Ft. Drum - North

Indian River County, Florida

Grazing Management Plan

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General Property Description

The Ft. Drum - North grazing lease consists of approximately 1,628 acres, located approximately 15 miles west of I-95 with its northeast entrance gate located approximately .75 miles south of SR 60 in Indian River County, Florida. This property was formerly a complex of native dry and wet prairie rangelands interspersed with depressional freshwater marshes. These fire dependent native plant communities were converted to intensive agriculture in the mid 1900's and the effects of field ditches installed to support this intensive agriculture are still evident today. Following intensive farming practices, much of this property was planted to bahiagrass pasture. Due to high-water table / soil saturated conditions and lack of agronomic practices, recruitment of desirable native rangelands plants such as bushybeard and purple bluestem grasses have become established in many areas formally planted to bahiagrass. Common pasture weeds such as dog fennel and soft rush, along with native shrubs such as sea myrtle and wax myrtle are effectively diminishing the livestock carrying capacity potential on this property. However, current grazing utilization and affects of livestock are having a positive ecological and environmental impact on the property, and by following the grazing management principles described within this plan will continue to enhance ecological functions and wildlife habitat values.

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 Ft Drum - North property. 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 encourages livestock grazing as the principle land management tool with judicious use of supporting practices such interior cross-fencing, stockwater development, prescribed burning and mechanical, chemical and biological brush and weed management.

To sustain a cost effective year-long commercial beef cattle operation on this property, optimizing livestock forage intake of domesticated forages such as bahiagrass, invasive plants such as torpedograss and desirable native rangeland grasses such as maidencane (*Panicum hemitomom*), blue maidencane (*Amphicarpum muhlenbergianum*), creeping bluestem (*Schizachyrium stoloniferum*), purple bluestem (*Andropogon glomeratus var. glaucopis*) , chalky bluestem (*Andropogon virginicus var. glaucus*), shortspike bluestem (*Andropogon brachystachyus*) and lopsided indiangrass (*Sorghastrum secundum*) is essential.

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

1. Maintain "cow-tight" fences.

2. Install additional interior cross-fencing to facilitate livestock movement.

3. Install additional livestock watering facilities as needed.

4. Control shrubs and herbaceous weeds where applicable.

5. Follow a rest-rotation grazing management strategy.

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

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

Soils

Review of the county-level soil survey of the Ft. Drum - North property is an important part of inventorying the natural resources and for making forage production predictions. The USDA - NRCS Soil Survey recognizes 13 different soil map units within the 1,628 acre parcel. Soils provide valuable information pertaining to present and former natural ecological communities and their ability to growth forage resources and provide wildlife habitat.

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

- Soil Map Symbol
- Soil Map Name
- Soil / Native Plant Community Correlations

Native plant communities are divided into communities that are typified by frequent fire or fire dependent, infrequent fire or fire sub-climax and communities that experience rare or no fire, i.e., climax communities.

Forage Suitability Groups

USDA - NRCS combines similar soils to assist in determining appropriate forage species and anticipated production yield potentials for recommending stocking rates. In **Appendix II,** "FSG - Table 1" group soils located within the Ft. Drum - North property by soil map symbols and soil map names into appropriate Forage Suitability Groups. "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 annually applied N:P:K fertilizer. However, bahiagrass is the most adapted non-native domesticated forage species capable of sustained production under low stock density without annual fertilization or other soil amendments. It should be noted however, that forage yields and livestock carrying capacity are **at best only about 50%** of what can be achieved when proper soil amendments are applied.

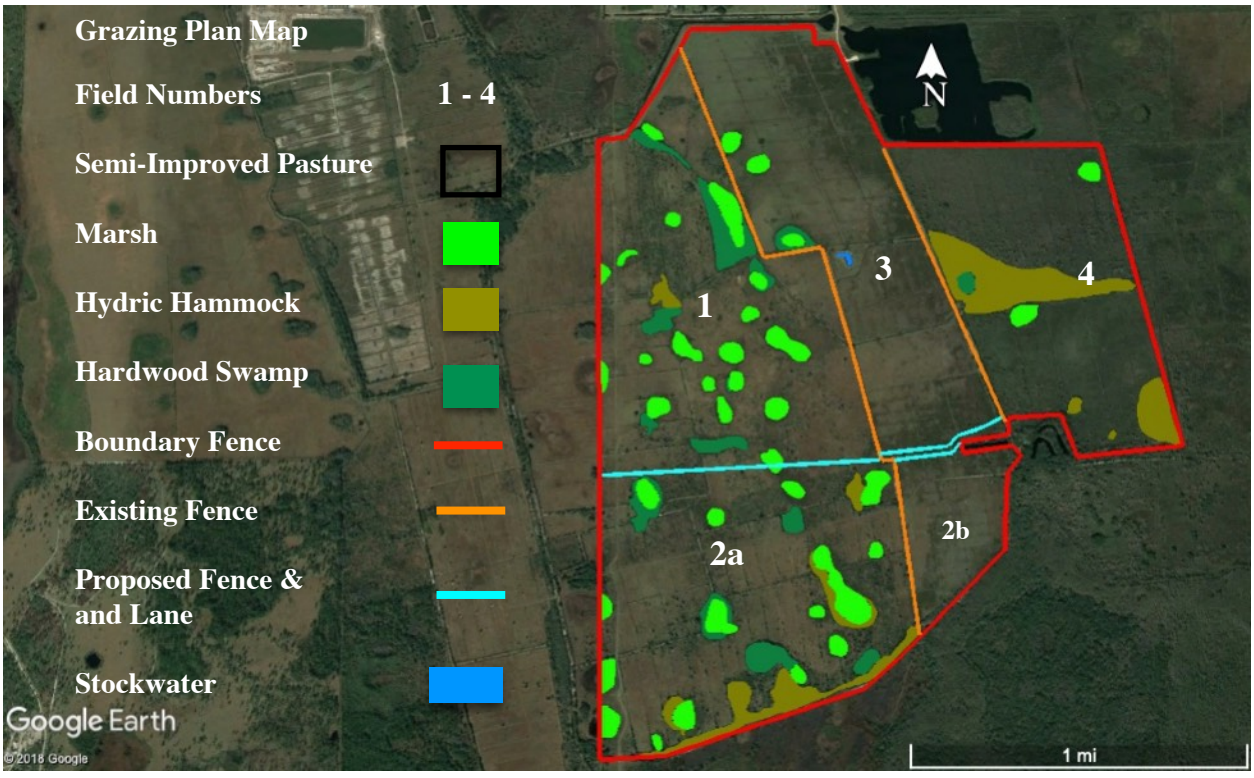
Native forages such as creeping, purple, chalky and shortspike bluestems, and lopsided indiangrass on former dry prairies, blue maidencane on wet prairies, and maidencane in freshwater marshes evolved under natural soil conditions. Therefore, native rangeland forages do not benefit by adding fertilizer or other soil amendments. Desirable native forages such as these are dependent upon natural hydrologic conditions and periodic burning combined with proper grazing use.

Key Forage Producing Areas

Improved pastures formerly established as a mono-culture of bahiagrass can become invaded by native or exotic herbaceous and/or woody plants as a result of diminished soil amendments (i.e., annual fertilizer and periodic liming) and/or due to poor drainage. We characterize this land-cover as **"semi-improved"** pasture when the former pasture forage species (e.g., bahiagrass) makes up ~ 60% or less of the pasture's plant composition.

Natural plant communities such as freshwater marshes (light green) appear to be "intact" vegetatively and with proper management have the potential to improve their forage yield capabilities as well as wildlife habitat values. Hydric Hammocks and Hardwood Swamps provide minimal livestock forage producing areas, however, their benefits to landscape diversity and wildlife habitat cannot be over stated.

The grazing lease is currently divided into 3 pasture areas, however, to effectively apply rotational grazing management, a proposed cross-fence is recommended dividing the western pasture unit into Fields 1 & 2a. To assist in livestock movement from Field 4 back into Fields 1 or 2, a lane is proposed with a large "wing" on its eastern side to facilitate cattle movement. By installing this lane it effectively separates Field 3 from Field 2b, therefore, it is recommended that as Field 4 and its associated cattle lane is brought into the grazing system, that the southern portion of the existing north/south cross-fence be dismantled in portions to allow cattle to access 2a and 2b as one Field or pasture unit.



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 habitat.

Fencing

To better apply proper grazing management additional cross-fence should be installed. Adding an East/West fence from the existing North/South fence will divide Field 1 & 2 and facilitate movement of cattle from Fields 1 to 2 to 3 and back to Field 1 without having to re-enter a previously grazed pasture. Also recommended is a lane linking Field 4 back into Fields 1 or 2 allowing complete rotation among the 4 pastures in a sequence that will allow grazing each pasture without re-entering a previously grazed pasture allowing proper grazing rest and forage recovery.

Proposed - East / West Fence	~ 4,334 feet
Proposed - Lane	~ 3,224 feet

(See Appendix VII for USDA - NRCS Fence constructions specifications.)

Stockwater Development

Livestock water appears to be largely available from existing ditches and swamps throughout the property and a large stockwater pond located in the center of Field 3 capable of providing the minimum supply of readily available water to accommodate the daily livestock requirements of 12 - 15 gallons of water per head.

If it is deemed necessary to provide for additional stockwater, dug ponds and shallow wells with solar pumps and troughs are most desirable. When constructing dug ponds as a stockwater source, the minimum size of each pond should be at least 1/4 acre in size, with one end sloped 4:1 for cattle access, and the remaining sides sloped at 2:1. Stockwater ponds should be designed in such a manner that a 10 foot depth is achieved in the center of the pond area. Using these dimensions approximately 2,433 cubic yards of material are required to be removed to construct a 1/4 acre pond.

The most desirable stockwater source is 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 enough 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.

Brush Management

Wax myrtle and sea myrtle has encroached is some areas but does not appear to be a major problem requiring brush management at this time.

Herbaceous Weeds

Good grazing management with occasional mowing will effectively control common weeds such as dog fennel, ragweed and thistle. When weeds become an issue such as this dense stand of dog fennel, mowing is a viable treatment method. For best results mow prior to flowering to minimize seed production. If native bluestems are present and provide a critical forage resource component within the area, adjust the mower deck height to a minimum of 10 inches to ensure that these important forages are not "clipped" too close. Provide a minimum of 30 days deferment from grazing following all 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 and prairies 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 "lightening season", (i.e., spring - early

summer), fire dependent plant communities benefit regardless of the timing of a fire. Provide a minimum of 30 days grazing deferment following all burning treatment.

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 their proper stubble height or grazing tolerance . Following this guide 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 having interior cross-fencing, gates and adequate stockwater in each pasture. The following table outlines forage species on Ft. Drum North and their heights in inches to initiate grazing and when grazing should be deferred to allow for regrowth.

Forage Species	***Begin Grazing***	***Begin Resting***
Bahiagrass	6 - 8 inches	2 - 3 inches
Torpedograss	12 - 14 inches	6 - 8 inches
Creeping Bluestem	14 - 16 inches	6 - 8 inches
Purple Bluestem	14 - 16 inches	8 - 10 inches
Shortspike Bluestem	14 - 16 inches	8 - 10 inches
Lopsided Indiangrass	14 - 16 inches	8 - 10 inches
Blue Maidencane	12 - 14 inches	6 - 8 inches
Maidencane	24 - 30 inches	10 - 14 inches

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

Picture Right: Shortspike bluestem, carpetgrass & bahiagrass properly grazed on Ft. Drum N.

Pictured Right: Purple Bluestem, carpetgrass and bahiagrass properly grazed on Ft. Drum N.

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 assist 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 Ft. Drum - North property. Within the following table each pasture is described by their forage yield potential based upon the amount of semi-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 on Ft. Drum - North is estimated at producing enough forage to support approximately **140 animal units**.

Pasture	Acres	AUM's/Ac.	Total AUMs	Total AUYs
Pasture 1 (434 Ac.) **Semi-Improved** **Marsh** **Hydric Hammock** **Hardwood Swamp**	 **367.2** **37.8** **3.2** **25.8**	 **1.2** **.6** **0** **0**	**464**	**39**
Pasture 2a & 2b (512 Ac.) **Semi-Improved** **Marsh** **Hydric Hammock** **Hardwood Swamp**	 **421.4** **40.2** **31.8** **18.6**	 **1.2** **.6** **0** **0**	**530**	**44**
Pasture 3 (356 Ac.) **Semi-Improved** **Marsh** **Hydric Hammock** **Hardwood Swamp**	 **346.0** **6.0** **0** **4.0**	 **1.2** **.6** **0** **0**	**419**	**35**
Pasture 4 (326 Ac.) **Semi-Improved** **Marsh** **Hydric Hammock** **Hardwood Swamp**	 **266.1** **5.1** **52.8** **2.0**	 **1.0** **.6** **0** **0**	**269**	**22**
Total	**1,628**			**140**

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 land 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 will benefit the health and ecological functions of the property.

The following grazing schedule is 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. During the wet-season or active growing period for warm-season forages, it is recommended that the grazing rotation accelerate to every 7 - 10 days through this 4 pasture system taking advantage of the higher forage quality and productivity that occurs during this period. During the shorter day, cooler night/dry-season, January through

April, grazing-periods for each pasture should be lengthen to 30 days. Close watch of the livestock needs to be observed during this period to ensure adequate stockwater and forage is available. Supplement hay may be required during this period along with a protein supplement feed in a liquid or dry-ration formula. A complete mineral mix should be available at will for the livestock year-round.

Annual Grazing Schedule

Pasture	Acres	AUM	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	434	464					Rotate cattle herd every 7 - 10 days to optimize forage utilization during the active growing season and before cool-season dormancy.							
2 a & 2 b	429	530												
3	439	419												
4	326	269												
* 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 & Lane	Field 2a/b & 3	Winter 2019
Mowing	All Pastures	As Needed
Invasive Species Control	All Pastures	On-Going
Prescribed Burning	Pasture 1	Spring 2022
	Pasture 2 a & b	Spring 2023
	Pasture 3	Spring 2020
	Pasture 4	Spring 2021
Prescribed Grazing	All Pastures	On-Going

Monitoring Plan

Evaluation of this annual grazing management plan should be performed in coordination with the lessee and SJRWMD land management staff. This annual evaluation should be conducted following the completion of the summer growing season in the fall or early winter. These evaluations should focus upon the total animal units days per pasture, 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 IV** for each pasture unit within this annual grazing management plan. Adjustments to stocking rates or movement of the livestock should be implemented on an as needed basis to address any issues or concerns during the year.

To assist in evaluating the grazing management plan, vegetative transects should be established in areas that can best reflect forage utilization, condition and trends of both domestic and native forages. See **Appendix V** for more details on monitoring methods and techniques.

Appendix I: Soils

Soil Map Symbol	Soil Map Name	Fire Dependent (Frequent Fire)	Fire Sub-Climax (Infrequent Fire)	Climax Rare or No Fire)
3	Eau Gallie Fine Sand	Dry Prairie	Mixed Pine/Mesic Hardwoods	Mesic Hammock
4	Immokalee Fine Sand	Dry Prairie	Mixed Pine/Mesic Hardwoods	Mesic Hammock
5	Myakka - Myakka Wet F.S.	Dry Prairie	Mixed Pine/Mesic Hardwoods	Mesic Hammock
10	Riviera Fine Sand	Wet Prairie	Mixed Pine/ Hydric Hardwoods	Hydric Hammock
16	Pineda-Pineda Wet Fine Sand	Wet Prairie	Mixed Pine/ Hydric Hardwoods	Hydric Hammock
39	Malabar Fine Sand	Dry Prairie	Mixed Pine/Mesic Hardwoods	Mesic Hammock
47	Holopaw Fine Sand	Dry Prairie	Mixed Pine/Mesic Hardwoods	Mesic Hammock
49	Pompano Fine Sand	Dry Prairie	Mixed Pine/Mesic Hardwoods	Mesic Hammock
53	Manatee Mucky Loamy F.S., Depressional	Marsh	Cypress Swamp	Hardwood Swamp
55	Floridana Mucky Fine Sand	Marsh	Cypress Swamp	Hardwood Swamp
60	Pompano Fine Sand, (frequently ponded)	Marsh	Cypress Swamp	Hardwood Swamp
61	Delray Muck	Marsh	Cypress Swamp	Hardwood Swamp
62	Chobee Mucky Loamy F.S., Depressional	Marsh	Cypress Swamp	Hardwood Swamp

Appendix II: Forage Suitability Groups

FSG Table - 1 Soil Map Symbol	Soil Map Name	Forage Suitability Group
3	Eau Gallie Fine Sand	G156BC141FL (FSG - 141)
4	Immockalee Fine Sand	
5	Myakka Fine Sand	
39	Malabar Fine Sand	
47	Holopaw Fine Sand	
49	Pompano Fine Sand	
10	Riviera Fine Sand	G156BC241FL (FSG - 241)
16	Pineda-Pineda Wet Fine Sand	
55	Floridana Mucky Fine Sand (frequently ponded)	G156BC245FL (FSG - 245)
60	Pompano Fine Sand (frequently ponded	
53	Manatee Mucky Loamy Fine Sand (depressional)	G156BC345FL (FSG - 345)
62	Chobee Mucky Loamy Fine Sand (depressional)	
61	Delray Muck	G156BC645FL (FSG - 645)

FSG Table - 2 Forage Suitability Groups	Forage Species	lbs/acre [1]	AUM/acre [2]
FSG - 141	Bahiagrass (0# N)	4,500	2.9
	Bahiagrass (60# N)	8,500	5.5
	Limpograss (400# N)	10,500	6.7
	Aeschynomene [3]	2,500	1.6
FSG - 241	Bahiagrass (0# N)	4,875	3.1
	Bahiagrass (60# N)	9,375	6.0
	Limpograss (400# N)	11,500	7.4
	Aeschynomene [3]	2,750	1.8
FSG - 245	Limpograss (400# N)	10,500	6.7
	Aeschynomene [3]	2,500	1.6
	Maidencane [3]	5,850	3.8
	Blue Maidencane [3]	2,300	1.5
FSG - 345	Limpograss (400# N)	10,500	6.7
	Aeschynomene [3]	2,500	1.6
	Maidencane [3]	5,850	3.8
	Blue Maidencane [3]	2,300	1.5
FSG - 645	Limpograss (400# N)	10,500	6.7
	Aeschynomene [3]	2,500	1.6
	Maidencane [3]	5,850	3.8
	Blue Maidencane [3]	2,300	1.5

[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 III: Pasture, Semi-Improved Pasture, Range & Forest Ecological Communities

Bahiagrass Pasture - (*Paspalum notatum*) This non-native forage grass is located throughout the property and is the primary forage resource. It is anticipated that these forages will continue to be managed without soil amendments, therefore control wax myrtle and other weedy species will be required. Some herbaceous weedy species such as broomsedge, carpetgrass and torpedograss should not be view as a weed needing control as cattle will find these species palatable and will control them by grazing.

Marsh - This native herbaceous wetland plant community is scattered throughout the Ft Drum South property. The dominant forage species is maidencane and cutgrass which provide excellent spring and summer forage. Infestations of sand cordgrass and wax myrtle can result as a consequence to draining and over grazing. However, when implementing sound grazing management invasive species such as torpedograss and West Indian marsh grass that are commonly found within these ecological communities are effectively controlled. 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.

Hydric Hammock - This native wetland, poorly drained plant community is typically dominated by evergreen hardwood species such as live oak, water oak cabbage palms and slash pines. These 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.

Hardwood Swamps - These seasonally inundated forested swamps are typically found within fire-dependent communities such as dry and wet prairies or mesic and wet flatwoods. They are dominated by red maple, bay trees, water ash, swamp dogwood and occasional cypress. These 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.

Appendix IV 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 V Monitoring Methods

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.

Grazing Utilization: Grazing exclosure cages provide an opportunity to evaluate the forage utilization levels in the pasture. Placing 2 - 3 cages in each pasture 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 forage outside the cage that has been grazed. The percent difference in plant height or weight of the vegetation outside the cage compared to forage inside the cage provides an estimate of utilization by the livestock. The rule-of-thumb for proper grazing utilization is to never grazing more than 50% of available forage. This ensure enough leaf-area to support regrowth and maintain forage 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 VI - 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.

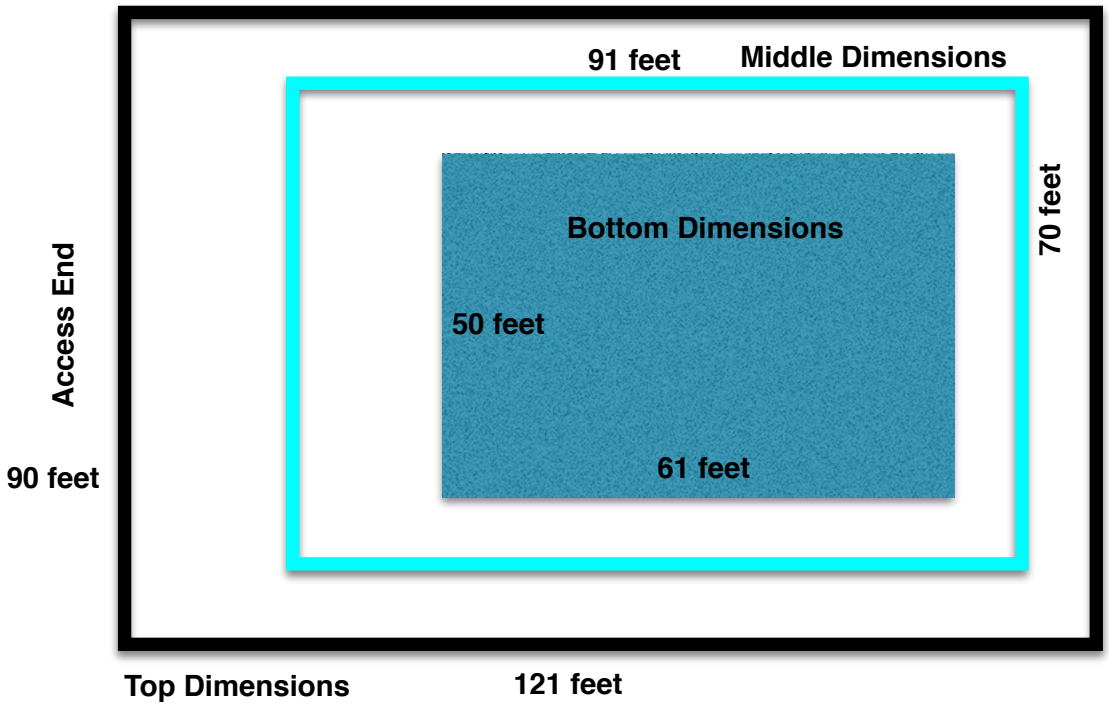
- **Wood posts** - Use 1.5 inch (minimum), 9 gauge (minimum), class 3 galvanized staples.

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

Appendix VII - 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 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.