USDA Natural Resources Conservation Service

Ecological site R156BY150FL
Subaqueous Freshwater Lacustrine Habitats

Last updated: 2/07/2025
Accessed: 05/11/2025

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): 156B–Southern Florida Lowlands

This area is in the Floridian section of the Coastal Plain province of the Atlantic Plain. It is on nearly level lowlands. A few hummocks rise 3 to 6 feet (1 to 2 meters) above the general level of the landscape. Elevation ranges from near sea level to 26 feet (8 meters).This area is a dominantly wetland ecosystem that has been heavily influenced by human activity. It supports hummock and slough wetland vegetation. Remaining native savanna and scrub areas consist of native grasses, forbs, sedges, and a few scattered pines. Slash pine and cabbage palm are the dominant overstory species. Saw palmetto, cordgrasses, and bluestems make up the understory. Major wildlife species include white-tailed deer, feral hog, gray fox, raccoon, opossum, armadillo, rabbit, tree squirrel, wild turkey, bobwhite quail, mourning dove, Florida mallard, and woodpecker.

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: 75 Southern Coastal Plain; 75d Eastern Florida Flatwoods (Griffith, G. E., Omernik, J. M., & Pierson, S. M., 2013)

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

Ecological site concept

The Subaqueous Freshwater Lacustrine Habitat are typically submerged sites found as permanently flooded bodies of water which support submerged aquatic vegetation. This includes landscapes of freshwater ponds, lakes and reservoirs. These sites are variable in depth and size, with water levels varying depending on the time of year. These sites are highly recreated and support a high diversity of wildlife. Notable sites in this MLRA include Blue Cypress Lake, Fellsmere Grade Recreation Area, Sawgrass Lake, Lake Washington, Lake Winder, and Lake Poinsett.

Associated sites

R156BY010FL	**Histisol Floodplain Marshes and Swamps** This site will occur immediately adjacent in the floodplain of the lacustrine system and support permanently high water tables and frequent slow moving surface water for histisol soil development and perpetuance.
R156BY100FL	**Subaqueous Freshwater Riverine Habitats** This site is feeds and is fed by the lacustrine habitats.

R156BY011FL	**Mineral Floodplain Marshes and Swamps** This site will occur within the floodplain of the lacustrine system and support permanent high water tables and frequent slow moving surface water for hydric mineral soil development.

Similar sites

R156BY100FL	**Subaqueous Freshwater Riverine Habitats** The Subaqueous Freshwater Riverine Habitats may be confused with the Subaqueous Freshwater Lacustrine Habitats during periods of extremely slow moving water in the very flat landscape of MLRA 156B.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Vallisneria americana* (2) *Nuphar*

Physiographic features

These sites are found within lacustrine systems. Lacustrine systems include wetlands and deep-water habitats with all of the following characteristics: 1) situated in a topographic depression or a dammed river channel, 2) lacking trees, shrubs, persistent emergents, emergent mosses or lichens with 30% or greater areal coverage; and 3) total area of at least 8 hectares. These sites are bounded by uplands or by wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens. These are usually stagnant water which may overflow and cause flooding of downland habitats during periods of extreme rains.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain (2) Marine terrace > Lake
Runoff class	Negligible to medium
Flooding duration	Brief (2 to 7 days) to long (7 to 30 days)
Flooding frequency	Rare to occasional
Ponding duration	Very long (more than 30 days)
Ponding frequency	Frequent
Elevation	0–80 ft
Slope	0–1%
Ponding depth	12–144 in
Water table depth	0 in
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation in this area is 40 to 62 inches (1,015 to 1,575 millimeters). About 60 percent of the precipitation occurs from June through September. The center of the area is the driest part. Most of the rainfall occurs as 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 is 73 to 78 degrees F (23 to 25 degrees C). The freeze-free period averages 365 days.

Table 3. Representative climatic features

Frost-free period (characteristic range)	365 days

Freeze-free period (characteristic range)	365 days
Precipitation total (characteristic range)	53-58 in
Frost-free period (actual range)	365 days
Freeze-free period (actual range)	365 days
Precipitation total (actual range)	52-61 in
Frost-free period (average)	365 days
Freeze-free period (average)	365 days
Precipitation total (average)	56 in

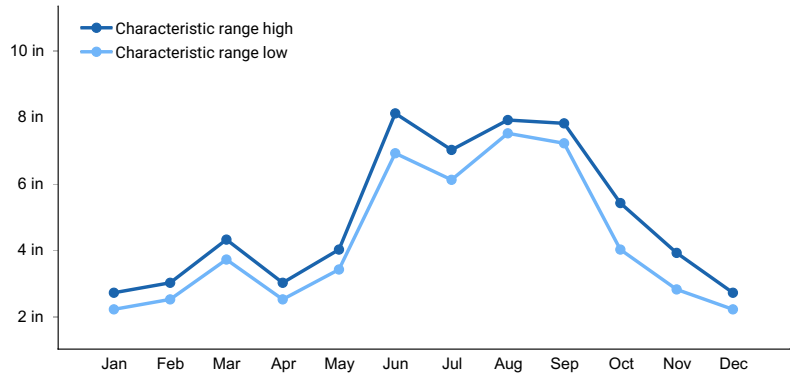


Figure 1. Monthly precipitation range

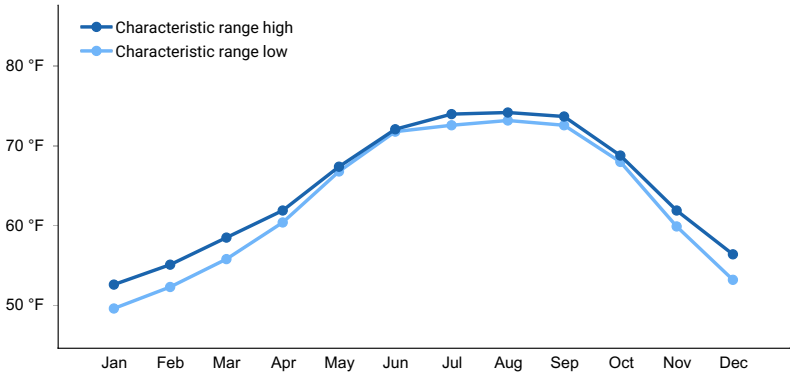


Figure 2. Monthly minimum temperature range

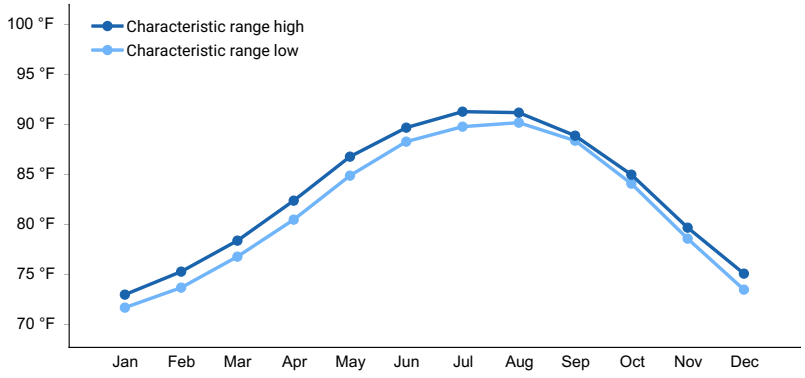


Figure 3. Monthly maximum temperature range

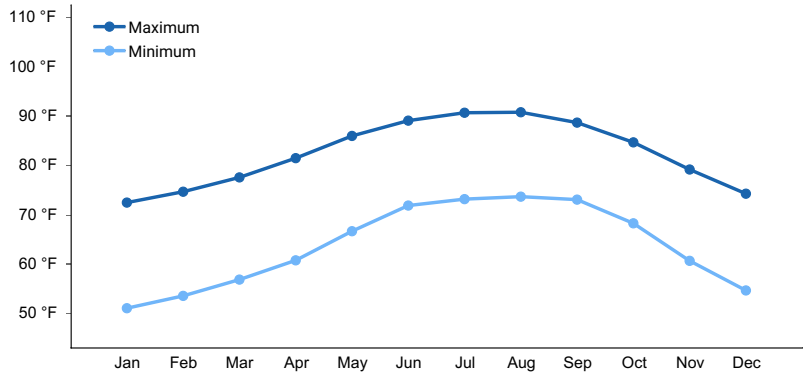


Figure 4. Monthly average minimum and maximum temperature

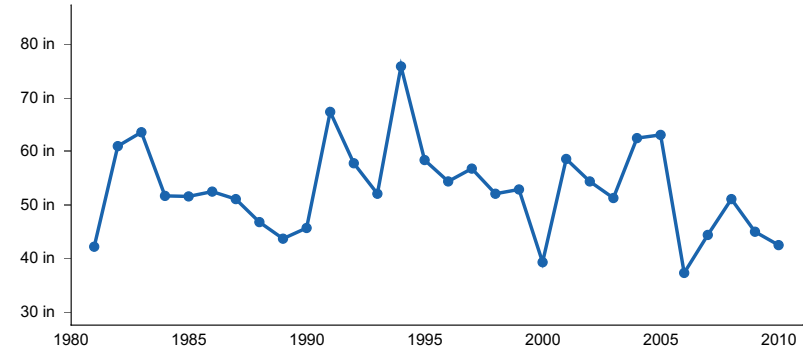


Figure 5. Annual precipitation pattern

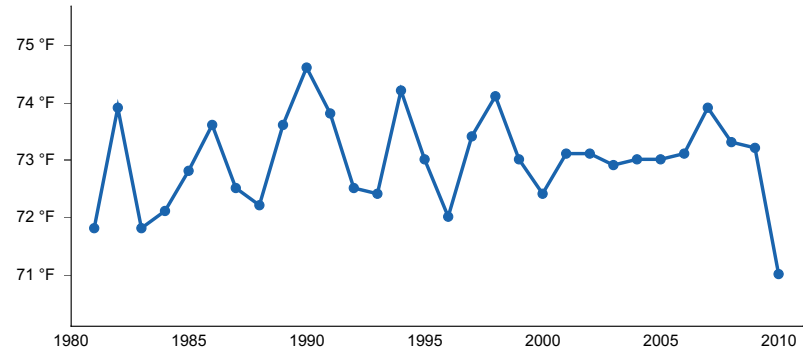


Figure 6. Annual average temperature pattern

Climate stations used

- (1) PALM BEACH GARDENS [USC00086764], Palm Beach Gardens, FL
- (2) CANAL POINT USDA [USC00081276], Belle Glade, FL
- (3) PORT SALERNO 5W [USC00087304], Stuart, FL
- (4) FT PIERCE ST LUCIE CO INTL AP [USW00012895], Fort Pierce, FL
- (5) VERO BEACH 4SE [USC00089219], Vero Beach, FL
- (6) MELBOURNE INTL AP [USW00012838], Melbourne, FL
- (7) TITUSVILLE [USC00088942], Titusville, FL
- (8) FOREVER FLORIDA [USC00083026], Saint Cloud, FL

Influencing water features

In the lacustrine systems water levels may vary depending on the season (precipitation) and year (drought conditions) but will continuously hold water. All lacustrine systems in this MLRA are primarily influenced by freshwater inputs from upland riverine systems and rainfall. These communities provide many ecosystem services such as providing flood control, habitat for wildlife, recreation, and hold freshwater for public water supply and irrigation supply. Vegetation grows only in the littoral zone in lakes, defined as the maximum extent of non-persistent emergents if they grow at depths greater than 2.5 m (8.2ft). Many of the lacustrine habitats in Florida are

very shallow and do not have a limnetic zone, which is the deep-water habitats (areas greater than 8.5 ft in depth with no vegetative growth). Lacustrine habitats are sensitive communities to anthropogenic alteration which may lower water levels through ditching and diking or may increase sedimentation from upland activities (land clearing/ timber harvest operations).

Wetland description

Classification: Cowardin
System: Lacustrine
Subsystem: Littoral
Class: Aquatic Bed

Soil features

Many of the soils in lacustrine systems typically have sandy, peaty, or alluvial clay bottoms frequently underlain by limestone. Many lake bottoms will have stratified layers of any of the textures mentioned above due to alluvial deposition from the riverine system that feeds into it during periods of high-water flow. Unconsolidated substrates can originate from organic sources such as decaying plant tissues (e.g. mud) or from water erosion of stream banks (e.g. sand). Consolidated materials may be eroded from limestone outcrops and moved downstream during periods of high flow. Geology of this MLRA is influenced by the Anastasia Formation, and Recent and Pleistocene Marine and Estuarine Deposits, which highly influence the substrate in the area. There are currently no correlated soil map units for these systems yet and will be addressed during future Initial Mapping Projects with the Coastal Zone Soil Survey project group.

Table 4. Representative soil features

Parent material	(1) Lacustrine deposits (2) Marine deposits
Surface texture	(1) Hydrous, grassy, parachannery sand
Drainage class	Subaqueous

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.

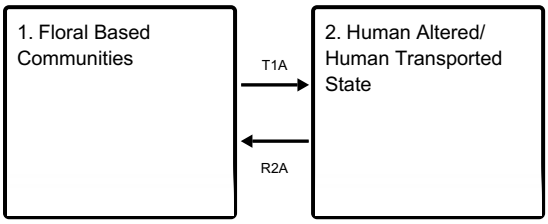
This ecosite consists of floral based submerged communities as well as floating emergent vegetation. Native submerged vegetation includes rooted and floating seagrasses and algal species, with floating emergents such as lilies and floating hearts present towards the banks of the riverine system. Cover of vegetation species may range from very few along the fringe of the system to almost complete cover of the water surface. The more cover of the water surfaces the less light is available to support benthic vegetation. Benthic and emergent vegetation helps stabilize unconsolidated substrates (sand, silty muck), entrap silt, recycle nutrients, provide shelter, habitat, and substrate for animals and other plant forms, provide important nursery grounds, and are important direct food sources. Dense communities of vegetative habitats help promotes settling of suspended particulates. The settled particles become stabilized by the dense roots and rhizomes that help soil accumulation. These communities are vulnerable to disturbances from both human and natural disturbances that are sensitive and can easily be destroyed or modified (e.g. dredging or nutrient pollution) and will often be accompanied by a shift in vegetation when disturbed.

These are fragile communities, with disturbances causing community shifts or destruction of the community entirely. Human activities from dredging for boat channels or fill can cause infaunal organisms to be destroyed or to migrate out of the area. Deposition of spoil material may create spoil islands which can replace habitat for native species. Much of the vegetated communities are found along sandy bottoms, with rocky bottoms giving the system barren

appearance. Water color may naturally range from clear water to tea-colored water, caused naturally by tannins, particulates and dissolved organic matter and iron derived from drainage through swamps and marshes. In areas where agriculture runoff is present, excess nitrogen and phosphorus causes eutrophication, creating phytoplankton blooms that block out light stressing or killing plants on the ground, as well as low dissolved oxygen levels that can cause fish kills. Accumulation of toxic levels of heavy metals, oil, and pesticides can also kill the infaunal organisms, eliminating food sources for fishes, birds, and other organisms. Natural disturbances consist of flooding events which can move and deposit sediments along other communities as well as washing out sediments from flood zones, adding new material into the community. Generally, these areas are easily recolonized either by the same organism or a series of organisms which eventually results in the community returning to its original state once the disturbance has ceased.

State and transition model

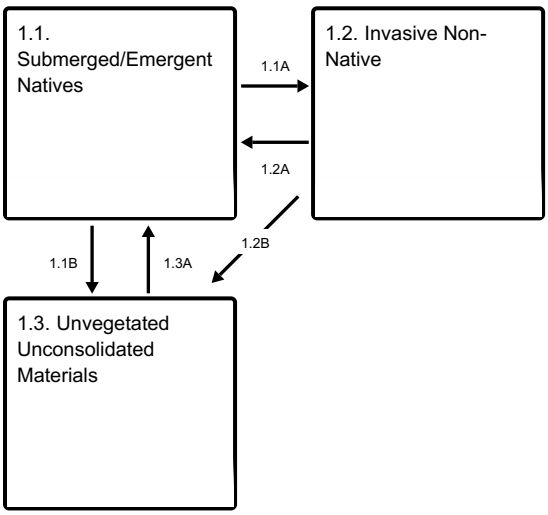
Ecosystem states



T1A - Dredging

R2A - Filling/ Vegetative Replanting

State 1 submodel, plant communities



1.1A - Decrease in Water Quality

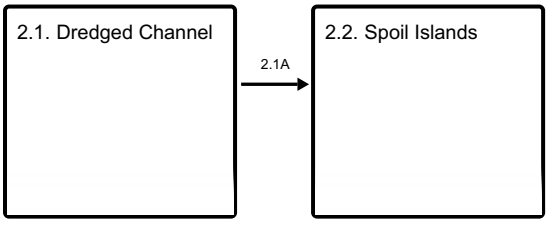
1.1B - Decrease in Water Quality

1.2A - Increase in Water Quality / Vegetative Regrowth

1.2B - Decrease in Water Quality

1.3A - Increase in Water Quality / Vegetative Regrowth

State 2 submodel, plant communities



2.1A - Deposition of Spoil Material

State 1
Floral Based Communities

These communities describe large populations of vascular and non-vascular submerged and emergent aquatic plants, found within the littoral zone. These communities provide habitat for smaller organisms as well as important food sources for marine organisms such as benthic organisms and fish. They are commonly found on unconsolidated substrates but can be found on consolidated substrates and act as stabilizers and reduces the wave-energy on the bottom and promotes settling of suspended particles. When found on unconsolidated substrates these communities are typically seen as extensive stands with one or more species present and open bare bottom areas. The natural vegetation of this community includes seagrass and algal beds and floating water emergent species.

Community 1.1
Submerged/Emergent Natives

This community is typically characterized with stands of vascular submerged and emergent plants. These plants play important roles in water quality and sediment stability, and often where rooted aquatic vegetation occur there is generally areas of soil accumulation. These species act as indicator species for water quality and overall health of a lacustrine system. Decreases in water quality may shift this community to an invasive floating and emergent habitat. Typical emergent species may include pickerelweed (*Pontederia cordata*), arrowheads (Sagittaria spp.), yellow waterlily (*Nymphaea mexicana*), American lotus (*Nelumbo lutea*), pondlilies (Nuphar spp.), white waterlily (*Nymphaea odorata*), coontail (*Ceratophyllum demersum*), water milfoil (Myriophyllum spp.), bladderworts (Utricularia spp.), Carolina fanwort (*Cabomba caroliniana*), and pondweed (Potamogeton spp.)

Dominant plant species

- pickerelweed (*Pontederia cordata*), other herbaceous
- arrowhead (*Sagittaria*), other herbaceous
- yellow waterlily (*Nymphaea mexicana*), other herbaceous
- American lotus (*Nelumbo lutea*), other herbaceous
- pond-lily (*Nuphar*), other herbaceous
- American white waterlily (*Nymphaea odorata*), other herbaceous
- coon's tail (*Ceratophyllum demersum*), other herbaceous
- watermilfoil (*Myriophyllum*), other herbaceous
- bladderwort (*Utricularia*), other herbaceous
- Carolina fanwort (*Cabomba caroliniana*), other herbaceous
- pondweed (*Potamogeton*), other herbaceous

Community 1.2
Invasive Non-Native

This community describes the shift from the natural community to one dominated by invasive or non native introduced species when water quality begins to move out of desired growth conditions for native species. These species may shade out habitat and outcompete native species for essential nutrients and habitat. Common species may include the aquatic soda apple (*Solanum tampicense*), crested floating heart (*Nymphoides cristata*), Hydrilla (*Hydrilla verticillata*), Giant salvinia (*Salvinia molesta*), water hyacinth (*Eichhornia crassipes*), water lettuce (*Pistia stratiotes*), and water spinach (*Ipomoea aquatica*). More information on these species and others may be found at: https://www.fdacs.gov/content/download/63140/file/Florida%E2%80%99s_Pest_Plants.pdf

Dominant plant species

- scrambling nightshade (*Solanum tampicense*), other herbaceous
- crested floatingheart (*Nymphoides cristata*), other herbaceous
- waterthyme (*Hydrilla verticillata*), other herbaceous
- kariba-weed (*Salvinia molesta*), other herbaceous
- common water hyacinth (*Eichhornia crassipes*), other herbaceous
- water lettuce (*Pistia stratiotes*), other herbaceous
- swamp morning-glory (*Ipomoea aquatica*), other herbaceous

Community 1.3
Unvegetated Unconsolidated Materials

This is characterized as expansive, relatively open areas of the littoral zone which lack dense populations of sessile plant and animal species. Unconsolidated substrates are unsolidified materials and include coralgal, marl, mud, mud/sand, sand, or shells. This community may support a large population of infaunal organisms as well as a variety of transient planktonic organisms. This is the primary medium in which the floral based communities will grow on and help stabilize. This is typically seen when poor water quality kills off existing floral species, leaving behind the medium for their growth. Areas which have become unvegetated may remain in this state for long periods of time, and may require replanting to transition back to the vegetated community.

Pathway 1.1A
Community 1.1 to 1.2

This transition is driven primarily by decreases in water quality. Common decreases in water quality include increased siltation, turbidity, excess of nutrients into the system, reduction of light, or a combination of the above.

Pathway 1.1B
Community 1.1 to 1.3

This transition is driven primarily by decreases in water quality. Common decreases in water quality include increased siltation, turbidity, excess of nutrients into the system, reduction of light, or a combination of the above.

Pathway 1.2A
Community 1.2 to 1.1

This transition is driven from an increase in water quality. This increase in water quality may provide the opportunity for vegetation regrowth. Transplanting of native species might be necessary for the community to become established again.

Pathway 1.2B
Community 1.2 to 1.3

This transition is driven primarily by decreases in water quality. Common decreases in water quality include increased siltation, turbidity, excess of nutrients into the system, reduction of light, or a combination of the above.

Pathway 1.3A
Community 1.3 to 1.1

This transition is driven from an increase in water quality. This increase in water quality may provide the opportunity for vegetation regrowth. Transplanting of native species might be necessary for the community to become established again.

State 2
Human Altered/ Human Transported State

This state describes the impact from anthropogenic sources which can change the vegetative structure of a community while maintaining the natural river boundaries.

Community 2.1
Dredged Channel

This community is created from the anthropogenic effect of dredging the bottom of an area to create a wider opening for the passage of large boats and other marine vessels. The removal of material is often deposited in large quantities in the form of spoil islands.

Community 2.2
Spoil Islands

Spoil islands are the result of deposited dredged materials when creating a deep channel. They are typically characterized by large mounds which are usually unvegetated that protrude from the landscape. If the spoil islands rise above the surface water they may be colonized by invasive non-native species.

Pathway 2.1A
Community 2.1 to 2.2

Transition T1A
State 1 to 2

This is an anthropogenic process of dredging. This is the removal of material from the bottom of the submerged system for the creation of channels for large boats and other marine vessels to pass through.

Restoration pathway R2A
State 2 to 1

This restoration includes the removal of altered habitat and filled and replanted with the native species to that habitat.

Additional community tables

Animal community

Much of the lakes in the Southern Florida Lowlands MLRA contains wildlife species which live in the system or are critically dependent on the system for survival. In the middle and lower river basin many of the species are present as well as marine mammals such as manatees and dolphins if the lacustrine system is connected via rivers or channels to an estuarine or marine system. These lakes are important breeding areas for many terrestrial and semi-aquatic amphibians, are frequently visited for feeding grounds for waterfowl and reptiles, and act as nursery grounds and habitat for many fish species. Common species found in the upper basin include:

Fish: Florida gar (Lepisosteus platyrhincus), bowfin (Amia calva), redfin pickerel (Esox americanus americanus), golden shiner (Notemigonus crysoleucas), taillight shiner (Notropis maculatus), lake chubsucker (Erimyzon sucetta), brown bullhead (Ameiurus nebulosus), spot (Leiostomus xanthurus), bluegill (Lepomis macrochirus), and largemouth bass (Micropterus salmoides).

Amphibians: Mole salamander (Ambystoma talpoideum), two-toed amphiuma (Amphiuma means), sirens (Siren spp.), southern cricket frog (Acris gryllus), bullfrog (Rana catesbeiana), pig frog (R. grylio), river frog (R. heckscheri), and southern leopard frog (R. sphenocephala).

Reptiles: American alligator (Alligator mississippiensis), common snapping turtle (Chelydra serpintina), Florida cooter (Pseudemys floridana), yellow-bellied slider (Trachemys scripta scripta), eastern mud turtle (Kinosternon subrubrum), common musk turtle (Sternotherus odoratus), Florida softshell turtle (Apalone floridana), mud snake (Farancia abacura), plainbelly watersnake (Nerodia erythorgaster), banded water snake (N. fasciata) and brown water snake (N. taxispilota).

Birds: Great blue heron (Ardea herodias), great egret (A. alba), snowy egret (Egretta thula), little blue heron (E. caerulea), green heron (Butorides virescens), white ibis (Eudocimus albus), wood stork (Mycteria americana) and belted kingfisher (Megaceryle alcyon).

Mammals: North American river otter (Lutra canadenisis).

Hydrological functions

Lakes in Florida may range in productivity throughout the year due to the changes in water quality. Lakes undergo

small shifts in thermal stratification throughout the year due to slight changes in temperature. Temperature variations in the water throughout the year cause changes in water density, reflected by different layers of productivity and light availability. Water quality plays an important role in vegetation, only growing in the littoral photic zone, the point where light dims to 1% of the light at the surface. This limits subaqueous vegetation growth to the lake edges in deep lakes. Changes in dissolved oxygen levels also limit where organisms can be found, low levels are often found in the deepest layer of the lake during summer months due to decomposition of organic material which uses up the available oxygen. When water reaches anoxic conditions, less than 0.5 mg/l dissolve oxygen, organisms cannot survive.

Recreational uses

This community is highly recreated and used year-round. Common recreation activities include boating, swimming, fishing, tourism, wildlife viewing and hunting (Waterfowl, Alligators).

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

Charles Stemmans, 2/07/2025

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Florida Department of Environmental Protection

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):**

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

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:**

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17. **Perennial plant reproductive capability:**
