Ecological site R154XX017FL
Wet Saline Marshes And Swamps

Last updated: 2/21/2024
Accessed: 05/06/2024

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): 154X–South-Central Florida Ridge

MLRA 154 is entirely in Peninsular Florida, and contains 8,285 square miles. The landscape of MLRA 154 is characterized by a series of parallel, prominent sandy ridges of Pleistocene marine origin, including the Brooksville and Mount Dora Ridges. These North to South oriented parallel ridges are interspersed with more low lying physiographic provinces, including: upland hills, plains, valleys and gaps (Puri and Vernon 1964). The extreme western portion of the MLRA consists of thin belt of coastal lowlands and marshlands.

Many of the soils of MLRA 154 are Pleistocene or Holocene sands that are underlain with older, loamy Pliocene marine sediments (Cypresshead formation) or the clayey Miocene marine sediments (Hawthorne formation). A combination of marine depositional events and the dissolution of underlying limestone (karst geology) is responsible for surficial topography throughout Peninsular Florida.

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; 75c Central Florida Ridges and Uplands (Griffith, G. E., Omernik, J. M., & Pierson, S. M., 2013)

-Florida Natural Area Inventory, 2010 Edition: Mangrove Swamp, Salt Marsh (FNAI, 2010)

Ecological site concept

Map units of this site occur exclusively in the Coastal Swamp physiographic unit of Coastal West Central Florida. The central concept of the Wet Saline Marshes and Swamps is shallow to very deep, very poorly drained, sandy or loamy, saline soils that have a muck or mucky surface layer and bedrock within 6 to 40 inches. Map unit components occur on flat landscapes (slopes <1%). Soil series include the shallow Cracker and Lacoochee soils, the moderately deep Homosassa and Weekiwachee soils, and the deep Tidewater soils and Durbin soils. Due to changes in MLRA boundary extent, this site will need to be reevaluated.

Associated sites

F154XA013FL	**Histic Alluvial Forests** These are very poorly drained alluvial concepts that will occur in organic soils, and will differ in physiographic positions, affect the types of vegetation and management strategies
F154XA014FL	**Histic Wetland Depressions** These sites are very poorly drained depressional concepts that will occur on organic soils, resulting in different types and amounts of vegetation as well as management strategies

F154XA015FL	**Mineral Depressional Wetlands** These are very poorly drained depressional concepts that will occur in mineral soils and will differ in physiographic positions, affect the types of vegetation and management strategies
F154XA016FL	**Wet Mineral Alluvial Forest And Marshlands** These sites are very poorly drained alluvial concepts that will occur in mineral soils and will differ in physiographic positions and affect the types of vegetation and management strategies

Similar sites

R155XY020FL	**Haline Intertidal Marshes and Swamps** This site is found within MLRA 155, which is more representative of lowland sites. This site has a greater latitudinal gradient and will have a greater variation in community composition.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Avicennia germinans*
Herbaceous	(1) *Spartina alterniflora* (2) *Juncus roemerianus*

Physiographic features

The physiography of the area is among the best defined in Peninsular Florida with rolling topography consisting of ridges, hills, and dunes interspersed with low-lying valleys, depressions, and drainageways. The entire area is located within the Floridian Section of the Coastal Plain Province of the Atlantic Plain.

This site is limited to the limestone platform that is part of a very broad shallow continental shelf. The west coast of the Central Florida Peninsula is a low energy shoreline; beaches and sandy soils are rare, and are confined to higher energy landforms (spits, bars).

This site occurs on occurs on flats and slight depressions of marine deposition with underlying limestone bedrock. The soils are dominantly shallow to moderately deep, and are very poorly drained, loamy or clayey soils with high salinity on coastal lowland flats. Slopes are level and range from 0 to 1%, and elevation ranges from sea level to 2 feet (0 to 0.6 m).

Table 2. Representative physiographic features

Landforms	(1) Marine terrace > Flat (2) Salt marsh (3) Mangrove swamp
Runoff class	Negligible
Flooding duration	Very brief (4 to 48 hours) to very long (more than 30 days)
Flooding frequency	Very frequent
Ponding frequency	None
Elevation	0–1 m
Slope	0–1%
Water table depth	0–15 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate is characterized by humid subtropical with long hot summers and mild winters. In the winter months, Canadian air masses move across Peninsular Florida and produce cool, cloudy, rainy weather. Freezing temperatures are occasional in the northern MLRA areas, with typically less than 30 days of the year with temperatures dropping below freezing.

Precipitation in the northern MLRA is distributed fairly evenly throughout the year. Average annual precipitation ranges from 45 to 55 inches. Highest monthly precipitation falls from June through October, with June through August being the wettest period. Winter rainfall is associated with cold fronts.

Hurricanes and tropical storms affect much of the MLRA 154 region. Catastrophic hurricanes make landfall along the Atlantic coast of Peninsular Florida on the order of two to four times per century. Strong winds and heavy rainfall affect the interior peninsula; rainfall from hurricanes and tropical systems vary widely but can exceed 20 inches from one storm. Hurricanes are most likely to occur between June and November and are most common in August and September.

Table 3. Representative climatic features

Frost-free period (characteristic range)	229-365 days
Freeze-free period (characteristic range)	365 days
Precipitation total (characteristic range)	1,295-1,346 mm
Frost-free period (actual range)	213-365 days
Freeze-free period (actual range)	314-365 days
Precipitation total (actual range)	1,270-1,372 mm
Frost-free period (average)	309 days
Freeze-free period (average)	356 days
Precipitation total (average)	1,321 mm

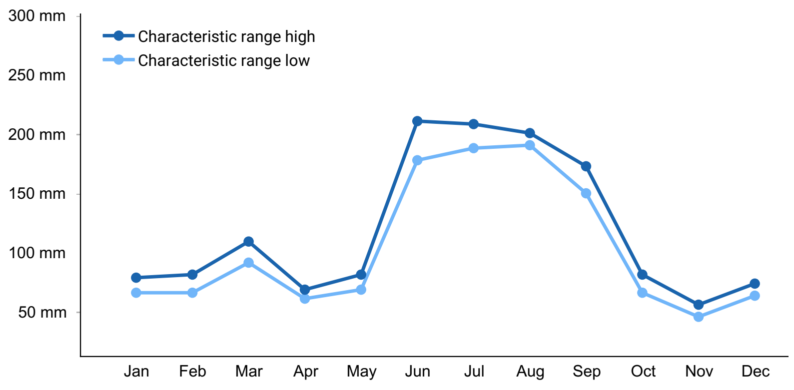

Figure 1. Monthly precipitation range

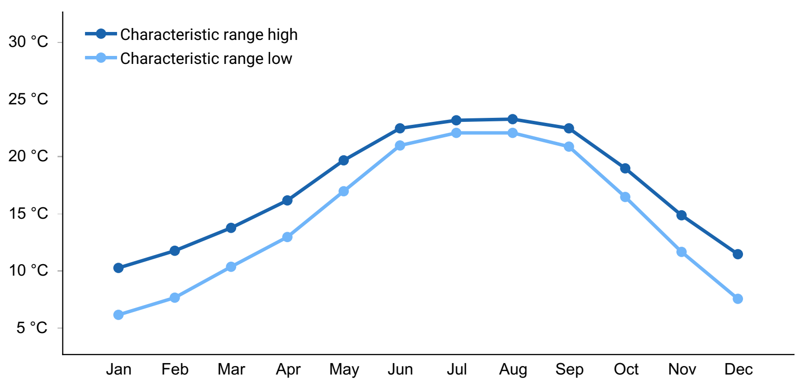

Figure 2. Monthly minimum temperature range

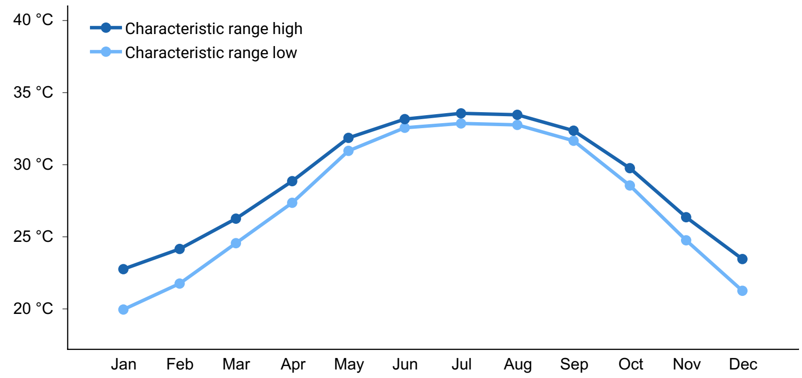

Figure 3. Monthly maximum temperature range

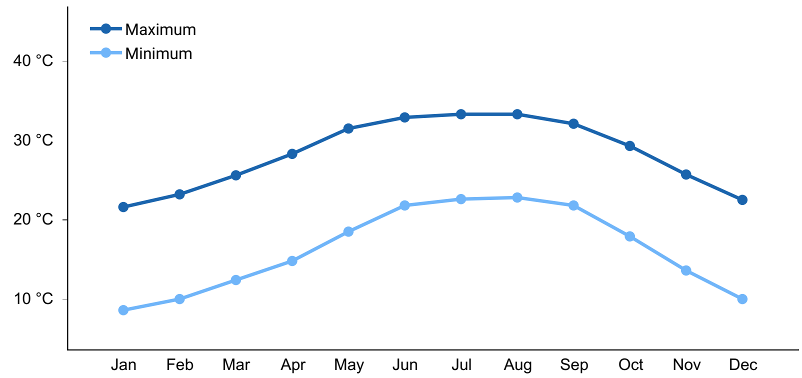

Figure 4. Monthly average minimum and maximum temperature

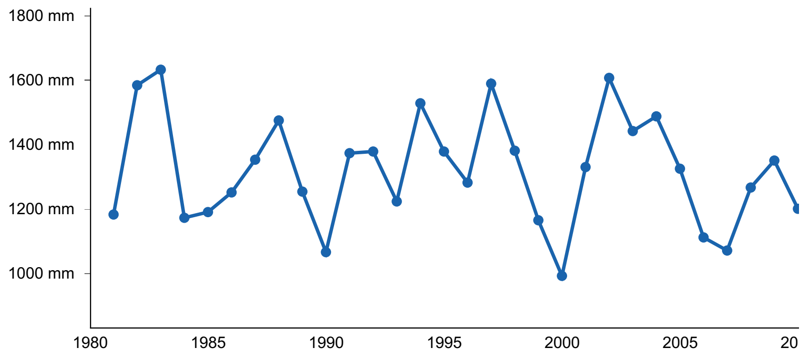

Figure 5. Annual precipitation pattern

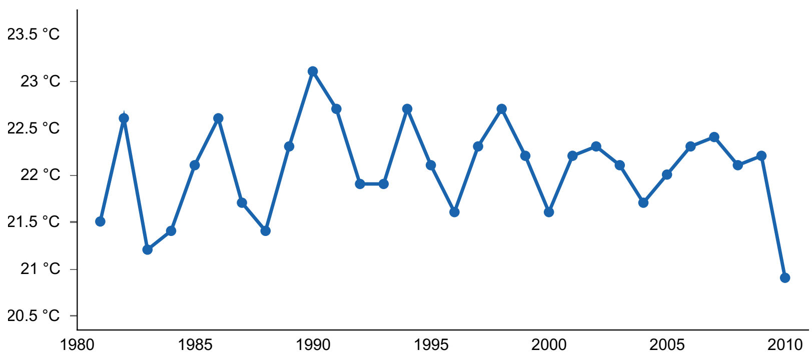

Figure 6. Annual average temperature pattern

Climate stations used

- (1) CLERMONT 9 S [USC00081641], Clermont, FL
- (2) GAINESVILLE 11 WNW [USC00083322], Gainesville, FL
- (3) INVERNESS 3 SE [USC00084289], Inverness, FL

- (4) PLANT CITY [USC00087205], Plant City, FL
- (5) BROOKSVILLE CHIN HILL [USC00081046], Brooksville, FL
- (6) SAINT LEO [USC00087851], San Antonio, FL
- (7) TARPON SPGS SEWAGE PL [USC00088824], Tarpon Springs, FL
- (8) LAKELAND [USW00012883], Lakeland, FL
- (9) BARTOW [USC00080478], Bartow, FL
- (10) LISBON [USC00085076], Leesburg, FL
- (11) WINTER HAVEN [USC00089707], Winter Haven, FL
- (12) ORANGE SPRINGS 2SSW [USC00086618], Fort Mc Coy, FL

Influencing water features

Hydrology of this site is largely influenced by salinity levels and tidal influx along the Coastal Lowlands adjacent to the Gulf of Mexico, as well as underlying karst features, including solution cavities, sinkholes, and chimneys. This site is situated in flat areas, bordered to the west by the Gulf of Mexico, and to the east by various uplands.

The site is situated on very poorly drained soils that are dominantly shallow or moderately deep to limestone bedrock. Subsurface water flow is dependent on the depth to the underlying limestone and karst features. The presence, depth, and orientation of these karstic features affect subsurface water movement into the Florida Aquifer, Gulf of Mexico, or adjacent sites.

Hydrogeomorphically, these marsh and swamp lowlands receive water through tidal action, lateral recharge, or local precipitation, and discharging water through the soil or as local runoff into the Gulf of Mexico or the Florida Aquifer. Low slope gradient, shallow or moderately depth to limestone, and moderately slow to rapid saturated hydraulic conductivity results in high or very high surface runoff.

Soil features

Soils are very poorly drained, saline, loamy Lithic Endoaquolls (Cracker), very poorly drained, sandy or loamy Typic Sulfaquents (Homosasssa, Tidewater), very poorly drained, sandy Spodic Quartzipsamments (Lacoochee), and very poorly drained Typic Sulfisaprists (Weekiwachee) and Typic Sulfihemists (Durbin). These soils formed in loamy or sandy marine sediments over limestone bedrock or in organic plant material over limestone. The representative slope for the correlated soil components ranges from 0 to 1%. There is a well-defined salinity gradient within this site that is related to frequency of tidal inundation.

These shallow to moderately deep soils restrict rooting depth, and chemical soil properties such as the high sulfur content, and high salinity limits the plant species that inhabit the site. The electrical conductivity (salinity) of this site ranges from 16 to 32 deciSiemens per meter and the sodium absorption ratio ranges from 20 to 80, but ranges to 0 in some of the mineral soils. Sulphur content ranges from 0.75 to 4.0%, but is less than 0.75 in the Cracker and Lacoochee soils.

Cracker

Weekiwachee

Figure 7. Representative soil profiles for this PES

Table 4. Representative soil features

Parent material	(1) Marine deposits–limestone
Surface texture	(1) Mucky clay (2) Fine sandy loam
Drainage class	Very poorly drained
Permeability class	Moderately slow to rapid
Soil depth	15–102 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	3.81–22.86 cm
Calcium carbonate equivalent (0-101.6cm)	0–50%
Electrical conductivity (0-101.6cm)	16–32 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–70
Soil reaction (1:1 water) (0-101.6cm)	3.5–8.4
Subsurface fragment volume <=3" (0-101.6cm)	0–5%
Subsurface fragment volume >3" (0-101.6cm)	0%

Ecological dynamics

The Wet Saline Marshes and Swamps concept includes several wetland natural communities (as recognized by FNAI 2010): Salt Marsh and Mangrove Swamp. Despite the broad variation of natural vegetation compositional and structure, the unifying features of this site are frequent flooding and high salinity environment. Wet Saline Marshes and Swamps occur in low energy coastal areas.

Mangrove swamps occupy coastal environments with similar flooding regime and salinity but are distinct from salt marshes in structure and composition. Mangrove swamps of MLRA 154 are typically comprised of the more cold-tolerant black mangrove (*Avicennia germinans*), a species that reaches its northern limits on the Gulf Coast in Levy County. Mangrove distribution is limited by water temperature and climate: in Peninsular Florida, annual water temperatures < 66 Fahrenheit and below freezing winter temperatures relegate mangroves to southern coastal regions (FNAI 2010).

Salt marshes have a wider distribution in coastal regions of MLRA 154. Plant composition varies within salt marsh relative to flooding frequencies and subtle topographic differences.

State and transition model

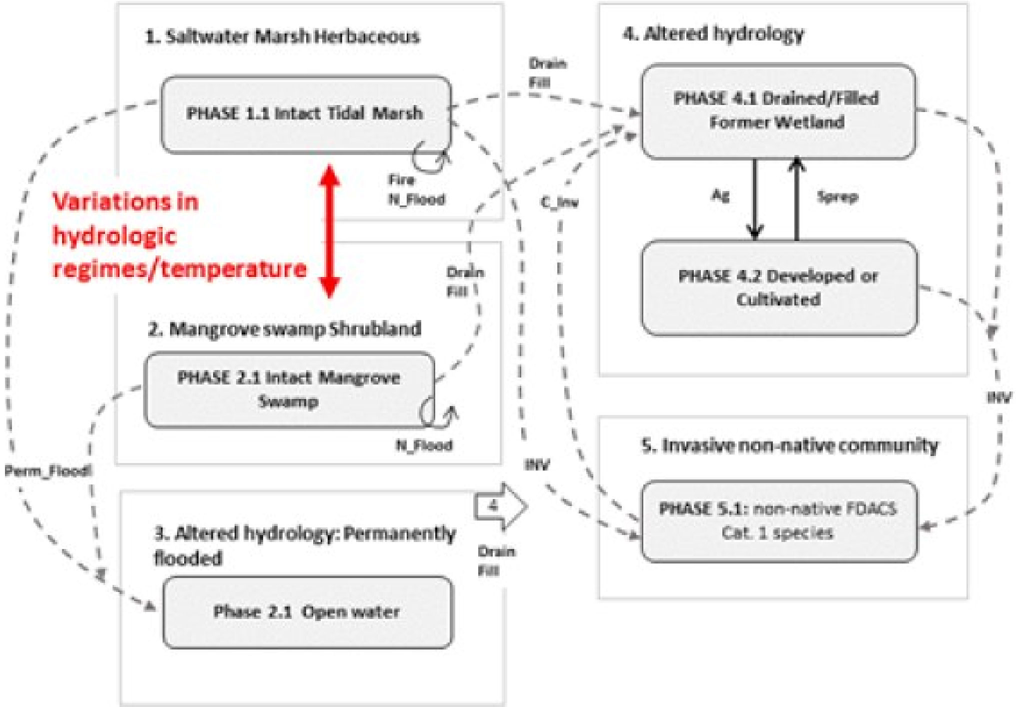

Figure 8. State and Transition Model

Sprep	Site prep (mechanical and chemical)
INV	Invasion of noxious non-native plant species
C_Inv	Mechanical/chemical control of invasive plant species
Drain	Permanent drainage via mechanical methods
Fill	Permanent Fill
N_Flood	Natural tidal flooding regime
Perm_Flood	Permanent Flooding (Climate change)
Ag	Various agricultural practices for crop cultivation

Figure 9. STM Legend

State 1
Intact Tidal (Salt) Marsh

Salt marshes of coastal tidal zones are grasslands dominated by perennial grasses and sedges. Distinct vegetation zones may be present, coincident with different flooding regimes. Saltmarsh cordgrass (*Spartina alterniflora*) dominates frequently inundated areas, whereas needle rush (*Juncus roemerianus*) dominates higher, less frequently flooded areas.

State 2
Mangrove Swamp

Mangrove swamp is a dense forest or shrubland, situated on coastal an estuarine shorelines with low wave energy. There are three mangrove species in Florida; red mangrove (*Rhizophora mangle*) and black mangrove (*Avicennia germinans*) occur within the coastal range of MLRA 154.

State 3
Open water

This state describes permanently flooded conditions for this site. Permanent flooding may result from damming, or a natural event causing permanent inundation.

State 4
Cleared/Drained/Cultivated

This state describes conditions related to land use conversion for community production. Drastic changes in hydrologic regime result from draining and clearing.

State 5
Invasive non-native community

This state describes a condition where one or several noxious non-native species has invaded and dominated the site.

References

. Fire Effects Information System. http://www.fs.fed.us/database/feis/.

. 2021 (Date accessed). USDA PLANTS Database. http://plants.usda.gov.

Other references

Carlson, D. B., O'Bryan, P. D., & Rey, J. R. 1991. A review of current salt marsh management issues in Florida. Journal of the American Mosquito Control Association, 7(1), 83-88.

Dawkins, K., & Esiobu, N. 2016. Emerging insights on Brazilian pepper tree (Schinus terebinthifolius) invasion: the potential role of soil microorganisms. Frontiers in plant science, 712.

Donnelly, Melinda, "Is The Exotic Brazilian Pepper, Schinus Terebinthifolius, A Threat To Mangrove Ecosystems In Florida?" 2006. Electronic Theses and Dissertations, 2004-2019. 801. https://stars.library.ucf.edu/etd/801

Florida Chapter Soil and Water Conservation Society. 1989. 26 Ecological Communities of Florida

Florida Natural Areas Inventory (FNAI). 2010. Guide to the natural communities of Florida: 2010 edition. Florida Natural Areas Inventory, Tallahassee, FL

Fretwell, J. D., Williams, J. S., & Redman, P. J. 1996. National water summary on wetland resources (Vol. 2425). US Government Printing Office.

Gann, G.D., K.A. Bradley, and S.W. Woodmansee. 2009. Floristic Inventory of South Florida Database. Institute for Regional Conservation.

Gilmore, R. G., Cooke, D. W., & Donohoe, C. J. 1982. A comparison of the fish populations and habitat in open and closed salt marsh impoundments in east-central Florida. Gulf of Mexico Science, 5(2), 2.

Harshberger, John W. 1914. The Vegetation of South Florida South of 27 30 North, Exclusive of the Florida Keys. Philadelphia, Wagner Free Institute of Science, 1914.

Jin-Eong, O. 1995. The ecology of mangrove conservation & management. Hydrobiologia, 295(1), 343-351.

Kambly, S. and Moreland, T.R., 2009, Land cover trends in the Southern Florida Coastal Plain: U.S. Geological Survey Scientific Investigations Report 2009–5054, 16 p.

Krauss, K. W., Demopoulos, A. W., Cormier, N., From, A. S., McClain-Counts, J. P., & Lewis III, R. R. 2018. Ghost forests of Marco Island: Mangrove mortality driven by belowground soil structural shifts during tidal hydrologic alteration. Estuarine, Coastal and Shelf Science, 212, 51-62.

Krauss, K. W., Doyle, T. W., Doyle, T. J., Swarzenski, C. M., From, A. S., Day, R. H., & Conner, W. H. 2009. Water level observations in mangrove swamps during two hurricanes in Florida. Wetlands, 29(1), 142-149.

Lugo, A. E., & Snedaker, S. C. 1974. The ecology of mangroves. Annual review of ecology and systematics, 5(1), 39-64.

Marchio, D. A., Savarese, M., Bovard, B., & Mitsch, W. J. 2016. Carbon sequestration and sedimentation in mangrove swamps influenced by hydrogeomorphic conditions and urbanization in Southwest Florida. Forests, 7(6), 116.

McNab, W.H.; Cleland, D.T.; Freeouf, J.A.; Keys, Jr., J.E.; Nowacki, G.J.; Carpenter, C.A., comps. 2007. Description of ecological subregions: sections of the conterminous United States [CD-ROM]. Gen. Tech. Report WO-76B. Washington, DC: U.S. Department of Agriculture, Forest Service. 80 p

McPherson, B. F., Hendrix, G. Y., Klein, H., & Tyus, H. M. 1976. The environment of south Florida: a summary report (Vol. 1011). US Government Printing Office.

Odum, W. E., McIvor, C. C., & Smith, T. J. 1982. The ecology of the mangroves of south Florida: a community profile. The Service.

Radabaugh, K. R., Moyer, R. P., Chappel, A. R., Powell, C. E., Bociu, I., Clark, B. C., & Smoak, J. M. 2018. Coastal blue carbon assessment of mangroves, salt marshes, and salt barrens in Tampa Bay, Florida, USA. Estuaries and Coasts, 41(5), 1496-1510.

Ruprecht, J. E., Glamore, W. C., & Rayner, D. S. 2018. Estuarine dynamics and acid sulfate soil discharge: Quantifying a conceptual model. Ecological Engineering, 110, 172-184.

Saha, A. K., Saha, S., Sadle, J., Jiang, J., Ross, M. S., Price, R. M., ... & Wendelberger, K. S. 2011. Sea level rise and South Florida coastal forests. Climatic Change, 107(1), 81-108.

Schoeneberger, P.J., and Wysocki, D.A. 2017. Geomorphic Description System, Version 5.0. Natural Resources Conservation Service, National Soil Survey Center, Lincoln, NE.

Scholl, D.W. 1964. Recent Sedimentary Record in Mangrove Swamps and Rise in Sea Level Over the Southwestern Coast of Florida: Part 1. Earth and Planetary Sciences Division, U.S. Naval Ordinance Test Station, China Lake, Calif. (U.S.A.). Marine Geology, 1, 344 – 366.

Scholl, D.W. 1964. Recent Sedimentary Record in Mangrove Swamps and Rise in Sea Level Over the Southwestern Coast of Florida: Part 2. Earth and Planetary Sciences Division, U.S. Naval Ordinance Test Station, China Lake, Calif. (U.S.A.). Marine Geology, 2, 343 – 364.

Scott, T. M. 2001. Text to accompany the geologic map of Florida. Florida Geologic Survey, Tallahassee, Florida.

Stevens, P. W., Fox, S. L., & Montague, C. L. 2006. The interplay between mangroves and saltmarshes at the transition between temperate and subtropical climate in Florida. Wetlands Ecology and management, 14(5), 435-444.

U.S. Fish & Wildlife Service Southeast Region (FWS). 1998. Mangroves. Multi-Species Recovery Plan for South Florida.

Contributors

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Approval

Charles Stemmans, 2/21/2024

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	05/06/2024
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):**

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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:

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

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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:**

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17. **Perennial plant reproductive capability:**
