring-fed wetland habitats. Thickets are dominated by a variety of shrubs. Includes forested habitats along seepage slopes and at the edge of mountain bogs, some of which are maintained by the actions of beaver.

Medium to Large Rivers

Moderate to high gradient rivers with cold, clear riffles, pools, and runs. Substrates may include boulders, bedrock, gravel, and pebbles. Many of these rivers traverse steep gorges. These aquatic habitats are low in productivity compared to streams of the Southwestern Appalachians/Ridge & Valley.

Mixed Pine-Hardwood Forests

Mesic to submesic forests of hardwoods and pines, typically at middle to low elevations over a broad range of topographic conditions. A large patch habitat that comprises a major forest type of the Blue Ridge. Dominants may include yellow-poplar, sweetgum, various oaks, and loblolly, white, and/or shortleaf pine.

Moist Cliff Faces and Spray Cliffs

Vertical to gently sloping rock faces located adjacent to waterfalls or seepage zones. These are wetlands dominated by mosses, liverworts, vascular herbs, and sparse shrubs or scrubby trees adapted to thin soils and high humidity. These small patch habitats represent unusually stable environments, where temperatures are moderated by the constant spray or seepage. Include many bryophytes and ferns representing disjunct occurrences from tropical regions as well as Southern Appalachian endemics.

Mountain Bogs and Wet Meadows

A mosaic of wetland communities usually dominated by shrubs or emergent herbs, with scattered trees. May occur as elongate bands along stream valleys, or in much smaller and more compact patches on flats or slopes. Includes wetlands maintained by beaver activity as well as small, sheltered seepage areas along the headwaters of mountain creeks.

Northern Hardwood Forests

High elevation mesic forests found in upper coves, flats and slopes with northerly aspects, usually at elevations above 3,500 ft. Dominant canopy species include American beech, yellow birch, sugar maple, and yellow buckeye, with white basswood, northern red oak, white ash, and black cherry also present. These forests are subject to broad scale disturbances such as ice storms. Old growth examples are rare and usually restricted to steeply sloped, inaccessible areas.

Oak Forest and Woodlands

This vegetation type includes a wide variety of upland forests dominated by Appalachian oaks. Composition and complexity of oak forests vary with elevation, slope and moisture. In more mesic sites, canopy dominants may include red oak, white oak, and black oak, along with hickories and mesophytic hardwoods. Canopy dominants of more xeric sites may include

mountain chestnut oak, scarlet oak, southern red oak, and northern red oak. Also includes subxeric or xeric oak woodlands found on ridges and upper slopes at high elevations. These oak-dominated forests and woodlands represent the most extensive upland vegetation type of the Blue Ridge.

Pine-Oak Woodlands and Forest

Relatively open subxeric forest to xeric woodland, typically dominated by shortleaf pine, pitch pine, Virginia pine, and post and blackjack oaks, often with a diverse grass and shrub layer. A rare subtype is found on serpentine soils. Pitch pine, Virginia pine, red maple and post oak are the dominant canopy trees in this rare community; understory trees of sourwood, dogwood and sassafras are usually thinly scattered and shrubs are sparse to dense.

Rich Mesic Hardwood Forests (Cove Hardwoods)

The mixed mesophytic hardwood forests of the Southern Appalachians are the most biologically diverse habitats in the United States. Variations of this forest type can be found in the Blue Ridge at elevations from 1,000 to 3,800 ft. They are typically found in mesic sites on concave landforms and ravines, or on protected north and east-facing slopes at low elevations. A diverse mixture of mesophytic trees dominates the canopy, including yellow poplar, white basswood, sugar maple, yellow and sweet birch, cucumber magnolia, yellow buckeye, black cherry, eastern hemlock, white ash, blackgum, American beech, red maple, and various oaks and hickories.

Rocky Bluffs and Streambanks

Plant composition of these rocky streamside habitats is variable, depending on stream size, amount of rock, and extent of flooding. These periodically scoured rocky habitats typically support few trees and sparse to moderate shrubs (sometimes thickets). A diverse stratum of light-loving herbs may be present.

Springs and Spring Runs; Gravelly Seeps

Springs are highly localized groundwater expressions. The waters of springs and associated habitats can be highly variable, depending on hydrology (hydroperiod and volume) and edaphic factors. These cool clean waters provide important habitat to a number of animal species, particularly salamanders.

Streams

Cold, clear, high gradient streams typically containing riffles, plunge-pools, cascades, and waterfalls. Substrata dominated by bedrock and boulders, but sand and gravel may also be present in depositional areas. These streams have low productivity and aquatic vegetation is rarely present.

Xeric Pine Woodlands

A heterogeneous group of xeric pine-dominated woodlands found on ridges and steep slopes with southerly aspects, knobs, and low-elevation peaks. Below 2,400 ft. shortleaf pine is a dominant, with Virginia pine a common associate. From 2,400 to 2,800 ft. on the driest ridges pitch pine dominates. Above 2,800 ft. on slopes and ridges, Table Mountain pine dominates. All of these habitats require periodic fire for maintenance.

PIEDMONT ECOREGION

Beaver Ponds; Freshwater Marsh

Beaver ponds are temporary impoundments created by beaver on small to medium sized streams. Freshwater marshes develop in shallow beaver ponds and along the edges of larger lakes and ponds. Dominants include a variety of sedges, rushes, grasses, and forbs, with scattered buttonbush, red maple, swamp dogwood, and tag alder. Few Georgia examples exist that are not invaded by the exotic weed, *Murdannia*. These wetlands provide habitat for a wide variety of wildlife species.

Bottomland Hardwood Forests

Forested wetlands of alluvial river floodplains, characterized by a diverse association of deciduous hardwood trees. Canopy dominants vary, but may include water oak, willow oak, overcup oak, cherrybark oak, swamp chestnut oak, green ash, sweetgum, bitternut hickory, and pignut hickory. Shrub layer may be dense or relatively sparse, containing a variety of mesophytic or hydrophytic woody plants and often a significant woody vine component. Many of these habitats have been impacted by invasive exotic species such as Chinese privet and Nepalese browntop.

Canebrakes

Thickets of native river cane found along rivers and creeks under sparse to full tree cover. Canebrakes represent important wildlife habitat for a variety of neotropical birds and insects. These habitats require fire or other form of periodic disturbance for maintenance. Most canebrakes in this region are relatively small and fire-suppressed, often occurring along the edges of fields and other clearings.

Granite Outcrops

Diverse mosaics of exposed granitic rock, herb and shrub dominated patches, and wetland microhabitats. Most have shallow solution pits that collect soil and support various stages of plant succession. These environments support rare or endemic species of plants and animals. The most important of these habitats contain a variety of solution pits, seepage zones, and bare rock exposures. Some outcrops are monadnocks (rise above the ground) while others are flat rock exposures. The Georgia Piedmont is the center of granite outcrop species diversity.

Medium to Large Rivers

Low to moderate gradient meandering rivers, typically with heavy sediment loads. Floodplains are relatively narrow compared to similar rivers in the Coastal Plain. Extensive shoal habitats may occur, especially along the Fall Line. Dominant habitats include runs, pools, and shoals. Substrate is variable, but is dominated by sand in runs and pools and by bedrock in shoals. Aquatic vegetation may be present.

Mesic Hardwood Forests

Non-wetland forests of floodplains, ravines, and north-facing slopes in the Piedmont. These may include species such as American beech, white oak, northern red oak, bitternut hickory, pignut hickory, shagbark hickory, bigleaf magnolia, yellow poplar, blackgum, dogwood, black cherry,

and loblolly pine. Typical shrubs include spicebush, sweetshrub, pawpaw, Oconee azalea, rusty viburnum, and pinxter-flower.

Montane Longleaf Pine-Hardwood Forest

A subxeric or xeric mixed forest with longleaf pine, oaks, and hickories. Georgia examples are typically fire-suppressed. Pine Mountain is the most notable example, but occurrences can also be found along Dugdown Mountain and other. Includes a rare longleaf pine/Georgia oak subtype found on Hollis quartzite along the main Pine Mountain ridge.

Oak Woodlands and Savannas

Rare upland hardwood habitats found in scattered locations in the Piedmont. These xeric or subxeric oak-dominated woodland are influenced by edaphic conditions (i.e. thin soils, mafic rocks) and periodic fire. Dominants may include southern red oak, scarlet oak, post oak, and blackjack oak, sometimes with shortleaf pine. Sparkleberry and hawbushes are common shrub components. A particularly rare type, the post oak-blackjack oak savanna, was apparently much more common in pre-settlement times; only small, fire-suppressed remnants of these habitats exist today.

Oak-Hickory-Pine Forest

Considered the climax forest of the Piedmont, this forest type formerly covered 50% to 75% of the region; most examples on fertile soils were eliminated by conversion to agricultural uses. Remaining examples are often found in rocky areas that were difficult to convert to agricultural fields. Typically include a variety of hardwood species such as white oak, black oak, southern red oak, pignut hickory, shagbark hickory, mockernut hickory, red maple, blackgum, shortleaf pine, and loblolly pine, with dogwood, rusty viburnum, hog plum, dwarf pawpaw, and various hawbushes in the understory. American chestnut was formerly a major component of the canopy. Examples over circumneutral soils influenced by mafic or ultramafic bedrock are often floristically richer, and may contain species such as Oglethorpe oak, basswood, red mulberry, redbud, and fringetree.

Rocky or Cobbly River Shoals

Shallow, high gradient reaches with swift water and rocky substrates. These habitats are important spawning areas for fish, including darters, shiners, and suckers (such as the extremely rare robust redhorse). In addition, shoals provide foraging areas for wading birds, and sunning areas for turtles. May contain dense growths of riverweed (*Podostemum ceratophyllum*). The shoals spiderlily (*Hymenocallis coronaria*), a State-protected plant, is found on rocky shoals in the middle reaches of the Savannah, Flint, and Chattahoochee rivers. Many shoals have been degraded by stream impoundments, altered water quality, and excessive silt deposition.

Rocky/Sandy River Bluffs

Exposed rocky or sandy bluffs along rivers in the Piedmont are often characterized by mixed pine-oak vegetation with shortleaf pine, loblolly pine post oak, eastern redcedar, southern red oak, blackjack oak, and white oak. Small trees and shrubs may include hornbeam, winged elm, sparkleberry, winged sumac, yucca, and century plant. More sheltered or east-facing bluffs may have mountain laurel and rosebay rhododendron.

Serpentine Outcrops/Woodland/Savanna

This rare habitat represents a complex mosaic of woodlands and savannas with scattered outcropping of serpentine rocks. The pine-mixed hardwood vegetation includes longleaf pine as a dominant. This type is maintained by fire and edaphic conditions. The only known Georgia examples are fire-suppressed. These habitats include disjunct coastal plain species such as pineland Barbara-buttons and Georgia plume.

Springs and Spring Runs

Springs are highly localized groundwater expressions. The waters of springs and associated habitats can be highly variable, depending on hydrology (hydroperiod and volume) and edaphic factors. Springs of the Piedmont have varying mineral content, chemical properties, and temperatures. Includes spring pools and first order streams immediately below springs where rare fish and invertebrates may occur.

Streams

In the upper Piedmont, streams are low to moderate gradient and typically contain well-defined riffles and pools. Substrate consists of gravel, pebble, sand, and silt; some bedrock may also be present. Lower Piedmont streams are lower gradient, have fewer riffles and pools, and their substrates have a higher proportion of silt, clay, and detritus than upper Piedmont streams. Turbidity is highly variable, but most of these streams become highly turbid after rain.

Upland Depression Swamp

A non-alluvial open swamp with water oak, southern shagbark hickory, Oglethorpe oak, and loblolly and shortleaf pine. Coastal plain elements in the understory include swamp palmetto and parsley haw. Usually found on Iredell or Enon soils in the lower Piedmont. These sticky, plastic soils pond water in the spring, resulting in swampy conditions for a portion of the year.

Xeric Pine Woodlands

Pine-dominated habitats of dry, rocky ridgetops and granitic outcrops. Dominants are loblolly, shortleaf, and Virginia pine. These woodland habitats are maintained by a combination of edaphic factors and periodic fire.

SOUTHEASTERN PLAINS ECOREGION

Alluvial (Brownwater) Rivers and Swamps

Large, low-gradient, meandering rivers with sandbars, sloughs and extensive floodplain swamps. Floodplains of these systems may remain inundated for extensive periods. Sand and silt are the dominant substrata and these rivers typically carry heavy sediment loads. Extensive cypress-gum swamps can be found on all major alluvial rivers in the upper portion of the Southeastern Plains. These systems have been impacted by altered flows from upstream dams.

Altamaha Grit Outcrops

These small patch habitats represent mosaics of indurated sandstone outcrops (vertical and horizontal surfaces) interspersed with rock-influenced pine woodland, bogs, and bottomlands. Characterized by several endemic species and plant association.

Atlantic Whitecedar Swamps; Clearwater Stream Swamps

Narrow, linear forested systems along cold, clear streams of the Fall Line sandhills. Characterized by a fairly dense canopy of Atlantic whitecedar, with pond pine, red maple, sweetbay, and other mesic-hydric site species. Clearwater stream swamps are similar but without Atlantic whitecedar in the canopy. The shrub layer is usually well developed and diverse, while the groundlayer herbaceous vegetation is often sparse. These systems are thought to be maintained by periodic fire, beaver activity, and possibly other forms of disturbance.

Bayheads and Titi Swamps

Forested wetlands dominated by broad-leaved evergreen trees: sweetbay, redbay, and loblolly bay. Usually found in domed peatlands, broad interstream flats, or shallow drainageways. Includes shrubby areas dominated by titi (*Cyrilla racemiflora*). Considered a late successional community in a variety of hydrogeomorphic settings in the Coastal Plain

Beech-Magnolia Slope Forests

These are uncommon Coastal Plain hardwood forests, typically found on very mesic river bluffs, and occasionally on gentle slopes that are naturally protected from fire by topographic setting. In addition to American beech and southern magnolia, may contain water oak, water hickory, American holly, and other fire-intolerant species. Often small in extent and occupying a narrow zone between wetland and fire-maintained upland forests. May contain epiphytic species such as green-fly orchid. Often associated with and in close proximity to hillside seeps.

Black Belt Prairies

Small-patch prairie habitats occurring over alkaline Oktibbeha soils. These soils are adhesive when wet and hard when dry, limiting the growth of woody plants. Black Belt prairies consist of herb-dominated patches interspersed with woody scrub component. These habitats are maintained by a combination of soil conditions and periodic fire.

Bottomland Hardwood Forests

Diverse hardwood-dominated forests found on natural levees, upper floodplain flats and terraces along brownwater and blackwater rivers. Characterized by a diverse canopy of hardwood species dominated by various oaks, green ash, sweetgum, red maple, water hickory, and other mesic species. These extensive forested systems provide habitat for a wide variety of wildlife species, and are especially important for wide-ranging forest interior species. Bottomland hardwood forests have been impacted by altered hydrologic conditions, forest conversion, and invasive exotic species.

Calcareous Swamps

Hardwood dominated swamp forests that are influenced by calcareous soils. Examples include Spring Creek in the Dougherty Plain. These spring-fed swamps may contain rare plants such as variable-leaved water plantain. Similar habitats are found along tributaries of the Ocmulgee and Ogeechee rivers.

Canebreaks

Thickets of native river cane found along rivers and creeks under sparse to full tree cover. Canebrakes represent important wildlife habitat for a variety of neotropical birds and insects. These habitats require periodic fire or other form of disturbance for maintenance.

Caves

Found primarily along the Pelham Escarpment in the southwestern portion of the ecoregion. A few caves are also found in karst environments near Cochran and Sandersville. These Coastal Plain caves provide habitat for high priority species such as the southeastern myotis and Georgia blind salamander.

Evergreen Hammocks and Mesic Hardwood Forests

Evergreen hammocks are typically associated with small isolated uplands within a floodplain or depression wetland. Protected from frequent fire, these habitats are characterized by a canopy of submesic oaks and hickories, with southern magnolia, American holly, ironwood, flowering dogwood and spruce pine. Mesic hardwood forests are similar, and may occur in terraces above bottomland hardwood forests, ravines, or nonalluvial flats protected from frequent fire.

Flint Kaolin Outcrops

Unusual rock outcrops composed of flint kaolin, a hard, flinty conglomerate of metamorphosed sediments. Outcrops are surrounded by xeric mixed oak/pine forest. The plant communities of the outcrops resemble Altamaha Grit. Known only from Columbia County.

Forested Depressional Wetlands

Seasonally or semi-permanently flooded forests of depressional features, including Carolina bays, limesinks, and Grady ponds. Soils range from mineral to organic and canopy dominants may include bays, pondcypress, and/or pond pine. Fire plays a role in maintaining some of these systems. Isolated wetlands that do not support fish populations are very important breeding habitats for amphibians such as the flatwoods salamander.

Freshwater “Prairies”

Semipermanently flooded freshwater wetlands dominated by emergent vegetation and floating macrophytes, with scattered cypress, buttonbush, and swamp blackgum. The primary example in this region is Grand Bay, possibly the largest Carolina bay known. Other examples can be found in the Tallahassee Hills/Valdosta Limesink region. Fluctuations in water levels and/or periodic fire are required for maintenance. Many of these habitats have been impacted by altered hydrology (impoundment with dams or drainage) and/or fire suppression.

Hillside Seeps

Small patch habitats found on moist to wet lower slopes in sandy terrain. These seeps represent natural groundwater discharge points. May be dominated by shrubs or herbs (including pitcherplants), with scattered trees such as pond, slash, or longleaf pine. Most Georgia examples are fire-suppressed.

Limestone and Marl Outcrops; Calcareous Bluffs

Rich riparian or ravine habitats influenced by limestone substrate. Marl gorges and bluffs are restricted to tributaries of the Chattahoochee River (Town Creek, Kolomoki Creek) near Fort Gaines. These “blue marl gorges” have diverse mesic hardwood forests and unusual seepage cliffs. Mesic calcareous bluffs are also found along the Savannah River and contain plant species of northern affinities.

Longleaf Pine-Scrub Oak Woodlands

Sparse-canopied xeric longleaf pine system with patchy oak understory composed of turkey oak, sand post oak, bluejack oak, blackjack oak and other scrub oak species. Typically found on deep sand soils, on ridges and upper slopes. Contains a fairly diverse groundlayer of xerophytic grasses and forbs and scattered shrubs.

Longleaf Pine-Wiregrass Savannas

Large patch or matrix upland habitats characterized by a sparse canopy of longleaf pine (sometimes with slash pine) and a diverse herb layer dominated by wiregrass. Can range from mesic to dry, depending on topographic position and soils. Transitions downslope into wet pine savanna. These habitats are heavily dependent on frequent fire for maintenance.

Nonalluvial (Blackwater) Rivers and Swamps

Large, meandering rivers with tea-stained, but translucent waters and narrow to wide floodplains. Dominant substrate is sand, which may form extensive bars in larger systems. Runs and pools are dominant habitats. Large snags are a significant component of habitat heterogeneity. Limestone shoals occur on some of these rivers.

Open-Water Ponds and Lakes (Carolina Bays, Limesinks and Beaver Ponds)

Open water aquatic habitats ranging from isolated depressions to impoundments created by beaver. Vegetation is sparse and consists primarily of emergent and floating macrophytes. Many wildlife species are dependent on these habitats. Limesinks are generally round, formed by the collapse of underground caverns, and are found primarily in the Dougherty Plain. Carolina bays are characterized by an elliptical shape, NW-SE axis, and a deep sandy rim on the east and south edges. Beaver activity along small branches may semi-permanently inundate areas, creating open wetlands.

Pine Flatwoods

Seasonally wet forests with open to closed pine canopy, often with an ericaceous shrub understory. Canopy dominants may include slash, longleaf, and occasionally pond pine. These habitats generally occur on nonalluvial flats and low terraces, and have a strong herbaceous component (although not as diverse as the longleaf pine savanna). Maintained by periodic fire.

Rocky/Sandy River Bluffs

Subxeric mixed pine-hardwood forest on river bluffs. May contain species such as white oak, southern red oak, post oak, laurel oak, mockernut hickory, shortleaf pine, loblolly pine and spruce pine. The woody understory may include red buckeye, blueberry, and possumhaw. The herb layer is typically sparse, but may include rare species such as Alabama milkvine.

Springs and Spring Runs

Clear, flowing systems with circumneutral pH and stable temperature and flow regimes. Limestone, detritus, and woody debris are dominant substrata. Floodplains of these systems are poorly developed. Mostly confined to the Dougherty Plain. Many of the larger springs in this ecoregion serve as important cool-water refuges for species such as striped bass.

Steephead Ravines

Rich mesic ravine forests characterized by a diverse canopy of hardwood trees, including American beech, southern sugar maple, southern magnolia, pyramid magnolia, basswood, and sugarberry. The most significant examples are the “Torreya Ravines” of the lower Pelham Escarpment near Lake Seminole. Similar habitats are found in the upper ends of narrow ravines in the Fall Line Sandhills and along the edges of deep limesinks in the Dougherty Plain.

Streams (Blackwater)

Meandering acidic streams with tea-stained, translucent waters and small to moderate-sized floodplains. Blackwater streams are highly acidic, high in dissolved organic materials, and low in suspended materials. Streambeds are characterized by sandy substrates, often with extensive woody debris and live plant roots are often interspersed. Pools and runs are the dominant microhabitats, but these are occasionally interspersed with beaver ponds and limestone outcroppings. These aquatic systems have been impacted by channelization, impoundment, and encroachment by agricultural and silvicultural uses.

Wet Pine Savannas, Herb and Shrub Bogs

Open pine savanna dominated by longleaf or slash pine, with interspersed bogs. Herb bogs are found in low swales or depressions. Herb bogs are often characterized by pitcherplants and a high diversity of forbs. Shrub bogs occur in the ecotones of Carolina bays or cypress ponds and along the drier edges of bay swamps. Dominated by shrubs with a few (usually stunted) scattered pines and a sparse herb layer.

Xeric Aeolian Dunes

Wind-formed deep well-drained dunes found mostly along the eastern side of rivers such as the Ochopee, Little Ochopee, Canoochee, and Little Ocmulgee. These unusual xeric habitats are dominated by deciduous or evergreen scrub oaks and scattered pines, with little groundcover other than patches of wiregrass and lichens. A number of rare plants are associated with these habitats, including sandhills rosemary and Ashe’s savory.

SOUTHERN COASTAL PLAIN ECOREGION

Alluvial (Brownwater) Rivers and Swamps

Large, low-gradient, meandering rivers with sandbars, sloughs and extensive floodplain swamps. Floodplains of these systems may remain inundated for extensive periods. Sand and silt are the dominant substrata and these rivers typically carry heavy sediment loads. Dominant canopy trees are baldcypress and tupelo gum; the understory tree/shrub vegetation may be patchy, often consisting of swamp priet, water elm, swamp dogwood, red maple, and Carolina ash. Cypress

and gum-dominated swamps can be found along the Altamaha, Savannah, and Ogeechee rivers. These systems have been impacted by altered flows from upstream dams.

Barrier Island Freshwater Wetlands and Ponds

Usually found in broad flats or in elliptical to linear interdune depressions on Georgia's coastal barrier islands. These wetland habitats are variable in physiognomy and species composition; deeper, more permanently flooded ponds often have a large extent of open water; shallower ponds are usually dominated by a combination of submergent, emergent and/or floating macrophytes. Trees or shrubs are present mainly along the edges of the ponds. These habitats have been impacted by groundwater withdrawals, fire suppression, and invasive exotic plants such as Chinese tallow tree.

Bayheads and Titi Swamps

Forested wetlands dominated by broad-leaved evergreen trees: sweetbay, redbay, and loblolly bay. Usually found in domed peatlands, broad interstream flats, or shallow drainageways. Includes shrubby areas dominated by titi (*Cyrilla racemiflora*). Considered a late successional community in a variety of hydrogeomorphic settings in the Coastal Plain

Beech-Magnolia Slope Forests

These are uncommon Coastal Plain hardwood forests, typically found on very mesic river bluffs, and occasionally on gentle slopes that are naturally protected from fire by topographic setting. In addition to American beech and southern magnolia, may contain water oak, water hickory, American holly, and other fire-intolerant species. Often small in extent and occupying a narrow zone between wetland and fire-maintained upland forests. May contain epiphytic species such as green-fly orchid. Often associated with and in close proximity to hillside seeps.

Bottomland Hardwood Forests

Diverse hardwood-dominated forests found on natural levees, upper floodplain flats and terraces along brownwater and blackwater rivers. Characterized by a diverse canopy of hardwood species dominated by various oaks, green ash, sweetgum, red maple, water hickory, and other mesic species. These extensive forested systems provide habitat for a wide variety of wildlife species, and are especially important for wide-ranging forest interior species. Bottomland hardwood forests have been impacted by altered hydrologic conditions, forest conversion, and invasive exotic species.

Brackish Marsh and Salt Marsh

Salt marshes are salt-tolerant grasslands, dominated by cordgrasses and rushes, over soils with circumneutral pH. Extremely productive habitats. Brackish marshes occupy a wide ecotonal zone in the vicinity of river mouths.

Canebreaks

Thickets of native river cane found along rivers and creeks under sparse to full tree cover. Canebrakes represent important wildlife habitat for a variety of neotropical birds and insects. These habitats require periodic fire or other form of disturbance for maintenance.

Coastal Beaches and Sand Bars

Beaches and sand bars are dynamic, high-energy intertidal systems that represent important habitat for shorebirds and sea turtles. Longshore movement of sand on barrier islands results in erosion at the north end and building up at the south end. These unvegetated habitats are important foraging areas for coastal shorebirds; sea turtles nest in the foredunes at the upper ends of sandy beaches.

Coastal Dunes and Bluffs

These habitats consist of sparsely vegetated sandy interdunes, rear dunes, and bluffs. They constitute important habitats for a number of high priority species adapted to harsh temperatures and salt spray. Coastal dune habitats include a number of important microhabitats such as interdune meadows and depressions, shrub thickets, and dune scrub forests. Similar vegetation can be found along eroded or exposed coastal bluffs.

Coastal Scrub-Shrub Wetlands

Shrub dominated estuarine communities found along the upper border of salt marsh or brackish marsh. These habitats are infrequently flooded by tidal action and form ecotones between wetland and terrestrial environments. Typical shrubs include groundsel tree, marsh elder, yaupon holly, wax myrtle, Florida privet, and false willow. Wind-pruned redcedar may also be present.

Estuarine and Inshore Marine Waters

Estuaries (brackish water between barrier islands and mainland) and near-shore ocean waters. Estuaries serve as nurseries for many species of fish and shellfish as well as habitats for manatees and other marine mammals. Plant composition is influenced by tidal regime and salinity.

Evergreen Hammocks and Mesic Hardwood Forests

Evergreen hammocks are typically associated with small isolated uplands within a floodplain or depressional wetland. Protected from frequent fire, these habitats are characterized by a canopy of submesic oaks and hickories, with southern magnolia, American holly, ironwood, flowering dogwood and spruce pine. Mesic hardwood forests are similar, and may occur in terraces above bottomland hardwood forests, ravines, or nonalluvial flats protected from frequent fire.

Forested Depressional Wetlands

Seasonally or semi-permanently flooded forests of depressional features in broad interstream flats. Soils range from mineral to organic and canopy dominants may include bays, pondcypress, and/or pond pine. Fire plays a role in maintaining some of these systems. Isolated wetlands that do not support fish populations are very important breeding habitats for amphibians such as the flatwoods salamander.

Freshwater “Prairies”

Semipermanently flooded freshwater wetlands dominated by emergent vegetation and floating macrophytes, with scattered cypress, buttonbush, and swamp blackgum. The primary example in this region is the Okefenokee Swamp. Fluctuations in water levels and/or periodic fire are required for maintenance. Many of these habitats have been impacted by altered hydrology (impoundment with dams or drainage) and/or fire suppression.

Hillside Seeps

Small patch habitats found on moist to wet lower slopes in sandy terrain. These seeps represent natural groundwater discharge points. May be dominated by shrubs or herbs (including pitcherplants), with scattered trees such as pond, slash, or longleaf pine. Most Georgia examples are fire-suppressed.

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Sparse-canopied xeric longleaf pine system with patchy oak understory composed of turkey oak, sand post oak, bluejack oak, blackjack oak and other scrub oak species. Typically found on deep sand soils, on ridges and upper slopes. Contains a fairly diverse groundlayer of xerophytic grasses and forbs and scattered shrubs.

Longleaf Pine-Wiregrass Savannas

Large patch or matrix upland habitats characterized by a sparse canopy of longleaf pine (sometimes with slash pine) and a diverse herb layer dominated by wiregrass. Can range from mesic to dry, depending on topographic position and soils. Transition downslope into wet pine savannas, pine flatwoods, or other wetlands. These habitats are heavily dependent on frequent fire for maintenance.

Maritime Forest and Coastal Hammocks

Coastal forests dominated by live oak and palmetto; hammocks are small islands of maritime forest usually surrounded by brackish water and/or salt marsh. These are restricted to a narrow band of shoreline and barrier islands. Characterized by sandy soils and wind-pruned canopy trees. Provide important habitat for neotropical migrant birds.

Mud and Sand Flats

Periodically inundated mud and sand deposits located in estuarine or inshore marine waters. These unvegetated habitats are generally covered at high tide and exposed at low tide. They serve as important feeding areas for a number of coastal shorebirds such as plovers, sandpipers, and dowitchers.

Nonalluvial (Blackwater) Rivers and Swamps

Large, meandering rivers with tea-stained, but translucent waters and narrow to wide floodplains. Dominant substrate is sand, which may form extensive bars in larger systems. Runs and pools are dominant habitats. Large snags are a significant component of habitat heterogeneity. Limestone shoals occur on some of these rivers.

Offshore Marine Waters

Georgia's offshore marine waters provide habitat for a number of high priority species, including loggerhead, green, Kemp's ridley, and leatherback turtles, North Atlantic right whales, and bottlenose dolphins. Hard-bottom areas are especially important habitats for marine fish and sessile organisms.

Open-Water Ponds and Lakes

Open water aquatic habitats ranging from isolated depressions to impoundments created by beaver. Vegetation is sparse and consists primarily of emergent and floating macrophytes. These habitats are relatively uncommon in this region. Maintained by periodic fire and fluctuating water levels.

Pine Flatwoods

Mesic or wet forests on flat, poorly-drained areas of the lower Coastal Plain. Dominated formerly by longleaf pine, now typically by slash pine, occasionally with loblolly or pond pine. Contains a well-developed shrub layer consisting of saw palmetto, gallberry, lowbush blueberry, and other ericaceous species. One of the most extensive and prevalent habitats of this ecoregion.

Tidal Rivers and Freshwater Tidal Marsh

Includes the tidally influenced portions of rivers and creeks and associated wetlands. Freshwater tidal marshes are wetlands found along the margins of tidal rivers and creeks above the brackish water zone, typically dominated by giant cutgrass, sawgrass, pickerel weed, wild rice, cattail, rushes, and a variety of other herbs.

Wet Pine Savannas, Herb and Shrub Bogs

Wet pine savannas are poorly drained wetlands with open to sparse canopies dominated by longleaf, slash, and/or pond pine. The shrub layer may be sparse, consisting mainly of gallberry, wax myrtle, and blueberries. The herbaceous layer is often diverse and dense, dominated by grasses, sedges, composites, orchids, and lilies. May include small peat-filled depressions dominated by titi and other shrubs or by herbaceous bog plants.

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Category	Southwestern Appalachians/Ridge & Valley High Priority Habitats	Number of Stressors			
E	Acidic Meadows over Sandstone or Shale	3		Broad Categories	
F	Calcareous Flatwoods (Hardwood Flats)	9		Aquatic	5
E	Calcareous Prairies (e.g. Coosa Valley Prairies)	7		Edaphic	4
O	Canebrakes	5		Forested	6
O	Caves, Rock Shelters, Talus Slopes	6		Other	2
F	Forested Limestone Slopes and Terraces	4		Wetland	2
A	High Gradient First- and Second-Order Streams	6			19
E	Limestone Glades and Barrens (Cedar Glades)	5			
F	Medium to Large Rivers	11			
A	Mesic Hardwood Forests	11			
F	Montane Longleaf Pine-Hardwood Forests	8			
F	Oak Woodlands	6			
F	Pine Oak Woodlands and Forests	6			
W	Red Maple/Blackgum Swamps	5			
W	Sagponds (Isolated Depressional Wetlands)	7			
E	Sandstone Barrens and Outcrops	4			
A	Springs and Spring Runs; Gravelly Seeps	8			
A	Streams	9			
A	Underground Streams	4			

Southwestern Appalachians/Ridge & Valley High Priority Habitats	Restore Fire	Restore Hydrology	Control Invasives	Restore Natives	Protect from disturbance	Vegetation Management
Acidic Meadows over Sandstone or Shale	0	3	3	2	1	3
Calcareous Flatwoods (Hardwood Flats)	1	3	2	1	1	1
Calcareous Prairies (e.g. Coosa Valley Prairies)	1	3	2	1	1	2
Canebrakes	1	2	2	1	1	1
Caves, Rock Shelters, Talus Slopes	0	0	3	3	1	0
Forested Limestone Slopes and Terraces	1	0	2	2	2	2
High Gradient First- and Second-Order Streams	0	1	2	1	1	0
Limestone Glades and Barrens (Cedar Glades)	1	0	1	1	1	1
Medium to Large Rivers	2	3	2	2	2	2
Mesic Hardwood Forests	0	1	2	1	1	0
Montane Longleaf Pine-Hardwood Forests	1	0	2	2	2	1
Oak Woodlands	1	0	2	2	2	1
Pine Oak Woodlands and Forests	1	0	2	2	2	1
Red Maple/Blackgum Swamps	0	2	2	3	2	3
Sagponds (Isolated Depressional Wetlands)	2	2	2	2	1	2
Sandstone Barrens and Outcrops	3	1	2	2	2	2
Springs and Spring Runs; Gravelly Seeps	0	1	2	2	1	0
Streams	0	1	2	1	1	0
Underground Streams	0	1	2	2	1	0
Total 1s:	10	7	1	9	14	8
Total 2s:	2	3	20	12	9	5
Total 3s:	2	4	2	2	0	3
1 = High Priority						
2 = Medium Priority						
3 = Low Priority						
0 = Does not apply						

Category	Blue Ridge High Priority Habitats	Number of Stressors				
F	Boulderfield Forests	0				Broad Categories
O	Canebrakes	5				Aquatic 3
O	Caves, Rock Shelters, Talus Slopes	5				Edaphic 2
F	Floodplain Hardwood Forests	12				Forested 12
F	Hemlock-Hardwood-White Pine Forests	9				Wetland 1
F	High-Elevation Early Successional Habitats	6				Other 3
F	High Elevation Forested Heath Thickets	4				
F	High Elevation Rocky Summits and Shrub Balds	4				
E	Low Elevation Seepy Thickets and Wet Woods	4				
F	Medium to Large Rivers	5				
A	Mixed Pine-Hardwood Forests	7				
O	Moist Cliff Faces and Spray Cliffs	5				
W	Mountain Bogs and Wet Meadows	10				
F	Northern Hardwood Forests	6				
F	Oak Forests and Woodlands	7				
F	Pine-Oak Woodlands and Forest	7				
F	Rich Mesic Hardwood Forests (Cove Hardwoods)	5				
E	Rocky Bluffs and Streambanks	3				
A	Springs and Spring Runs; Gravelly Seeps	5				
A	Streams	7				
F	Xeric Pine Woodlands	6				

Blue Ridge High Priority Habitats	Restore Fire	Restore Hydrology	Control Invasives	Restore Natives	Protect from Disturbance	Vegetation Management
Boulderfield Forests	0	0	3	3	1	0
Canebrakes	1	2	1	2	2	2
Caves, Rock Shelters, Talus Slopes	0	0	3	3	1	0
Floodplain Hardwood Forests	3	2	1	2	2	3
Hemlock-Hardwood-White Pine Forests	1	0	2	2	2	2
High-Elevation Early Successional Habitats	3	0	2	2	2	3
High Elevation Forested Heath Thickets	2	0	2	3	3	1
High Elevation Rocky Summits and Shrub Balds	2	0	2	3	2	2
Low Elevation Seepy Thickets and Wet Woods	0	0	2	2	1	0
Medium to Large Rivers	3	1	1	2	1	3
Mixed Pine-Hardwood Forests	0	1	2	2	1	0
Moist Cliff Faces and Spray Cliffs	0	2	2	2	1	0
Mountain Bogs and Wet Meadows	1	1	2	2	2	1
Northern Hardwood Forests	2	0	2	2	1	3
Oak Forests and Woodlands	1	0	2	2	2	1
Pine-Oak Woodlands and Forest	1	0	2	2	2	1
Rich Mesic Hardwood Forests (Cove Hardwoods)	3	0	2	2	1	2
Rocky Bluffs and Streambanks	0	2	2	2	2	0
Springs and Spring Runs; Gravelly Seeps	0	2	2	2	1	0
Streams	0	2	2	2	1	0
Xeric Pine Woodlands	1	0	2	2	2	2
Total 1s:	9	3	3	0	10	5
Total 2s:	3	6	19	20	11	7
Total 3s:	4	0	2	4	3	4
1 = High Priority						
2 = Medium Priority						
3 = Low Priority						
0 = Does not apply						

Category	Piedmont High Priority Habitats	Number of Stressors				
W	Beaver Ponds; Freshwater Marshes	11				
F	Bottomland Hardwood Forests	12			Broad Categories	
O	Canebrakes	8			Aquatic	4
E	Granite Outcrops	15			Edaphic	3
A	Medium to Large Rivers	15			Forested	6
F	Mesic Hardwood Forests	9			Other	1
F	Montane Longleaf Pine-Hardwood Forests	8			Wetland	2
F	Oak Woodlands and Savannas	8				16
F	Oak-Hickory-Pine Forests	8				
F	Xeric Pine Woodlands	8				
A	Rocky or Cobbly River Shoals	7				
E	Rocky/Sandy River Bluffs	4				
E	Serpentine Outcrops/Woodlands/Savannas	7				
A	Springs and Spring Runs	5				
A	Streams	12				
W	Upland Depression Swamps	9				

	Restore Fire	Restore Hydrology	Control Invasives	Restore Natives	Protect from disturbance	Vegetation Management
Piedmont High Priority Habitats						
Beaver Ponds; Freshwater Marshes	3	1	2	2	3	3
Bottomland Hardwood Forests	3	1	2	3	2	3
Canebrakes	1	2	2	1	3	1
Granite Outcrops	1	0	1	2	1	3
Medium to Large Rivers	0	1	2	2	1	0
Mesic Hardwood Forests	3	0	2	3	2	2
Montane Longleaf Pine-Hardwood Forests	1	0	2	1	2	1
Oak Woodlands and Savannas	1	0	2	3	2	1
Oak-Hickory-Pine Forests	1	0	2	3	2	1
Xeric Pine Woodlands	1	0	2	3	2	1
Rocky or Cobbly River Shoals	0	2	2	2	1	0
Rocky/Sandy River Bluffs	0	3	2	2	1	3
Serpentine Outcrops/Woodlands/Savannas	1	0	2	2	1	1
Springs and Spring Runs	0	2	2	2	1	0
Streams	0	2	2	2	1	0
Upland Depression Swamps	2	1	1	2	1	3
Total 1s:	8	4	2	3	9	7
Total 2s:	2	5	18	11	9	2
Total 3s:	4	1	0	6	1	7
1 = High Priority						
2 = Medium Priority						
3 = Low Priority						
0 = Does not apply						

Category	Southeastern Plains High Priority Habitats	Number of Stressors			
A	Alluvial (Brownwater) Rivers and Swamps	15		Broad Categories	
E	Altamaha Grit Outcrops	7		Aquatic	4
W	Atlantic Whitecedar Swamps; Clearwater Stream Swamps	8		Edaphic	5
W	Bayheads, Titi Swamps	8		Forested	6
F	Beech-Magnolia Slope Forests	5		Other	4
O	Blackbelt Prairies	7		Wetland	8
F	Bottomland Hardwood Forests	8			27
W	Calcareous Swamps	7			
O	Canebreaks	7			
O	Caves	5			
F	Evergreen Hammocks, Mesic Hardwood Forests	5			
E	Flint Kaolin Outcrops	4			
W	Forested Depressional Wetlands	14			
W	Freshwater "Prairies"	12			
W	Hillside Seeps	8			
E	Limestone Shoals and Marl Outcrops; Calcareous Bluffs	5			
F	Longleaf Pine-Scrub Oak Woodlands	7			
O	Longleaf Pine-Wiregrass Savannas	9			
A	Nonalluvial (Blackwater) Rivers and Swamps	7			
W	Open-Water Ponds and Lakes (Carolina Bays, Limesink and Beaver Ponds)	3			
F	Pine Flatwoods	8			
E	Rocky/Sandy River Bluffs	4			
A	Springs and Spring Runs	10			
F	Steephead Ravines	4			
A	Streams (Blackwater)	7			
W	Wet Pine Savannas, Herb and Shrub Bogs	14			
E	Xeric Aeolian Dunes	10			

SOUTHEASTERN PLAINS HABITATS	Restore Fire	Restore Hydrology	Control Invasives	Restore Natives	Protect from disturbance	Vegetation Management
Alluvial (Brownwater) Rivers and Swamps	0	2	2	1	1	0
Altamaha Grit Outcrops	1	0	2	2	1	2
Atlantic Whitecedar Swamps; Clearwater Stream Swamps	0	2	2	2	1	2
Bayheads, Titi Swamps	1	2	2	2	1	2
Beech-Magnolia Slope Forests	0	0	2	2	1	3
Blackbelt Prairies	1	0	1	1	1	1
Bottomland Hardwood Forests	3	2	2	3	2	3
Calcareous Swamps	0	2	2	3	2	3
Canebreaks	1	2	2	1	1	2
Caves	0	2	3	3	1	0
Evergreen Hammocks, Mesic Hardwood Forests	0	0	2	2	2	3
Flint Kaolin Outcrops	0	0	0	3	1	3
Forested Depressional Wetlands	1	1	2	2	1	2
Freshwater "Prairies"	1	1	2	2	1	2
Hillside Seeps	1	1	2	2	1	2
Limestone Shoals and Marl Outcrops; Calcareous Bluffs	3	0	2	2	1	3
Longleaf Pine-Scrub Oak Woodlands	1	0	2	1	2	1
Longleaf Pine-Wiregrass Savannas	1	3	2	1	2	1
Nonalluvial (Blackwater) Rivers and Swamps	0	1	2	2	1	0
Open-Water Ponds and Lakes (Carolina Bays, Limesink and Beaver Ponds)	3	1	2	2	1	3
Pine Flatwoods	1	1	2	1	2	1
Rocky/Sandy River Bluffs	0	0	2	2	2	0
Springs and Spring Runs	0	1	2	1	1	3
Steephead Ravines	0	1	2	2	1	0
Streams (Blackwater)	0	2	2	2	1	0
Wet Pine Savannas, Herb and Shrub Bogs	1	1	2	1	2	2
Xeric Aeolian Dunes	1	0	3	2	1	2
Total 1s:	12	9	1	8	19	4
Total 2s:	0	8	23	15	8	9
Total 3s:	3	1	2	4	0	8
1 = High Priority						
2= Medium Priority						
3 = Low priority						
0 = Does not apply						

Category	Southern Coastal Plain High Priority Habitats	Number of Stressors			
A	Alluvial (Brownwater) Rivers and Swamps	19		Broad Categories	
W	Barrier Island Freshwater Wetlands and Ponds	8		Aquatic	5
W	Bayheads and Titi Swamps	9		Edaphic	1
F	Beech-Magnolia Slope Forests	4		Forested	6
F	Bottomland Hardwood Forests	14		Other	4
W	Brackish Marsh and Salt Marsh	13		Wetland	9
O	Canebreaks	7			25
O	Coastal Beaches and Sand Bars	15			
E	Coastal Dunes and Bluffs	4			
A	Estuarine and Inshore Marine Waters	15			
F	Evergreen Hammocks and Mesic Hardwood Forests	7			
W	Forested Depressional Wetlands	13			
W	Freshwater "Prairies"	5			
W	Hillside Seeps	6			
F	Longleaf Pine-Scrub Oak Woodlands	9			
O	Longleaf Pine-Wiregrass Savannas	10			
F	Maritime Forest and Coastal Hammocks	11			
O	Mud and Sand Flats	8			
A	Nonalluvial (Blackwater) Rivers and Swamps	8			
A	Offshore Marine Waters	9			
W	Open-Water Ponds and Lakes	7			
F	Pine Flatwoods	10			
W	Coastal Scrub-Shrub Wetlands	8			
A	Tidal Rivers and Freshwater Tidal Marsh	13			
W	Wet Pine Savannas, Herb and Shrub Bogs	11			

Southern Coastal Plain High Priority Habitats	Restore Fire	Restore Hydrology	Control Invasives	Restore Natives	Protect from disturbance	Vegetation Management
Alluvial (Brownwater) Rivers and Swamps	0	2	1	2	2	0
Barrier Island Freshwater Wetlands and Ponds	0	1	1	2	2	0
Bayheads and Titi Swamps	1	2	2	2	2	1
Beech-Magnolia Slope Forests	3	0	2	2	2	0
Bottomland Hardwood Forests	3	2	2	2	2	3
Brackish Marsh and Salt Marsh	0	1	0	0	1	0
Canebreaks	1	2	3	3	2	2
Coastal Beaches and Sand Bars	0	0	2	2	1	0
Coastal Dunes and Bluffs	0	0	3	3	1	0
Estuarine and Inshore Marine Waters	0	1	2	0	1	0
Evergreen Hammocks and Mesic Hardwood Forests	0	0	2	3	1	0
Forested Depressional Wetlands	1	1	3	2	2	2
Freshwater "Prairies"	1	1	2	3	1	2
Hillside Seeps	1	1	2	2	2	2
Longleaf Pine-Scrub Oak Woodlands	1	0	2	1	2	1
Longleaf Pine-Wiregrass Savannas	1	3	2	1	2	1
Maritime Forest and Coastal Hammocks	3	0	2	2	1	2
Mud and Sand Flats	0	3	0	0	1	0
Nonalluvial (Blackwater) Rivers and Swamps	0	2	2	2	2	0
Offshore Marine Waters	0	0	0	0	1	0
Open-Water Ponds and Lakes	2	2	3	2	2	2
Pine Flatwoods	1	2	3	1	2	1
Coastal Scrub-Shrub Wetlands	0	2	1	1	1	3
Tidal Rivers and Freshwater Tidal Marsh	0	1	3	3	2	0
Wet Pine Savannas, Herb and Shrub Bogs	1	2	3	2	1	2
Total 1s:	9	7	3	4	13	4
Total 2s:	1	10	12	13	14	7
Total 3s:	3	2	7	5	0	2
1 = High Priority						
2 = Medium Priority						
3 = Low Priority						
0 = Does not apply						