USDA Natural Resources Conservation Service

Ecological site F156AY390FL
Subtropical Scrub of Miami Ridge / Atlantic Coastal Strip

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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 156A–Florida Everglades and Associated Areas

This area makes up about 7,749 square miles (20,071 square kilometers) and is entirely in Florida. It is located at the southern tip of the State and has shoreline on both the Atlantic Ocean and the Gulf of Mexico. Lake Okeechobee borders the MLRA to the north. Aside from sugar cane plantations in the north, the Everglades National Park, Big Cypress National Preserve, and the Big Cypress Seminole Indian Reservation comprise this area. Historical ditching, berming, and canals prevent natural water flow through this delicate ecosystem. To mitigate this, extensive restoration efforts have been implemented. Urban sprawl from Miami and cities to its north on the Atlantic Ridge has encroached along the eastern boundary of this area. Most of the MLRA has resisted urbanization because of a water table that is at or near the surface, a considerable acreage of unstable organic soils, and its identity as a national treasure.

About one-third of this area is in Native American reservations, national parks, game refuges, or other large holdings. Cypress forests are extensive in the area, but mangrove forests are widespread along the eastern and southern coasts. A large part of the area is open marsh. Much of the area is used for hunting, fishing, and other recreational activities. The cropland in the area is used mainly for winter vegetables, but citrus fruits, avocado, and papaya are grown on the better drained soils. Sugarcane is an important crop on the organic soils south of Lake Okeechobee. The acreage of improved pasture is increasing. Beef cattle are the principal kind of livestock, but dairying is an important enterprise locally. Urbanization is extensive along the eastern coast.

The major soil resource concerns are wind erosion, maintenance of the content of organic matter and productivity of the soils, and management of soil moisture and soil subsidence. Conservation practices on cropland generally include conservation crop rotations, cover crops, nutrient management, pest management, water-control structures, surface drainage systems (field ditches, mains, and laterals), pumping plants, and irrigation water management (including micro irrigation systems and surface and subsurface irrigation systems). Conservation practices on pasture and rangeland generally include prescribed grazing, brush management, pest management, prescribed burning, and watering facilities. Conservation practices on forestland generally include forest stand improvement, firebreaks, pest management, prescribed burning, and management of upland and wetland wildlife habitat.

LRU notes

There is not an official LRU for the MLRA 156A area. For the time being the technical team recommended to add the four terrestrial physiographic provinces ecoregions (Big Cypress, Everglades, Southern Coast and Islands, and Miami Ridge / Atlantic Coastal Strip) and one subaqueous ecoregion (Coastal Marine and Estuarine) on this section. This PES occurs within the Miami Ridge / Atlantic Coastal Strip ecoregion.

The Miami Ridge/Atlantic Coastal Strip Ecoregion, sea level to 20 m (0 to 66 ft) in elevation, is a heavily urbanized region, with coastal ridges on the east and flatter terrain to the west that grades into the Everglades. The western side originally had wet and dry prairie marshes on marl and rockland and sawgrass marshes, but much of it is now covered by cropland, pasture, and suburbs. To the south, the Miami Ridge extends from near Hollywood south to

Homestead and west into Long Pine Key of Everglades National Park. It is a gently rolling rock ridge of oolitic limestone that once supported more extensive southern slash pine forests and islands of tropical hardwood hammocks. The northern part of the region is a plain of pine flatwoods and wet prairie, and coastal sand ridges with scrub vegetation and sand pine. There are very few natural lakes in the region, but three types of ponded surface waters occur: 1) Pits dug deep into underlying "rock" containing water that is clear, high pH and alkaline, with moderate nutrients; 2) Shallow, surficial dug drains that are darker water; and 3) flow-through lakes (e.g., Lake Osborne) that are colored and nutrient rich.

Classification relationships

All portions of the geographical range of this site falls under the following ecological / land classifications including:

-Environmental Protection Agency's Level 3 and 4 Ecoregions of Florida: 76 Southern Florida Coastal Plain; 76C Miami Ridge/ Atlantic Coastal Strip (Griffith, G. E., Omernik, J. M., & Pierson, S. M., 2013)

-Florida Natural Area Inventory, 2010 Edition: Scrub (FNAI ,2010)

-Soil Conservation Service, 26 Ecological Communities of Florida: 3- Sand Scrub (Florida Chapter Soil and Water Conservation Society, 1989)

Ecological site concept

The Subtropical Scrub Habitat of the Miami Ridge/ Atlantic Coastal Strip ecosite is a community composed of evergreen shrubs, with or without a canopy of pines, found on dry, infertile, sandy ridges. These sites are not known to occur at elevations less than 10 to 15 feet above sea level and are typically the highest community within this ecoregion. Their distribution depends on the deposition of aeolian sand during geographic formation along the Miami Ridge, differing from interior scrubs of different MLRAs in their geologic age, species composition, response to disturbance, and management needs. Scrub habitats within this ecoregion were historically maintained by periodic wind disturbances such as hurricanes as well as periodic fires estimated between 5 and 20 years. Most of these scrub communities along the Miami Ridge have been destroyed, severely fragmented and degraded due to residential and commercial expansion.

Associated sites

F156AY380FL	**Subtropical Hardwood Hammocks of Miami Ridge / Atlantic Coastal Strip** The Subtropical Hardwood Hammocks of Miami Ridge / Atlantic Coastal Strip will be found in slightly lower landscape positions where the soil drainage is moderately well to well drained.

Similar sites

F156AY380FL	**Subtropical Hardwood Hammocks of Miami Ridge / Atlantic Coastal Strip** The Subtropical Hardwood Hammocks of Miami Ridge / Atlantic Coastal Strip may be confused with the hammock communities if the scrub is unburned and forms a xeric hammock. Distinguishing factors include the drainage class of the soil and xerophytic species as well as patches of open sand throughout the community.

Table 1. Dominant plant species

Tree	(1) *Pinus clausa* (2) *Quercus*
Shrub	(1) *Ceratiola ericoides* (2) *Serenoa repens*
Herbaceous	(1) *Aristida* (2) *Bulbostylis*

Physiographic features

This site will occur as convex – linear shrublands formed on stabilized ridge and dune systems of aeolian and / or

sandy marine deposits. They will be primarily found on summits, shoulders, and backslopes of marine terraces, often marking a ridge system formed from variable shoreline development through Florida's geologic history. Within the MLRA 156A the Pleistocene shoreline consists of the Miami Ridge/ Atlantic Coastal Strip. The Miami Ridge/ Atlantic Coastal Strip falls under the Pleistocene series Miami Limestone geologic formation, also known as Miami Oolite. It forms the Atlantic Coastal Ridge and extends beneath the Everglades where it is commonly covered by thin organic and freshwater sediments, as well as extending down into the Florida Keys. To the north the Miami Limestone formation grades laterally northward into the Anastasia Formation. The Miami Limestone consists of two facies, an oolitic facies and a bryozoan facies. The oolitic facies consists of white to orangish gray, poorly to moderately indurated, sandy, oolitic limestone (grainstone) with scattered concentrations of fossils. The bryozoan facies consist of white to orangish gray, poorly to well indurated, sandy, fossiliferous limestone grainstone and packstone). Beds of quartz sand are also present as unindicated sediments and indurated limey sandstones. Fossils present include mollusks, bryozoans, and corals. Molds and casts of fossils are common. The highly porous and permeable Miami Limestone forms much of the Biscayne Aquifer of the surficial aquifer system.

Table 2. Representative physiographic features

Geomorphic position, flats	(1) Rise (2) Talf
Slope shape across	(1) Convex
Geomorphic position, terraces	(1) Riser
Slope shape up-down	(1) Linear
Landforms	(1) Coastal plain (2) Marine terrace > Ridge (3) Marine terrace > Rise (4) Marine terrace > Knoll
Runoff class	Negligible to low
Flooding frequency	None
Ponding frequency	None
Elevation	10–66 ft
Slope	0–2%
Ponding depth	0 in
Water table depth	80 in
Aspect	Aspect is not a significant factor

Climatic features

The climate of MLRA 156A is subtropical, with mild winters and hot wet summers. The average annual precipitation of this MLRA is 37 to 62 inches (950 to 1,565 millimeters). About 60 percent of the precipitation occurs from June through September. Most of the rainfall occurs during moderate intensity, tropical storms that produce large amounts of rain from late spring through early autumn. Late autumn and winter are relatively dry. The average annual temperature of the MLRA is 74 to 78 degrees F (23 to 26 degrees C). The freeze-free period of the MLRA averages 355 days and ranges from 345 to 365 days.

The following tables and graphs consist of specific climate stations found within the range of this ecological site within this MLRA.

Table 3. Representative climatic features

Frost-free period (characteristic range)	365 days
Freeze-free period (characteristic range)	365 days
Precipitation total (characteristic range)	58-64 in
Frost-free period (actual range)	365 days

Freeze-free period (actual range)	365 days
Precipitation total (actual range)	51-68 in
Frost-free period (average)	365 days
Freeze-free period (average)	365 days
Precipitation total (average)	61 in

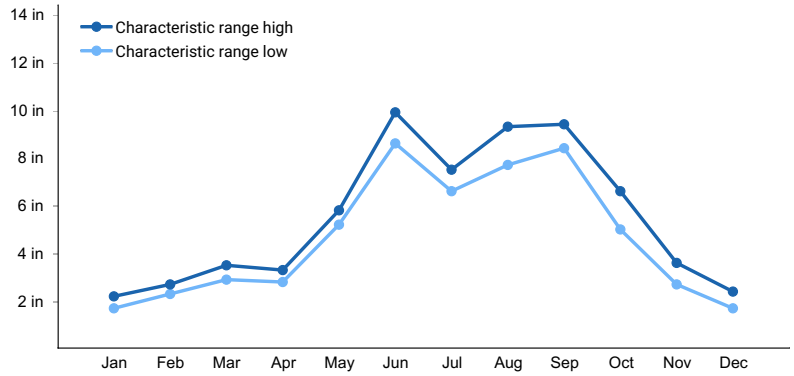


Figure 1. Monthly precipitation range

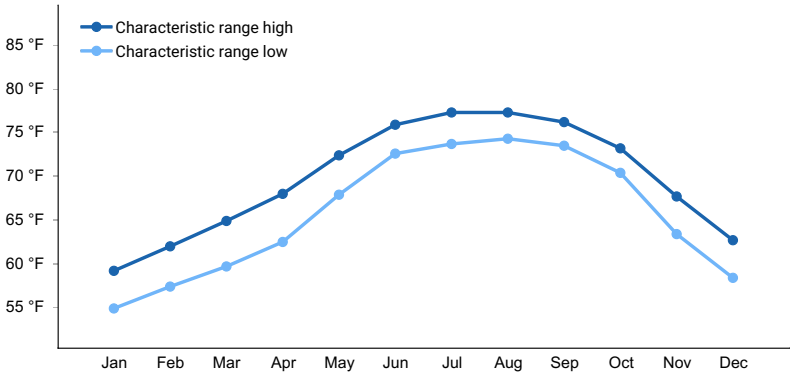


Figure 2. Monthly minimum temperature range

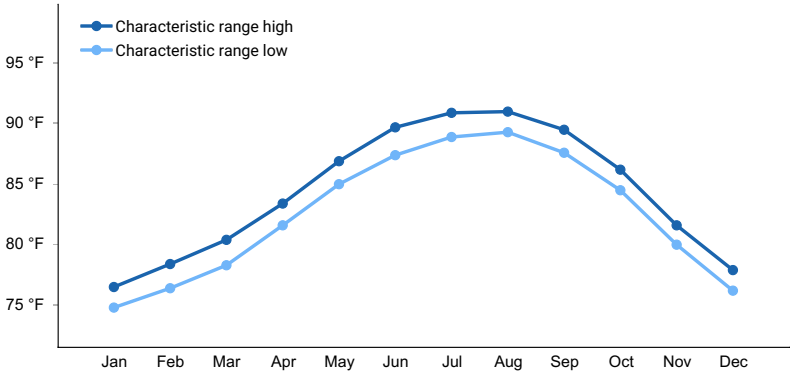


Figure 3. Monthly maximum temperature range

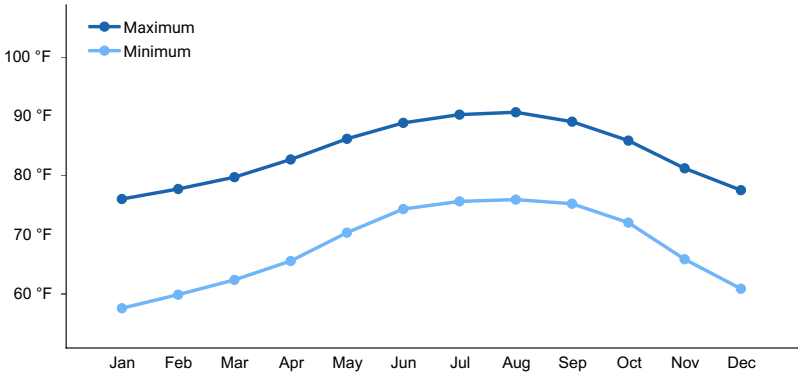


Figure 4. Monthly average minimum and maximum temperature

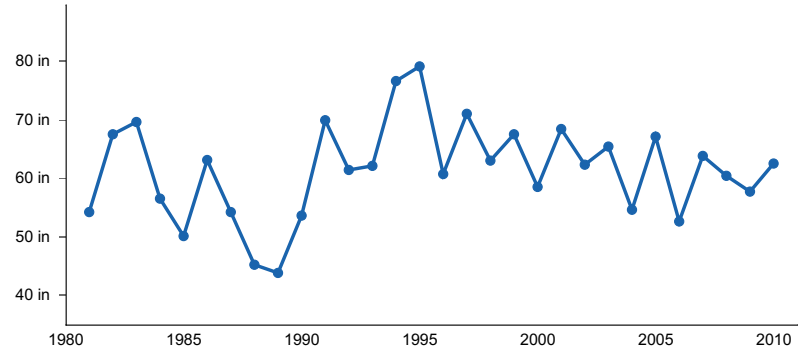


Figure 5. Annual precipitation pattern

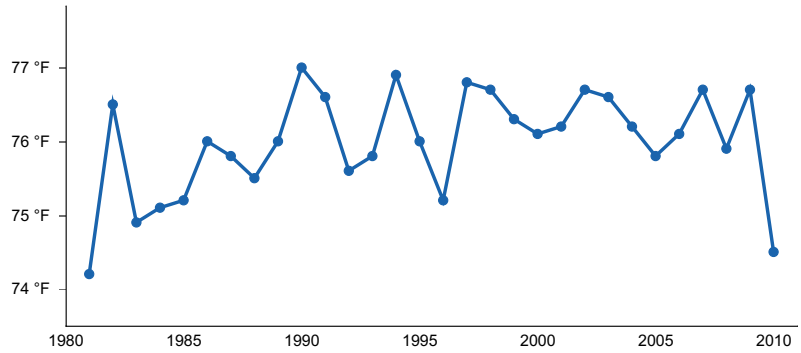


Figure 6. Annual average temperature pattern

Climate stations used

- (1) ROYAL PALM RS [USC00087760], Homestead, FL
- (2) HOMESTEAD GEN AVIATION [USC00084095], Homestead, FL
- (3) PERRINE 4W [USC00087020], Miami, FL
- (4) MIAMI KENDALL TAMIAMI EXEC AP [USW00012888], Miami, FL
- (5) MIAMI WSO CITY [USW00012859], Miami, FL
- (6) MIAMI NWSFO [USC00085667], Miami, FL
- (7) MIAMI INTL AP [USW00012839], Miami, FL
- (8) HIALEAH [USC00083909], Miami, FL
- (9) MIAMI BEACH [USW00092811], Miami Beach, FL
- (10) MIAMI OPA LOCKA AP [USW00012882], Opa Locka, FL
- (11) NORTH MIAMI BEACH #2 [USC00086315], Miami, FL
- (12) WESTON [USC00089511], Fort Lauderdale, FL
- (13) FT LAUDERDALE [USC00083163], Fort Lauderdale, FL
- (14) LOXAHATCHEE NWR [USC00085184], Boynton Beach, FL

Influencing water features

This ecosite currently occurs as isolated fragmented scrublands on knolls, rises, and ridges surrounded by urban areas along the Miami Ridge/ Atlantic Coastal Strip, but historically were larger expanses surrounded by wetter environments. Soils have very deep seasonal high-water tables and low slope gradient and very rapid infiltration with negligible or very low surface runoff.

Wetland description

NA

Soil features

Soils associate with this ecological site occur in the isohyperthermic soil temperature regime of MLRA 156A. The isohyperthermic soil temperature regime has mean annual soil temperatures of 22 °C (72^{0}F) or more and a difference between mean summer and mean winter soil temperatures of less than 5 °C (41^{0}F) at 50 cm (20 inches) below the surface.

They are derived from quartz, slightly to strongly acidic, very low in nutrients and moderately to excessively well drained. These are predominately sand, and practically devoid of organic matter, silt and clay. A deep subsurface horizon may be present which may impede drainage at the bottom of the profile. This area has undergone extreme urbanization efforts and much of the historic representative soils in this area have been replaced with an "Urban Complex" phase or have been completely altered to the extent of being "Urban Land", and the representative soil destroyed. Present soils include udorthents and urban land as main soil components. This requires future projects focusing on human altered / human transported soils and will need to be remapped to show historic communities.

Table 4. Representative soil features

Parent material	(1) Marine deposits (2) Eolian deposits
Surface texture	(1) Sand (2) Fine sand
Drainage class	Moderately well drained to excessively drained
Permeability class	Rapid to very rapid
Depth to restrictive layer	0–80 in
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-80in)	1.2–2.4 in
Calcium carbonate equivalent (0-80in)	0%
Clay content (0-80in)	0–2%
Electrical conductivity (0-80in)	0–1 mmhos/cm
Sodium adsorption ratio (0-80in)	1
Soil reaction (1:1 water) (0-80in)	6–7.6
Subsurface fragment volume <=3" (0-80in)	5–12%
Subsurface fragment volume >3" (0-80in)	5%

Ecological dynamics

The information presented in this ecological site description (ESD) and state-and-transition model (STM) were developed using archaeological and historical information, published and unpublished scientific reports, professional experience, consultation with technical experts, and NRCS inventories and studies. The information presented represents a complex set of plant community dynamic and environmental variables. Not all scenarios or plants are represented and included. Key indicator plants, animals, and ecological processes are described to help guide land management decisions and actions.

The Subtropical Scrub habitat of Miami Ridge/ Atlantic Coastal Strip is a community composed of evergreen shrubs, with or without a canopy of pines, and is found on dry, infertile, sandy ridges. Similar species are characteristic of scrub throughout the state and no one species is endemic to scrub habitat alone. Signature species of scrub habitats include shrubby oaks; myrtle oak (*Quercus myrtifolia*), sand live oak (Q. geminate), and Chapman's oak (*Q. chapmanii*), as well as Florida rosemary (*Ceratiola ericoides*), sand pine (*Pinus clausa*), rusty staggerbush (*Lyonia ferruginea*) and saw palmetto (*Serenoa repens*). These species can either form a sparse or dense canopy interspersed with opening that consist of bare sand with a sparse cover of herbs and subshrubs. Species include threeawns (Aristida spp.), hairsedges (Bulbostylis spp.), sandyfield beaksedge (*Rhynchospora megalocarpa*), pinweeds (Lechea spp.), jointweeds (Polygonella spp.), and ground lichens (Cladonia leporine, C. prostrata, *Cladina subtenuis*, and *C. evansii*). When sand pines are present, they do not typically form a continuous canopy like pine flatwoods but occur as scattered individuals or clumps of individuals. Most scrub habitats occur on white sand and patches of bare sand with or without scattered clumps of ground lichens.

This ecosite typically occupies the ecotone between freshwater wetlands and pine flatwoods with shrubby flatwoods as an intermediate transition. Differences in vegetation composition and structure are the result of the frequency of fire within this community, which was historically determined by the local topography is now done through prescribed burning. These fires were typically started through lightning strikes during the growing season of March, April, or May and burned from surrounding grassland or forests into this community, where it would be naturally extinguished due to the absence of litter on the surface or flammability of certain species. Natural fires are not believed to burn entire habitats at once, but rather burn in patches. Fires that cause heterogeneity help influence the subsequent community recovery, allowing unburned patches to grow larger and provide cover, nest-sites, and acorns for wildlife species. In scrubs dominated by oak species, the fire interval is estimated to be intervals between 5 and 20 years to promote suitable habitat requirement for the Florida scrub-jay (Aphelocoma coerulescens), where habitat dominated by Florida rosemary is estimated to be intervals between 10 and 40 years based off the life history characteristics of Florida rosemary. The lower limit is set by the age at which rosemary begins to produce seed and the upper limit by the age at which the shrub begins to die back and seed production declines. Scrub habitats that are dominated by sand pine, the dominant scrub habitat type along the Miami Ridge is estimated to burn at intervals of more than 10 years based off the life history of pines, usually being killed by fire and re-establishing from seed. Periodic wind disturbances from hurricanes also affect the vegetative structure of this community, primarily by killing larger trees which opens the canopy allowing regrowth of new species.

When scrubs are prevented from burning for a long period of time, some of the oak species may grow up to tree size and create a closed canopy, transitioning the community into a xeric hammock. Sand pines have a generally low resistance to fire, and the even stands of pine make fire devastating, but is a requirement for reproduction. Sand pines need fire to open their seeds for germination, and over time (80 years) they become more susceptible to root rot and can die off allowing the oaks to grow. Without fire, scrub habitats lose plant and wildlife diversity, with dominant shrubs and trees increasing in cover percent. If a native scrub site has been replaced for agriculture or urban development but is abandoned, a pioneer scrub site may develop, and is dominated by invasive weed but also reference plants such as Florida rosemary, sand pine, and sand live oak.

Due to the dry upland nature of these sites, the scrub habitat along the Miami Ridge/ Atlantic Coastal strip has declined in distribution and quality as a part of anthropogenic activities. While few fragmented scrub habitats still occur along this ecoregion, fire regimes and hydrology have been altered to create less productive and natural habitats. Before development boomed in the mid-20th century, this community formed a near continuous band from Brevard County to Broward County along the coastal ridge (Steinberg, 1976).

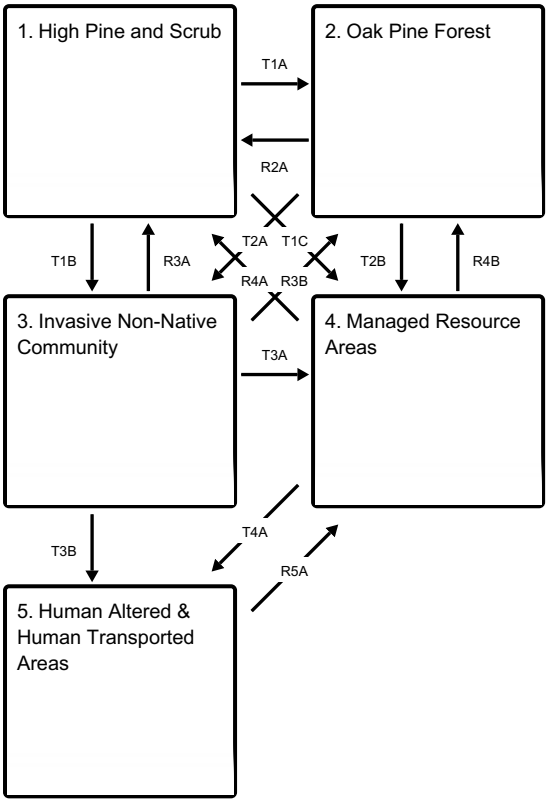
In areas that are highly urbanized and prescribed fires and smoke act as a nuisance upon the community, mechanical disturbance has been suggested as an alternative management practice as chopping or mowing. In areas that have had habitat loss, intensive vegetation establishment and maintenance methods such as irrigation

are needed for best results. This includes reestablishing native species which require less maintenance and are more easily established.

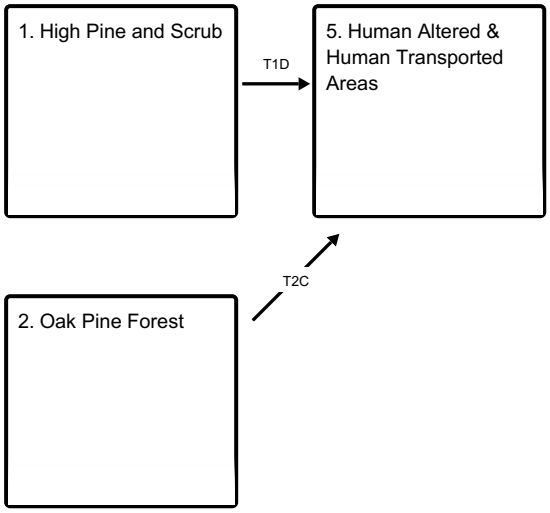
Representative sites along the Miami Ridge/ Atlantic Coastal Strip include County Line Scrub Preserve and Tivoli Sands Preserve.

State and transition model

Ecosystem states

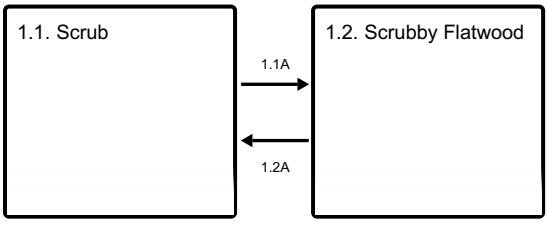


States 1, 5 and 2 (additional transitions)



T1A - Absence of Fire (100 years)
T1B - Invasion of Non-Native / Exotic Species
T1C - Modified for Desired Land Use
T1D - Human Alteration / Transportation of Materials
R2A - Woody Species Mortality
T2A - Invasion of Non-Native / Exotic Species
T2B - Modify for Desired Land Use
T2C - Human Alteration / Transportation of Materials
R3A - Mechanical / Biological / Chemical Removal
R3B - Mechanical / Biological / Chemical Removal
T3A - Modify for Desired Land Use
T3B - Human Alteration / Transportation of Materials
R4A - Landscape and Habitat Restoration
R4B - Landscape and Habitat Restoration
T4A - Human Alteration / Transportation of Materials
R5A - Landscape and Habitat Restoration

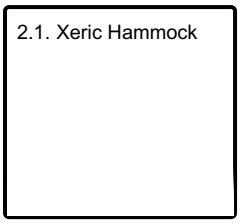
State 1 submodel, plant communities



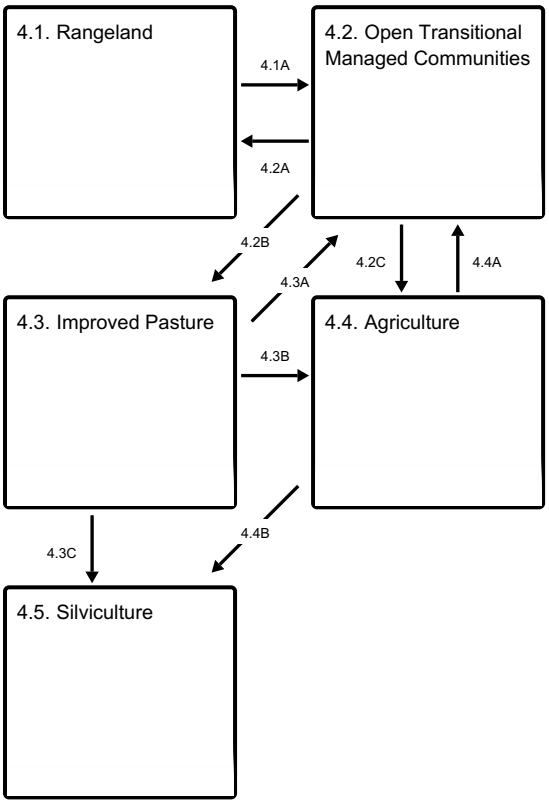
1.1A - Absence of Fire (>40 years)

1.2A - Proper Management Techniques

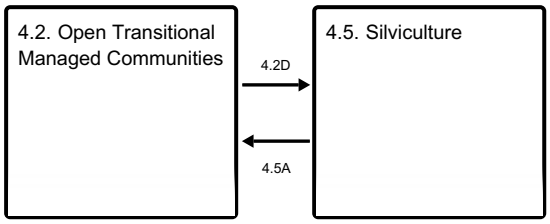
State 2 submodel, plant communities



State 4 submodel, plant communities



Communities 2 and 5 (additional pathways)



4.1A - Land Clearing Practices

4.2A - Habitat Reclamation

4.2B - Pasture Preparation

4.2C - Agricultural Preparation

4.2D - Silvicultural Preparation

4.3A - Land Clearing Practices

4.3B - Agricultural Preparation

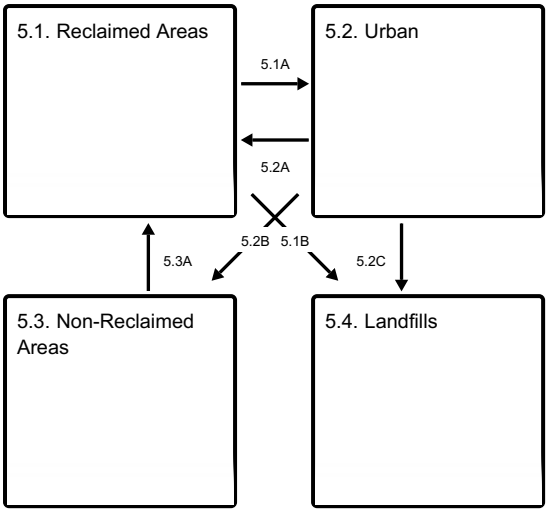
4.3C - Silvicultural Preparation

4.4A - Land Clearing Practices

4.4B - Silvicultural Preparation

4.5A - Land Clearing Practices

State 5 submodel, plant communities



5.1A - Urban Development

5.1B - Waste Accumulation

5.2A - Land Reclamation

5.2B - Industrial / Urban Development

5.2C - Waste Accumulation

5.3A - Land Reclamation

State 1
High Pine and Scrub

This state consists of mesic or xeric woodlands or shrublands found on dry infertile sandy ridges with a canopy, if present, open and consisting of pine or a mixture of pine and deciduous hardwoods.

Characteristics and indicators. No one species is charactistic of this state as similar species in scrub habitat are found throughout the state. Most scrub habitat occur with patches of bare sand with or without scattered clumps of ground lichens.

Dominant resource concerns

- Sheet and rill erosion
- Wind erosion
- Subsidence
- Plant productivity and health
- Plant structure and composition

Community 1.1
Scrub

This community is composed of evergreen shrubs, with or without a canopy of pines, and is found on dry, infertile, sandy ridges. These communities are the oldest natural communities in Florida and were formed as sea levels retreated during the Pliocene era. They were formed from sandy island ridges of stabilized coastal dunes when the Atlantic Ocean was retreating, creating these patches of higher isolated areas. In the Miami Ridge / Atlantic Coastal Strip ecoregion this community is at its southern extent and is only seen in a few fragmented natural areas.

Resilience management. This is a fire maintained community, but is not easily ignitable and has average fire return intervals of 10 to 40 years. They burn less frequently due to lower grassy groundcover as well as bare spots which cause the habitat to burn unevenly. Without fire in the system, this scrub habitat may begin to allow woody species to become established.

Dominant plant species

- sand live oak (*Quercus geminata*), tree

- Chapman oak (*Quercus chapmanii*), tree
- myrtle oak (*Quercus myrtifolia*), tree
- sand pine (*Pinus clausa*), tree
- rusty staggerbush (*Lyonia ferruginea*), shrub
- saw palmetto (*Serenoa repens*), shrub
- sand heath (*Ceratiola ericoides*), shrub
- threeawn (*Aristida*), grass
- hairsedge (*Bulbostylis*), grass
- sandyfield beaksedge (*Rhynchospora megalocarpa*), grass
- cup lichen (*Cladonia*), other herbaceous

Community 1.2
Scrubby Flatwood

This community is a transition of the natural scrub community when fire has been excluded for a long period of time (>40 years). It is characterized by a sparse, open overstory of pines, usually sand pine or slash pine, and a low cover of scrubby species such as sand live oak and Chapman's oak. Many scrub areas that remain in the Miami Ridge / Atlantic Coastal Strip ecoregion have been fragmented and are unable to use prescribed burning as a management technique due to the high urban density, leaving much of these areas to transition to scrubby flatwoods.

Dominant plant species

- Florida slash pine (*Pinus elliottii var. densa*), tree
- sand live oak (*Quercus geminata*), tree
- myrtle oak (*Quercus myrtifolia*), tree
- Chapman oak (*Quercus chapmanii*), tree
- saw palmetto (*Serenoa repens*), shrub
- inkberry (*Ilex glabra*), shrub
- rusty staggerbush (*Lyonia ferruginea*), shrub
- threeawn (*Aristida*), grass
- broomsedge bluestem (*Andropogon virginicus*), grass
- little bluestem (*Schizachyrium*), grass

Pathway 1.1A
Community 1.1 to 1.2

This transition is driven by the absence of fire from the scrub community. Natural fire return intervals are estimated every 10 to 40 years for the proper management of scrub jay habitat. As fire is excluded from the system woody species begin to grow and become established.

Pathway 1.2A
Community 1.2 to 1.1

This transition is driven by proper management techniques for the scrub habitat. This may include the reestablishment of fire into the community which removes the woody shrubs, returning to a scrub habitat. In high density areas where fire is not allow, this management technique can be replaced with the mechanical removal of species through mechanical roller chopping. While effective at removing undesirable species the effects of mechanical removal may disturb the soil and allow for the invasion of non-native or exotic species.

State 2
Oak Pine Forest

This state describes the transition from scrub to an established closed oak community with emergent pines. This state is formed when fire has been absent from the scrub community for a long period of time (>100 yr.).

Dominant resource concerns

- Sheet and rill erosion
- Wind erosion
- Subsidence
- Organic matter depletion
- Plant productivity and health
- Plant structure and composition

Community 2.1
Xeric Hammock

This is an evergreen forest on well-drained sandy soils. The low canopy is closed and dominated by oak species with an emergent canopy of pine. Emergent pine is typically characterizing of a transitioned scrub habitat that hasn't been burned in a long time (>100 yrs). As fire becomes more absent, oaks and other woody species eventually shade the understory and creates a layer of leaf litter, covering open patches of sandy and leading to more shaded, mesic ground conditions.

Dominant plant species

- sand live oak (*Quercus geminata*), tree
- Chapman oak (*Quercus chapmanii*), tree
- sand post oak (*Quercus margaretta*), tree
- sand pine (*Pinus clausa*), tree
- Florida slash pine (*Pinus elliottii var. densa*), tree
- saw palmetto (*Serenoa repens*), shrub
- rusty staggerbush (*Lyonia ferruginea*), shrub
- American beautyberry (*Callicarpa americana*), shrub
- pineland threeawn (*Aristida stricta*), grass
- sandyfield beaksedge (*Rhynchospora megalocarpa*), grass
- rosette grass (*Dichanthelium*), grass
- airplant (*Tillandsia*), other herbaceous
- greenbrier (*Smilax*), other herbaceous
- goldenrod (*Solidago*), other herbaceous

State 3
Invasive Non-Native Community

This state consists of Florida Department of Agriculture and Consumer Services (FDACS) Non-Native Category 1 Species list . More information on these species list can be found: https://www.fdacs.gov/content/download/63140/file/Florida%E2%80%99s_Pest_Plants.pdf or by contacting the UF / IFAS Center for Aquatic and Invasive Plants (http://plants.ifas.ufl.edu/), the UF / IFAS Assessment of Non-native Plants in Florida's Natural Areas (https://assessment.ifas.ufl.edu/), or the FWC Invasive Plant Management Section (http://myfwc.com/wildlifehabitats/invasive-plants/). This community will not represent every possibility of invasive species but rather the most common in these areas.

Characteristics and indicators. Non-native species include species that exist outside of Florida's natural range and introduced to the state by people, weather, or any other means.

Resilience management. This state can be found as a part of any other state and can completely destroy the native habitat if not properly managed. Restoration to natural communities after exotic invasion include practices such as mechanical, biological, and chemical removals.

Dominant resource concerns

- Sheet and rill erosion
- Wind erosion
- Subsidence
- Organic matter depletion

State 4
Managed Resource Areas

The following communities comprise the major land uses in the United States and the land uses receiving the majority of the conservation treatment that address soil, water, air, plant, and animal resources within the USDA.

Characteristics and indicators. These land uses consist of areas that are not completely naturalized (i.e. native habitat) but are not completely altered by anthropogenic means.

Dominant resource concerns

- Sheet and rill erosion
- Subsidence
- Organic matter depletion
- Ponding and flooding
- Surface water depletion
- Nutrients transported to surface water

Community 4.1
Rangeland

Rangelands are described as lands on which the indigenous vegetation is predominately grasses, grass-like plants, forbs, and possibly shrubs or dispersed trees. Existing plant communities can include both native and introduced plants. Primary export from Florida ranges are cattle and have been present in the state since their first introduction by Spanish explorers in 1521. This is the reference community for this state because it requires very little alterations to the landscape for grazing species. Rangelands provide a diversity of ecosystems and also provide a diverse and significant production of economic benefits and ecosystem goods and services. Livestock production along with sustainable wildlife populations provide for the major direct economic benefits, but also tourism, recreational uses, minerals/energy production, renewable energy, and other natural resource uses can be very significant. Vital ecosystem contributions include clean water, clean air, fish/wildlife habitat, as well as intangible considerations such as historical, cultural, aesthetic and spiritual values.

Resilience management. Grazing, by both domestic livestock and wildlife, is the most common ecological management process, with fire and weather extremes also being significant ecological factors. For information regarding specific cattle grazing techniques please contact your local NRCS office.

Community 4.2
Open Transitional Managed Communities

This is an area that is managed to maintain open land before shifting to another community. These communities are often used as transitional periods from one practice to another and could lead to an abandoned / fallow field.

Community 4.3
Improved Pasture

Pasture is a land use type having vegetation cover comprised primarily of introduced or enhanced native forage species that is used for livestock grazing. Pasture vegetation can consist of grasses, legumes, other forbs, shrubs or a mixture. The majority of these forages are introduced, having originally come from areas in other states or continents. Most are now naturalized and are vital components of pasture based grazing systems. Pasture lands provide many benefits other than forage for livestock. Wildlife use pasture as shelter and for food sources. Well managed pasture captures rainwater that is slowly infiltrated into the soil which helps recharge groundwater. Many small pasture livestock operations are near urban areas providing vistas for everyone to enjoy. Pasture is the basis of any livestock operation that is truly sustainable. It is especially important as livestock grazers continues to experience extraordinarily high fuel and other input costs.

Resilience management. Pastures receive periodic renovation and cultural treatments such as tillage, fertilization, mowing, weed control, and may be irrigated. For more information regarding specific pasture management please contact your local NRCS office.

Community 4.4
Agriculture

The agriculture industry includes cultivated crops, aquaculture, and apiculture. Cultivated cropland includes areas used for the production of adapted crops for harvest. These areas comprises land in row crops or close-grown crops that are in a rotation with row or close-grown crops. Primary export from Florida consists of fruits, greenhouse and nursery products, sugar cane, and the signature export of citrus. Aquaculture includes the cultivation and maintenance of aquatic plants, aquatic reptiles, crustaceans, food/ ornamental fish, shellfish, and other miscellaneous species for harvesting. Apiculture includes the maintenance of honeybees and hives to provide beeswax, honey/ other edible bee products, crop pollination services, and sales of bees to other beekeepers. These areas have been modified resulting in land clearing practices and hydrologic management to fit the growers needs.

Resilience management. Major natural resource concerns facing agricultural lands include: (1) erosion by wind and water, (2) maintaining and enhancing soil quality, (3) water quality from nutrient and pesticides runoff and leaching, and (4) managing the quantity of water available for irrigation. For more specific information regarding cropland please contact your local NRCS office.

Community 4.5
Silviculture

Silviculture is land used in controlling the establishment, growth, composition, health, and quality of forests and woodlands to meet the diverse needs and values of landowners and society such as wildlife habitat, timber, water resources, restoration, and recreation on a sustainable basis. These are forestry practices that include thinning, harvesting, planting, pruning, prescribed burning and site preparation, for managed goals such as wildlife habitat creation or harvesting. Many managed silvicultural lands in Florida include tree plantations for growth of tropical ornamental species such as palms; and lumber, pulp, and paper species such as slash pine, longleaf pine, cypress, and eucalyptus. This community also include management practices of agroforestry, the intentional mixing of trees and shrubs into crop and/or animal production systems to create environmental, economic and social benefits. This is included in this community and not any other state because the primary management is for tree species. This may include practices such as riparian forest buffers, windbreaks, forest farming, silvopasture, and alley cropping.

Resilience management. Management of silvicultural lands require specific prescriptions based on the management goals for the stand, and may include thinning, harvesting, planting, pruning, prescribed burning and site preparation. For more information regarding specific management for silviculture practices please contact your local NRCS office.

Pathway 4.1A
Community 4.1 to 4.2

This pathway is driven by land clearing practices that consists of removing the existing vegetation from the habitat and altering the habitat to prepare for modified land use.

Pathway 4.2A
Community 4.2 to 4.1

This pathway is driven by the restoration of the native habitat for the use of rangeland. This includes restoration of both the hydrology and landscape in advance of replanting native species. This is a time-consuming process and often results in second-hand community structure. Once restored to a natural capacity the introduction of grazing species to the system creates a managed rangeland.

Pathway 4.2B
Community 4.2 to 4.3

This pathway is driven by preparing the land for pasteurization. This includes the planting of vegetation consisting of grasses, legumes, other forbs, shrubs or a mixture that will provide preferred forage for managed grazing species.

Pathway 4.2C
Community 4.2 to 4.4

This pathway is driven by the preparation of land for agricultural uses. This change is dependent on the type of agricultural community is being created, but often depends on the growing, maintenance, and cultivation of an agricultural product for consumers. This community may require modification to the land to fit the hydrologic requirement of the growing crop.

Pathway 4.2D
Community 4.2 to 4.5

This pathway is driven by the preparation of the land for silvicultural purposes. This change is dependent on the type of silvicultural product being cultivated, as many different practices require different growth requirement.

Pathway 4.3A
Community 4.3 to 4.2

This pathway is driven by land clearing practices that consists of removing the existing vegetation from the habitat and altering the habitat to prepare for modified land use.

Pathway 4.3B
Community 4.3 to 4.4

This pathway is driven by the preparation of land for agricultural uses. This change is dependent on the type of agricultural community is being created, but often depends on the growing, maintenance, and cultivation of an agricultural product for consumers. This community may require modification to the land to fit the hydrologic requirement of the growing crop.

Pathway 4.3C
Community 4.3 to 4.5

This pathway is driven by the preparation of the land for silvicultural purposes. This change is dependent on the type of silvicultural product being cultivated, as many different practices require different growth requirements.

Pathway 4.4A
Community 4.4 to 4.2

This pathway is driven by land clearing practices that consists of removing the existing vegetation from the habitat and altering the habitat to prepare for modified land use.

Pathway 4.4B
Community 4.4 to 4.5

This pathway is driven by the preparation of the land for silvicultural purposes. This change is dependent on the type of silvicultural product being cultivated, as many different practices require different growth requirements.

Pathway 4.5A
Community 4.5 to 4.2

This pathway is driven by land clearing practices that consists of removing the existing vegetation from the habitat and altering the habitat to prepare for modified land use.

State 5
Human Altered & Human Transported Areas

These areas include soils that were intentionally and substantially modified by humans for an intended purpose, commonly for terraced agriculture, building support, mining, transportation, and commerce. The alteration is of

sufficient magnitude to result in the introduction of a new parent material (human-transported material) or a profound change in the previously existing parent material (human-altered material). They do not include soils modified through standard agricultural practices or formed soils with unintended wind and water erosion. When a soil is on or above an anthropogenic landform or microfeature, it can be definitely be associated with human activity and is assigned to a unique taxa, usually found as an "Urban land complex" within that communities natural soil properties (e.g., Urban land, 0 to 2 percent slopes).

Characteristics and indicators. Evidence of these areas include soils with manufactured items (e.g. artifacts) present in the profile, human altered-materials (e.g., deeply excavated or deeply plowed soil) or human-transported material (e.g., fill), and position on or above anthropogenic landforms (e.g., flood-control levees) and microfeatures (e.g., drainage ditches). Detailed criteria regarding the identification of anthropogenic (artificial) landforms, human-altered materials, and human-transported material are in the "Keys to Soil Taxonomy" (Soil Survey Staff, 2014).

Dominant resource concerns

- Sheet and rill erosion
- Compaction
- Organic matter depletion
- Ponding and flooding
- Seasonal high water table

Community 5.1
Reclaimed Areas

Reclaimed areas are areas that have been modified through anthropogenic means that are restored to a natural or second-hand natural community. Areas that can be reclaimed are any intensely urbanized areas, and may be required to be reclaimed after urban use (e.g., active mines must be reclaimed). Examples of reclaimed lands may be shut down phosphate mining operations, superfund sites, or brownfields. These practices include the identification, removal, and stockpiling soil materials before altering the land, and revegetation and replacement of soil materials after altering the land. This also applies to nearby urban areas that have been adversely affected by the anthropogenic activities.

Community 5.2
Urban

This urban community consists of development for human use. Urban areas include a variety of land uses, e.g., inner city or urban core, industrial and residential areas, cemeteries, parks, and other open spaces; the overall function which may benefit the quality of human life. These often form an urban soil mosaic, where the natural landscape has been fragmented into parcels with distinctive disturbance and management regimes and, as a result, distinctive characteristic soil properties. Within this community there are three different levels of urbanization, based off population dynamics, residential density, and intensity of development. These are labeled as low-intensity, medium-intensity, and high-intensity urban areas, which can eventually be split apart into its own separate state. Low-intensity urban areas may consist of single dwelling homes with little impact on the surrounding community which still somewhat represents the natural community (e.g., represents natural landscape, hydrology, and vegetation) , other examples of this are urban parks, cemeteries, or campgrounds with little urban development. Medium-intensity urban areas consist of larger urban dwellings with some natural features, but have been modified to meet urban needs (e.g., towns). High-intensity urban areas are areas of heavily modified areas with complete alterations of the natural landscape, hydrology, and vegetation to support a very large population, which once constructed is permanently altered (e.g., metropolis areas).

Community 5.3
Non-Reclaimed Areas

Non-reclaimed areas are areas that have been modified through anthropogenic means that are unable to be restored to a natural or second-hand natural community. Areas that cannot be reclaimed are areas under active mining status or mined areas before the Phosphate Land Reclamation Act in 1975, which leaves shut down operations alone. These areas also include fallow mines that have been flooded and are now permanent bodies of water.

Community 5.4
Landfills

This is an anthropogenic site for the disposal of waste material. It includes manufactured layers (artificial, root limiting layer below the soil surface) that are representative of human altered and human transported sites. These layers are often alternative between natural fill material and geotextile liners, asphalt, concrete, rubber or plastic that are built up and can rise above the surrounding landscape by 30 meters or more often impeding water, gas, or roots from moving through the profile.

Pathway 5.1A
Community 5.1 to 5.2

This shift in communities is driven by clearing and developing the land for the desired community.

Pathway 5.1B
Community 5.1 to 5.4

This transition is driven by the deposition of manufactured layers along with anthropogenic waste which is consistently built upon.

Pathway 5.2A
Community 5.2 to 5.1

This transition is driven by the revegetation, reestablished hydrology, and replacement of displaced soil materials after altering the land.

Pathway 5.2B
Community 5.2 to 5.3

This transition is driven from heavy industrial or urban development which causes the land to become non-reclaimable. This transition is rare due to the many environmental laws and regulations that must be followed when developing.

Pathway 5.2C
Community 5.2 to 5.4

This transition is driven by the deposition of manufactured layers along with anthropogenic waste which is consistently built upon.

Pathway 5.3A
Community 5.3 to 5.1

This transition is driven by the revegetation, reestablished hydrology, and replacement of displaced soil materials after altering the land.

Transition T1A
State 1 to 2

This transition is driven by an absence of fire within a scrub community for a long time. This allows the establishment of woody species and over time, they grow upwards to form a canopy that shades the understory and creates a layer of leaf litter, covering open patches of sand and more mesic ground conditions.

Constraints to recovery. The natural fire return interval for scrub communities is estimated from 10 to 40 years, the absence of fire to let this community be established would be around 100 years without the presence of fire in the community.

Transition T1B
State 1 to 3

The invasion of non-native or exotic species can be driven by a multitude of different environmental factors such as changes in natural hydroperiods or in fire regimes. Typically once a change in one of the two factors mentioned above occurs, non-native or exotic invasive species become established and begin to compete with native species for habitat and nutrients.

Constraints to recovery. Recovery from non-native or exotic invasive species may be difficult due to many adaptations which allow them to outcompete and survive in altered conditions. Localized knowledge for each species must be known for best removal of it without harming the native environment, and often different treatments must be applied over one given area.

Context dependence. Growth of non-native and exotic invasive species can be rapid following a change in a natural stressor such as fire frequency or natural hydroperiods which might have once kept the invasive species at bay.

Transition T1C
State 1 to 4

Modify the land for the desired land use. This may include the establishment of grazing species or the modification of land for the cultivation of crops of other desired products.

Transition T1D
State 1 to 5

This transition is driven by the alteration and/ or transportation of materials via anthropogenic means.

Restoration pathway R2A
State 2 to 1

This restoration is driven by overstory mortality which will open the canopy and allow for the reestablishment of scrub species. Overstory mortality may be natural or anthropogenic, and can include extreme storm events, clear cutting, or catastrophic fires.

Transition T2A
State 2 to 3

The invasion of non-native or exotic species can be driven by a multitude of different environmental factors such as changes in natural hydroperiods or in fire regimes. Typically once a change in one of the two factors mentioned above occurs, non-native or exotic invasive species become established and begin to compete with native species for habitat and nutrients.

Constraints to recovery. Recovery from non-native or exotic invasive species may be difficult due to many adaptations which allow them to outcompete and survive in altered conditions. Localized knowledge for each species must be known for best removal of it without harming the native environment, and often different treatments must be applied over one given area.

Context dependence. Growth of non-native and exotic invasive species can be rapid following a change in a natural stressor such as fire frequency or natural hydroperiods which might have once kept the invasive species at bay.

Transition T2B
State 2 to 4

Modify the land for the desired land use. This may include the establishment of grazing species or the modification of land for the cultivation of crops of other desired products.

Transition T2C
State 2 to 5

This transition is driven by the alteration and/ or transportation of materials via anthropogenic means.

Restoration pathway R3A
State 3 to 1

Mechanical, biological, and chemical removal strategies include removing the non-native and exotic invasive species through various mechanisms. Localized knowledge for individual non-native or exotic invasive species is needed for specific management. Sometimes introduction of fire regimes may prevent or stop the growth of non-native or exotic invasive species, but many species are fire tolerant. Mechanical removal might include roller chopping, harvesting, or cutting and removal of invasive species. Chemical removal might include aerial dispersal from planes, or basal bark injection treatments.

Context dependence. Mechanical, biological, and chemical removal of non-native and exotic invasive species is a time dependent process, with both removal types taking long times to be considered effective.

Restoration pathway R3B
State 3 to 2

Mechanical, biological, and chemical removal strategies include removing the non-native and exotic invasive species through various mechanisms. Localized knowledge for individual non-native or exotic invasive species is needed for specific management. Sometimes introduction of fire regimes may prevent or stop the growth of non-native or exotic invasive species, but many species are fire tolerant. Mechanical removal might include roller chopping, harvesting, or cutting and removal of invasive species. Chemical removal might include aerial dispersal from planes, or basal bark injection treatments.

Context dependence. Mechanical, biological, and chemical removal of non-native and exotic invasive species is a time dependent process, with both removal types taking long times to be considered effective.

Transition T3A
State 3 to 4

Modify the land for the desired land use. This may include the establishment of grazing species or the modification of land for the cultivation of crops of other desired products.

Transition T3B
State 3 to 5

This transition is driven by the alteration and/ or transportation of materials via anthropogenic means.

Restoration pathway R4A
State 4 to 1

These practices include the restoration of both the natural hydroperiods and landscape in advance of revegetating the area (if needed).

Restoration pathway R4B
State 4 to 2

These practices include the restoration of both the natural hydroperiods and landscape in advance of revegetating the area (if needed).

Transition T4A
State 4 to 5

This transition is driven by the alteration and/ or transportation of materials via anthropogenic means.

Restoration pathway R5A
State 5 to 4

These practices include the restoration of both the natural hydroperiods and landscape in advance of revegetating the area (if needed).

Additional community tables

Animal community

Animals found in this community are adapted to high temperatures and droughty conditions, which provide low food production conditions. Dense vegetation provides good cover for animals. Typically sought food sources in this ecosite come from saw palmetto berries, oak acorns, and gopher apples. This habitat is habitat to species both on the federal and state threatened lists. Common species may include:

Mammals: Least shrew (Cyyptotis parva), eastern yellow bat (Lasiurus intermedius), evening bat (Nycticeius humeralis), nine-banded armadillo (Dasypus novemcinctus), cottontail rabbit (Sylvilagus palustris), Florida mouse (Podomys floridana), oldfield mouse (Peromyscus polionotus), cotton mouse (P. gossypinus), spotted skunk (Spilogale putorius)

Birds: Florida scrub-jay (Aphelocoma coerulescens), southeastern American kestrel (Falco sparvenius paulus), mourning dove (Zenaida macroura), common ground dove (Columbina passerine), eastern screech owl (Otus asio), common nighthawk (Chordeilas minor), tufted titmouse (Parus bicolor), blue-gray gnatcatcher (Polioptila caerulea), ruby-crowned kinglet (Regulus calendula), northern mockingbird (Mimus polyglottos), gray catbird (Dumetalla carolinensis), brown thrasher (Toxostoma rufium), northern parula (Parula americana), pine warbler (Dendroica pinus), yellow rumped warbler (D. coronate), palm warbler (D. palmarus), common yellowthroat (Geothlypis trichas), northern cardinal (Cardinalis cardinalis), rufous-sided towhee (Piplio erythrophthalmus), and chipping sparrow (Spizella passerine).

Reptiles: Gopher tortoise (Gopherus polyphemus), Florida worm lizard (Rhineura floridana), scrub lizard (Sceloporus woodi), peninsula mole skink (Eumeces egregious onocrepis), blue-tailed mole skink (E. e. lividus), Sand skink (Neoseps reynoldsi), rough green snake (Opheodrys aestivus), crowned snake (Tantilla relicta), and pygmy rattlesnake (Sistrurus milarius)

Amphibians: greenhouse frog (Eleutherodatylus planirostris), eastern spadefoot toad (Scaphiopus holbrooki), southern toad (Bufo terrestris), oak toad (B. quercicus), pinewoods treefrog (Hyla femoralis), narrow-mouthed toad (Gastrophyne carolinensis), gopher frog (Rana capito).

The Florida scrub-jay is endemic to this habitat with most management plans revolving around this federally threatened species. Presence of the scrub-jay is used as an indicator species for healthy, natural scrub, and its preferred habitat as the management goals. The species depends on fires to leave behind patches of unburned fuels for forage and nesting sites, and scrub habitats left unburned for too long the scrub-jays will abandon the habitat.

Gopher tortoises are another species that are critically important within scrub and other upland habitats such as mesic flatwoods or mesic hammocks. They create large underground burrows throughout the landscape that serve as refuges for multiple species during fires. Studies done through Florida Fish and Wildlife have shown over 350 species use their burrows which can vary up to 52 feet long.

Hydrological functions

This ecosite is primarily influenced by freshwater inputs from rain, with the majority of rain being deposited during the months of June through November. Primarily consisting of deep, less developed sandy soils, these sites are moderately well drained with little to no runoff. The water table is usually at depths of 4 to 6 feet from 1 month to 4 months during the wet season. It is below these depths most of the rest of each year. After heavy or prolonged rain

it rises above these depths briefly.

Recreational uses

This habitat is primarily used for outdoor recreation such as hiking and bird watching. Many of the remaining few scrub habitats along the Atlantic Coastal Strip are owned by towns or counties which have been converted into parks with adequate management.

Wood products

Because of the protected nature of this site within this ecoregion it is not suitable for commercial wood production, however, sites in northern Florida and along the Lake Wales Ridge have been altered from their pine community to pulp and lumber production of planted slash pine.

Other products

Natural scrub sites has a limited potential for producing native forage for rangeland grazing. Livestock typically would not use this site unless other ecological sites are unavailable.

Other information

This site has few limitations for urban development and was the primary location during initial and post European colonization to create settlements in the Miami Ridge / Atlantic Coastal Strip eco region.

Inventory data references

Information presented was derived from NRCS clipping data, current and historical literature, field observations, and personals contacts with local, state and federal partners. This is a provisional level ESD and is subject to change as more information becomes available, for any questions please contact your local NRCS office.

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Approval

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Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	05/11/2025
Approved by	Charles Stemmans
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

   _____

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

14. **Average percent litter cover (%) and depth (in):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

---

17. **Perennial plant reproductive capability:**
