Yarborough Lease
Seminole County, Florida

Grazing Management Plan

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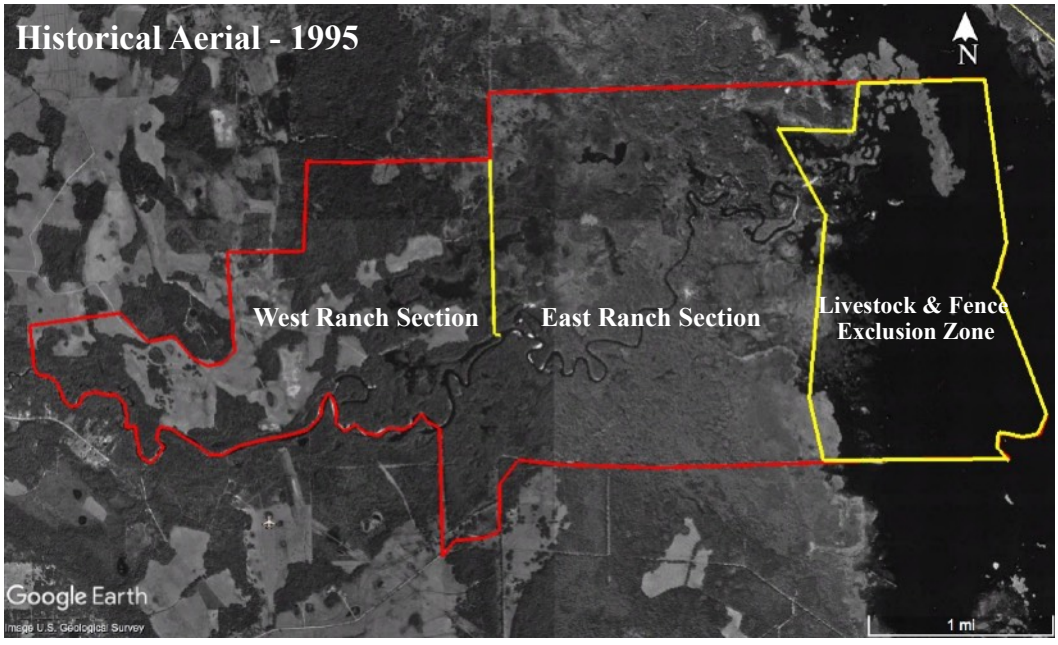
Table of Contents

General Property Description

The Yarborough grazing lease consists of approximately 3,681 acres located within the eastern portion of the Little Big Econ State Forest in Seminole County, Florida. This property has a long history of cattle grazing from its upland forests down to the St. Johns River floodplain. The Econlockhatchee River is an alluring natural resource feature of this property. This river forms the southern most boundary of what we refer to in these grazing management plan as the "West Ranch Section," as it meanders on a west-to-east flow. At a point where we will refer to as the "East Ranch Section," the Econlockhatchee Rivers travels more or less from a southwest to northeast flow where it terminates into the St. Johns River.

Historically, small "islands" of scrubby flatwoods and xeric hardwood hammocks located west of the properly drained through mesic flatwoods, wet prairies, depressional marshes, hydric hammocks and swamps south into the Econlockhatchee River and then east into the St. Johns River Floodplain. By 1972, most of the improved pasture areas were cleared and planted to forage within the "West Ranch Section." Today, bahiagrass still occupies these open areas and is the principle forage resource within this section of the property.

Due to extreme hydroperiod fluctuations associated with the St. Johns River floodplain and its association to natural saline conditions resulting from "ancient seawater" uplifting, minimal evidence of planted pasture can be found in the "East Ranch Section." However, desirable native forage species such as seashore dropseed (*Sporobolus virginicus*) and seashore paspalum (*Paspalum vaginatum*) are prevalent within this open marsh area and contribute greatly to the livestock carrying capacity on the floodplain. However, some areas located close to the western tree-line of the floodplain marsh have become invaded by sand cordgrass (*Spartina bakeri*), sea myrtle (*Baccharis halimifolia*) and other unpalatable species resulting in areas of "thickets" having minimal value to grazing at this time.



In **Appendix I**, a series of historical aerial photo illustrate some interesting changes to the natural flow patterns and "open" fire dependent communities that formally existed prior to the introduction of improved pasture. A 1940 aerial photo illustrates the open floodplain marshes that we prevalent prior to the encroachment of sea myrtle and sand cordgrass along its western edge. A 1972 aerial photo shows the establishment of improved pastures in the "West Ranch Section" place by their distinctive polygons. And, a couple of 2005 aerial photos show the rapid changes that can occur during the wet season on the floodplain marsh drastically reducing the amount of marsh access to livestock and to desirable native forages.

Goals & Objectives

The objective of this grazing management plan is to provide guidance and recommendations to SJRWMD land managers and to the grazing lessee on methods and techniques that will support livestock grazing as an effective land management tool on the Yarborough cattle lease. For this purpose, this plan recognizes the former native plant communities where applicable, historic land use(s), the property's current condition and its potential to support a low-intensity/low-input livestock enterprise. Using recognized range management principles this grazing management plan will encourage livestock grazing as the principle land management tool with judicious use of supporting practices such as interior cross-fencing, stockwater development, prescribed burning and mechanical, chemical and biological brush and weed management.

The ability to apply livestock grazing for the benefit of natural resource management requires having the right stock density, length of grazing, and period of rest following grazing to allow recovery of forage plants within each pasture. The objective of this grazing plan will be to recommend the appropriate use of existing forage resources in a manner that will meet livestock health and performance needs and achieve land management goals. Therefore, the application of a rest-rotation grazing management strategy is imperative.

To create these opportunities the following goals need to be accomplished:

1. Maintain "cow-tight" boundary fences.

2. Install additional interior cross-fencing that facilitates livestock movement.

3. Install additional livestock watering facilities to ensure adequate water availability.

4. Control shrubs and herbaceous weeds where needed.

5. Follow a rest-rotation grazing management plan.

6. Maintain grazing records to assist with annual grazing plan revisions.

7. Revise the annual grazing management plan in a timely manner incorporating SRJWMD management and lessee inputs.

Soils

Review of the county-level published soil survey of the Yarborough lease is an important part of inventorying the natural resources and for making forage production predictions. The USDA - NRCS Soil Survey recognizes 17 different soil map units within the 3,681 acre parcel. Soils provide valuable information pertaining to present and former natural ecological communities and their ability to growth native and domestic forages, and to manage for better wildlife habitat.

In **Appendix II,** a soil map of the property followed and Table 1 - "Soils" includes the following information:

- Soil Map Symbol
- Soil Map Name
- Soil and Native Plant Community Correlation

Native plant communities are divided into communities of frequent fire or fire dependent, infrequent fire or fire sub-climax communities, and those communities that experience rare or no fire, or climax communities.

Forage Suitability Groups

USDA - NRCS combines similar soils to assist in determining appropriate forage species and forage production yield potential for recommending stocking rates. Forage Suitability Groups can be found in Section II of the USDA - NRCS Field Office Technical Guide (FOTG).
In **Appendix III,** FSG - "Table 1" groups soils located within the Yarborough lease property by soil map symbols and soil map names into appropriate Forage Suitability Group. FSG - "Table 2" provides recommended forage species and their **potential to produce forage yields and livestock carrying capacity**.

"Improved" or non-native forages such as bahiagrass perform best when soil pH is maintained between 5.5 - 6.0 combined with proper levels of N:P:K fertilizer applied annually. Bahiagrass is the most adapted non-native domesticated forage species capable of sustained production under low stock density without annual fertilization. However, it should be noted that forage yields and livestock carrying capacity are **at best only about 50%** of what can be achieved when proper soil amendments are applied.

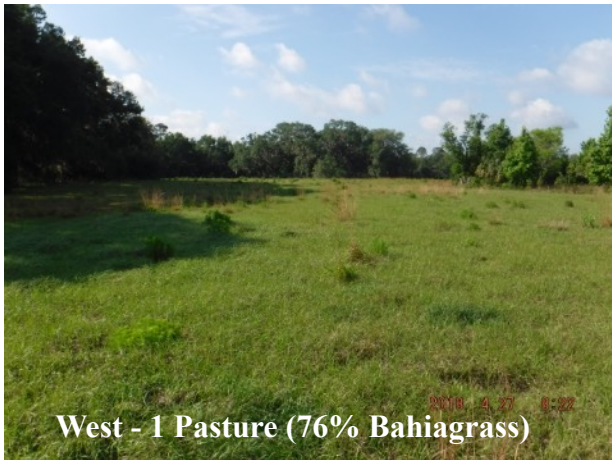
Native forages such as creeping, purple, chalky and shortspike bluestems along with lopsided indiangrass on mesic flatwoods, blue maidencane on wet prairies, maidencane in freshwater marshes, and seashore dropseed and paspalum found in saline-influenced marshes along the St. Johns River evolved under natural soil conditions. Therefore, native rangeland forages do not benefit by adding fertilizer or other soil amendments. Desirable native forages such as these depend upon natural hydrologic conditions and fire regimes combined with proper grazing use. Interior cross-fencing and stockwater developments recommended in this annual grazing

management plan will contribute greatly in sustaining pasture and native forage production while benefiting wildlife habitat and watershed functions.

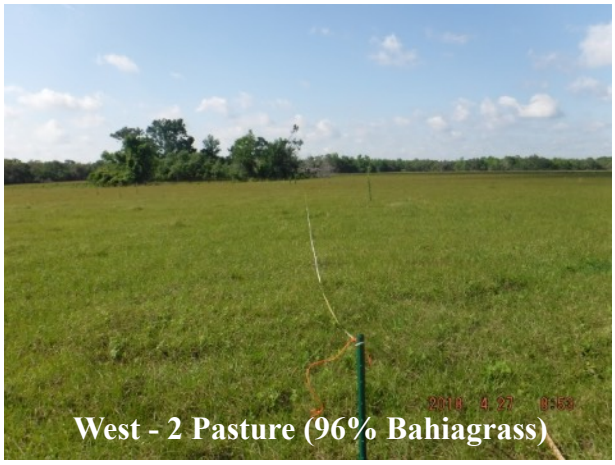
Key Forage Producing Areas

West Ranch Section

Bahiagrass pastures dominate the forage producing areas throughout the West Ranch Section. These pastures appear to have had moderate to low levels of grazing pressure throughout the winter and spring months and will perform well during the upcoming growing season. Due to the small size of the West - 1 Pasture (34.5 acres), it appears combining West - 1 with the West - 2 pasture will provide a more balanced rest-rotation grazing system with Pastures West - 3, West - 4 North and West - 4 South.



West - 1 Pasture (76% Bahiagrass)

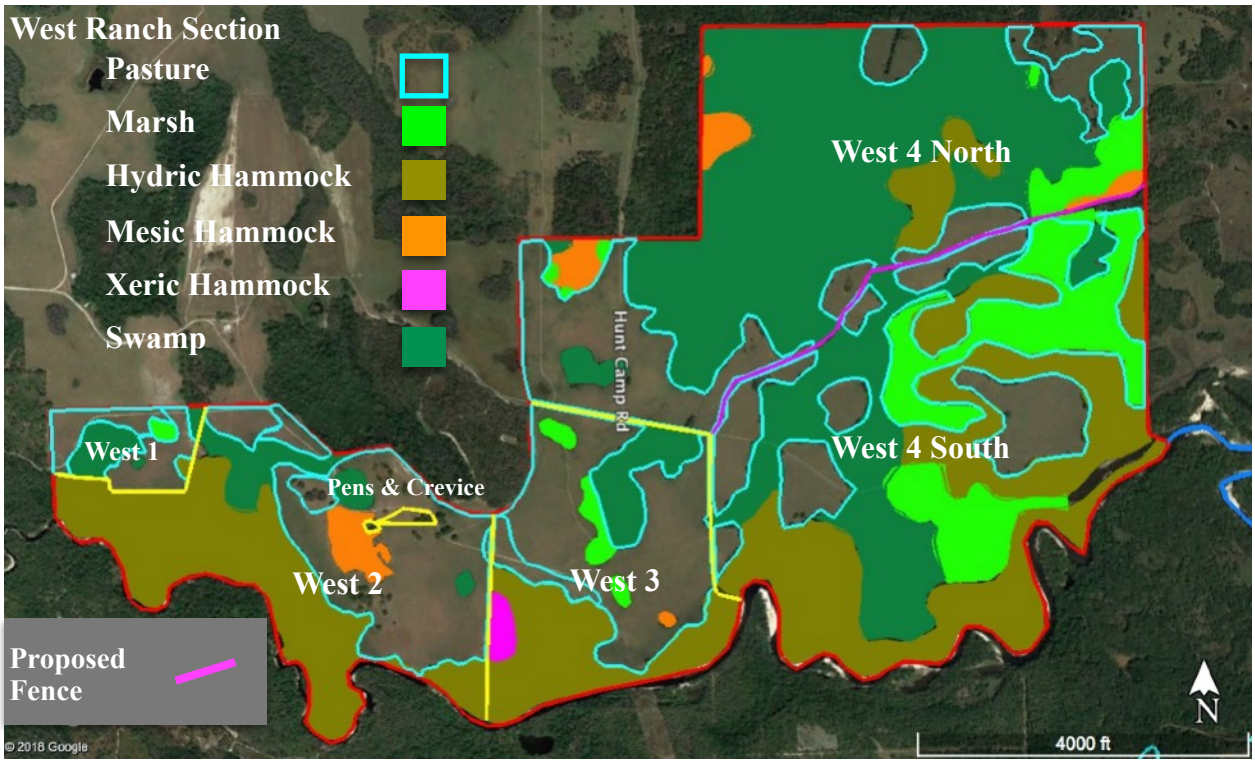


West - 2 Pasture (96% Bahiagrass)

Natural plant communities such as freshwater marshes identified as bright green on the West Ranch Section map will provide some grazing values to cattle throughout the year, however, their contributions will be limited due to their small area. These isolated marshes do provide idea emergent wetland habitat for a variety of important wildlife species. Hammocks and swamps provide minimal livestock forage yields, however, their benefits to landscape diversity and wildlife habitat cannot be over stated.

East Ranch Section

The East Ranch Section is divided by the Econlockhatchee River into two approximately equal parts identified as the East - North Pasture and the East - South Pasture. The dominant forage producing area within the East Ranch Section is by far native forages found within the floodplain marshes. Marshes within this region vary from those characteristic of typical freshwater marshes in plant composition to those exhibiting a moderate to high level of saline influence. Saline influence marshes have native vegetation such as seashore dropseed, seashore paspalum, switchgrass (*Panicum virgatum*) sand cordgrass, sea purslane (*Sesuvium spp.*), and glasswort (*Salicornia spp.*).


West Ranch Section
Pasture
Marsh
Hydric Hammock
Mesic Hammock
Xeric Hammock
Swamp
West 4 North
Hunt Camp Rd
West 1
Pens & Crevice
West 2
West 3
West 4 South
Proposed Fence
© 2018 Google
4000 ft
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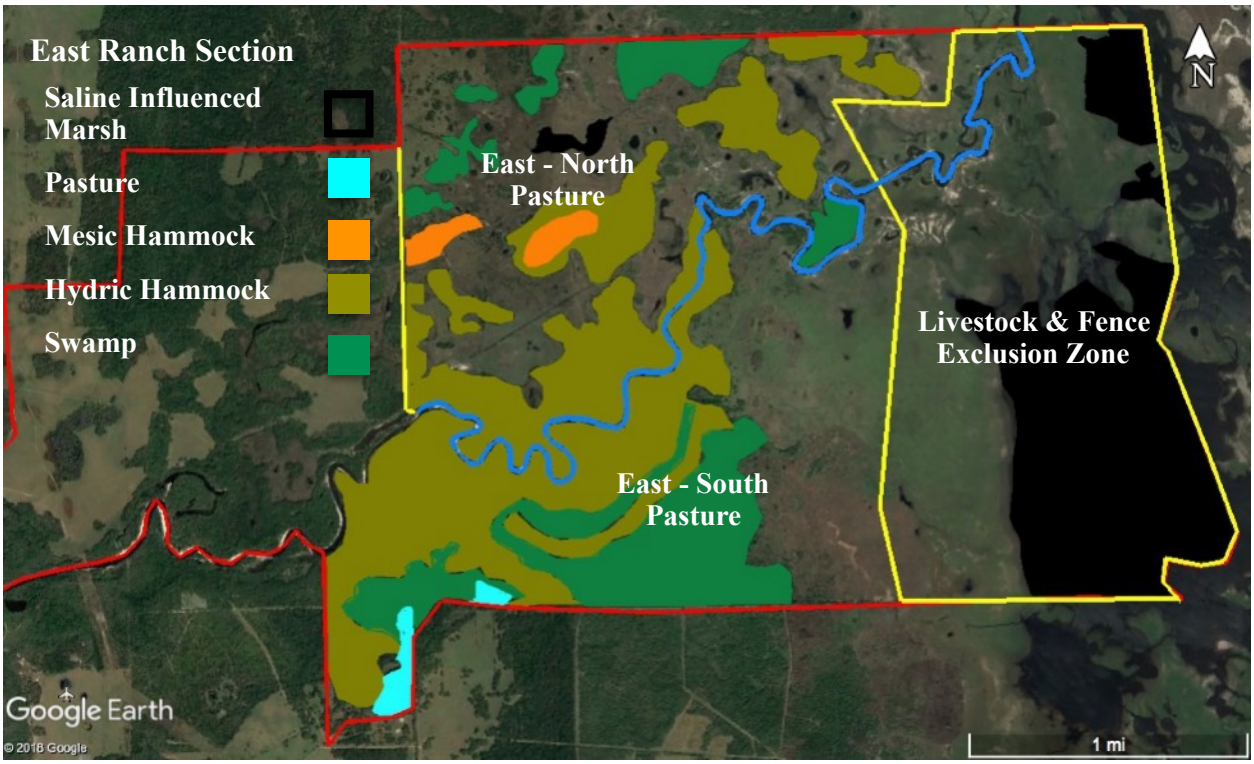
East Ranch Section
Saline Influenced Marsh
Pasture
Mesic Hammock
Hydric Hammock
Swamp
East - North Pasture
Livestock & Fence Exclusion Zone
East - South Pasture
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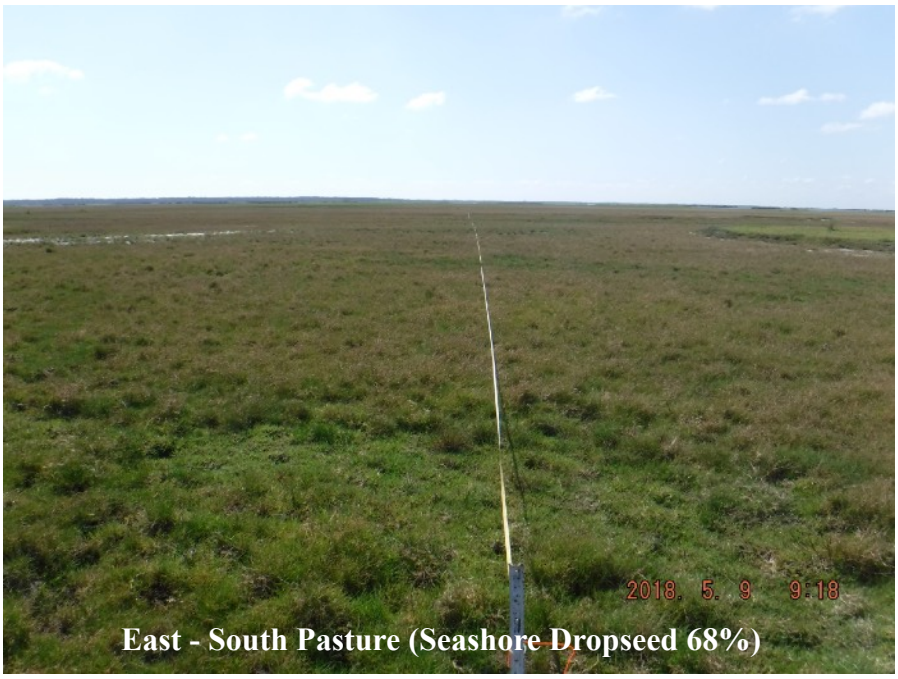


East - South Pasture (Seashore Dropseed 68%)

East - South Pasture (Areas of High Saline Influence)

Areas of the floodplain marsh closest to the western tree-line show signs of heavy grazing with an increased occurrence of unpalatable sand cordgrass and sea myrtle. More desirable forages that once dominated these sites have been replaced. Periodic burning, proper grazing management, and roller-chopping can restore these areas to a more desirable plant composition for the benefit of forage production and wildlife habitat.

East - South Pasture (Floodplain Close to Tree-line)

Grazing Management & Supporting Practices

USDA - NRCS conservation practice Prescribed Grazing - Code 528, is the application of managing the harvesting of vegetation with grazing and/or browsing animals. This practice combined with Prescribed Burning - Code 338, Firebreak - Code 394, Brush Management - Code 314, Herbaceous Weed Control - Code 315, Fence - Code 382, Integrated Pest Management - Code 595 and Watering Facility - Code 614 should be incorporated within this grazing management plan to ensure healthy livestock, sustainable forage resources and desirable wildlife habitats.

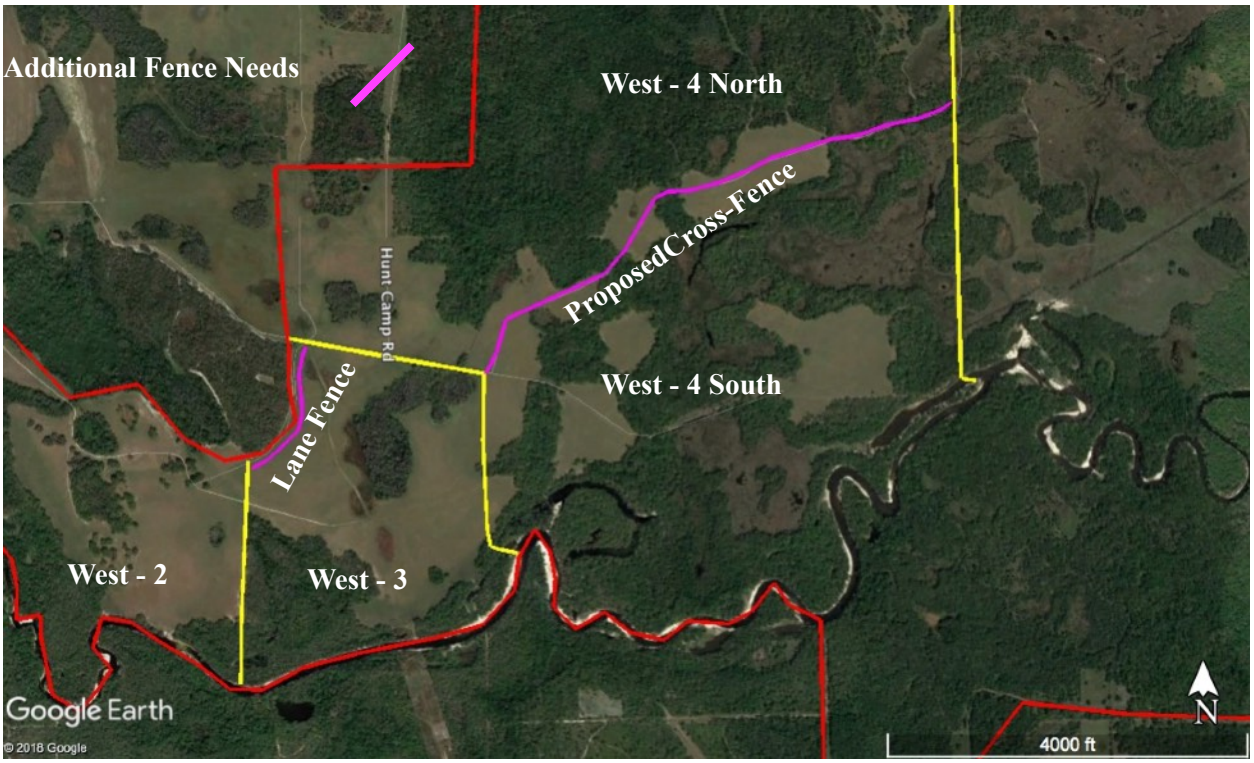
Fencing

To facilitate an effective rest-rotation grazing system additional fence is needed to separate the West - 4 North pasture from West - 4 South. To aid in moving cattle through the planned grazing rotation, a livestock lane built along the northwest corner of West - 3 will allow cattle to be moved from West - 1 & 2 to West - 4 North without having to re-enter the West - 3 pasture.

Additional Fence Needs:

Lane Fence	1,610 feet
Cross-fence (West - 4 North from West - 4 South)	6,329 feet

See Appendix VIII for USDA - NRCS recommended constructions specifications.



Stockwater Development

The principles of this annual grazing management plan are based upon a rest-rotation grazing management strategy, where cattle are constrained within each pasture at a specific animal unit density and number of days of grazing duration. After each pasture has completed a grazing period, the pasture must receive a period of grazing deferment or "rest from grazing" to allow forage resources to recover. To facilitate maintaining cattle within each pasture it is essential that a year-round supply of livestock water be available within each pasture. This can be accomplished in two ways, 1) excavate a stockwater pond or 2) install a trough and well source using a submersible solar pump.

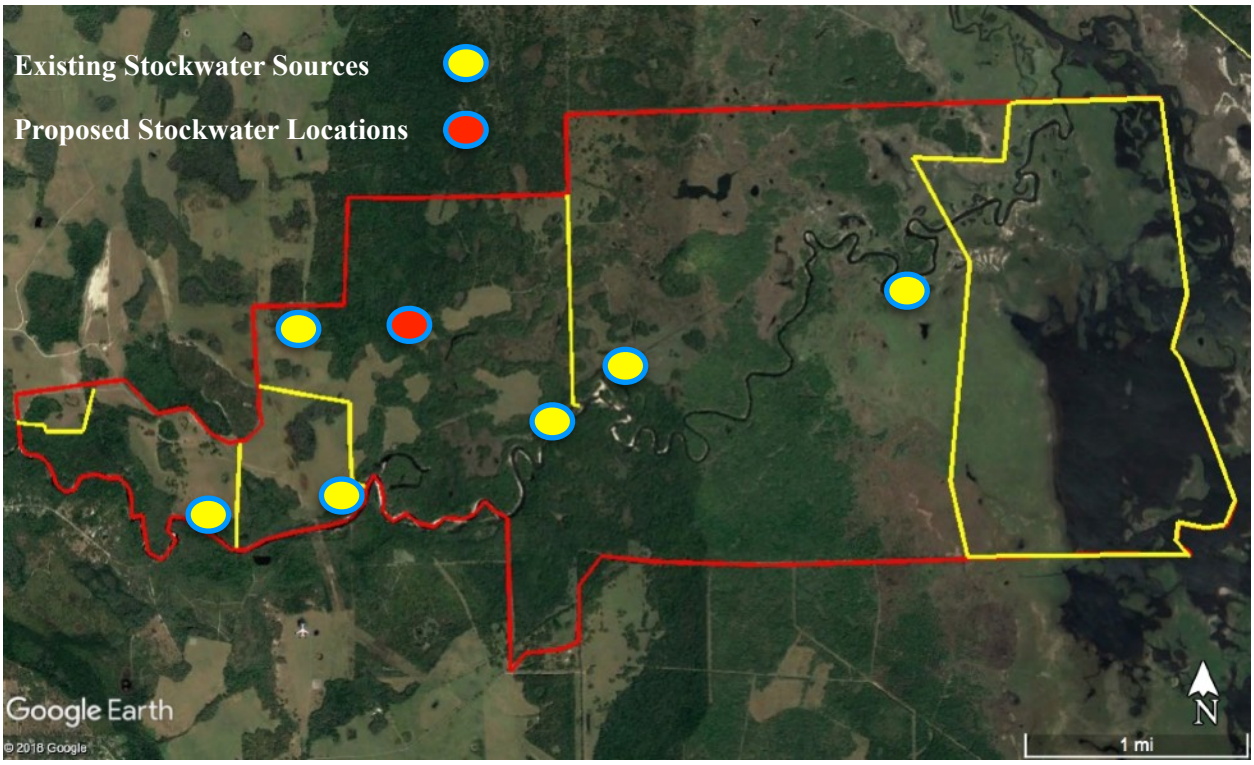
Stockwater Availability:

West - 1	None	West - 4 (S.)	River Access
West - 2	River Access	East - (N.)	River Access
West - 3	River Access	East - (S.)	River Access
West - 4 (N.)	New Source Recommended		

Stock ponds if large enough can provide suitable livestock water. The minimum size of each stockwater pond must be 1/4 acre in size, with one end sloped 4:1 for cattle access, with the remaining sides sloped at 2:1. Minimum depth of the stockwater pond needs to be 10 feet. Using these dimensions you will need to excavate 2,433 cubic yards of material.

The most desirable stockwater sources are from a well and trough system. This ensures the best quality water available to livestock and minimizes livestock diseases and other pathogens. If troughs and wells are considered, use large round toughs that hold approximately 1000 gallons of water per trough. These larger toughs provide ample storage and linear-space for cattle to have ample access to good quality water when needed. Locate troughs on a level firm foundation at a central location in each pasture where water is needed.

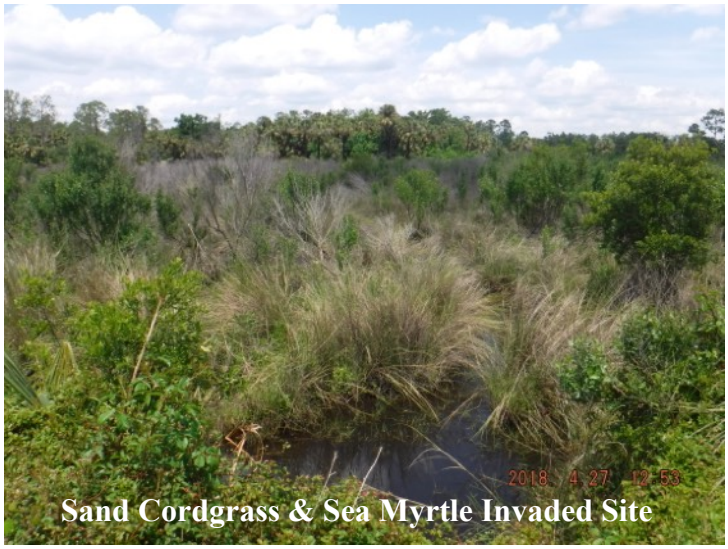
Beef cattle consume 12 - 15 gallons of water each day. If solar-power pumps and wells were the only source of livestock water, we would recommend a minimum of 5-days supply of water in storage at all times. However, access to the river mitigates the need to have 5-days of water storage.



Brush Management

Sea myrtle has encroached along the western "tree-line" of the floodplain's former open marsh as a result of untimely and perhaps continuous grazing of desirable native forage species. Sea myrtle a native shrub species has many benefits to wildlife. However, sea myrtle thickets have marginal value and significantly diminishes forage productivity.

For medium - small shrubs use a "Marden type M-7" roller-chopper capable of delivering 1,000 pounds per linear foot. Native forage species such as seashore dropseed, seashore paspalum and switchgrass all have modified underground stems (rhizomes) that respond well following roller-chopping. To optimize vegetative reproduction from these desirable species it is essential to provide a minimum of 90 days deferment from grazing following treatment during the active growing season.



Sand Cordgrass & Sea Myrtle Invaded Site

Brazilian pepper, a non-native invasive species was observed growing periodically across the property. SJRWMD has done an excellent job in keeping this aggressive species from forming dense stands. It is essential that continued vigilance be maintained in controlling Brazilian pepper by applying herbicide as a basal-bark or cut and stump application method whenever this species is encountered.

Herbaceous Weeds

Good grazing management with occasional mowing on improved pastures (i.e., bahiagrass) will effectively control common weeds such as thistle, dog fennel and ragweed. Best results occur when target species are mowed prior to flowering to minimize seed production. Non-native invasive species such as tropical soda apple and cogongrass will require dedicated herbicide treatments and constant vigilance to ensure these species do not establish dense infestations.

Mowing is not recommended on native rangelands areas (e.g., floodplain marshes), however, if applied to control weeds, adjust the mower deck height to a minimum of 10 inches to ensure that desirable native species are not "clipped" too closely. Provide a minimum of 30 days deferment from grazing following mowing treatments during the active growing season.

Prescribed Burning

Prescribed burning is used to reduce biomass accumulation, minimize wildfire threats and to mimic the natural ecological functions and benefits that fire provides to Florida's fire-dependent ecological communities. Native plant communities such as marshes, wet prairies, wet and mesic flatwoods and cypress swamps require periodic burning either naturally or prescribed to sustain their natural ecological functions, structure and values. Although, it is believed that much of Florida's natural landscape burned during the dry "lightening season", or spring - early summer, period, fire dependent plant communities benefit regardless of the season fire is applied. Most importantly, are the effects of livestock on the landscape following a burn.

Whether a natural fire or a prescribed burn, it is essential that cattle grazing be deferred for a minimum of 30 days following a burn within the active growing season. Taking an integrated approach of burning and grazing along the St. Johns River floodplain marshes can provide ideal livestock carrying capacity and wildlife habitat benefits.

For a safe and effective use of prescribed burns, the services of a Florida "certified burner" that establishes acceptable air temperature, relative humidity, wind speed and direction, fuel moisture, and considers smoke management and other important parameters should be acquired before conducting any burn. Also critical is having the required resources, both human and mechanical, on-site to effectively control and manage all burning evolutions.

Grazing Height Tolerances

To optimize forage production and maximize livestock forage intake from both native range and domestic pasture forages, it is critical that livestock graze no closer than to the proper stubble height or grazing tolerance . Following these guides will ensure rapid recovery and regrowth of forages following grazing periods, improved animal performance, sustain forage productivity and improved wildlife habitat. To accomplish this it is essential that complete control of livestock grazing be obtained by sound interior cross-fencing, gates and adequate stockwater in each pasture. The following table outlines forage species on the Yarborough lease property and the height in inches to initiate grazing and when grazing should be deferred.

Forage Species	***Begin Grazing***	***Begin Resting***
Bahiagrass	6 - 8 inches	2 - 3 inches
Seashore Dropseed	12 - 16 inches	6 - 8 inches
Seashore Paspalum	16 - 20 inches	8 - 10 inches
Switchgrass	24 - 30 inches	10 - 12 inches

Managing grazing pressure in accordance to these forage use tolerances will determine the success of the livestock enterprise and the overall grazing management plan.

Animal Unit Equivalents (AUE's)

Animal Unit Equivalents are used to develop a unit of measure across multiple classes of livestock based upon the animal's body weight. AUEs assists in preparing livestock forage inventories and estimates of livestock carrying capacity based upon the ability of each pasture to produce forage. Animal unit day (AUD), animal unit month (AUM) and animal unit year (AUY) estimates the amount of forage available to sustain a 1000 pound cow with calf-at-side for 1, 30 and 365 days respectively.

Livestock Class	Average Weight (pounds)	Animal Unit Equivalent	Forage Consumed * (Pounds)		
			AUD	AUM	AUY **
Cow w/ calf	1000	1.0	26	790	9490
Dry Cow	900	0.9	24	730	8760
Bull	1500	1.5	39	1187	14,235

* Forage consumed based upon daily intake of 2.6% of livestock body weight.
** AUY assumes calf-at-side is restricted to 6 months

Livestock Forage Inventory

The livestock forage inventory estimates the current livestock carrying capacity for the Yarborough cattle lease. In the following table each pasture is described by their forage yield potential based upon the amount of improved pasture and native plant communities in acres. In columns 3, 4 and 5 are carrying capacity estimates in AUM's per acre, AUM's per pasture and total AUY's or the number of livestock that can be supported within each pasture over a 12 month period.

At the present time, the overall carrying capacity from the West and East Ranch Sections is estimated at producing enough forage to support approximately **205 animal units**. Carrying capacity estimates related to improved pasture areas, (i.e., bahiagrass) described within this plan are based upon USDA - NRCS Forage Suitability Groups outlined in Appendix III. Carrying capacity estimates related to native plant communities are based upon USDA - NRCS Range Site Interpretations. To assist the rancher and to meet land management goals and objectives, adjustments to the livestock forage inventory and this grazing management plan should be done annually based upon forage utilization monitoring and grazing records kept by the lessee.

Pasture	Acres	AUM's/Ac.	Total AUMs	Total AUYs
West - 1 (35.4 Ac.)				
Pasture				
FSG -131	13.1	2.2	28.8	5
FSG- 141	10.1	2.9	29.3	
Marsh	1.7	1.0	1.7	
Hydric Hammock	.8	0	0	
Swamp	9.7	0	0	
West - 2 (245.0 Ac.)				
Pasture				
FSG - 121	6.4	2.4	15.4	24
FSG - 131	4.0	2.2	8.8	
FSG - 141	87.9	2.9	254.9	
FSG - 241	.6	3.1	1.9	
Mesic Hammock	9.0	.35	3.2	
Hydric Hammock	116.9	0	0	
Swamp	17.8	0	0	
Pens & Crevice	2.4	0	0	
West - 3 (189.5 Ac.)				
Pasture				
FSG - 141	94.2	2.9	273.2	25
FSG - 241	7.5	3.1	23.3	
Marsh	7.7	1.0	7.7	
Xeric Hammock	4.6	.25	1.2	
Mesic Hammock	.6	.35	.2	
Hydric Hammock	54.6	0	0	
Swamp	20.3	0	0	
West - 4 North (460.5 Ac.)				
Pasture				
FSG - 141	89.0	2.9	258.1	32
FSG - 145	30.4	3.2	97.3	
Marsh	18.0	1.0	18.0	
Mesic Hammock	13.0	.35	4.6	
Hydric Hammock	19.8	0	0	
Swamp	290.3	0	0	
West - 4 South (431.2 Ac.)				
Pasture				
FSG - 141	86.8	2.9	251.7	30
Marsh	102.7	1.0	102.7	
Hydric Hammock	152.9	0	0	
Swamp	88.8	0	0	
East - North (1,148.5 Ac)				
Saline Influenced Marsh	769.9	.80	615.9	52
Mesic Hammock	29.1	.35	10.2	
Hydric Hammock	251.8	0	0	
Swamp	87.8	0	0	
Open Water	9.9	0	0	

Pasture	Acres	AUM's/Ac.	Total AUMs	Total AUYs
East - South (1170.9 Ac) Pasture FSG -141 Saline Influenced Marsh Hydric Hammock Swamp	 19.1 488.7 397.9 265.2	 2.9 .80 0 0	 55.4 391.0 0 0	37
Total	3,681			205

Annual Grazing Plan

For effective grassland management, animal health and livestock performance it is imperative that a rest-rotation grazing system be implemented to effectively manage key grazing resources. Livestock forages, both native and introduced provide the essential resources critical to the health and productivity of the livestock. The interaction of the cattle upon the landscape, i.e., grazing, trampling, trailing, controlling of invasive plant species and cycling of nutrients can contribute greatly to the health and ecological functions of the property. These benefits will contribute to sustaining the forage resource base and benefit wetland and upland plant composition and habitat values.

The following grazing schedules are provided as a guide to the lessee to management livestock within the projected carrying capacity and to provide strategic rest-periods or deferments to ensure adequate recovery of grazed pastures. Annual Grazing Schedule - I considers the "West Ranch Section" only. Annual Grazing Schedule II considers both the West and East Ranch Sections eastward to the "livestock exclusion zone."

Annual Grazing Schedule - I (West Ranch Section Only - 116 AUYs)

Pasture	Acres	AUM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
West - 1 & 2	280.4	348	G				Rotate cattle herd every 7 - 14 days to optimize forage utilization during the growing season.							
West - 3	189.5	300		G										
West 4 (N)	460.5	384			G									
West 4 (S)	431.2	360				G								
* Supplements	X - Protein Y - Mineral H - Hay		X Y H	X Y H	X Y H	X Y H	Y H	Y	Y	Y	Y	Y	Y	Y

G = Grazing Periods

*** Recommended livestock supplements.**

Annual Grazing Schedule - II (West & East Ranch Section - 205 AUYs)

Pasture	Acres	AUM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
West - 1 & 2	280.4	348						Rotate cattle herd every 7 - 14 days to optimize forage utilization during the growing season.						
West - 3	189.5	300												
West 4 (N)	460.5	384												
West 4 (S)	431.2	360												
East (N)	1,148.5	624	G											
East (S)	1,170.9	444				G								
* Supplements	X - Protein Y - Mineral H - Hay		X Y H	X Y H	X Y H	X Y H	Y H	Y	Y	Y	Y	Y	Y	Y

G = Grazing Periods

*** Recommended livestock supplements.**

This annual grazing management plan is designed to minimize feeding of hay supplements. If hay supplements are required locate hay bales away from wetlands, open water, intact native plant communities or other environmentally sensitive areas. Monitor key forages on each pasture throughout the year. Adhere to grazing tolerances noted above to ensure key forage species are not over grazed. Consequences of weather, markets and other unexpected factors may cause the lessee to deviate from the grazing schedule for short periods of time. However, the overall concept of applied grazing management by providing periodic resting of pastures to promote desirable grassland health and vigor should always be part of the overall grazing management philosophy.

Conservation Practice Schedule:	Location	Approximate Date
Interior Cross - Fence	West - 4 (N) & West - 4 (S)	Summer 2018
Cattle Lane - Fence	West - 3	Sumer 2018
Stockwater	West - 4 (N)	Summer 2018
Invasive Species Control	All Pastures	On-Going
Pasture Weed Mgt.	All Bahiagrass Pastures	On-Going
Prescribed Grazing	All Pastures	On-Going
Prescribed Burning	East (N)	April 2019 *
	East (S)	June 2019 *

* Schedule prescribed burns following removal of livestock if cattle have access to the floodplain marsh.

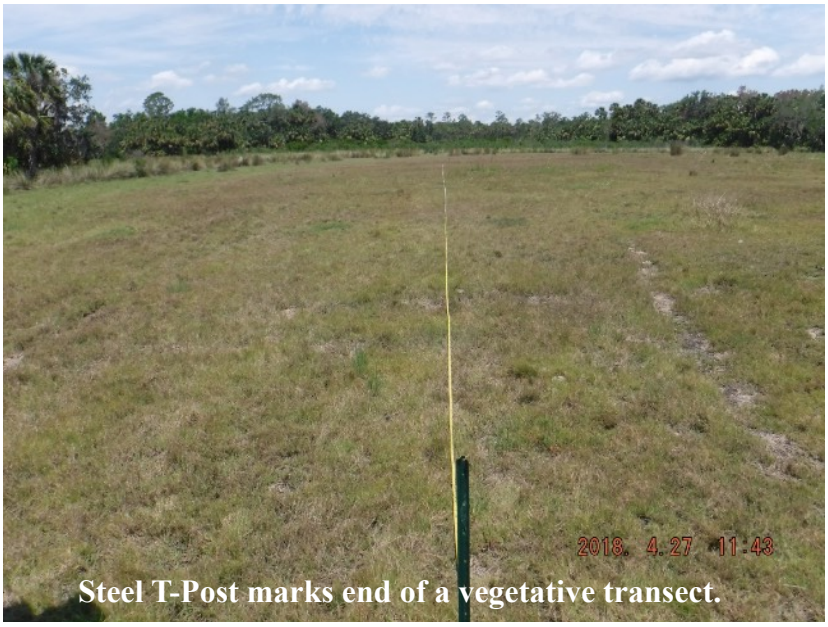
Monitoring Plan

Evaluation of this annual grazing management plan should be performed in coordination with the lessee and SJRWMD land management staff. This evaluation should be conducted following the completion of the summer growing season and before the start of the succeeding summer growing season when evaluating bahiagrass pasture areas. If grazing is to be applied on the floodplain marshes, annual evaluation of this area should be conducted in late May or early June following departure of cattle from these pastures. Pasture evaluations should focus on total animal units days per pasture obtained, condition and trends of key forage resources, grazing use intensity and other issues pertinent to the management of livestock under this annual grazing plan.

To facilitate collection of grazing records it is recommended that the lessee use the USDA-NRCS FL-ECS-3 form located in Appendix VI for each pasture unit. Based on actual Animal Unit Day records, adjustments to stocking rates, grazing periods and grazing frequency can be analyzed to determine if modifications are needed to the annual grazing plan.

To assist in evaluating the effects of livestock grazing on desirable forages, vegetative transects should be established in areas that reflect the intensity of forage utilization and the condition and trends of both domestic and native forages. Vegetative transects combined with forage utilization exclosure cages will provide useful information that will guide adjustments to the annual grazing management plan.

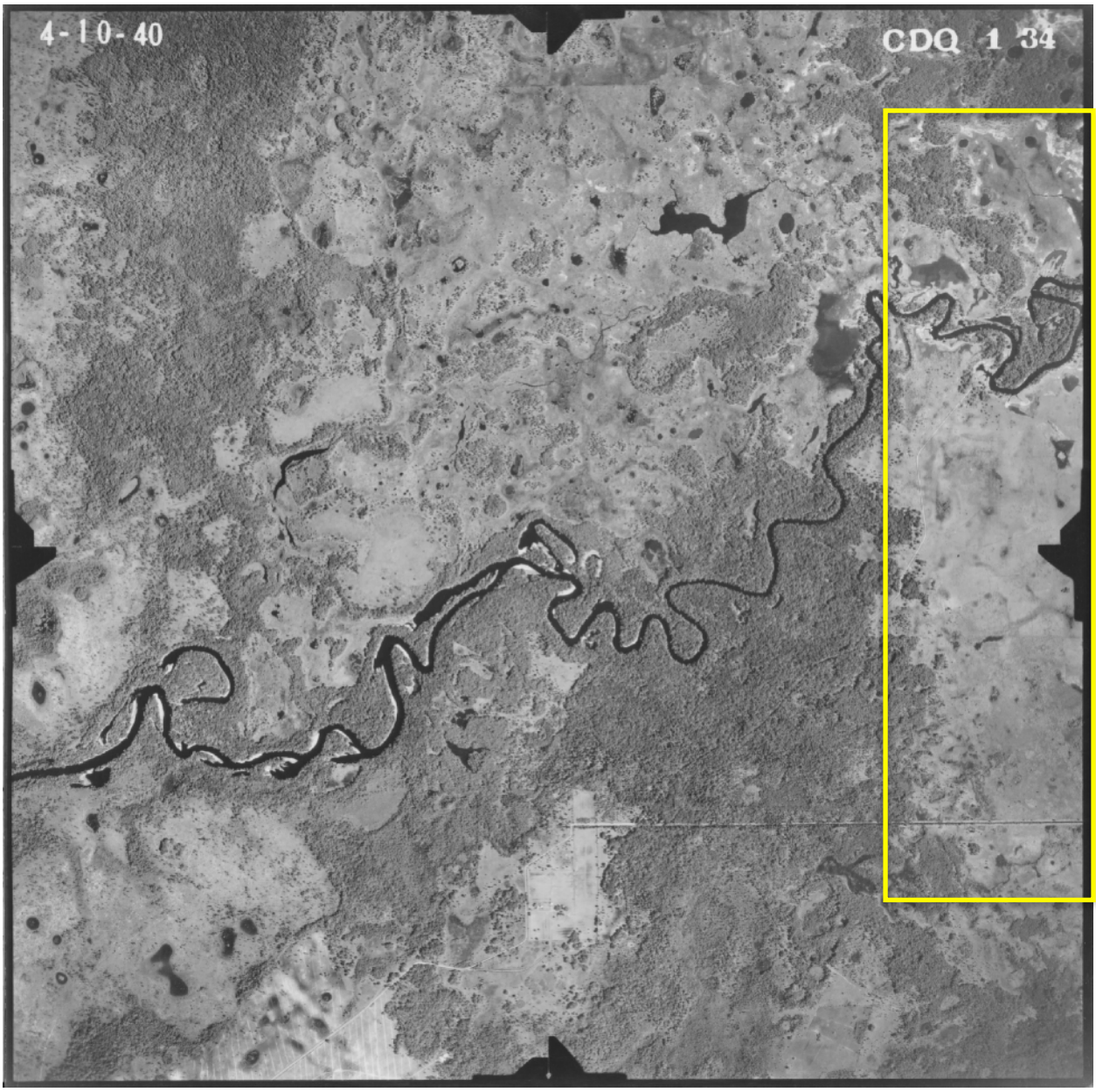
See Appendix VII for more details on monitoring methods and techniques.



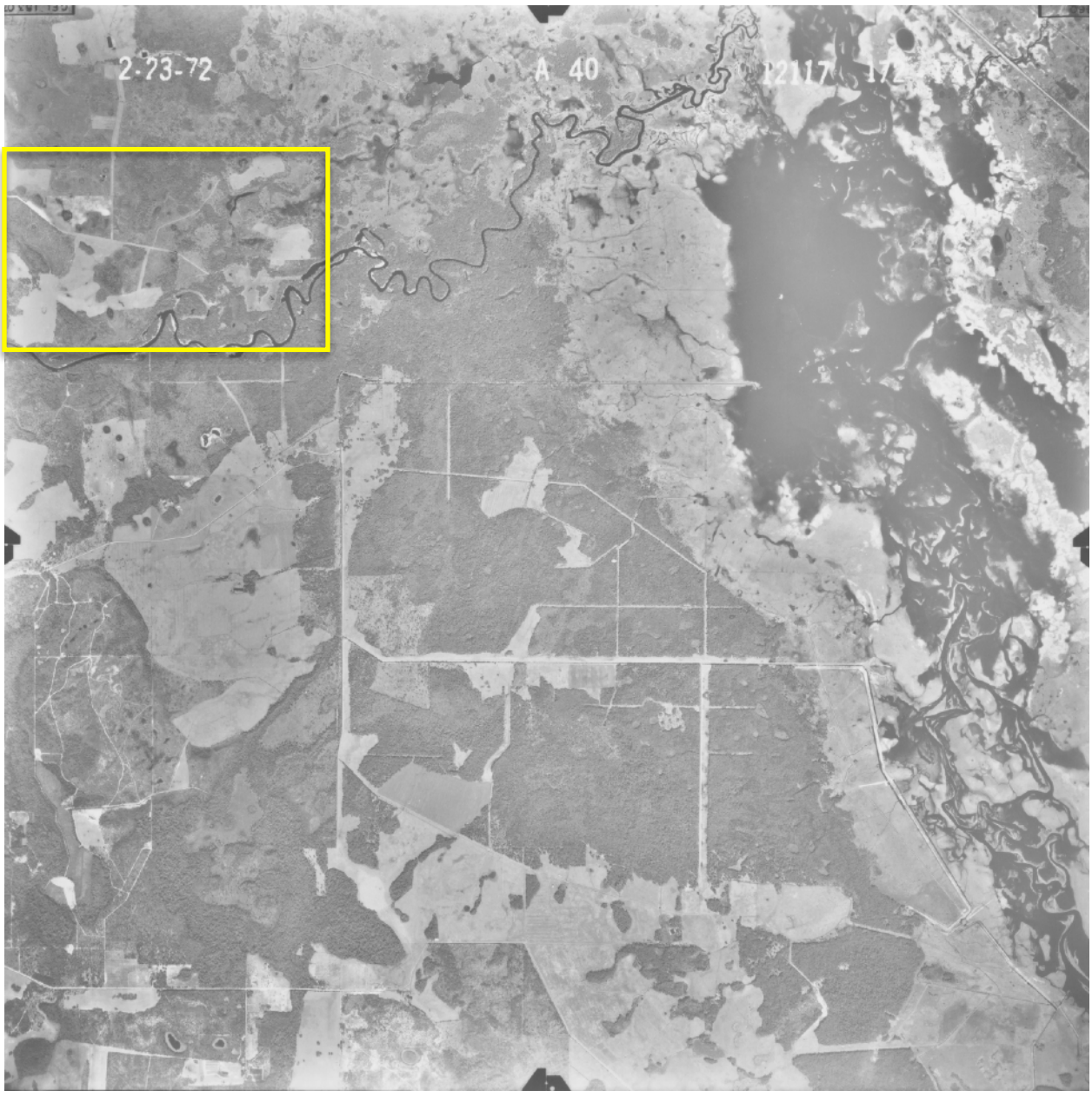
Steel T-Post marks end of a vegetative transect.

Appendix I: Historical Photos

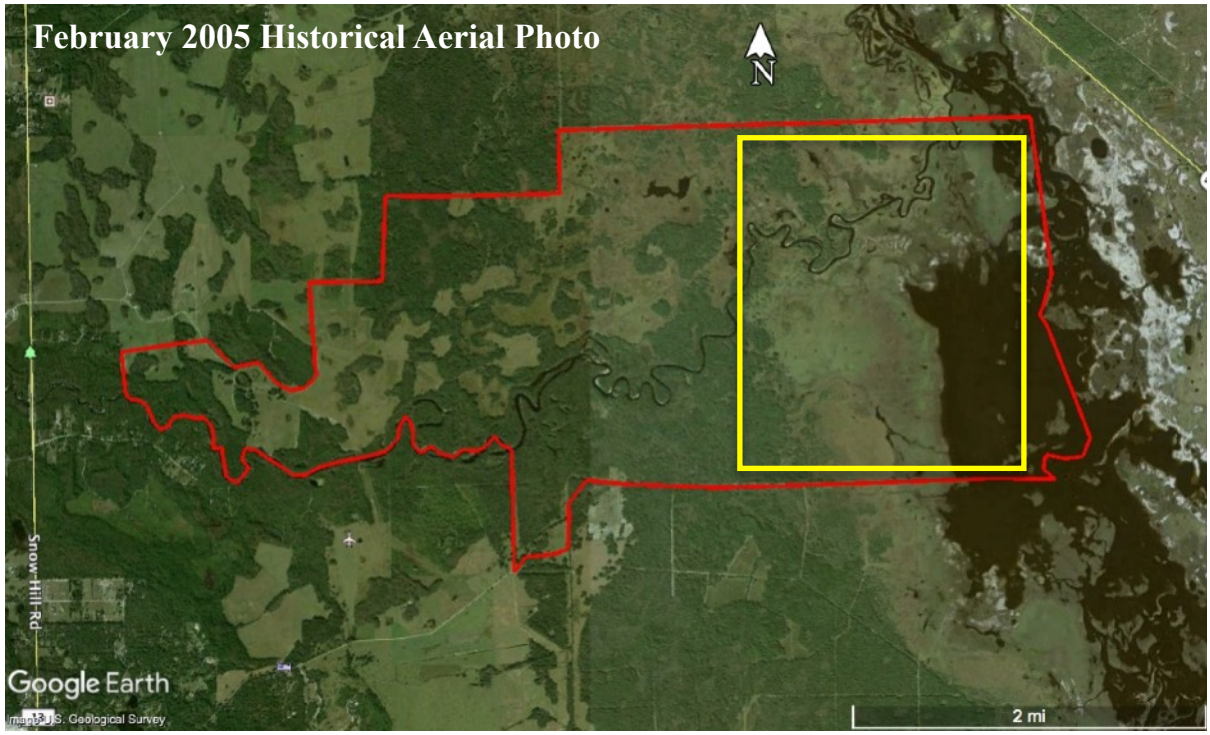
This 1940 aerial photo illustrates the open floodplain marsh prior to the encroachment of sand cordgrass and sea myrtle.

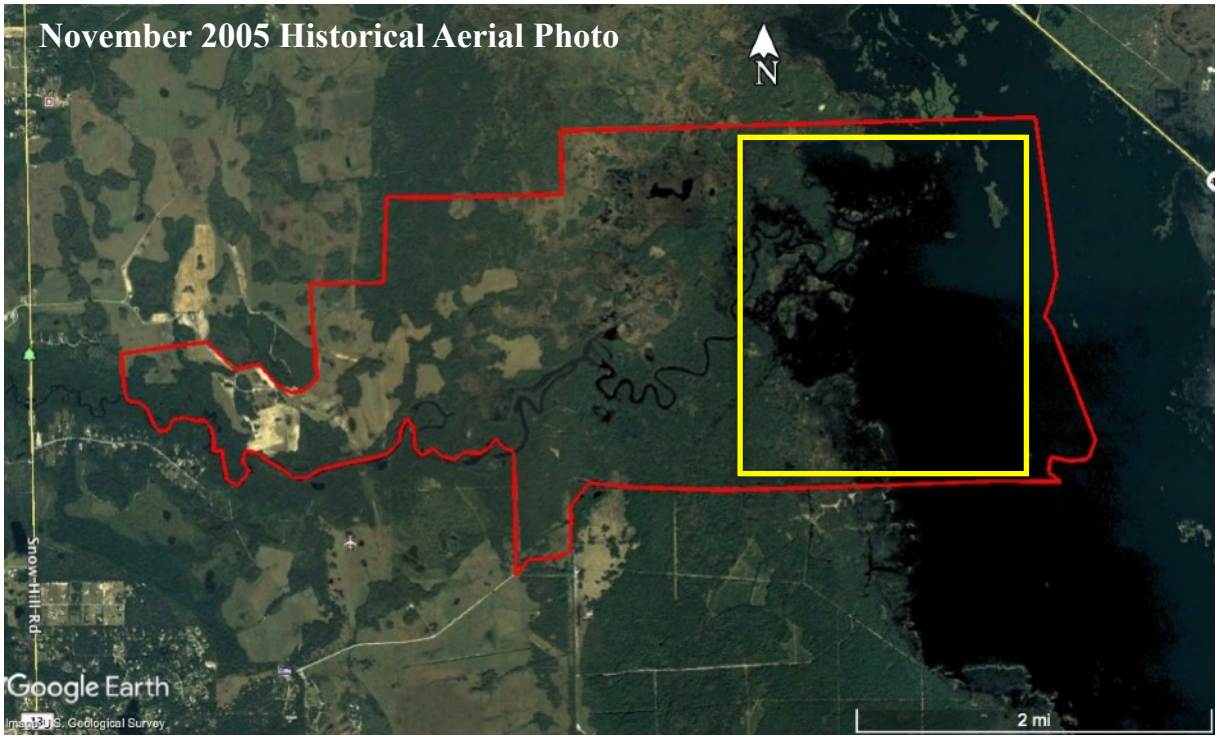


By 1972, this aerial photo illustrates the presence of improved pasture north of the Econlockhatchee River.

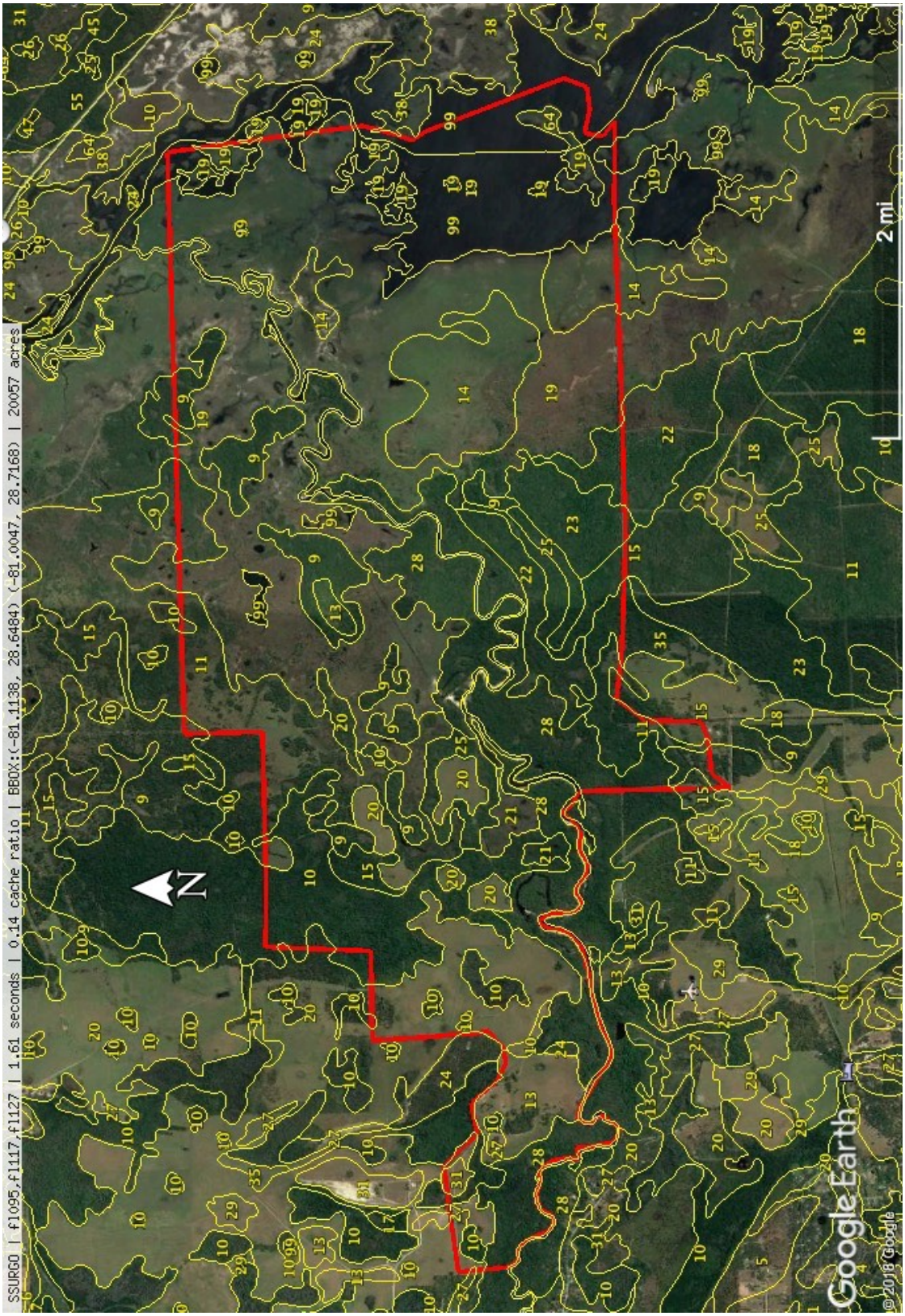


This sequence to two aerial photos in February and November 2005 illustrate how quickly the St. Johns River floodplain can become inundated during a “wet-year.”





Appendix II: Soils



Soil Map Symbol	Soil Map Name	Fire Dependent (Frequent Fire)	Fire Sub-Climax (Infrequent Fire)	Climax Rare or No Fire)
9	Basinger & Delray Fine Sand	Wet Prairie	Wet Flatwoods	Hydric Hammock
10	Basinger, Samsula & Hontoon Depressional	Depressional Marsh	Cypress Swamp	Hardwood Swamp
11	Basinger & Samsula Fine Sand Depressional	Depressional Marsh	Cypress Swamp	Hardwood Swamp
13	EauGallie & Immokalee FS	Mesic Flatwoods	Mixed Pine/Mesic Hardwoods	Mesic Hammock
14	Felda Fine Sand - Saline Frequently Flooded	Saline Influenced Marsh	Mixed Pine/ Hydric Hardwoods	Hydric Hammock
15	Felda & Manatee Mucky FS Depressional	Depressional Marsh	Cypress Swamp	Hardwood Swamp
19	Manatee, Floridana & Holopaw, Freq. Flooded	Depressional Marsh	Cypress Swamp	Hardwood Swamp
20	Myakka & EauGallie FS	Mesic Flatwoods	Mixed Pine/Mesic Hardwoods	Mesic Hammock
21	Nittaw Mucky Fine Sand Depressional	Depressional Marsh	Cypress Swamp	Hardwood Swamp
22	Nittaw Muck Occasionally Flooded	Depressional Marsh	Cypress Swamp	Hardwood Swamp
23	Nittaw, Okeelanta & Basinger Frequently Flooded	Depressional Marsh	Cypress Swamp	Hardwood Swamp
24	Paola - St Lucie Sands	Scrubby Flatwoods	Mixed Pine/Xeric Hardwoods	Xeric Hammock
25	Pineda Fine Sand	Wet Prairie	Wet Flatwoods	Hydric Hammock
27	Pomello Fine Sand	Depressional Marsh	Cypress Swamp	Hardwood Swamp
28	Pompano Fine Sand Occasionally Flooded	Depressional Marsh	Cypress Swamp	Hardwood Swamp
31	Tavares - Millhopper Complex	Longleaf Pine Forest	Upland Mixed Pine/Mesic Hardwoods	Upland Hammock
64	Tequesta Muck Frequently Flooded	Depressional Marsh	Cypress Swamp	Hardwood Swamp
99	Water	N/A	N/A	N/A

Appendix III: Forage Suitability Groups

FSG Table - 1 Soil Map Symbol	Soil Map Name	Forage Suitability Groups G155XB____FL
24	Paola - St. Lucie Sands	FSG - 111
31	Tavares - Millhopper Complex	FSG - 121
27	Pomello Fine Sand	FSF - 131
13	EauGallie & Immokalee Fine Sand	FSG - 141
20	Myakka & EauGallie Fine Sand	
9	Basinger & Delray Fine Sand	FSG 145
28	Pompano Fine Sand	
11	Basinger & Smyrna Fine Sand	
25	Pineda Fine Sand	FSG - 241
21	Nittaw Mucky Fine Sand, Dep.	FSG - 345
22	Nittaw Muck, Occasionally Flooded	FSG - 645
10	Basinger, Samsula & Hontoon Dep.	N/A
14	Felda Fine Sand - Saline, Freq. Flooded	
15	Felda & Manatee Mucky FS, Dep.	
19	Manatee, Floridana & Holopaw, Freq. Flooded	
23	Nittaw, Okeelanta & Basinger, Freq, Flooded	
64	Tequesta Muck, Freq. Flooded	

FSG Table - 2 Forage Suitability Groups	Forage Species	lbs/acre [1]	AUM/acre [2]
FSG - 111	Bahiagrass (0# N)	3,000	1.9
	Bahiagrass (60# N)	5,000	3.2
	Bermudagrass (400# N)	17,000	10.9
FSG - 121	Bahiagrass (0# N)	3750	2.4
	Bahiagrass (60# N)	6,250	4.0
	Bermudagrass (400# N)	21,250	13.6
FSG - 131	Bahiagrass (0# N)	3,375	2.2
	Bahiagrass (60# N)	6,375	4.1
	Bermudagrass (400# N)	12,000	7.6
FSG - 141	Bahiagrass (0# N)	4,500	2.9
	Bahiagrass (60# N)	8,500	5.5
	Bermudagrass (200# N)	12,000	7.7
	Limpograss (400# N)	10,500	6.7
FSG - 145	Limpograss (400# N)	10,500	6.7
FSG - 241	Bahiagrass (0# N)	4,875	3.1
	Bahiagrass (60# N)	9,375	6.0
	Bermudagrass (200# N)	13,250	8.5
	Limpograss (400# N)	10,500	7.4
FSG - 345	Limpograss (400# N)	10,500	6.7
FSG - 645	Limpograss (400# N)	10,500	6.7
	St. Augustine (200 # N)	2,500	1.6

[1] Average forage production yields
[2] Average carrying capacity in animal unit months (AUMs) per acre based upon 50% grazing efficiency & 2.6% body weight daily of forage intake per animal.
[3] Application of fertilizer or other soil amendments are not recommended on native forage species.

Appendix IV: Pasture, Semi-Improved Pasture, Range & Forest Ecological Communities

Bahiagrass Pasture (BP) - (*Paspalum notatum*) Is a non-native warm-season perennial forage grass that produces its greatest volume of forage and best quality during the wet-season summer months in Florida. Bahiagrass can be managed in Florida's sandy nutrient poor soils without fertilizer, however yields are less and weed encroachment more problematic. Periodic mowing is advisable prior to weeds setting flower to minimize seed production of weedy plants.

Marsh (DM) - This native herbaceous wetland plant community is present throughout the property. The natural dominant forage species in these areas is maidencane and cutgrass that provide excellent spring and summer forage. Along with valuable amounts of livestock forage that can be produced within marshes, these site provide valuable habitat for a variety of species and excellent nesting habitat for sandhill cranes. Infestations of sand cordgrass, wax myrtle and sea myrtle can result as a consequence to draining and over grazing.

Saline Influenced Marshes (SM) - These native marshes are inland of the coast and removed from typical marine influences. However, due to a geologic anomaly, saline conditions resulting from upwelling of saline groundwater is high enough in the soil to support native vegetation typically found in brackish and saltwater marshes normally observed along Florida's coasts. Species such as seashore dropseed (*Sporobolus virginicus*), seashore paspalum (*Paspalum vaginatum*), switchgrass (*Panicum virgatum*), sand cordgrass (*Spartina bakeri*), sea myrtle (*Baccharis halimifolia*), shoreline seapurslane (*Sesuvium portulacastrum*) and perennial glasswort (*Salicornia perennis*) are common.

Wet Prairie (WP) - These native wetlands are treeless prairies naturally dominated by blue maidencane, purple bluestem, toothachegrass, gulf paspalum and south Florida bluestem. Over grazing tends to promote a dominance of wiregrass, carpetgrass and sand cordgrass. Lack of burning tends to encourage wax myrtle, gallberry, and bay trees to form an undesirable woody thicket.

Xeric Hammock (XH) - These climax native upland communities are characterized by the presence of sand pines, longleaf pines, sand live oak, bluejack oak, turkey oak, sand post oak and a variety of shrubs and herbs that thrive on well-drained soils. With greater fire frequencies, these sites are characterized as scrubby flatwoods or sandhill pine forests depending on the water holding capacity of the natural soil conditions.

Mesic Hammock (MH) - This native upland, poorly drained plant community is typically dominated by evergreen hardwood species such as live oak, water oak cabbage palms and slash pines. This ecological communities due to its closed forest canopy limits the amount of light reaching the forest floor, thus minimizing the amount of forage production. These forest plant communities provide excellent habitat and mast production supporting a variety of important wildlife species such as wild turkey, deer and important predator species.

Hydric Hammock (HH) - These native wetland forested communities are dominated by hardwood species such as swamp laurel oak, live oak, water oak, sweet gum, sweetbay magnolia, sugar berry, along with red cedar, cabbage palm and a variety of shrubs and ground vegetation tolerant of hydric soil conditions and occasional inundation.

Swamps (SW) - These seasonally inundated forested wetlands when not disturbed by fire, wind damage or other disturbances are typically occupied by climax forest species with little to no ground cover. The forest community is commonly dominated by cypress, red maple, bay trees, water ash and swamp dogwood. Sites that experience a rare fire are often dominated by cypress, however, as fire frequency lessen, hardwood species can become more dominant.

Appendix V: Federal & State Protected Species

Birds

Florida Grasshopper Sparrow	Limpkin	* Florida Burrowing Owl
* Little Blue Heron	* Snowy Egret	* Tricolored Heron
* White Ibis	Peregrine Falcon	* SE American Kestrel
Whooping Crane	* Fla. Sandhill Crane	* Bald Eagle
* Wood Stork	* Audubon's Cara Cara	Everglades Snail Kite
* Red-cockaded Woodpecker	Florida Scrub Jay	

Mammals

* Florida Panther	Sherman's Fox Squirrel	Fla. Black Bear
Florida Mouse		

Reptiles

* American Alligator	* Eastern Indigo Snake	* Gopher Tortoise
Bluetailed Mole Skink	Sand Skink	

Amphibians

None

Plants

None

Species with an asterisk preceding are species that are very likely to be present within the Ft. Drum South boundary. Of particular interest is the Wood Stork, Red-cockaded Woodpecker, Florida Sandhill Crane and the host of other wading birds listed. Each of these species are protected by the state of Florida and the U.S. Fish and Wildlife Service.

Wood Storks: Historically had roosting colonies throughout Florida selecting cypress swamps, hardwood swamps and mangrove swamps as their preferred roosting sites. Wood Stork nesting season in Florida begins in November and concludes in May, where nesting success is dependent upon having water levels low enough to concentrate prey so that a minimal amount of energy is expended by adults as they rear and fled their chicks. Wood Storks travel up to 80 miles from their nesting site to feeding areas.

Red-cockaded Woodpeckers: Are cavity nesting birds that require older mature pines to develop their nests. If cavity trees are found, contact SJRWMD staff before doing any work that may disturb or harm this bird or the pine trees around the nesting area.

Florida Sandhill Cranes: Two subspecies of sandhill crane occur in Florida, the Florida sandhill a non-migratory year-round breeding resident and the migratory greater sandhill. The greater sandhill crane winters in Florida but nests in the Great Lakes region. The Florida sandhill cranes nest during late winter and spring on mats of vegetation about two feet in diameter and in shallow water along depression marshes such as those found within the Ft Drum South property. Cranes live to be older than most birds, some reaching 20 years old.

Appendix VI Grazing Records

U.S. Department of Agriculture
Natural Resources Conservation Service

FL-ECS-3
9/2000

RANGELAND AND PASTURELAND STOCKING ASSESSMENT RECORDS

PASTURE NO. : _____ **ACRES:** _____ **YEAR:** _____

1. Date In: _____ Date Out: _____ Animal Units:_____ Animal Unit Days_____	8. Date In_____ Date Out_____ Animal Units_____ Animal Unit Days_____
2. Date In _____ Date Out _____ Animal Units _____ Animal Unit Days _____	9. Date In _____ Date Out _____ Animal Units _____ Animal Unit Days _____
3. Date In _____ Date Out _____ Animal Units _____ Animal Unit Days _____	10. Date In _____ Date Out _____ Animal Units _____ Animal Unit Days _____
4. Date In _____ Date Out _____ Animal Units _____ Animal Unit Days_____	11. Date In _____ Date Out _____ Animal Units _____ Animal Unit Days _____
5. Date In _____ Date Out _____ Animal Units _____ Animal Unit Days _____	12. Date Out _____ Animal Units _____ Animal Unit Days_____
6. Date In _____ Date Out _____ Animal Units _____ Animal Unit Days _____	13. Date In _____ Date Out _____ Animal Units _____ Animal Unit Days _____
7. Date In _____ Date Out _____ Animal Units _____ Animal Unit Days _____	14. Date In _____ Date Out _____ Animal Units _____ Animal Unit Days _____

Animal Unit Days (AUD) = No. Days x Animal Units TOTAL AUD(s): ___

Animal Units Month(s) (AUM) = $\frac{\text{AUD(s)}}{\text{30(days)}}$ TOTAL AUM(s) ___

AUM(s) per Acre = $\frac{\text{Total AUM(s)}}{\text{No. Acres}}$ AUM(s) per Acre ___

Dates and Amounts of Fertilizer: _____

Date of: First Frost: _____ Last Frost _____

Monthly Rainfall: J :____F ____M ____A ____M ____J ____J ____A ___S ____O ____N ____D ___
Yearly Rainfall Total ___

Appendix VII Monitoring Plan

This monitoring plan consists of two components:

Vegetative Transects: A T-Post is placed in the ground to establish a permanent reference point. From the T-Post a line intercept transect is established for 50 - 100 meters depending on the site location. At 1 - 2 meter intervals, the nearest rooted plant is tallied to assess the plant composition of the pasture. This data should be collected at the end of the growing season in October - November of each year on bahiagrass pastures and prior to the summer wet season on the floodplain marsh.

Grazing Utilization: Grazing exclosure cages provide an opportunity to evaluate the forage utilization levels in the pasture. Placing cages throughout the ranch area will be evaluated periodically during the year. Cages need to be placed over good examples of forage at the beginning of a pasture's grazing period. Once cattle are removed from the pasture, forage species within the exclosure cage are compared to grazed forage outside the cage. The percent difference in plant height or weight of the vegetation outside the cage compared to forage inside the cage provides an estimate of the forage utilization by the livestock. The rule-thumb for proper grazing utilization is to never grazing more than 50% of available forage. This ensure enough leaf-area to support rapid regrowth of the forage and to maintain plant vigor.

Below is a recommended grazing exclosure cage design that has worked well for us in Florida.

Grazing Exclosure Monitoring Cage

This grazing exclosure provides ~ 1 square meter of grazing protection to allow grazing intensity utilization determinations. Exclosure Cages are made from welded woven-wire fencing material and held down by tent-like stakes.

Tee-pee ~ 4.5 ft. tall

"The tee-pee" design provides the greatest height within the cage for optimum plant growth between monitoring sessions.

This design minimizes livestock rubbing which can damage the cage and the integrity of plant data.

Appendix VIII - Barbwire Fence Guidance

This information should be used as guidance or for reference purposes, unless USDA-NRCS cost-sharing is a consideration. Please refer to SJRWMD performance measures and construction specifications for all practices under consideration.

This sheet lists the minimum requirements to meet Florida Fence Standard (FL 382) for barbwire fence *if USDA Food Security Act costing-sharing is a consideration*. Variances in fence design may be allowed if requested. All variances requests shall be submitted to the State Rangeland Management Specialist or an individual with proper job approval authority for approval. All barbed wire fences will be installed using braces that meet Florida NRCS specifications for braces. Please note, SJRWMD may have standards that exceed the following.

Wire and Spacing
Use only new wire composed of two twisted strands of minimum class 3 galvanized 15.5 gauge high tensile steel barbwire.

Number of Wires
Interior cross fence - 3 wires (minimum) to manage movement of larger livestock such as cattle and horses.
Boundary fence - 4 wire (minimum) are required for boundary fences and next to highways.

Fence and Wire Height and Placement
Cattle and Horses-

- The minimum top wire height for 4 and 5 wire fences is 42 inches above ground level.
- The minimum top wire height for 3 wire fences is 38 inches above ground level.
- Install wires with a minimum of 10-12 inches spacing between the top 2 wires.

Note: Inline fence wire spacing shown below are recommendations only.

WIRE HEIGHT AND SPACING OF WIRES IN INCHES (“)			
Number of Line Wires	**5 Strand**	**4 Strand**	**3 Strand**
Boundary Fence Top Wire Height (minimum)	46	46	**Not Acceptable**
Boundary Fence Bottom Wire Height (minimum)	6	12	**Not Acceptable**
Recommended Inline Fence Wire Spacing (inches)			
Cattle and Horses	6, 16, 26, 36, 46	16, 26, 32, 44	16, 26, 38
To Allow For Wildlife Movement	**Not recommended**	18, 24, 30, 42	18, 26, 38

LINE POSTS MATERIALS, POST SPACING AND INSTALIATION DEPTH

- **Steel** - Use only new, painted or galvanized T or U posts.

- **Wood**- Treated with 0.4 lbs/ft3 of chromate copper arsenate (CCA type A, B or C or equivalent). Minimum size, 3" top-diameter X 6.5' length.

- **Post Spacing** - The maximum distance between line posts is 16 feet without the use of stays, or 30 ft. with a minimum of 1 stay between posts.

- **Installation** - Drive or bury wood posts at least 24 inches into the ground in sandy or loamy soils. Install posts to a 42 inch depth in muck soils. If post holes are dug, backfill by tamping the soil around the post at every 4 in. depth.

- **Fastening** - Attach wires to the side of the post receiving the most livestock pressure. Drive staple diagonally to the wood's grain and at a slight downward angle (upward if the pull is up) such as in low places to avoid splitting posts and loosening of staples. Space should be left between staple and post to permit free movement of wire.

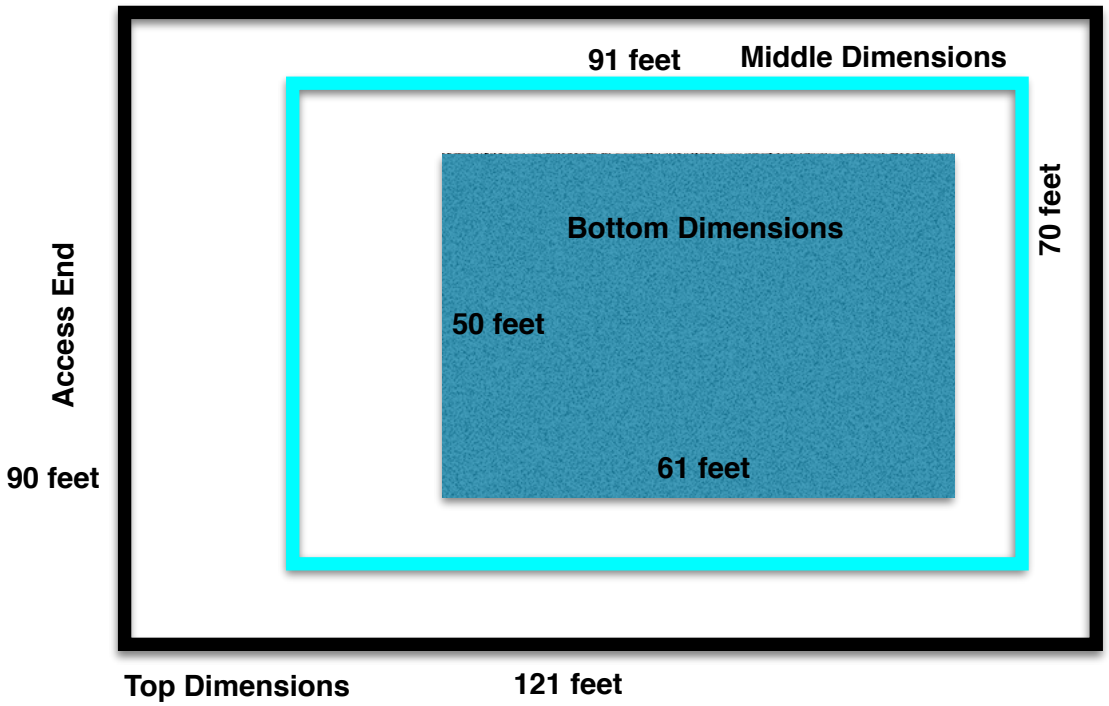
- **Wood posts** - Use 1.5 inch (minimum), 9 gauge (minimum), class 3 galvanized staples.

- **Steel posts** - Use manufactured clips or wire posts.

Appendix IX - Stockwater Development Alternatives

Stock Pond Design (1/4 Acre)

Access end sloped 4:1
Other sides sloped 2:1
Total volume excavated: 2,433 yds ^{3}



Solar Stockwater Systems

Solar stockwater systems with large troughs positioned on a level, solid foundation provides the best quality water for livestock. Solar submersible pumps are cost-effective and can deliver water from shallow wells.

Automatic shutoff valves maintain desired water levels in the trough while keeping water readily available for the animals. Having an overflow outlet directing water away from the trough and its foundation is important to minimize washouts around the trough and its base.