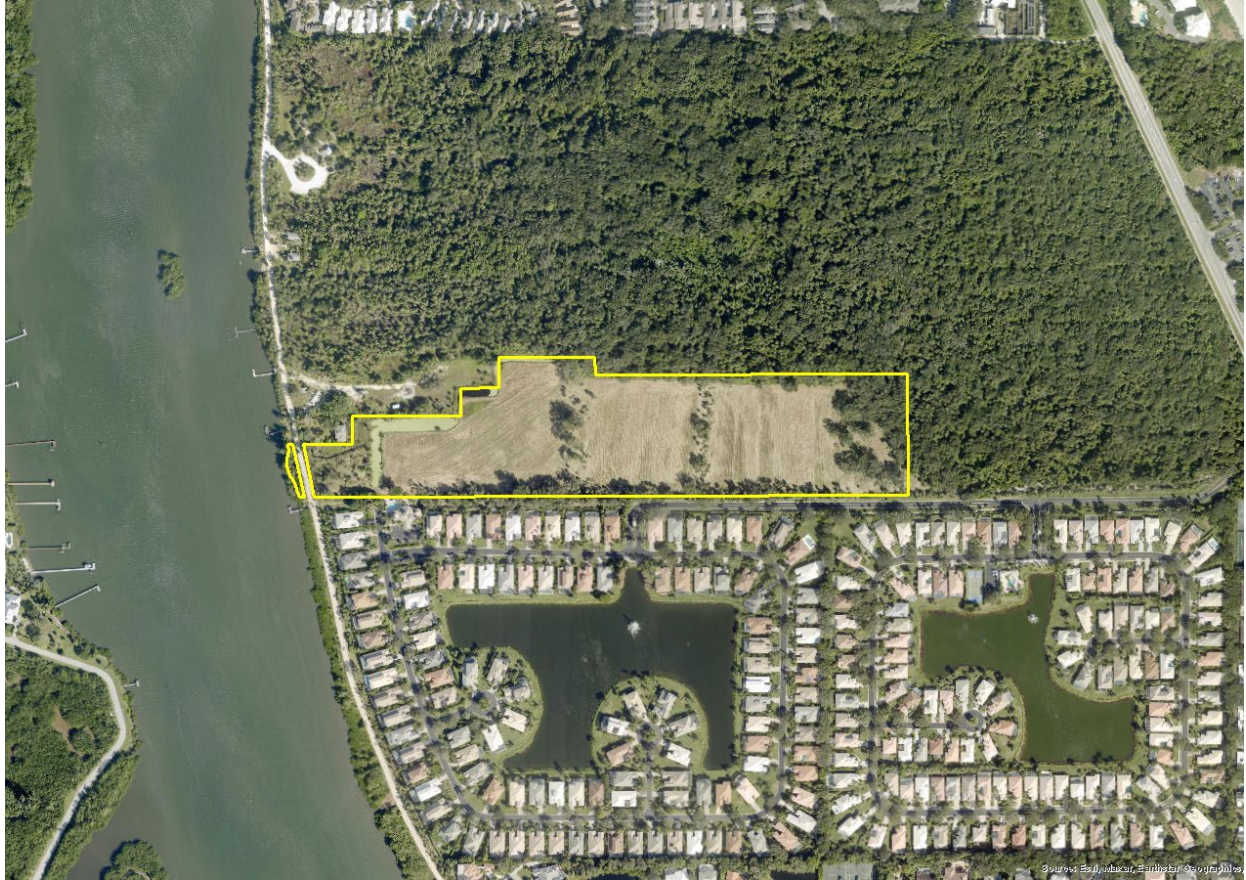


Jungle Trail Island Manor Property Indian River County Environmental Bond 2024



Prepared by:

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water & air
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1.0 JUNGLE TRAIL ISLAND MANOR PROPERTY

The Jungle Trail Island Manor Property, Environmental Bond Nomination Number 2, was nominated by a representative of Island Manor Development LLC with the anticipated acquisition type of Fee Simple.

1.1 LOCATION

The property is in eastern Indian River County on Tax Parcel # 31392600000010000008.0 (Figure 1). The west boundary of the property lies along approximately 58m of the east bank of the Indian River/Intercoastal Waterway across from Orchid Isle Estates. Jungle Trail road runs along the west boundary. The western portion of the northern boundary is adjacent to largely undeveloped land and the remaining portion of the north border, and all of the eastern boundary abut Captain Forster Hammock Preserve Conservation Area. The southern boundary is bound by a residential development, Island Club Manor.

1.2 SIZE

The property is an approximately 19.36-acre irregular shaped rectangle approximately 130 m from north to south and is approximately 650 m wide. There is a small 0.12-acre disjunct associated polygon west of Jungle Trail along the Indian River Lagoon.

1.3 CURRENT AND FUTURE ZONING

The current land use zoning is A-1 - Agricultural-1 District (up to 1 unit/5 acres) (Version 9/04/2024) and the future land use zoning is L-2: Low-Density Residential-2 (6 Units/Acre) (Version 3/28/2024).

1.4 PENDING ZONING CHANGES AND SPECIAL OVERLAY DISTRICTS

An inquiry to the Director of Planning & Development Services for Indian River County, Chris Balter, revealed the zone classification on this parcel was effectively reclassified from A-1 to RS-3 on April 26, 2024. RS-3 zone is classified as Single-Family Residential District (up to 3 units/acre).

2.0 VEGETATIVE COMMUNITIES

The Jungle Trail Island Manor property straddles two major vegetative community types within Indian River County. The far western side of the property resides in the Indian River Lagoon and associated estuarine wetlands portion of the county, and most of the parcel was likely historically tropical/coastal hammock (maritime hammock, FNAI).

2.1 LAND USE AND LAND COVER

There was one natural community type, and five altered land use types identified on the property from the 2023 Florida Cooperative Landcover Map (CLC) (Figure 2). Approximately 88 percent of the site consists of cleared brushland that was likely formerly maritime hammock (Table 1). There was a small area (approximately 1.8-acres) of forested land on the far eastern boundary that was typed “unaltered” mixed hardwood-coniferous swamp, however within this polygon there is

some evidence of historic groundcover clearing apparent in some of the historical aerial photographs. Furthermore, this area that remained forested throughout the years was typed as wetland in the CLC map, but LiDAR indicates it is more likely upland. There is a small 0.12-acre disjunct associated polygon west of Jungle Trail along the Indian River Lagoon. The small 0.12-acre disjunct associated polygon west of Jungle Trail along the Indian River Lagoon is typed as shrub and brushland in the CLC map however this small polygon is mangrove forest with some invasive exotic plant species. The CLC map Figure 3 and Table 1 present the acreage of each land use and natural community type on the property.

Table 1. The amount of each altered land use type or natural community type on the Jungle Trail Island Manor property from the Florida Cooperative Landcover Map (2023).

Land Use/Natural Community	Acres	% Cover	Type	Up/Wet	State Rank
Shrub and Brushland (cleared)	17.0	88.0%	Altered	Upland	not ranked
Mixed Hardwood-Coniferous Swamp	1.8	9.3%	Natural	Wetland	not ranked
Mixed Hardwood-Coniferous Swamp	0.4	1.8%	Altered	Wetland	not ranked
Transportation	0.1	0.7%	Altered	Upland	not ranked
Urban Open Forested	0.02	0.1%	Altered	Upland	not ranked
Residential, Low Density	0.01	0.1%	Altered	Upland	not ranked
Total Altered	17.5	90.7%			
Total Natural	1.8	9.3%			
Total Upland	17.2	88.9%			
Total Wetland	2.2	11.1%			

*The level of disturbance within each onsite natural community has not been assessed.

The eastern portion of the site is within the coastal hammock portion of the county. Coastal hammocks (maritime hammock) in this area possess a diverse assemblage of tropical and temperate species and can vary from a mature canopy of live oaks and cabbage palms with a sparse understory of ferns and vines to a dense community of tropical hardwoods, vines, and shrubs, with a fairly open canopy of oaks and cabbage palms.

Mangrove and estuarine habitats were likely historically dominant on the western portion of the property. Characteristic species of mangrove swamps include red mangrove, black mangrove, white mangrove, and buttonwood. Brazilian pepper can be a common component especially within disturbed estuarine communities. The western portion of the property has some salt tolerant marsh species (e.g., salt bush, saltmarsh mallow, giant leather fern, common reed) and typical salt marsh within the county is an herbaceous community that occurs in the portion of the coastal zone affected by tides and seawater but protected from large waves. Dominant species often include saltmarsh cordgrass, saltwort, glasswort, salt grass, seaside oxeye daisy, Carolina sea lavender, marsh fimbry, shoreline seapurslane, marsh elder, and saltgrass.

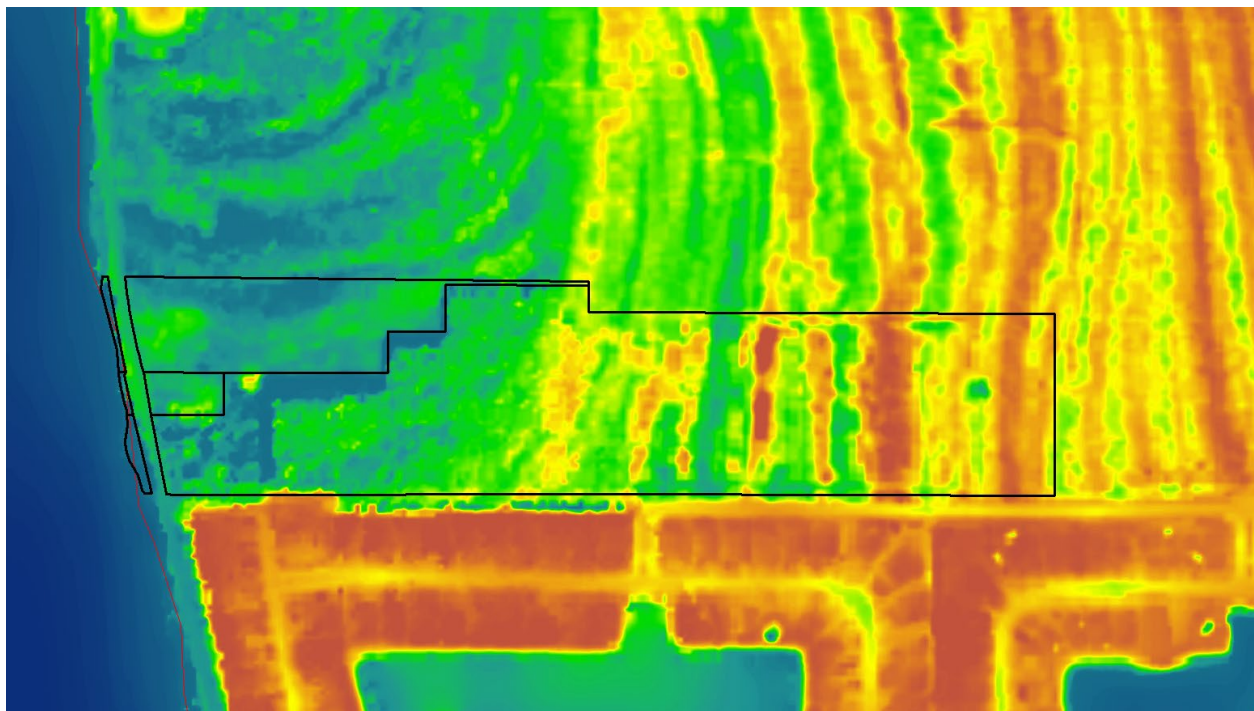
There were no regionally rare natural community types (e.g., scrub, scrubby flatwoods, maritime hammock) identified on the property from the CLC map. However, a large proportion of the property was historically maritime forest which is rare (imperiled) in Indian River County. There appears to be a small remnant (1.8-acres) of maritime forest in the far eastern portion of the parcel.

Figure 4 shows the under-represented natural communities mapped by FNAI for the Florida Forever statewide environmental lands acquisition program that occur on and near the property. No portions of the property contain under-represented natural communities (scale is Priority 1 through 4 with 1 being the highest priority; 0=no rank).

2.2 SOILS

The soil types found on the Jungle Trail Island Manor Property are represented in Figure 5. Captiva (14 acres) and Canaveral (5 acres) were the only two soil types identified on the property. The Captiva series makes up most of the western 0.75 of the site and is currently labelled Shrub and Brushland (old citrus grove) with some small areas labelled as Mixed Hardwood – Coniferous Swamps. The typical vegetation for the Captiva soils series is sand cordgrass, leather leaf fern and Brazilian pepper but on this property, it was historically likely Mixed Hardwood – Coniferous Swamps. The Captiva series consists of very deep, poorly drained, very rapidly permeable soils on broad, low flats near the coast. Internal drainage is impeded by a shallow water table. The water table is within depths of 10 inches for 1 to 2 months during the normal summer rainy season and other periods of high rainfall. In some years the soil is covered by standing water for several days. The Canaveral series makes up the eastern 0.25 of the site and consists of very deep, somewhat poorly to moderately well drained, very rapidly permeable soils on side slopes of dune-like ridges bordering depressions and sloughs along the coast in Peninsular Florida. The native vegetation consists of cabbage palm, scattered saw palmetto, magnolias, bays, and slash pine with an under-story of gallberry and pineland threawn.

The eastern portion of the property has a series of up to seven historic dune and swales that traverse the property north and south (LiDAR figure below). This area was likely historically maritime forest but may have contained some aspects of coastal strand alternating with coastal interdunal swale, given the onsite topography.



LiDAR Figure. The LiDAR generated digital elevation model of the Jungle Trail Island Manor property, showing the successive ridge and swale topography on the eastern portion of the property and the connected excavated ponds and marsh habitat on the western portion of the site.

2.3 HISTORICAL IMAGERY REVIEW

Some of the aerial photographs reviewed for this assessment can be found in the Appendix.

1943 May 05 (UF Map Library)

- Jungle Trail road runs along the west boundary of the property adjacent to the Indian River Lagoon
- Young citrus grove has been planted on approximately 12.6-acres of the property
- Within the grove two linear north south oriented forested strips remain
- Small areas east and west of the citrus grove and west of Jungle Trail (mangroves) are still forested
- The adjacent forested natural lands (to the north and east – currently the Captain Forster Hammock Preserve) are densely canopied with some minor jeep trails. The Jungle Trail Island Manor property was historically likely a continuation of the adjacent natural communities
- South of this property is a large citrus grove

1951 April 4 (UF Map Library)

- The citrus trees are more mature with some mortality
- The natural appearing forested areas are still intact
- The adjacent forested natural lands (to the north and east - Captain Forster Hammock Preserve) have expanded jeep trails/roads and a grid of dirt roads and house lots along the lagoon

1970 December 29 (UF Map Library)

- There appears to be three large linear ditches with adjacent excavated material along the northwestern boundary of the citrus grove
- A1A has been constructed to the east on one of the large dirt roads

No aerial photography was found between 1971 and 1993.

1994 March 17 (Google Earth Pro)

- Borrow pit excavation appears to be starting along the northwestern edge of the citrus grove, fill dirt may have been spread around the two new houses on the adjacent properties to the north (Fischer and Skiscim Properties)
- The offsite forested areas to the north and east remain, currently Captain Forster Hammock Preserve

1999 February 21 (Google Earth Pro)

- Borrow pits have been constructed along the northwestern boundary of the citrus grove, water is visible, and fill may have been spread on the adjacent house property to the north (Skiscim property)
- The structure on the Fischer property is gone
- Houses are being built in the former citrus grove offsite to the southeast

2005 November 30 (Google Earth Pro)

- The citrus grove has become fallow with recruitment of various tree species including palms
- The citrus grove to the south has been converted to houses and retention ponds

2010 January 3 (Google Earth Pro)

- The entire fallow citrus grove onsite has been cleared and mowed; all woody species have been removed
- Portions of the linear north south forested areas in the former citrus grove have been removed and the tree canopy thinned
- The forested area west of the former citrus grove and south of the existing house (Skiscim property) has been thinned and there is a 78m long east-west ditch apparent that runs from the series of borrow pits to the Jungle Trail road
- The forested area in the eastern portion of the site appears relatively undisturbed (as well as, in the 2017 aerial)

2024 (Google Earth Pro and Pictometry)

- The north south linear forested areas in the mowed area (former citrus grove) have been thinned and cleared of about half the trees (live oaks and cabbage palms remain)
- Vegetation in and around the borrow pits has been cleared and the pits may have been deepened, some new fill visible on the Fischer property, the “pits” form a continuous zig-zag channel that totals more than 330m in length and some segments are up to 12m wide
- The forested area west of the former citrus grove has been mostly cleared, some ditches and a woods road along the southern boundary are visible
- The forested area on the eastern boundary has been cleared of some large trees and bare ground is visible (live oaks and cabbage palms remain)
- In the mowed areas (former citrus grove) there is a band of exposed soils/ground near the east end, possibly a drier soil or remnant dune
- In the mowed area some wetter areas are visible, one is west of the band of exposed soil

2.4 OFFSITE CONTINUITY OF NATURAL COMMUNITIES

The small (1.8-acres) forest in the eastern portion is contiguous with the maritime hammock and forested wetland natural communities of Captain Forster Hammock Preserve Conservation Area. The wetland community in the western portion is connected to the mangrove swamp and waters of the Indian River Lagoon via a culvert under Jungle Trail road.

3.0 RARE SPECIES

Table 2 includes a list of the animal species and Table 3 includes the plant species that have the potential to occur onsite that are considered endangered, threatened, or rare as listed by the U.S. Fish and Wildlife Service (FWS), Florida Fish and Wildlife Conservation Commission (FWC), Florida Natural Areas Inventory (FNAI) and the Florida Department of Agriculture. A search using the FNAI Biodiversity Matrix Map Server, and the FWS Information, Planning, and Consultation System (IPaC) Resource List was performed for listed species that may potentially occur within the Project Site. These lists were reviewed and only the species that were potentially likely to occur within the habitats available onsite were included. Additionally, species that are tracked by FNAI

or state listed that occur within Indian River that were not included in the Biodiversity Matrix search, but potential habitat occurs onsite, were included in Tables 2 and 3. The majority of the potential rare animals and plants listed for this property are often associated with mangrove wetland or forested coastal upland communities.

Figure 6 shows The Florida Fish and Wildlife Conservation Commission's Fish and Wildlife Research Institute Terrestrial Resources Geographic Information System web mapping results for species observations near the assessment property. Note these observations are a collection of species documented in the vicinity by various means and are a very incomplete representation of what may occur in the area or that may utilize this property. The resources selected for documented occurrences in the area included Black Bear Calls, Black Bear Telemetry, Eagle Nesting, Panther Mortality, Panther Telemetry, Scrub Jay, Wading Bird Rookeries, and opportunistic Wildlife Observations. There are no documented wildlife sightings on the Jungle Trail Island Manor property (Figure 6).

Figure 7 shows the Critical Lands and Waters Identification Project (CLIP version 4.0) Biodiversity Resource Priorities model, which combines several conservation priorities models including the Strategic Habitat Conservation Areas for Florida Forever, Vertebrate Richness, Potential Rare Species Habitat, and Priority Natural Communities Core Data layers. The property is mapped as Priority 4 (Priority 1 has the highest conservation priority on a scale from 1 to 5) (Figure 7).

Table 2. The animal species listed endangered, threatened, or tracked by FNAI that have the potential to occur on the Jungle Trail Island Manor property.

Species Name	Common Name	Global Rank	State Rank	Federal Status	State Listing
<u>Bird</u>					
<i>Mycteria americana</i>	wood stork	G4	S2	T, PDL	FT
<i>Setophaga discolor paludicola</i>	Florida prairie warbler	G5T3	S3	N	N
<i>Setophaga kirtlandii</i>	Kirtland's Warbler	G3	S1		N
<u>Fish</u>					
<i>Ctenogobius stigmaturus</i>	Spottail Goby	G2	S2	N	N
<i>Rivulus marmoratus</i>	Mangrove Rivulus	G4G5	S3	SC	N
<u>Reptile</u>					
<i>Drymarchon couperi</i>	eastern indigo snake	G3	S2?	T	FT
<i>Gopherus polyphemus</i>	gopher tortoise	G3	S3	N	ST

Table 3. The plant species listed endangered, threatened, or tracked by FNAI that have the potential to occur on the Jungle Trail Island Manor property.

Species Name	Common Name	Global Rank	State Rank	Federal Status	State Listing
<i>Glandularia maritima</i>	coastal vervain	G3	S3	N	E
<i>Harrisia simpsonii (fragrans)</i>	Simpson's prickly apple	G2	S2	N	N
<i>Lantana depressa var. floridana</i>	Atlantic Coast Florida lantana	G2T1T2	S1S2	N	E
<i>Myrcianthes fragrans</i>	Simpson's stopper	G4	S4	N	T

4.0 WETLANDS

Approximately 11 percent of the site is covered in wetlands according to the CLC map. The parcel is within the Indian River Lagoon watershed.

4.1 AERIAL EXTENT AND CONNECTIVITY

From the CLC map only the mixed hardwood-coniferous swamp natural community was identified on the property (Table 1).

Figure 8 shows the wetlands, waterbodies, and flood zones located on the property from the National Wetlands Inventory (NWI) and Federal Emergency Management Agency (FEMA) maps. The NWI map identified 3.3 acres of wetlands, 17 percent of the site, and only freshwater forested/shrub wetland was documented. The excavated ponds, ditches and the Estuarine and Marine wetland polygon west of Jungle Trail were not depicted on the NWI or CLC maps.

The onsite wetlands appear to be hydrologically connected to the Indian River Lagoon via a culvert under Jungle Trail that is connected to a ditch that extends to the excavated ponds in the northwest corner of the site.

4.2 ALTERATIONS

There is evidence of vegetation clearing, and ditches and artificial impoundments have been excavated within and adjoining the onsite wetland communities.

Invasive exotic plant infestations, particularly Brazilian pepper, could be high. There were several other invasive exotic plant species observed along the edge of the wetland communities that border Jungle Trail and included Australian pine, beach naupaka, West Indian dropseed, Guinea grass, Senegal date palm, and queen palm.

5.0 WATER RESOURCES

5.1 AQUIFER RECHARGE

Figure 9 shows the priority ranking for aquifer recharge on the project site. This is a broad measure focusing on the recharge of springs, sinks, aquifers, natural systems, and water supply. Areas of potential recharge to the Floridan and surficial aquifers were determined from soil hydraulic conductivity, proximity to karst features, depth to water, and overburden (Florida Forever Conservation Needs Assessment, Tech Report 2023). No portion of the site was identified as a priority for aquifer recharge (ranks 1 through 6 with Priority 1 being the highest priority; 0=no rank) (Figure 9).

5.2 WATER QUALITY

The wetlands onsite have the potential to aid in maintaining water quality and in situ water purification of stormwater entering the system from the uplands. Onsite water quality could potentially be improved by assuring that the essentially impounded wetland is allowed to regularly flush with the tides and hydrological conditions allowing for the continuation of natural biological and chemical processes.

5.3 WATER ATTENUATION

The wetland communities can help to store water and reduce the speed of water as it flows over the landscape.

6.0 CORRIDORS AND GREENWAYS

The eastern portion of the northern boundary and the east boundary of the Jungle Trail Island Manor Property shares an approximately 128m border with the Captain Forster Hammock Preserve Conservation Area (Figure 10). The Captain Forster property is part of the Archie Carr Sea Turtle Refuge Florida Forever BOT Project. Approximately 60m of the western boundary lies along the Indian River Lagoon Blueway Corridor. The Indian River Land Trust Pine Island property is 350m southwest from the site.

Figure 11 shows the CLIP landscape priority ranking for the property. This model combines priorities from the Ecological Greenways and Landscape Integrity Core Data layers. No portion of this property was ranked a priority.

7.0 RESTORATION, LAND MANAGEMENT, HAZARDOUS MATERIALS, AND RECREATION/EDUCATION OPPORTUNITIES

7.1 RESTORATION POTENTIAL

Possible restoration of the onsite natural communities could include planting of maritime hammock vegetation in the uplands, stormwater wetland creation/enhancement, salt marsh restoration, and invasive exotic plant species control. The alterations to the onsite hydrology would need to be more thoroughly assessed to determine the type and amount of restoration that may be beneficial and feasible.

7.2 LAND MANAGEMENT POTENTIAL

This property could be a significant addition to Captain Forster Hammock Preserve Conservation Area that was purchased in the mid-1990s by Indian River County with cost-share funds from the State Conservation and Recreation Lands Program.

7.3 HAZARDOUS MATERIALS

There are no hazardous waste sites reported on the property from two online sources provided by the Florida Department Environmental Protection Division of Waste Management.

Map Direct: <https://ca.dep.state.fl.us/mapdirect/>

Contamination Locator Map <https://ca.dep.state.fl.us/mapdirect/?web-map=bdfa237157c7426a8f552e40a741685e>

DEP cleanup sites <https://www.arcgis.com/apps/mapviewer/index.html?web-map=316f774db3f7420faf54008608faff64>

7.4 RECREATION AND EDUCATION OPPORTUNITIES

The process of establishing recreational opportunities will require inventorying the area to determine appropriate locations for activities, collaborating with stakeholders, determining the desired objectives that recreation could provide, and identifying the financial costs and benefits of

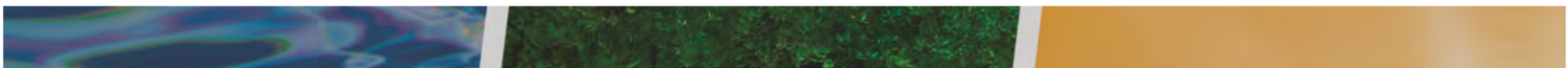
providing the different types of opportunities. Some examples of potential recreation at this site include boating, bank fishing, wildlife viewing, and hiking. The historic Jungle Trail runs along the west boundary. There is the potential for replanting native vegetation and possibly even creating a native arboretum on the parcel. Educational kiosks describing the estuarine wetlands and how they relate to water quality within the Indian River Lagoon could be installed. Similarly, educational resources that describe the value of the last remaining maritime hammocks to migrating Neotropical birds could be installed and help to influence the management of the property.

8.0 OTHER CONSIDERATIONS

The two private parcels northwest of this property that are contiguous with Captain Forster Hammock Preserve have also been nominated for acquisition and these parcels are essentially the last opportunity to add to the Captain Forster Hammock Preserve Conservation Area.

9.0 SUMMARY

The Jungle Trail Island Manor Property is a 19.4-acre parcel that is contiguous with one of the last large remaining mature maritime hammocks in the county. It contains a mix of cleared citrus grove land with shrub marsh, mangrove swamp and salt marsh estuarine wetlands.



FIGURES



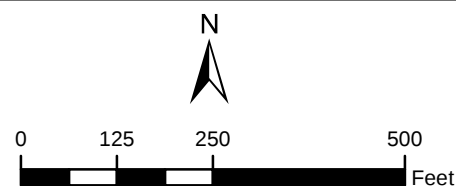
Figure 1.
The Location of the Jungle Trail Island Manor Property
within Indian River County, Florida

Source: ESRI, DigitalGlobe Imagery; Water & Air Research, Inc., 2024.



Figure 2.
 The Florida Cooperative Land Cover Map
 on the Jungle Trail Island Manor Property
 Indian River County, Florida

Source: ESRI, DigitalGlobe Imagery, 2023; Water & Air Research, Inc., 2024.



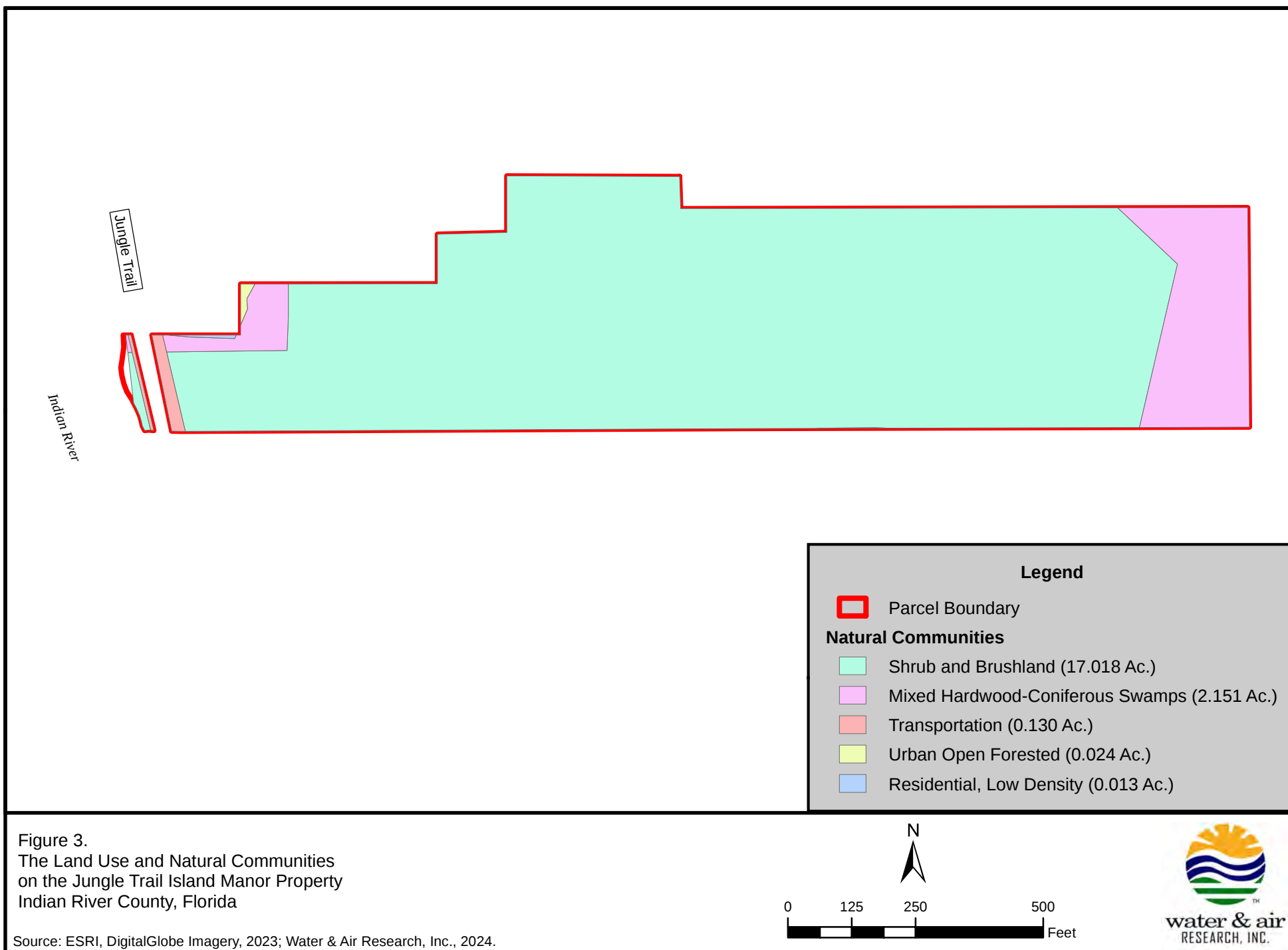


Figure 3.
The Land Use and Natural Communities
on the Jungle Trail Island Manor Property
Indian River County, Florida

Source: ESRI, DigitalGlobe Imagery, 2023; Water & Air Research, Inc., 2024.

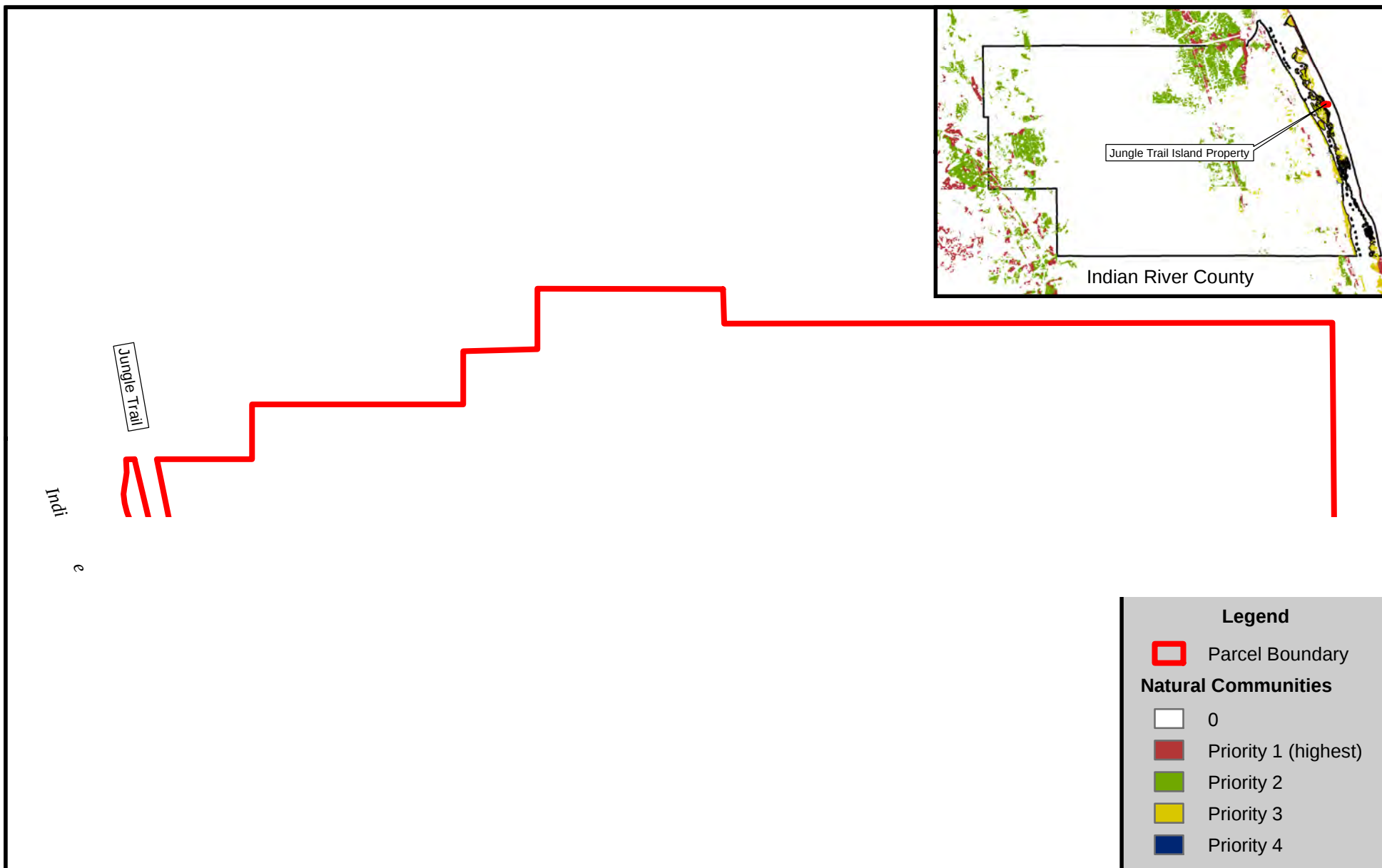


Figure 4.
 The Under-represented Natural Communities Mapped by FNAI for the
 Florida Forever Statewide Environmental Lands Acquisition Program
 That occur on the Jungle Trail Island Manor Property
 Indian River County, Florida
 Source: Water & Air Research, Inc., 2024.

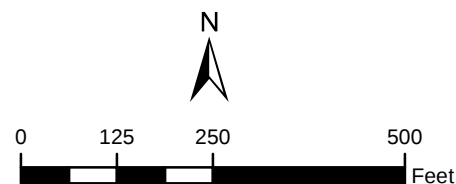
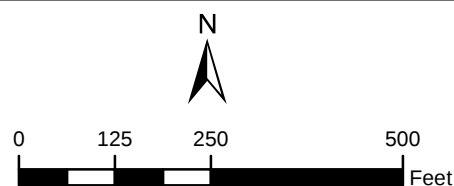




Figure 5.
 The Soil Types Found on the
 Jungle Trail Island Manor Property
 Indian River County, Florida

Source: ESRI, DigitalGlobe Imagery, 2023; Water & Air Research, Inc., 2024.



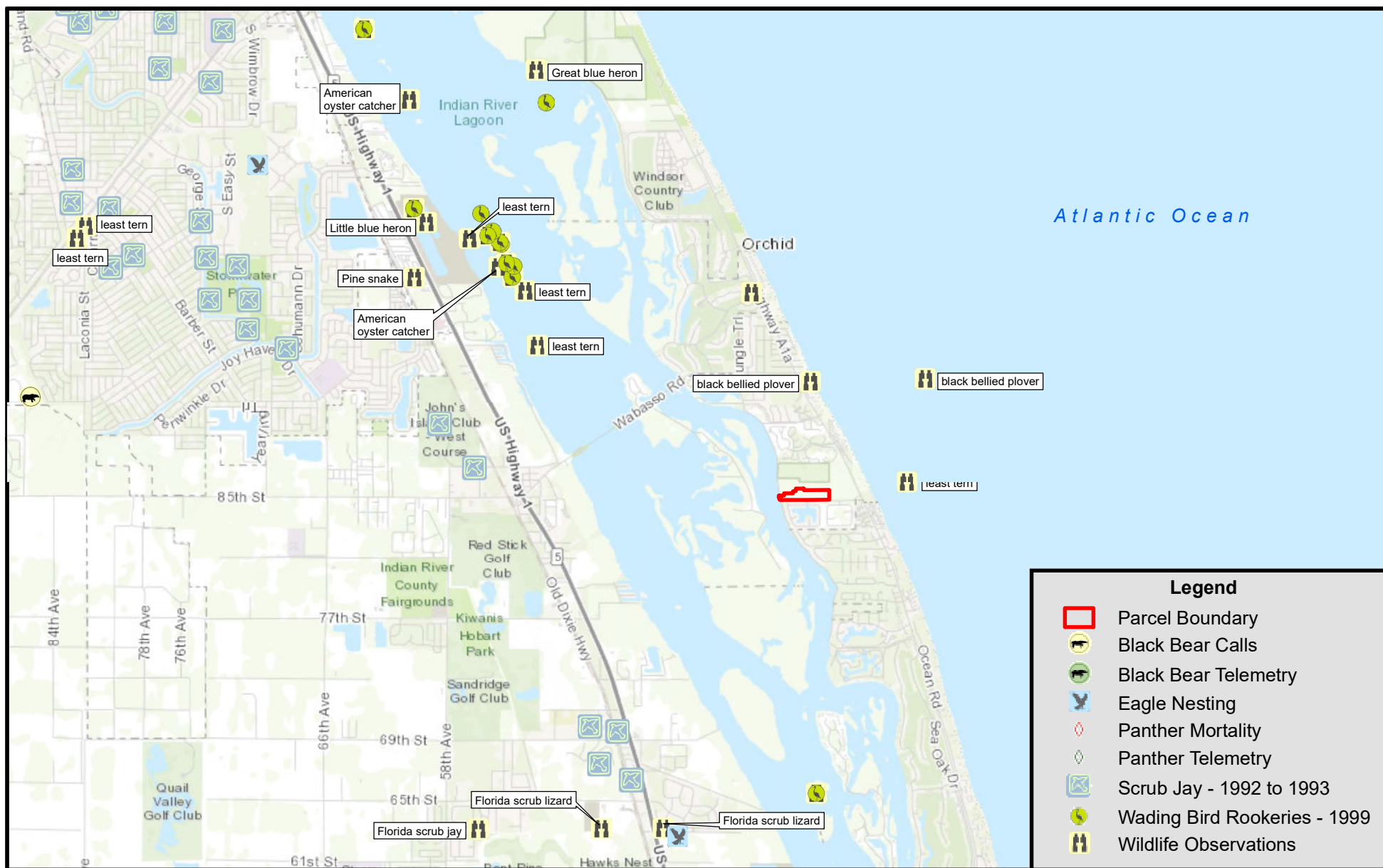
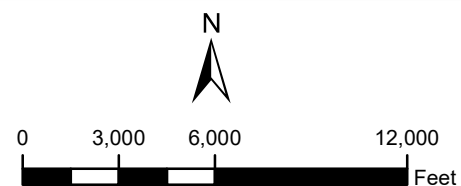


Figure 6.
The Florida Fish and Wildlife Conservation Commission's Fish and Wildlife Research Institute Terrestrial Resources Geographic Information System Web Mapping Results for Species Observations near the Assessment Property
Source: FNAI, 2023; Water & Air Research, Inc., 2024.



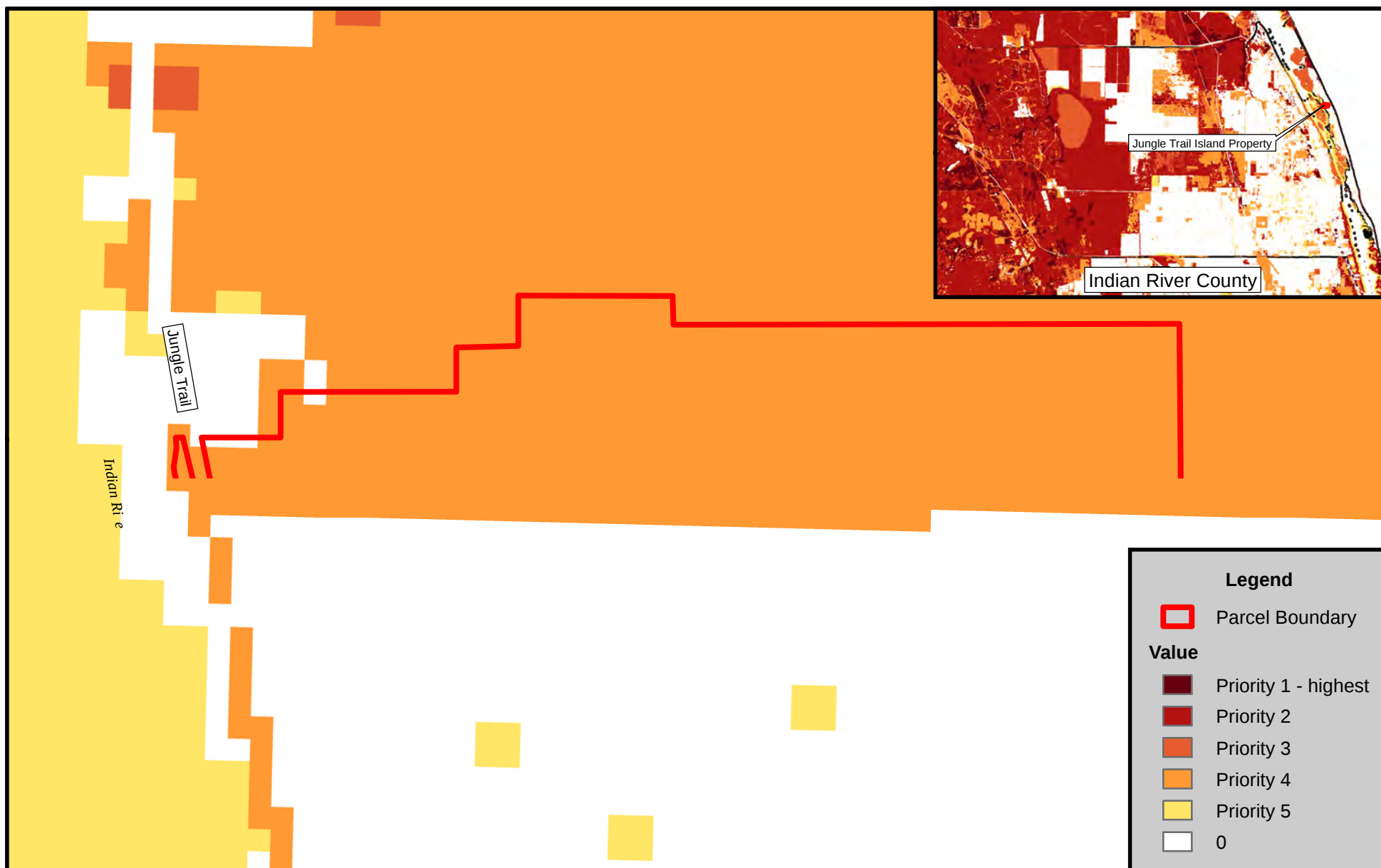


Figure 7.
The Biodiversity Resource Priorities Model (CLIP 4.0)
on the Jungle Trail Island Manor Property
Indian River County, Florida

Source: FNAI, 2023; Water & Air Research, Inc., 2024.

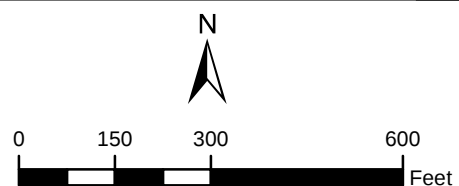
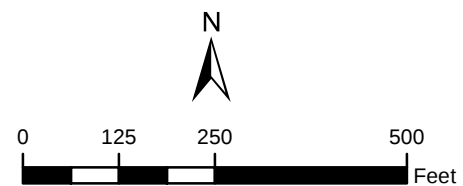




Figure 8.
The NWI Wetlands and FEMA Flood Zones
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Source: ESRI, DigitalGlobe Imagery, 2023; Water & Air Research, Inc., 2024.



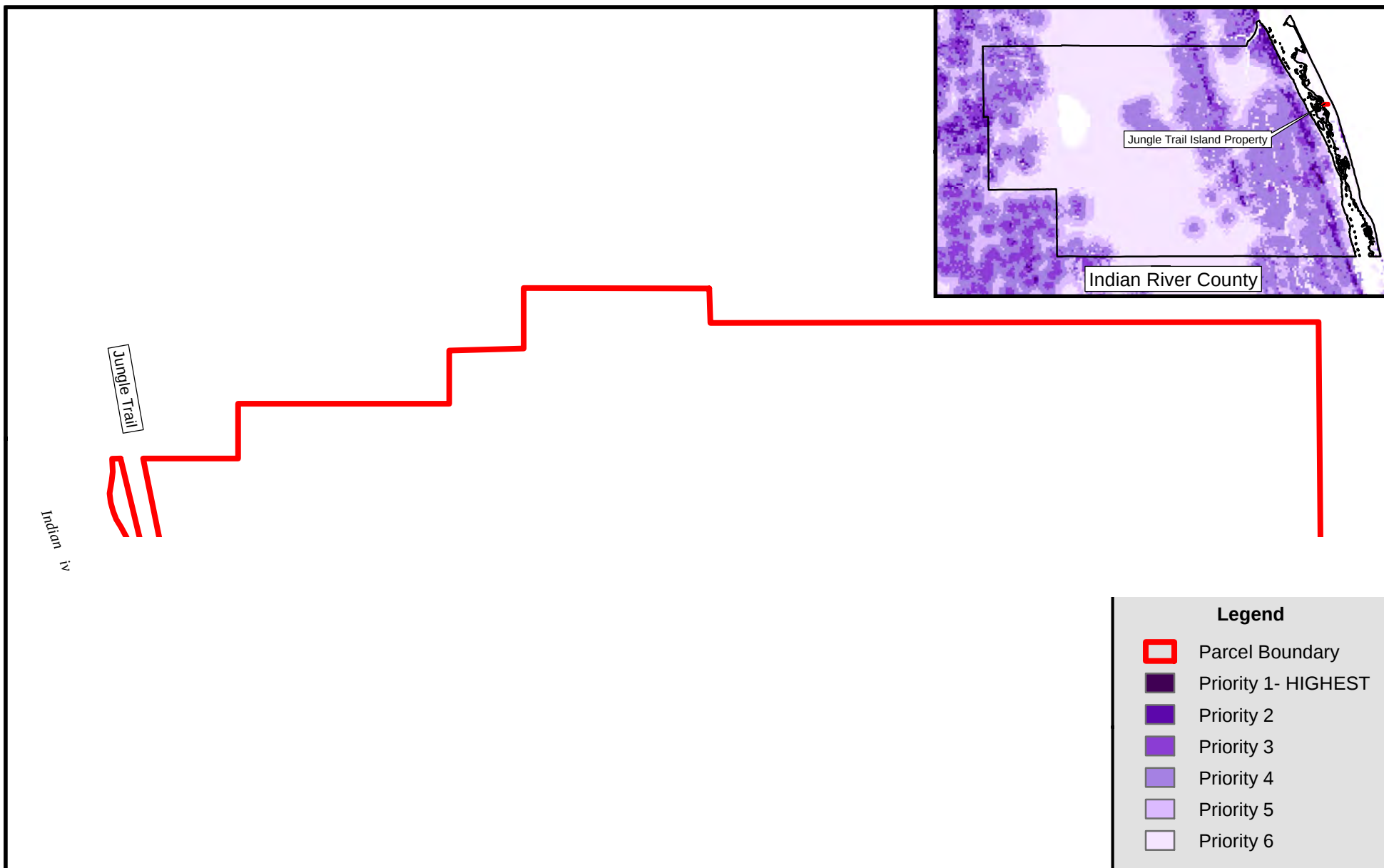


Figure 9.
Groundwater Recharge Areas Critical to Springs, Sinks, Aquifers, Natural
Systems, or Water Supply on the Jungle Trail Island Manor Property
Indian River County, Florida

Source: FNAI, 2023; Water & Air Research, Inc., 2024.



Figure 10.
The Jungle Trail Island Manor Property
and the Conserved Lands in the Vicinity
Indian River County, Florida

Source: ESRI, DigitalGlobe Imagery, 2023; Water & Air Research, Inc., 2024.

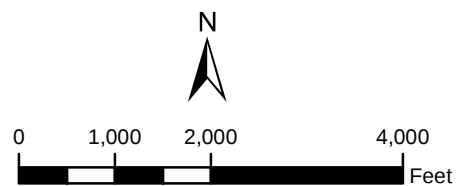
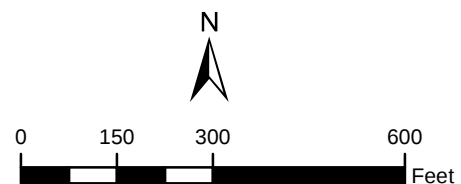
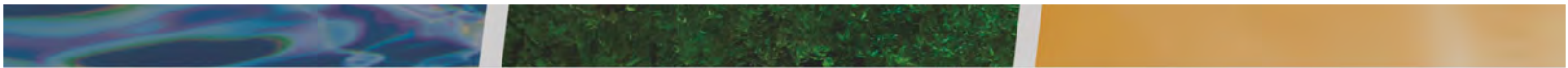




Figure 11.
The Landscape Resource Priorities Model (CLIP 4.0)
on the Jungle Trail Island Manor Property
Indian River County, Florida

Source: FNAI, 2023; Water & Air Research, Inc., 2024.



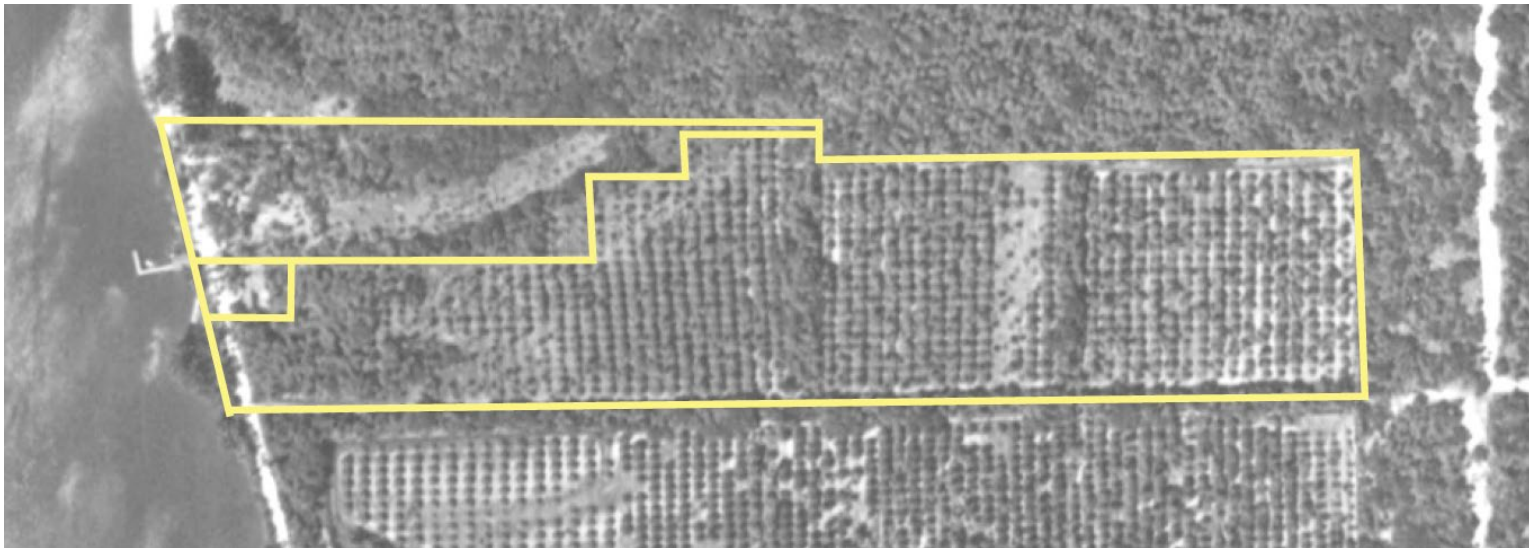


APPENDIX

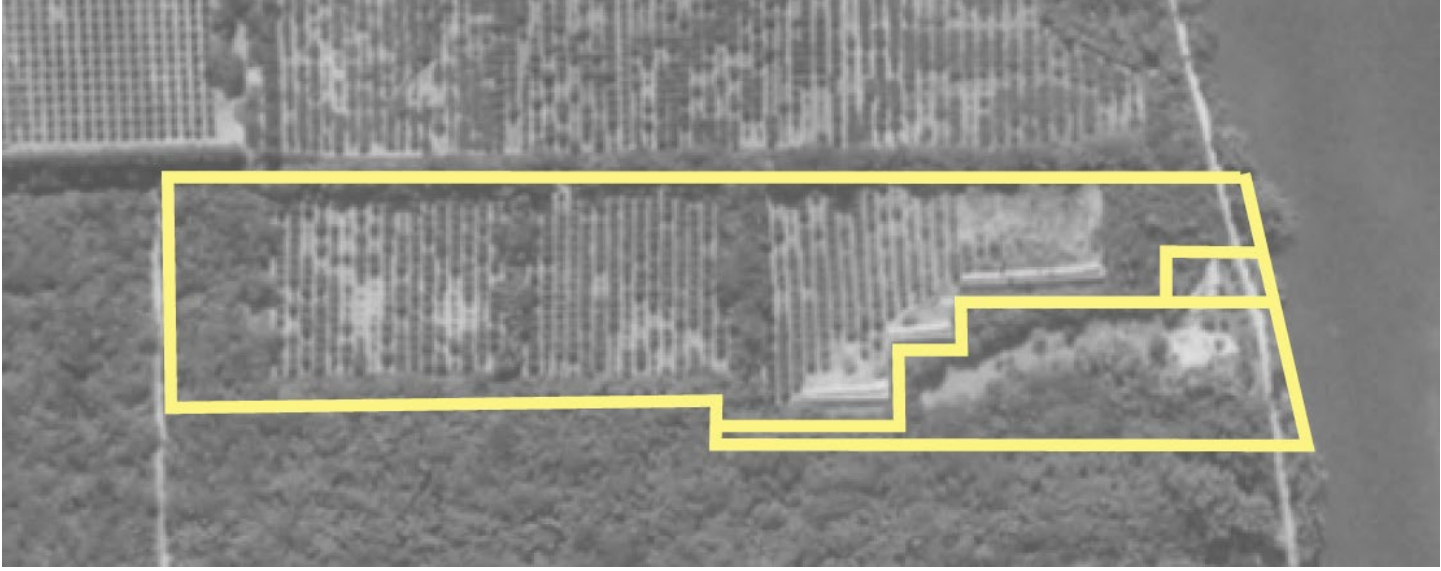
JUNGLE TRAIL ISLAND MANOR HISTORICAL AERIALS REVIEWED



1943 Aerial Photograph



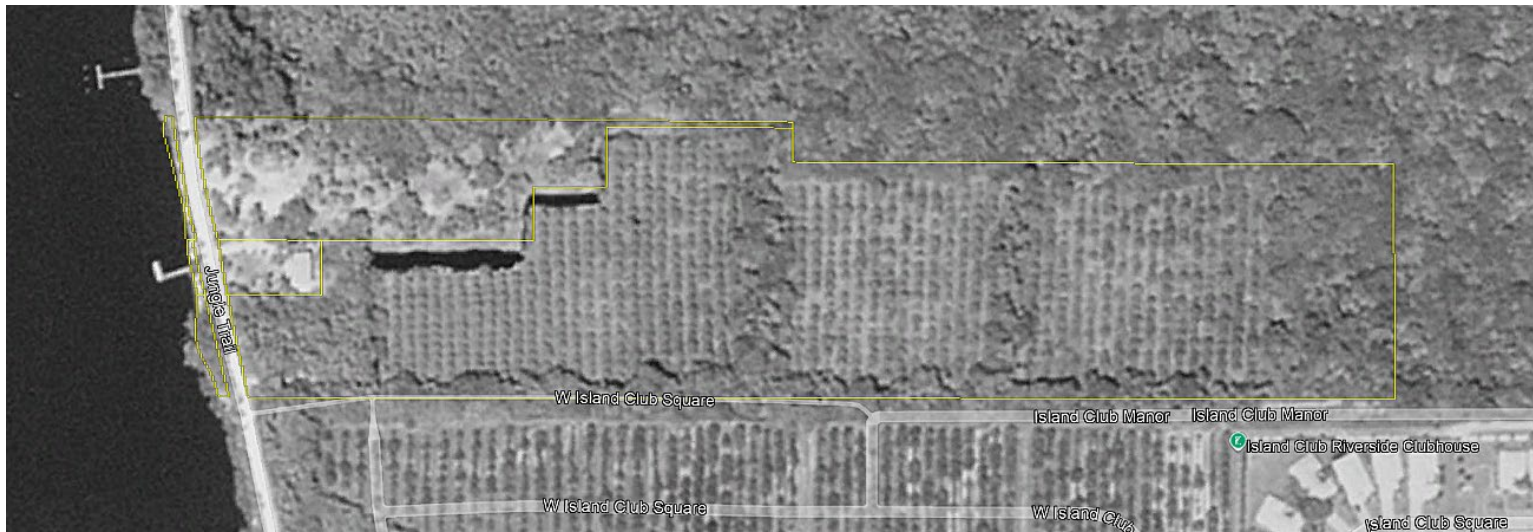
1951 Aerial Photograph



1970 Aerial Photograph



1994 Aerial Photograph



1999 Aerial Photograph



2005 Aerial Photograph



2010 Aerial Photograph



2017 Aerial Photograph



2024 Aerial Photograph



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***Environmental Engineers,
Scientists, & Planners***