2017 Monitoring Report

YELLOW RIVER RANCH

Santa Rosa County, Florida

ERC #: 17-196C

October 2017

Bumblebee mimic robber fly (*Laphria thoracica*)

Photographed at Yellow River Ranch restoration site, October 18, 2017.

Ecological Resource Consultants, Inc.

2017 Monitoring Report

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Santa Rosa County, Florida

ERC #: 17-196C

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EXECUTIVE SUMMARY

Annual monitoring of the 275 acre Yellow River Ranch Site located in Santa Rosa County, Florida was conducted in October 2017 to assess the hydrologic, vegetative, and ecological condition of the site. Assessments were conducted at specific transect sites located within discrete mapped delineations of Florida Land Use and Cover Classification (FLUCCS) restoration target habitats. Fifteen sample points in each of two quantitative transects, documented the coverage of each species, open water, and bare ground in a square meter. The quantitative transects were conducted in two locations previously used for Improved Pasture (FLUCCS 211) that are being restored to Hydric Pine Flatwoods (FLUCCS 625). One qualitative transect documented estimated coverage of graminoids and total groundcover in modified Braun/Blanquet Scale classes and general notes regarding the natural history of the site. Biostatistical parameters were calculated and presented in the report in tabular and graphic formats. The qualitative transect was conducted in a location previously used for Improved Pasture (FLUCCS 211) that is being restored to Hydric Pine Flatwoods (FLUCCS 625). Four belt transects were conducted including two transects at two locations previously used for improved pasture (FLUCCS 211) that are being restored to Cypress Swamp (FLUCCS 621) and at two locations of preserved Bottomland (FLUCCS 615). Belt Transects documented the health and condition of planted tree saplings. Quantitative and qualitative transects were documented with a panoramic photograph. All transects and photograph points are depicted on maps that accompany the monitoring report.

The results of the 2017 monitoring represent the current condition, which can be compared to past and future monitoring events to assess the progress of restoration efforts. The monitoring report also documents compliance with permit conditions for the Yellow River Ranch Site. Data obtained during the October 18, 2017 monitoring event documents a landscape in recovery. The prescribed fire of July 16, 2015 reduced many of the shrubs and fire sensitive trees to coppice. At the time of monitoring many of these coppiced saplings had grown from 3-12 feet. There is natural dispersal and regeneration of native trees and shrubs such as wax myrtle, red maple, slash pine, swamp tupelo, white cedar, swamp laurel oak, styrax, buttonbush and pond cypress. Also thickets of brambles (*Rubus*) are common. Herbaceous groundcover with fall flowering goldenrod and frost aster is interspersed amongst shrubs and tree saplings. Numerous birds (sedge wren, yellowthroat, eastern phoebe, tree swallow, red winged blackbird, belted kingfisher, coopers hawk, marsh hawk, red shouldered hawk, red tailed hawk, turkey vulture, and Virginia rail), reptiles (alligator and Carolina anole), mammals (raccoon tracks and evidence of feral hog foraging), spiders (garden spider, banana spider, jumping spider, lynx spider, water spider, and wolf spider) and insects (grasshopper, cricket, butterfly, damselfly, robberfly, mosquito and a diversity of beetles) were observed using the landscape as a source of food and shelter.

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1.0 INTRODUCTION

1.1. Purpose and Scope

1.1.1 Purpose

The Yellow River Ranch (YRR) Restoration site is located in Santa Rosa County, approximately 1.5 miles east of SR 87 in Section 13, Township 1 North, Range 27 West (Figure 1). The YRR is located on the floodplain of the Yellow River. The 275 acre tract was acquired by the Northwest Florida Water Management District (NWFWMD) in December 2005 specifically for use as mitigation to offset current and future Florida Department of Transportation (FDOT) wetland impacts. The goal of the mitigation is to preserve and protect intact bottomland forest and restore disturbed portions of the site to natural conditions. Restoration activities include breaching of dikes and ditch plugging, prescribed fire, herbicide treatment, and planting native species. One hundred and fifty-five acres of bottomland forest preservation and restoration of 55 acres are mitigation for a U.S. Army Corps of Engineers permit associated with State Road 87 wetland impacts. Additional mitigation credit is available from the restoration of an additional 65 acres of prior converted wetlands. The purpose of this study is to obtain data that reflect the current vegetative condition. The data is reported to document permit compliance and is used for a reference by which the success of future restoration efforts is assessed.

1.1.2 Scope

The scope of this study is ecological monitoring in specific habitats and preparation of a report that summarizes the results of the data obtained during the monitoring activity. Critical evaluation allows the determination of current landscape scale conditions as reflected in the dominant species, species richness, invasive exotic plants, and plant life-forms (herbs, vines, shrubs, and strata in the canopy). The monitoring data is used in the selection of appropriate restoration and management strategies, measurement of the success of implemented restoration practices, evaluation of trends in landscape responses to management, selection of future adaptive management strategies, and adherence to and completion of regulatory permit conditions.

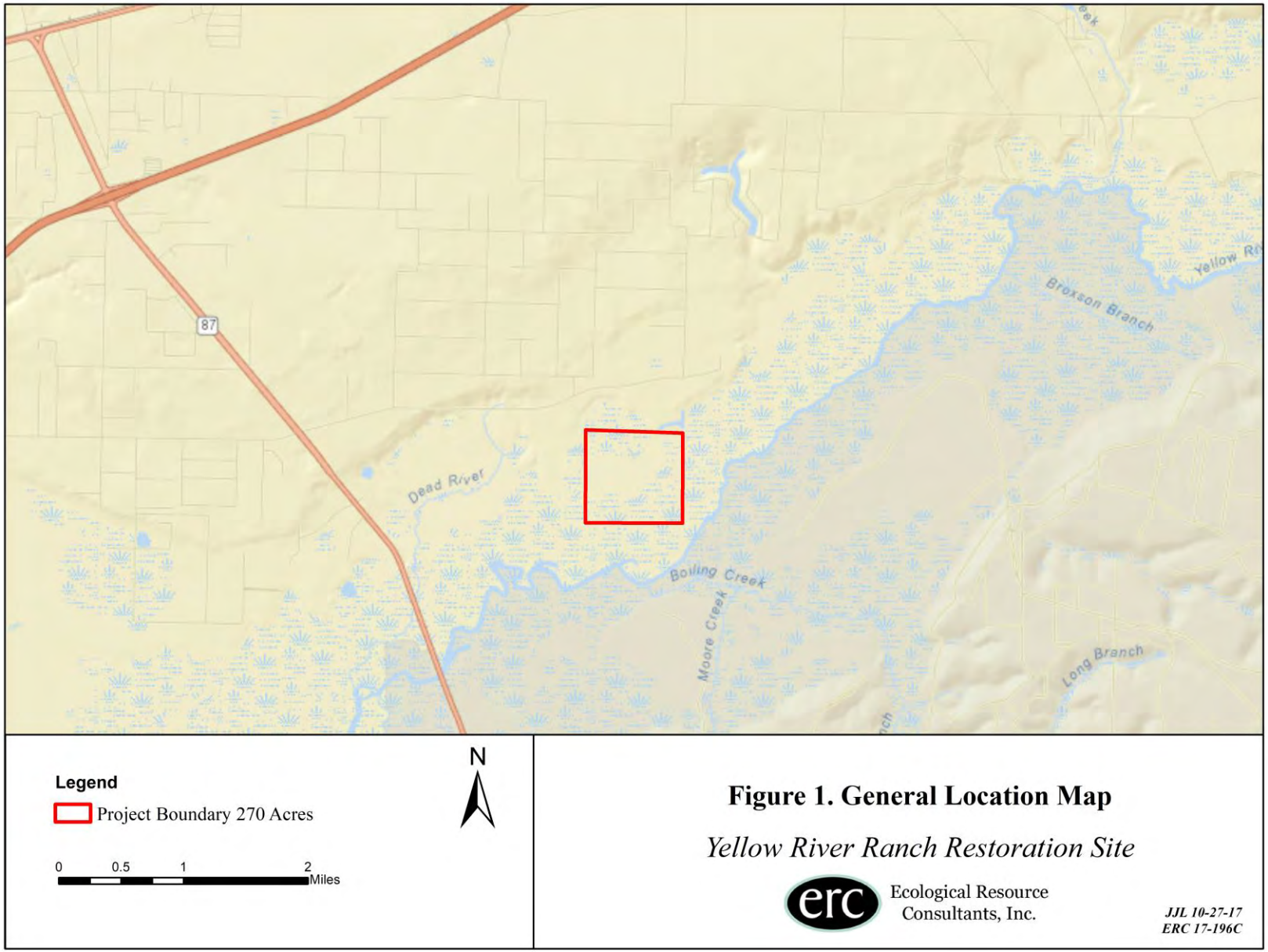

Figure 1. General Location Map

Yellow River Ranch Restoration Site

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2.0 METHODS

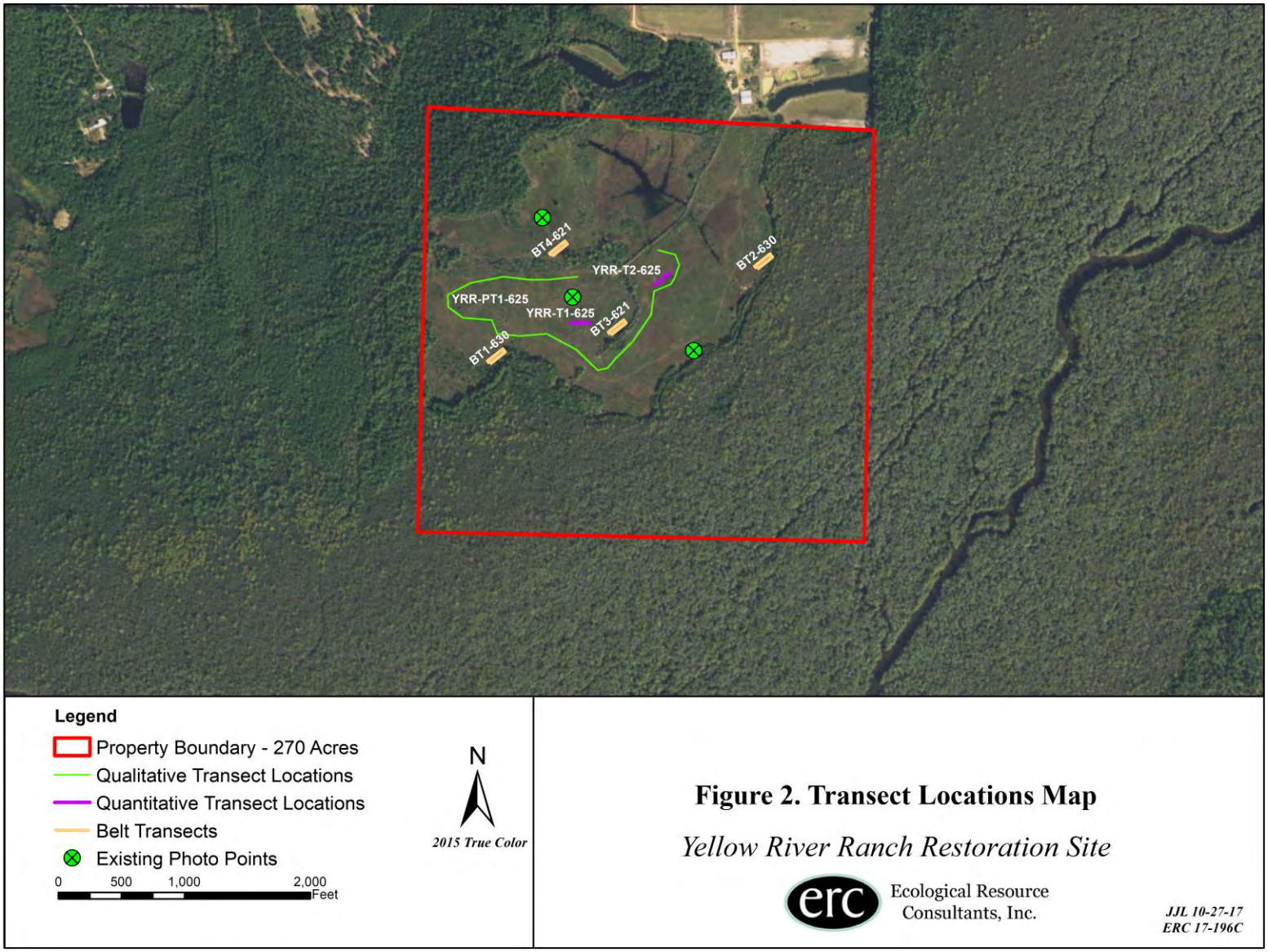
2.1 Field Methods

The location of all transects is depicted on Figure 2. A list of all the transect names appears in Table 1, Yellow River Ranch Transects, along with the target FLUCCS codes for each transect.

Table 1: Yellow River Ranch Monitoring Scope by Activity

Project Name	Transect/Activity Type	Polygon Descriptor	Number of Transects
Yellow River Ranch	Pedestrian Transect/Qualitative	625 – Hydric Pine Flatwoods	1
Total			**1**
Yellow River Ranch	Quantitative Transect 150’	625- Hydric Pine Flatwoods	2
Total			**2**
Yellow River Ranch	Belt Transect 20’ X 150’	621 - Cypress	2
Yellow River Ranch	Belt Transect 20’ X 150’	615 - Bottomland	2
Total			**4**

The data in this table was provided by the Northwest Florida Water Management District.


BT4-621
YRR-T2-625
BT2-630
YRR-PT1-625
YRR-T1-625
BT3-621
BT1-630
Legend
Property Boundary - 270 Acres
Qualitative Transect Locations
Quantitative Transect Locations
Belt Transects
Existing Photo Points
0 500 1,000 2,000
Feet
N
2015 True Color
Figure 2. Transect Locations Map
Yellow River Ranch Restoration Site
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2.1.1 Quantitative Transects

Biological indicators are commonly used criteria for analyzing the value, health and restoration success of habitats. Indicators obtained from the monitoring methodology employed at the Yellow River Ranch Restoration Site include species diversity, relative cover, density and frequency for plant species. The sum of relative values (cover, density and frequency) is typically referred to as importance value. Ranking of plant species importance is used to describe the community structure, e.g. importance allows for discovery of dominant species, sensitive species and dominant life-forms (i.e. herb, woody shrub, vine, or tree). Plant life-form and community structure are typically measured in three plant strata: groundcover, shrub and canopy.

A summary of the measurements (importance, life-form, diversity) for each plant community or habitat permits a critical evaluation of the landscape. The evaluation allows a determination of appropriate indicator species, species richness, invasive exotic plants and presence of appropriate life-forms versus life-forms indicative of a degraded landscape. Evaluations of the measurements are used to assist in the selection of the appropriate restoration and management strategies, determination of the successional landscape trending, the need for adaptive management strategies to enhance conditions for appropriate plant community structure, diversity and life-forms; and successful adherence to and completion of regulatory permit conditions. The quantitative monitoring methodology includes the following steps:

For measuring the Groundcover, Shrubs, and Vines a 150' linear transect with fifteen 1m x 1m quadrats will be employed:

a) Measure and apply one 1m x 1m quadrat at each of the 15 points. Fifteen (15) quadrats are used to sample each transect. The methodology samples 15 square meters along each 150' transect.

b) Photograph each sample point with the grid in place. A representative point is selected and located with a GPS to obtain a 360-degree (panoramic) photograph of the landscape.

c) Identify and estimate coverage for each species. All groundcover, shrub, and vine species are identified. Data collected for each plot includes species name, percent cover by species, percent bare ground, and notes. The total coverage of each species within the plot was estimated using the following percentage classes: 100%, 75%, 50%, 25%, 12%, 6%, and 3%. The coverage classes represent successive divisions of the square by one-half (after 75%), and are readily and consistently applied in the field. Bare ground and/or open water is also recorded using the same coverage classes listed above.

2.1.2. Belt Transects

Belt transects (20' x 150') are used to measure the quantity and heath of tree saplings and for this study, specifically the quantity and health of planted trees.

a) Trees and saplings are located within the belt transect. Identify all trees and saplings, assign a height scale to all in the following increments: 0-1'; >1-2'; >2'-3'; >3'-4'; >4'-5'; >5'-6. Note overall health of plants qualitatively as healthy, growing, stunted and/or limited mortality.

b) Tree species are recorded, along with a height class and the condition of the trees, for each belt transect.

2.1.3 Qualitative Transects

The initial qualitative monitoring is conducted prior to implementation of restoration activities in the late summer/fall and annually thereafter for the duration specified in the permit. The length of the transect is variable and depends upon the nature and size of the FLUCCS delineation that is being evaluated.

The monitoring is conducted by recording observations along the designated transect or walking path. Each walking path is designed to ensure maximal coverage of the selected plant community. The walking path is typically a loop for smaller ecosystem delineations and a line for larger ecosystem delineations. Approved transect locations are uploaded to a GPS unit to guide a walking traverse in the field. During the traverse, a record is maintained of species diversity and observations regarding overall ecosystem health and fecundity. Indications of wildlife usage and pertinent natural history notes are recorded. GPS locations are obtained for exotic invasive species and threatened and endangered species observed. Upon completion of the walking traverse, specific parameters are observed and recorded at an observation point for all polygons. The specific parameters include the following:

1. The type of plant community sampled.
2. The date, time and weather conditions.
3. An estimation of the aerial coverage of plants in the canopy, subcanopy and shrub strata and identification of the dominant species in the canopy, subcanopy and shrub strata.
4. An estimation of the coverage of graminoids (grasses, sedges and rushes) and total coverage of groundcover including graminoids and forbs, based on the following cover classes as per a modified Braun/Blanquet scale: 0-1%; 1-5%; 5-25%; 25-50%; 50-75%; 75-100%.
5. Identification of at least four dominant species in the groundcover.
6. Indications of wildlife usage and natural history including presence of any threatened or endangered species. Also note and obtain gps locations for threatened and endangered species observed at other points along the transect.
7. Identification of exotic species and estimated coverage of exotics as per Brower,

et al., 1998. Also note and obtain gps locations for exotic invasive species observed at other points along the transect.

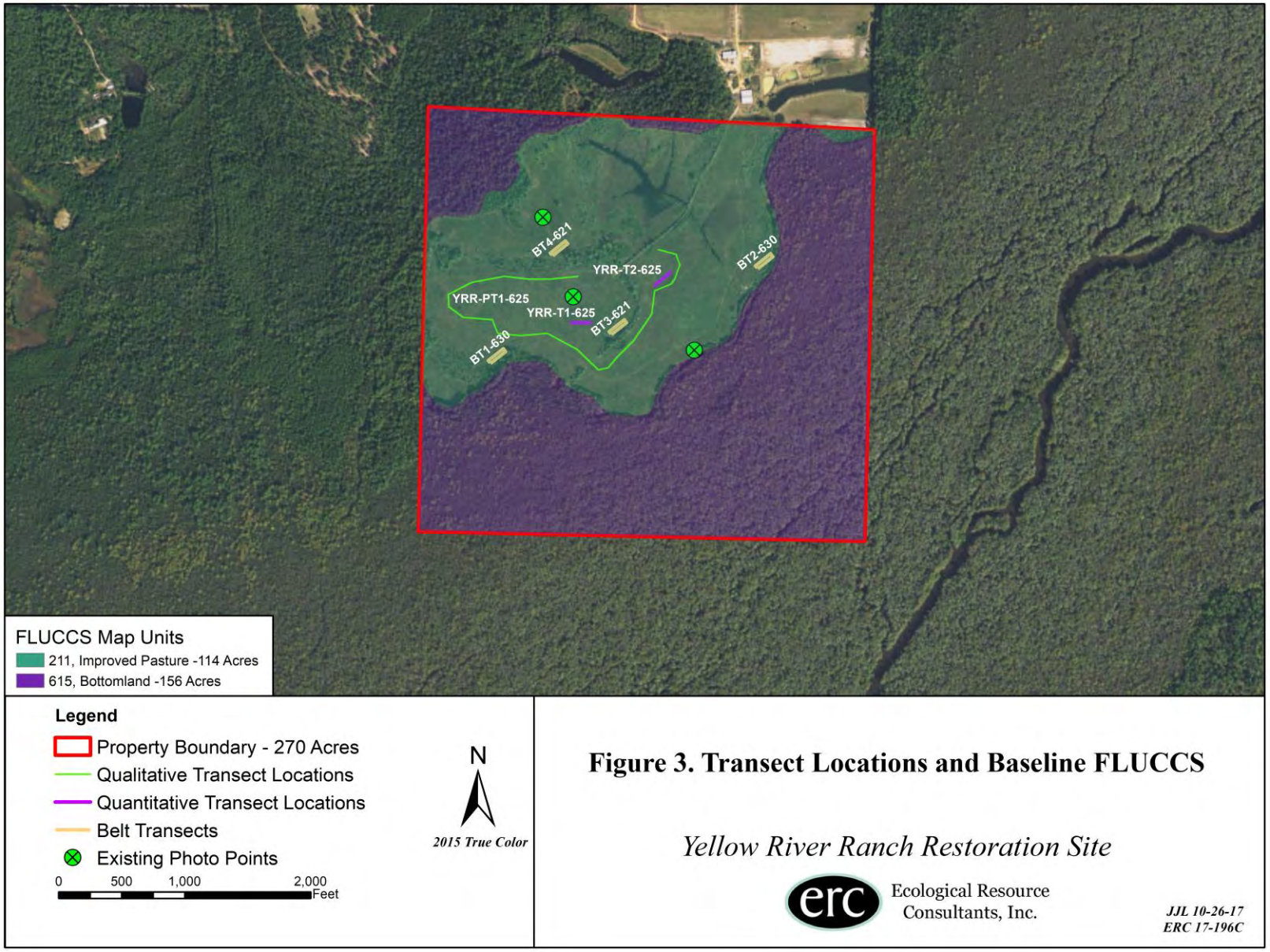
8. An estimation of the fuel load and aspects of the vegetative condition that might affect fire. Measure depth of litter and duff. Observe soil moisture conditions in upper 6 inches by inserting tiling spade into soil and using tactile method to determine moisture state.
9. A list of plant species encountered during the qualitative transect inspection.

2.1.4 Panoramic Photographs

Representative photographs are obtained at specific locations for each quantitative and qualitative transect. The photographic documentation is a 360-degree panorama of the landscape at one end of the quantitative transect and at the representative data point for the qualitative transects. Photographic locations are depicted on Figures 3 and 4.

2.1.5 Additional Observations

All incidental listed wildlife and botanical observations are recorded during site visits. Surveys are conducted concurrently with overall site assessments performed as part of quantitative and qualitative transect field work. No threatened or endangered species were observed during the site visit.


BT4-621
YRR-T2-625
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FLUCCS Map Units
211, Improved Pasture -114 Acres
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Qualitative Transect Locations
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Figure 3. Transect Locations and Baseline FLUCCS
Yellow River Ranch Restoration Site
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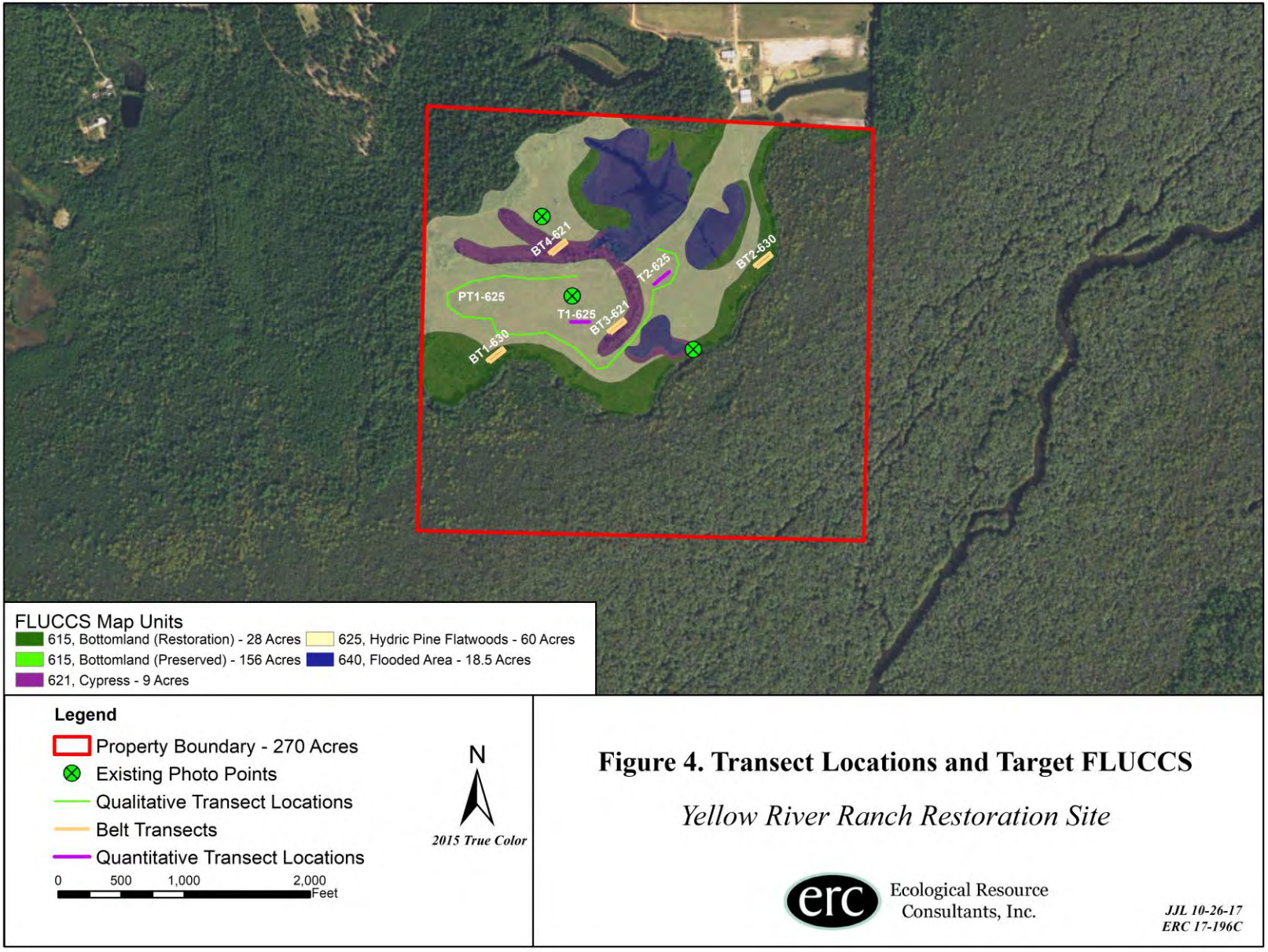

Figure 4. Transect Locations and Target FLUCCS

Yellow River Ranch Restoration Site

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2.2 Analytical Methods

Biostatistical methods are employed to quantitatively describe and summarize the monitoring field data. The data collected in quadrats along 150' linear transects and within a 20' X 150' belt transects is analyzed by calculating the proportional distribution of all plants in the groundcover quadrats and recorded. The transect data is treated as representative samples of larger plant community polygons. The basic units for describing populations and communities are relative density, frequency and coverage. From these parameters, species importance and diversity are calculated. Formulas are provided below for several measures used to analyze the data.

2.2.1 Statistical Methods for Linear Transects

From the raw data, sum separately:

(1) the % coverage of each species from all plots
(2) the # of individuals of each species from all plots
(3) the % coverage of all species sampled in plots
(4) the #'s of individuals of all species sampled in plots

2.2.2 Relative Coverage

Calculate the Relative Coverage by dividing the total coverage of each species by the total coverage of all species.
RC= (1) / (3)

2.2.3 Relative Density

Calculate the Relative Density by dividing the total # of individuals of each species by the total #'s of individuals of all species.
RD= (2) / (4)

2.2.4 Relative Frequency

Calculate the Relative Frequency by initially calculating the frequency for each species (5). This is the total number of sample plots in which a species occurred in divided by the total number of plots sampled. Sum the frequencies of each species (6). The Relative Frequency is obtained by dividing the frequency of each species by the total frequencies of all species.
RF= (5) / (6)

2.2.5 Importance Value

The Importance Value is the sum of all Relative values for each species.
Importance Value = RC+RD+RF
The Importance Value Percentage is the Importance Value multiplied by 100
Importance Value Percentage = Importance Value * 100

2.2.6 Statistical Methods for Belt Transects

For the 20' X 150' belt transects the number of tree saplings per acre and total tree sapling diversity is calculated. From the raw data, sum separately:

(1) the individuals of each tree species with height measure/20' X 150' belt transects.

2.2.7 Number of Trees/Acre

Calculate the Number of Trees/Acre by multiplying the total number of tree species recorded in the 150' X 20' belt transect by 14.28.
Trees/Acre = (1)(14.28)

3.0 DATA AND OBSERVATIONS

3.1. Quantitative Transect Data

Four standard calculations of the relative abundance of each species are given for each quantitative transect: Importance Value, Relative Cover, Relative Density, and Relative Frequency (See Tables 2a and 3a). Quantitative summary data is reported for each transect by plant community (See Tables 2b and 3b). Summary data for the belt transects is provided in Tables 4, 5, 6 and 7.

Table 2a. Transect YRR-T1-625 Hydric Pine Flatwoods

Herbaceous Plants	Importance Value %	Importance Value	Relative Cover	Relative Density	Relative Frequency
Symphyotrichum dumosum	10.41	0.312	0.116	0.102	0.094
Andropogon virginicus	9.79	0.294	0.155	0.066	0.073
Rubus cuneifolius	8.7	0.261	0.138	0.072	0.051
Rhynchospora plumosa	6.87	0.206	0.057	0.120	0.029
Rhynchospora chapmanii	5.36	0.161	0.030	0.087	0.044
Paspalum notatum	4.88	0.146	0.047	0.049	0.051
Andropogon glomeratus	4.08	0.123	0.046	0.041	0.036
Rubus argutus	3.82	0.115	0.041	0.037	0.036
Lachnanthes caroliana	3.78	0.113	0.019	0.051	0.044
Panicum anceps	2.97	0.089	0.025	0.035	0.029
Hypericum cistifolium	2.89	0.087	0.013	0.037	0.036
Euthamia caroliniana	2.88	0.087	0.025	0.033	0.029
Axonopus furcatus	2.42	0.073	0.018	0.034	0.022
Centella asiatica	2.22	0.067	0.010	0.035	0.022
Cuphea carthagenensis	1.94	0.058	0.006	0.024	0.029
Euthamia graminifolia	1.65	0.050	0.011	0.010	0.029
Rhynchospora microcarpa	1.57	0.047	0.010	0.023	0.015
Rubus trivialis	1.49	0.045	0.012	0.018	0.015
Scoparia dulcis	1.18	0.035	0.006	0.007	0.022
Paspalum urvillei	1.15	0.035	0.010	0.010	0.015
Eupatorium leptophyllum	1	0.030	0.005	0.004	0.022
Rhexia mariana	0.97	0.029	0.004	0.011	0.015
Fuirena breviseta	0.88	0.026	0.004	0.008	0.015
Eupatorium capillifolium	0.87	0.026	0.005	0.006	0.015
Hypericum crux-andreae	0.77	0.023	0.007	0.002	0.015
Bidens mitis	0.64	0.019	0.007	0.005	0.007

Herbaceous Plants	Importance Value %	Importance Value	Relative Cover	Relative Density	Relative Frequency
Solidago fistulosa	0.6	0.018	0.003	0.008	0.007
Ctenium aromaticum	0.58	0.017	0.007	0.003	0.007
Andropogon gyrans	0.57	0.017	0.003	0.007	0.007
Eragrostis virginica	0.52	0.016	0.007	0.001	0.007
Dichanthelium scabriusculum	0.52	0.016	0.007	0.001	0.007
Lycopus rubellus	0.51	0.015	0.003	0.005	0.007
Rhynchospora pusilla	0.46	0.014	0.001	0.005	0.007
Oldenlandia uniflora	0.37	0.011	0.001	0.003	0.007
Ludwigia virgata	0.36	0.011	0.003	0.001	0.007
Dichanthelium ensifolium	0.36	0.011	0.003	0.001	0.007
Rhynchospora filifolia	0.36	0.011	0.003	0.001	0.007
Eriocaulon decangulare	0.36	0.0108	0.0027	0.0009	0.0072
Woody Plants	**Importance Value %**	**Importance Value**	**Relative Cover**	**Relative Density**	**Relative Frequency**
Baccharis halimifolia	4.42	0.133	0.070	0.012	0.051
Ilex coriacea	1.42	0.043	0.017	0.019	0.007
Pinus elliottii	1.4	0.042	0.018	0.003	0.022
Myrica cerifera	0.59	0.018	0.010	0.001	0.007
Nyssa sylvatica v. biflora	0.52	0.016	0.007	0.001	0.007
Chamaecyparis thyoides	0.52	0.016	0.007	0.001	0.007
Sapium sebiferum	0.36	0.011	0.003	0.001	0.007

Table 2b. Transect YRR-T1-625 Hydric Pine Flatwoods

Groundcover Vegetation Relative Cover (%)			Average Cover (%)	Species Richness
Forbs	**Graminoids**	**Woody Plants**	**Bare ground/ Standing water**	
43.7	43.2	13.1	1.2	45
Shrub Height (meters)				0.5

Graphical Depiction of Percent Cover for Transect YRRT1-625 Hydric Pine Flatwoods

2017-YRR-T1-625

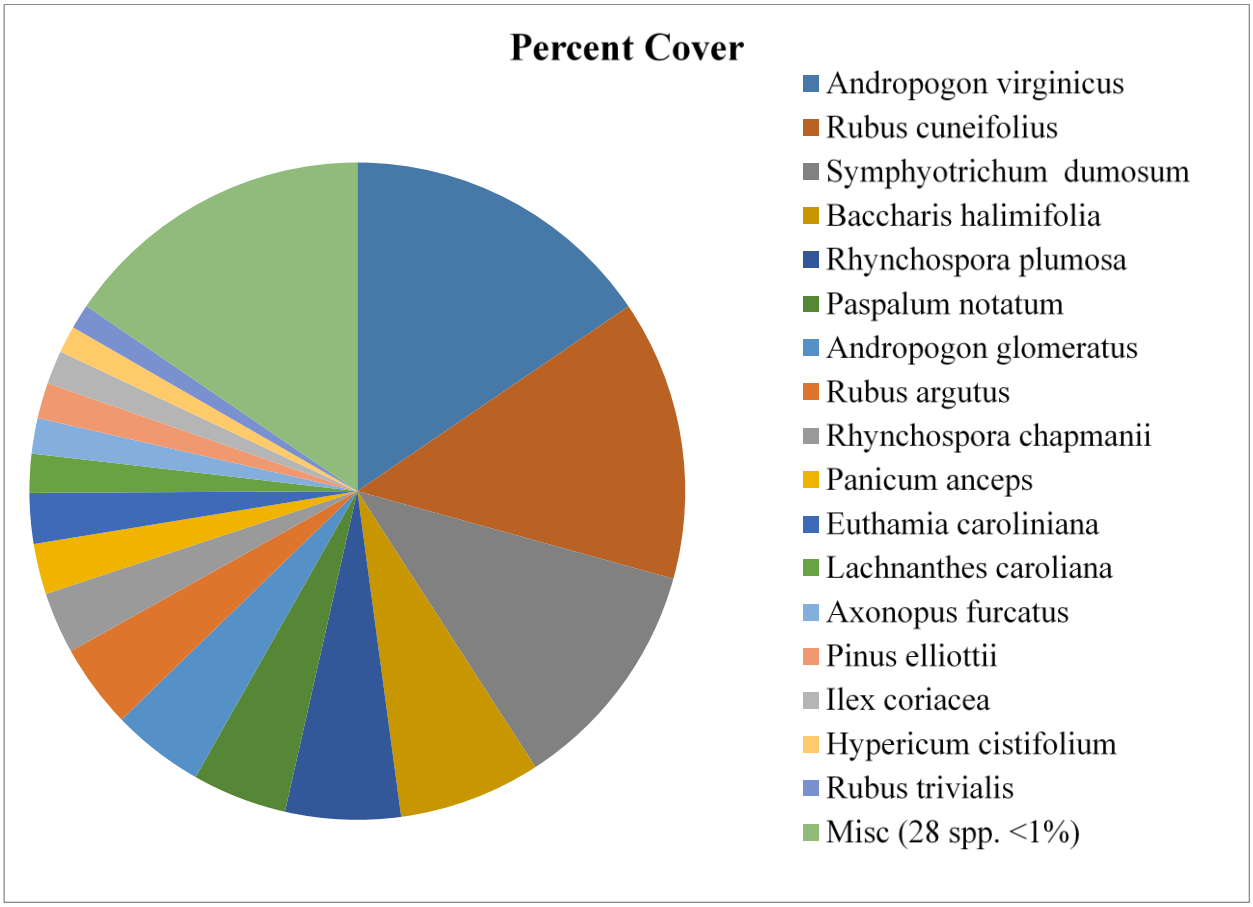

Table 3a. Transect YRR-T2-625 Hydric Pine Flatwoods

Herbaceous Plants	Importance Value %	Importance Value	Relative Cover	Relative Density	Relative Frequency
Rhynchospora plumosa	13.47	0.404	0.116	0.197	0.091
Centella asiatica	11.25	0.337	0.055	0.192	0.091
Dichanthelium scabriusculum	10.32	0.310	0.158	0.067	0.084
Symphyotrichum dumosum	8.3	0.249	0.099	0.066	0.084
Ludwigia pilosa	7.93	0.238	0.098	0.088	0.052
Axonopus furcatus	5.13	0.154	0.055	0.047	0.052
Viola lanceolata	4.67	0.140	0.016	0.073	0.052
Rhynchospora filifolia	3.67	0.110	0.047	0.024	0.039
Andropogon virginicus	3.14	0.094	0.038	0.017	0.039
Oldenlandia uniflora	2.87	0.086	0.007	0.040	0.039
Cuphea carthagenensis	2.39	0.072	0.014	0.039	0.020
Bidens mitis	2.26	0.068	0.023	0.013	0.033
Rhexia mariana	1.34	0.040	0.005	0.016	0.020
Lachnanthes caroliana	1.33	0.040	0.016	0.011	0.013
Fuirena breviseta	1.22	0.037	0.014	0.004	0.020
Xyris stricta	1.19	0.036	0.014	0.003	0.020
Rubus cuneifolius	1.1	0.033	0.011	0.009	0.013
Ctenium aromaticum	1.02	0.031	0.016	0.002	0.013
Hypericum cistifolium	1	0.030	0.011	0.006	0.013
Panicum anceps	1	0.030	0.011	0.006	0.013
Ludwigia virgata	0.98	0.029	0.009	0.007	0.013
Ludwigia linifolia	0.94	0.028	0.005	0.004	0.020
Rhynchospora pusilla	0.79	0.024	0.008	0.009	0.007
Xyris fimbriata	0.51	0.015	0.008	0.001	0.007
Viola primulifolia	0.44	0.013	0.001	0.006	0.007
Lycopus rubellus	0.37	0.011	0.003	0.002	0.007
Cyperus haspan	0.35	0.010	0.001	0.003	0.007
Eupatorium leptophyllum	0.34	0.010	0.003	0.001	0.007
Solidago fistulosa	0.34	0.010	0.003	0.001	0.007
Euthamia caroliniana	0.34	0.010	0.003	0.001	0.007
Solidago rugosa subsp. aspera	0.28	0.009	0.001	0.001	0.007
Phyllanthus urinaria	0.28	0.009	0.001	0.001	0.007
Hyptis alata	0.28	0.009	0.001	0.001	0.007
Rhynchospora inundata	0.28	0.009	0.001	0.001	0.007

Woody Plants	Importance Value %	Importance Value	Relative Cover	Relative Density	Relative Frequency
Nyssa sylvatica v. biflora	4.81	0.144	0.082	0.023	0.039
Magnolia virginiana	0.98	0.029	0.017	0.006	0.007
Ilex glabra	0.94	0.028	0.011	0.005	0.013
Vaccinium myrsinites	0.66	0.020	0.008	0.006	0.007
Pinus elliottii	0.51	0.015	0.008	0.001	0.007
Acer rubrum	0.34	0.010	0.003	0.001	0.007
Baccharis halimifolia	0.34	0.010	0.003	0.001	0.007
Sapium sebiferum	0.28	0.009	0.001	0.001	0.007

Table 3b. Transect YRR-T2-625 Hydric Pine Flatwoods

Groundcover Vegetation Relative Cover (%)			Average Cover (%)	Species Richness
Forbs	Graminoids	Woody Plants	Bare ground/ Standing water	
40.3	46.4	13.2	4.4	42
Shrub Height (meters)				0.72

Graphical Depiction of Percent Cover for Transect YRR-T2-625 Hydric Pine Flatwoods

2017-YRR-T2-625

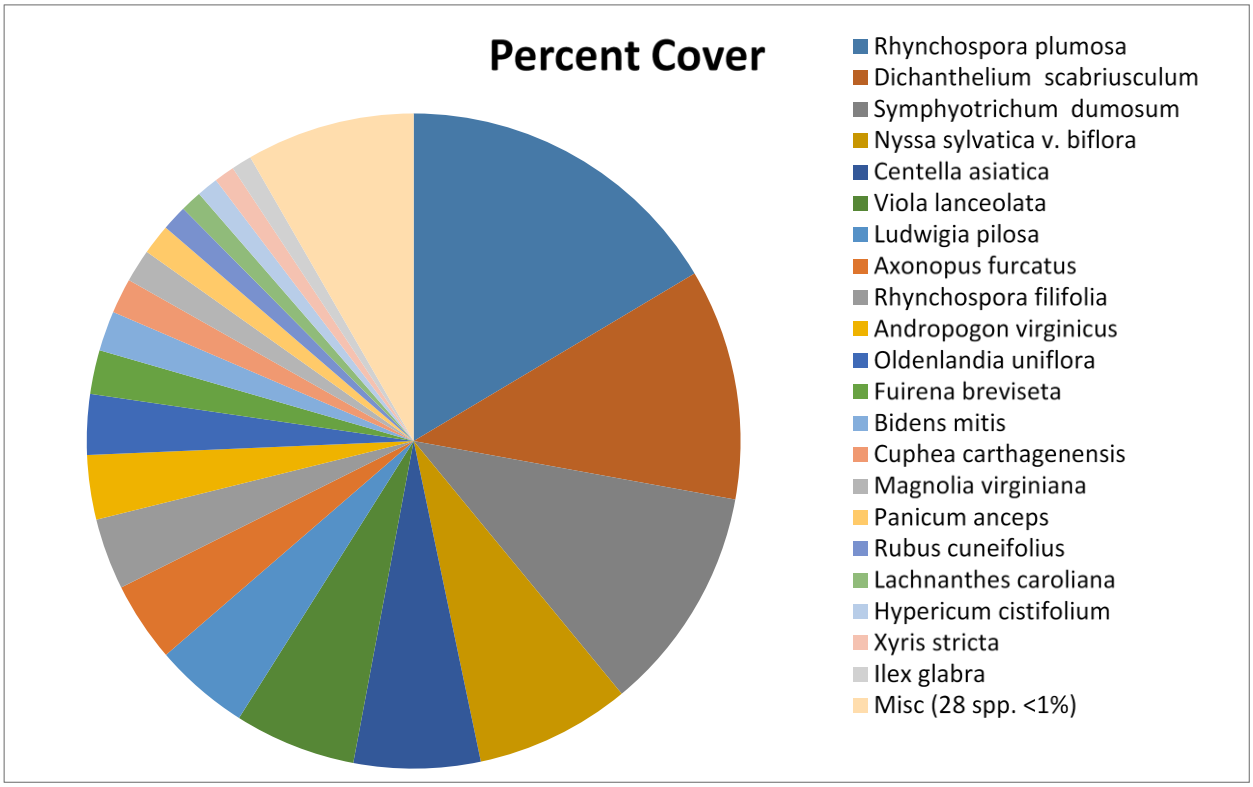

Table 4. Belt Transect Summary for YYR-BT1-630

Belt Transect Summaries for Transect YYR-BT1-630 (Wetland Forested Mix)						
		Height Scale (feet)				
Species	Total Number	0-1'	>1'-3'	>3'-5'	>5'	Condition
Acer rubrum		3	6	14	23	healthy/growing - many are from natural recruitment
Cephlanthus occidentalis				3		healthy/growing - natural recruitment
Chamaecyparis thyoides			3	1		healthy/growing
Ilex myrtifolia				1		healthy/growing - natural recruitment
Nyssa biflora			4	5		healthy/growing
Pinus elliottii			28	33	15	healthy/growing - many are from natural recruitment
Styrax americana				3		healthy/growing - natural recruitment
Taxodium ascendens			1	6	26	healthy/growing
Total number of Saplings	175					
Number of Saplings/Acre	2499					

Table 5. Belt Transect Summary for YYR-BT2-630

Belt Transect Summaries for Transect YYR-BT2-630 (Wetland Forested Mix)						
		Height Scale (feet)				
Species	Total Number	0-1'	>1'-3'	>3'-5'	>5'	Condition
Acer rubrum		5	3			healthy/growing
Chamaecyparis thyoides					23	healthy/growing
Juniperus virginiana					1	healthy/growing
Magnolia virginiana			3		1	healthy/growing
Pinus palustris					1	healthy/growing
Quercus laurifolia					3	healthy/growing
Total number of Saplings	40					
Number of Saplings/Acre	571					

Table 6. Belt Transect Summary for YYR-BT3-621

Belt Transect Summaries for Transect YYR-BT3-621 (Cypress)						
		Height Scale (feet)				
Species	**Total Number**	**0-1'**	**>1'-3'**	**>3'-5'**	**>5'**	**Condition**
Chamaecyparis thyoides				7	4	healthy/growing
Pinus elliottii				20	10	healthy/growing
Taxodium ascendens				2	1	healthy/growing
Total number of Saplings	44					
Number of Saplings/Acre	628.32					

Table 7. Belt Transect Summaries for Transect YYR-BT3-621

Belt Transect Summaries for Transect YYR-BT4-621 (Cypress)						
		Height Scale (feet)				
Species	**Total Number**	**0-1'**	**>1'-3'**	**>3'-5'**	**>5'**	**Condition**
Pinus elliottii		1				healthy/growing
Magnolia virginiana		1	1			healthy/growing
Nyssa biflora				13		healthy/growing
Taxodium ascendens		1		49	39	healthy/growing
Total number of Saplings	105					
Number of Saplings/Acre	1499					

3.2. Qualitative Transect Data

A summary of the qualitative data and a plant list (Table 8) are provided below for Qualitative Transect YRR-PT1-625. The qualitative data sheet recorded for this transect is located in Appendix A.

Qualitative Transect YRR-PT1-625 Hydric Pine Flatwoods

The plant community is wet flatwoods. This is an area of former pasture land that is in the process of being restored. Fire burned across this landscape on July 16, 2015, reducing the shrubs to coppice. Some fire-resistant trees such as slash pine and pond cypress survived the fire. There is no mature canopy although a young canopy near this point is developing that consists of slash pine, planted and naturally recruiting pond cypress, red maple, swamp tupelo and white cedar. Shrub coverage has increased since the last fire. The dominant shrub species is *Baccharis halimifolia* followed by *Myrica cerifera*. The graminoid groundcover coverage class is 76-100% percent and the total groundcover cover class is 76-100% percent. The dominant groundcover species are *Andropogon virginicus, Symphyotrichum dumosum, Viola lanceolata, Agalinis divaricata, Axonopus furcatus, Centella asiatica, Ctenium aromaticum, Cuphea carthagenensis, Diodia virginiana, Eupatorium leptophyllum, Euthamia caroliniana, Ludwigia linifolia, Ludwigia pilosa, Panicum verrucosum*, and *Scoparia dulcis*. The groundcover contains a diversity of herbaceous species, many of which are providing fall flowers for a variety of organisms.

Wildlife observations included cooper's hawk (*Accipiter cooperii*), sedge wren (*Cistothorus platensis*), yellowthroat (*Geothlypis trichas*), turkey vulture (*Cathartes aura*), marsh hawk (*Circus hudsonius*), eastern phoebe (*Sayornis phoebe*), cloudless sulfur (*Phoebis sennae*), gulf fritillary (*Agraulis vanillae*), buckeye butterfly (*Junonia coenia*), monarch (*Danaus plexippus*), grasshoppers, crickets, beetles, dragonflies, green lynx spider (*Peucetia viridans*), and flower crab spider (*Misumenops celer*). Wintering phoebe were hawking insects, migrating cloudless sulfur, and gulf fritillary were also migrating and feeding on the flowers of goldenrod and aster. Alligators, sunfish and gambusia were observed in the ditches along the roads and in pools found along the east side of the site.

Exotic species were observed, including the Chinese tallow (*Sapium sebiferum*), vaseygrass (*Paspalum urvillei*), Colombian waxweed (*Cuphea carthagenensis*) and bahia grass (*Paspalum notatum*); however, none of these are dominant plants (although waxweed is very common) and all are currently controlled by periodic prescribed fire. Compared to extensive feral hog evidence in 2015 and 2016, a decline in the coverage of rutting by feral hogs (*Sus scrofa*) was observed.

Natural regeneration of appropriate species is occurring. At least 40 native plant species were observed in the quantitative transect and many of these are graminoid species that are good for carrying fire across the landscape. The overall visual appearance of the landscape is one of groundcover dominance by *Andropogon virginicus* with many shrubs and tree samplings rising above the *Androgopon*.

Table 8. Plant List for YRR-PT1 625 Hydric Pine Flatwoods

Scientific Name	Common Name
Agalinus fasciculata	false foxglove
Andropogon glomeratus	big broomgrass
Andropogon glomeratus	broomgrass
Aristida palustris	three-awn grass
Aristida stricta	wiregrass
Axonopus furcatus	carpetgrass
Baccharis halimifolia	saltbush
Bidens mitis	beggarticks
Centella asiatica	coinwort
Ctenium aromaticum	toothache grass
Cyperus flavescens	flatsedge
Cyperus odoratus	flatsedge
Cuphea carthagenensis	Colombian waxweed
Dichanthelium acuminatum	tapered witchgrass
Dichondra carolinensis	ponyfoot
Dichanthelium ensifolium	witchgrass
Diodia virginiana	Virginia buttonweed
Erechtites hieracifolium	fireweed
Eupatorium capillifolium	dogfennel
Eupatorium leptophyllum	cutleaf thoroughwort
Euthamia spp.	flattop goldenrod
Fuirena breviseta	umbrella sedge
Hydrocotyle sp.	pennywort
Hypericum cistifolium	St Johns wort
Ilex vomitoria	yaupon
Kyllinga sp.	spikesedge
Juncus marginatus	rush
Juncus polycephalus	manyhead rush
Juncus scirpoides	rush
Lachnanthes caroliana	redroot
Ludwigia linifolia	primrose willow
Ludwigia maritima	seedbox primrose willow
Ludwigia pilosa	hairy primrose willow
Lycopus sp.	water horehound
Myrica cerifera	wax myrtle
Nyssa sylvatica v. biflora	swamp gum
Oldenlandia uniflora	clustered mille graines
Panicum anceps	Panicum
Panicum hians	Panicum
Panicum verrucosum	warty panicum
Paspalum dilatatum	Dallis grass
Paspalum floridanum	wetland paspalum

Scientific Name	Common Name
Paspalum notatum	Bahia grass
Polypremum procumbens	rustweed
Rhexia mariana	Maryland meadow beauty
Rhexia virginica	Virginia meadow beauty
Rhynchospora chapmanii	Chapman's beaksedge
Rhynchospora colorata	starsedge
Rhynchospora fascicularis	fascicled beaksedge
Rhynchospora inundata	longbeak beaksedge
Rhynchospora microcarpa	southern beaksedge
Rhynchospora plumosa	plumose beaksedge
Rhynchospora pusilla	beaksedge
Rubus argutus	sawtooth blackberry
Rubus cuneatus	blackberry
Rubus trivialis	dewberry
Sapium sebiferum	Chinese tallow tree
Schizachyrium sp.	bluestem
Scoparia dulcis	goatweed
Solidago rugosa	goldenrod
Symphyotrichum dumosa	frost aster
Viola primulifolia	primrose-leaf violet
Viola lanceolata	lance-leaf violet

3.3. Photographic Documentation

Panoramic photographs are located in Appendix B of the monitoring report. Quantitative monitoring plot photographs are located in Appendix C.

4.0 RESULTS AND DISCUSSION

The restoration site is located in a gently sloped landscape, much of this is within the floodplain of the Yellow River. Intact native bottomland forest is located on the lowest portion of the floodplain while the restoration area is located on low erosional terrace that is generally flooded less frequently. The erosional terrace also has soil, landform and vegetative signatures of a seepage slope. Significant historic anthropogenic alteration and drainage of the erosional terrace resulted in a cultural landscape of drained pasture lands managed by the cultivation and grazing of non-native forage grasses (primarily bahia grass). Restoration of the site involves hydrologic modification, installation of appropriate native species, control of invasive species, and prescribed fire.

Approximately 155 acres of the Yellow River Ranch consists of existing forested Bottomland (615), with the remaining 120 acres converted to pasture from a previously forested landscape. Of the remaining 120 acres, 27 acres of Bottomland (615), 9 acres of Cypress (621) and 60 acres of Hydric Pine Flatwoods (625) are the focus of the quantitative monitoring. Table 9 summarizes the performance standards for each of the sampled plant communities.

The results of quantitative monitoring within the polygon identified as Hydric Pine Flatwoods (625) indicate that this is a landscape dominated by successional graminoids and forbs. Species richness of at least 40 species was measured in the quantitative transects. All shrubs were reduced to coppice by the 2015 prescribed fire. Currently the shrubs are overtopping the tallest groundcover species.

In October 2017 a few scattered Chinese tallow were found, which had been burned and coppiced by the 2015 fire. Bahia grass and Vasey grass coverage was minimal and has declined. Cogon grass was not observed at the site during the October 2017 site visit.

The quantitative summary results for the tree saplings in the target FLUCCS communities identified as forested/cypress wetlands (615 and 621) indicate that there are at least 600 to 1,499 trees/acre in the sample area. Atlantic white cedar density and coverage increased in 2017 compared to the 2016 monitoring. A remarkable increase in overall woody growth and height of pond cypress, slash pine, red maple, and swamp tupelo was observed. There is evidence of natural dispersal of tree seedlings across the site. Trees with winged and floating seeds such as slash pine, red maple and pond cypress, are found throughout the site. New sapling swamp tupelo were observed throughout the site. Some of the hardwood trees were planted and others are the result of dispersal primarily by birds.

The landscape traversed during the pedestrian transect is mapped entirely as Hydric Pine Flatwoods (625). Herbaceous plant life-form dominance is primarily herbaceous and graminoid throughout the landscape. Herbaceous life-form dominance is consistent and corroborated by the quantitative measures of groundcover. Wildlife and insects were observed feeding and using the

open, grassy landscape. Notable animal observations during the pedestrian transect monitoring include Cooper's hawk, marsh hawk, sedge wrens, migrating butterflies and a high diversity of insects feeding on flowering frost aster and false foxglove.

Table 9. Objectives, Performance Standards, and Current Status by Habitat Type.

Objectives	Performance Standards	Status
150' Linear Transect YRRT1-625 Hydric Pine Flatwoods		
Reduce and/or eliminate invasive, exotic and nuisance vegetation.	Invasive exotic vegetation less than 1% cover over the site and nuisance/non-invasive exotic vegetation less than 5% cover.	Invasive exotics less than 5% of the groundcover coverage; nuisance, non-native vegetation less than 5% cover.
Increase coverage and diversity of native, appropriate vegetation.	Kind and total coverage of species appropriate for management goals and target natural community. 80% coverage by desirable species.	At least 80% coverage by native species. Species richness of native plants >40.
Increase coverage and diversity of native, appropriate tree vegetation.	Kind and total coverage of tree species appropriate for management goals and target natural community.	Tree succession occurring, slash pine, red maple and swamp tupelo.
Increase coverage and diversity of native, appropriate groundcover vegetation.	Increase in appropriate herbaceous, shrub and /or tree species.	Site is recovering with increased diversity and coverage by native species.
150' Linear Transect YRRT2-625 Hydric Pine Flatwoods		
Reduce and/or eliminate invasive, exotic and nuisance vegetation.	Invasive exotic vegetation less than 1% cover over the site and nuisance/non-invasive exotic vegetation less than 5% cover.	Invasive exotics less than 5% of the groundcover coverage; nuisance, non-native vegetation less than 5% cover.
Increase coverage and diversity of native, appropriate vegetation.	Kind and total coverage of species appropriate for management goals and target natural community. 80% coverage by desirable species.	At least 80% coverage by native species. Species richness of native plants >40.
Increase coverage and diversity of native, appropriate tree vegetation.	Kind and total coverage of tree species appropriate for management goals and target natural community.	Tree succession occurring, slash pine, red maple and swamp tupelo.
Increase coverage and diversity of native, appropriate groundcover vegetation.	Increase in appropriate herbaceous, shrub and /or tree species.	Site is recovering with increased diversity and coverage by native species.

Table 9. Objectives, Performance Standards, and Current Status by Habitat Type (Continued).

Belt Transect YYR-BT1-615 Bottomland		
Reduce and/or eliminate invasive, exotic and nuisance vegetation.	Invasive exotic vegetation less than 1% cover over the site and nuisance/non-invasive exotic vegetation less than 5% cover.	Invasive exotics less than 1% of the groundcover coverage; nuisance, non-native vegetation less than 5% cover.
Increase coverage and diversity of native, appropriate vegetation.	Kind and total coverage of species appropriate for management goals and target natural community. 80% coverage by desirable species.	Site is recovering with increased diversity and coverage by native species. 80% coverage by desirable species.
Increase coverage and diversity of native, appropriate tree vegetation.	Kind and total coverage of tree species appropriate for management goals and target natural community.	Site is recovering with increased diversity and coverage by native species.
Increase coverage and diversity of native, appropriate groundcover vegetation.	Increase in appropriate herbaceous, shrub and /or tree species.	Site is recovering with increased diversity and coverage by native species.
Belt Transect YYR-BT2-615 Bottomland		
Reduce and/or eliminate invasive, exotic and nuisance vegetation.	Invasive exotic vegetation less than 1% cover over the site and nuisance/non-invasive exotic vegetation less than 5% cover.	Invasive exotics less than 1% of the groundcover coverage; nuisance, non-native vegetation less than 5% cover.
Increase coverage and diversity of native, appropriate vegetation.	Kind and total coverage of species appropriate for management goals and target natural community. 80% coverage by desirable species.	Site is recovering with increased diversity and coverage by native species. 80% coverage by desirable species.
Increase coverage and diversity of native, appropriate tree vegetation.	Kind and total coverage of tree species appropriate for management goals and target natural community.	Site is recovering with increased diversity and coverage by native species.
Increase coverage and diversity of native, appropriate groundcover vegetation.	Increase in appropriate herbaceous, shrub and /or tree species.	Site is recovering with increased diversity and coverage by native species.
Belt Transect YYR-BT3-621 Cypress		
Reduce and/or eliminate invasive, exotic and nuisance vegetation.	Invasive exotic vegetation less than 1% cover over the site and nuisance/non-invasive exotic vegetation less than 5% cover.	Invasive exotics less than 1% of the groundcover coverage; nuisance, non-native vegetation less than 5% cover.
Increase coverage and diversity of native, appropriate vegetation.	Kind and total coverage of species appropriate for management goals and target natural community. 80% coverage by desirable species.	Site is recovering with increased diversity and coverage by native species. 80% coverage by desirable species.

Table 9. Objectives, Performance Standards, and Current Status by Habitat Type (Continued).

Belt Transect YYR-BT3-621 Cypress		
Increase coverage and diversity of native, appropriate tree vegetation.	Kind and total coverage of tree species appropriate for management goals and target natural community.	Site is recovering with increased diversity and coverage by native species.
Increase coverage and diversity of native, appropriate groundcover vegetation.	Increase in appropriate herbaceous, shrub and /or tree species.	Site is recovering with increased diversity and coverage by native species.
Belt Transect YYR-BT4-621 Cypress		
Reduce and/or eliminate invasive, exotic and nuisance vegetation.	Invasive exotic vegetation less than 1% cover over the site and nuisance/non-invasive exotic vegetation less than 5% cover.	Invasive exotics less than 1% of the groundcover coverage; nuisance, non-native vegetation less than 5% cover.
Increase coverage and diversity of native, appropriate vegetation.	Kind and total coverage of species appropriate for management goals and target natural community. 80% coverage by desirable species.	Site is recovering with increased diversity and coverage by native species. 80% coverage by desirable species.
Increase coverage and diversity of native, appropriate tree vegetation.	Kind and total coverage of tree species appropriate for management goals and target natural community.	Site is recovering with increased diversity and coverage by native species.
Increase coverage and diversity of native, appropriate groundcover vegetation.	Increase in appropriate herbaceous, shrub and /or tree species.	Site is recovering with increased diversity and coverage by native species.

5.0. CONCLUSIONS AND RECOMMENDATIONS

Notes on the current conditions at the Yellow River Ranch restoration site were obtained from ecological monitoring in 2017. Most of the site was burned in July of 2015. The 2015 fire resulted in the rejuvenation of herbaceous species; woody sensitive species were eliminated or reduced to coppice, and all landscapes that were burned have a groundcover dominated by graminoids and a variety of native wildflowers. Much of the site was flooded in 2017. Overall a high diversity of native flora and fauna including insects were observed during the monitoring event. The sum of observations indicate that the ecosystem of seepage slope and floodplain wetlands is healthy and functioning. Observed species diversity is important in the restoration of natural landscapes as this creates ecosystems that are self-sustaining and resilient to climate change and invasive exotics.

The bottomland (615) restoration area landscape was burned in 2015. Continued burning will help control the Chinese tallow tree seedlings and promote appropriate growth and coverage of native groundcover species. Scattered pond cypress, swamp tupelo, red maple and slash pine are thriving and some of the cypress that were previously coppiced by fire have become arborescent.

Use of landscape scale prescribed fire is beneficial for maintaining appropriate native species and life-forms. The groundcover vegetation is healthy and providing habit and feeding sites for a diversity of mammals, birds, reptiles, amphibians, spiders, and insects. The soil disturbance from feral hogs has decreased compared to observations in 2015 and 2016.

The cypress (621) restoration landscape is dominated by graminoids with a scattered landscape of pond cypress saplings. Many of the pond cypress saplings survived the 2015 prescribed fire without damage and these are now greater than 5 feet tall. The groundcover vegetation is healthy and providing habitat and hunting conditions for a variety of insects, spiders, reptiles, amphibians, mammals and birds. The soil disturbance from feral hogs has decreased compared to observations made in 2015 and 2016.

The hydric pine flatwoods (625) is open and park-like with a layer of chest high broomgrass (*Andropogon virginicus*). Slash pine saplings and wax myrtle are now typically greater than 4 feet tall, and are taller than the broomgrass. The open aspect of this landscape provides excellent foraging conditions for a variety of animals. One avian observation of note was an actively hunting marsh harrier. This species requires large tracts of habitat that is open and grassy. Non-native plants occupy less than 1% of the landscape. Continued herbicide treatment of Chinese tallow is recommended. Recurring prescribed burns in the hydric pine flatwoods (625) landscape will accelerate the trend toward the desired target and promote a self-sustaining ecosystem with increased ecological processes.

No significant expansion of non-native plants or animals was observed. ERC recommends continued control of feral hogs. The feral hog control resulted in an observable reduction of the coverage of rutting as seen from pedestrian and quantitative transects. If the Chinese tallow continue to re-sprout after a controlled fire, a selective herbicide treatment is recommended. Frequent prescribed fire is the best management for this site. The site should be burned whenever possible. Pond cypress and slash pine seedlings planted in fall of 2015 will be allowed to grow and become fire resistant, therefore prescribed fire as a management tool will be deferred until a later date.

ERC recommends appropriately timed seasonal prescribed fire as the best management tool for ecosystem recovery at this site. Feral hog removal and herbicide of non-native plants is necessary for continued ecosystem recovery and maintenance.

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APPENDIX A

QUALITATIVE DATA SHEETS

Qualitative assessment data sheet

Transect ID: YRR-PT1-625 **Date:** 10/18/2017

Plant Community Type: Hydric pine savanna **Time (am/pm):** 10:00 AM CT

1. Weather: ☑ Full Sun ☐ Part Sun ☐ Cloudy ☐ Cloudy with Rain/Fog

2. Temperature: ☐ 20-50 F ☑ 51-70 F ☐ 71-90 F ☐ 91-110 F

☐ Pine Plantation (Rows) ☑ Restoration in progress ☐ Pine Plantation (Rows) ☐ Managed for Pine ☐ Natural Forest

3. CANOPY % cover: ☑ Absent ☐ 0-1% ☐ 1-5% ☐ 6-25% ☐ 26-50% ☐ 51-75% ☐ 76-100%

4. Estimated height class of the majority of **TREES** using the following scale: ☑ absent ☐ 3-5m ☐ 6-10m ☐ >10m

List 6 dominant **TREE** species observed in canopy:

1. N/A **2.** **3.**

4. **5.** **6.**

5. Estimated height class of the majority of **SUBCANOPY** using the following scale: ☑ absent ☑ 3-5m ☐ 6-10m ☐ >10m

List up to 6 dominant **SUBCANOPY** species observed:

1. N/A **2.** **3.**

4. **5.** **6.**

6. SHRUBS % cover: ☐ Absent ☐ 0-1% ☐ 1-5% ☑ 6-25% ☐ 26-50% ☐ 51-75% ☐ 76-100%

List 3 dominant **SHRUB** species observed:

1. Myrica cerifera **2.** Baccharis halmifolia **3.** many tree saplings - shrub-like growth pl

7. Estimated height class of the majority of **SHRUBS** using the following scale: ☐ absent ☐ 0-.5m ☐ .6-1.5m ☑ 1.6-3m

List 3 of the most common **SHRUB** and/or **TREE** seedlings observed:

1. Pinus elliottii **2.** Myrica cerifera **3.** Nyssa biflora

8. GROUNDCOVER % cover of graminoids (grasses, sedges and rushes):

☐ Absent ☐ 0-1% ☐ 1-5% ☐ 6-25% ☐ 26-50% ☐ 51-75% ☑ 76-100%

9. TOTAL GROUNDCOVER % cover (including graminoids and forbes):

☐ Absent ☐ 0-1% ☐ 1-5% ☐ 6-25% ☐ 26-50% ☐ 51-75% ☑ 76-100%

List up to 9 dominant **GROUNDCOVER** species observed:

1. *Andropogon virginicus* **2.** *Symphyotrichum dumosum* **3.** *Axonopus furcatus*

4. *Rhynchospora* spp. **5.** *Euthamia* spp. **6.** *Centella asiatica*

7. *Eupatorium leptophyllum* **8.** *Rubus argutus* and *R. cuneatus* **9.** *Juncus marginatus*

List the NATIVE **WEEDY** or **RUDERAL** species observe - otherwise SEE 18. EXOTIC SPECIES BELOW

1. **2.** **3.**

4. **5.** **6.**

Vegetation notes: Site was burned in 2015. There is a dense thatch in some areas, this should provide excellent fuel for prescribed fire when dry. Shrubs have grown into thickets, sometimes over 10 feet tall. Groundcover is dominated by herbaceous species, mostly Andropogon virginicus, beak sedge, and *Axonopus.* Good coverage by herbs, this will help carry fire during the next prescribed fire. Many shrubs over 6 feet in height. There is widespread slash pine sapling dispersal at the landscape scales, especially where not flooded.

Qualitative assessment data sheet

Transect ID: YRR-PT1-625 **Date:** 10/18/2017

Plant Community Type: Hydric pine savanna

10. Tree density: no canopy, although there are many tree saplings dispersed across the site,

11. Tree health: no canopy

13. Water table: ☐ at the surface ☑ below surface **Standing water:** ☐ present ☑ absent

14. Water color: ☐ tannic ☐ non-tannic/clear ☐ cloudy

Notes on wildlife usage observed:

1. Yellow throat warbler **2.** Eastern phoebe **3.** red winged blackbird

4. Birds of prey - see wildlife notes **5.** Cricket and grasshopper **6.** butterflies - see wildlife notes

7. Blue darner dragonfly and damselfly **8.** American alligator **9.** Carolina anole

17. Wildlife usage and natural history observations: ☐ footprints ☐ scat ☐ fish ☑ birds ☐ mammals ☐ arthropods ☑ herbivory ☐ frog calls ☐ scratch marks

Wildlife notes: Clear, cool day, low humidity, many species of pollinators visiting flowering frost aster, goldenrod and blazing star *(Liatris spicata).* High density of migratory sedge wrens and warblers using the shrub, graminoid and blackberry thickets for shelter. Birds of prey included coopers hawk, marsh hawk, red shouldered hawk, red tailed hawk, and turkey vultures. Butterfly density was high, many cloudless surfur, gulf fritillary and buckeye visiting the Fall wildflowers. Juvenile alligators observed. Tracks of deer, raccoon, and soil disturbance from feral hogs observed.

Notes on Exotic species observed:

18. Exotic species: ☑ present ☐ absent

Sapium sebiferum <1% cover; *Paspalum notatum* < 1% coverage. Limited and locally common soil disturbance from feral pigs.

Pig footprints seen throughout the site. Large pig trap observed on west portion of the site.

Juvenile alligators observed in pools associated with the east portion of site, near the floodplain.

Notes on Restoration:

19. Notes on the general aspect of the site/techniques to meet restoration goals:

Is natural regeneration occurring? ☑ yes ☐ no **and:** ☑ species appropriate ☐ supplemental planting/seeding needed

Landscape observation: ☑ appropriately managed

Planted? some areas are planted with native tree samplings **~Tree age:** ☑ 0-5 yrs. ☐ 6-10 yrs. ☐ 11-20 yrs. ☐ 20+ yrs.

Recommendations for restoration: ☑ prescribed burn **other:**

20. Notes on prescribed burning and fire conditions:

Fuels: ɜaf litter (cm): 1-10 duff (cm) <1 Note: site should burn well, dense grasses and sedges in groundcover

Soil moisture: moist to saturated

Specific notes on restoration, observations, or adaptive management techniques:

Continue prescribed burning, this is assisting the natural regeneration of appropriate native groundcover species. Landscape remains open.

Natural regeneration has augmented the planted tree saplings. Fire will assist with the appropriate trajectory for restoration of this site.

A large hog trap has reduced hog damage. Burning will eliminate and suppress invasive exotic plants such as Chinese tallow.

APPENDIX B

PANORAMIC PHOTOGRAPHS

QUANTITATIVE AND QUALITATIVE TRANSECTS

Yellow River Ranch Quantitative Transect YRR-T1-625: Panoramic Photograph depicted in two 180 degree sections.

0^0 **180^0**

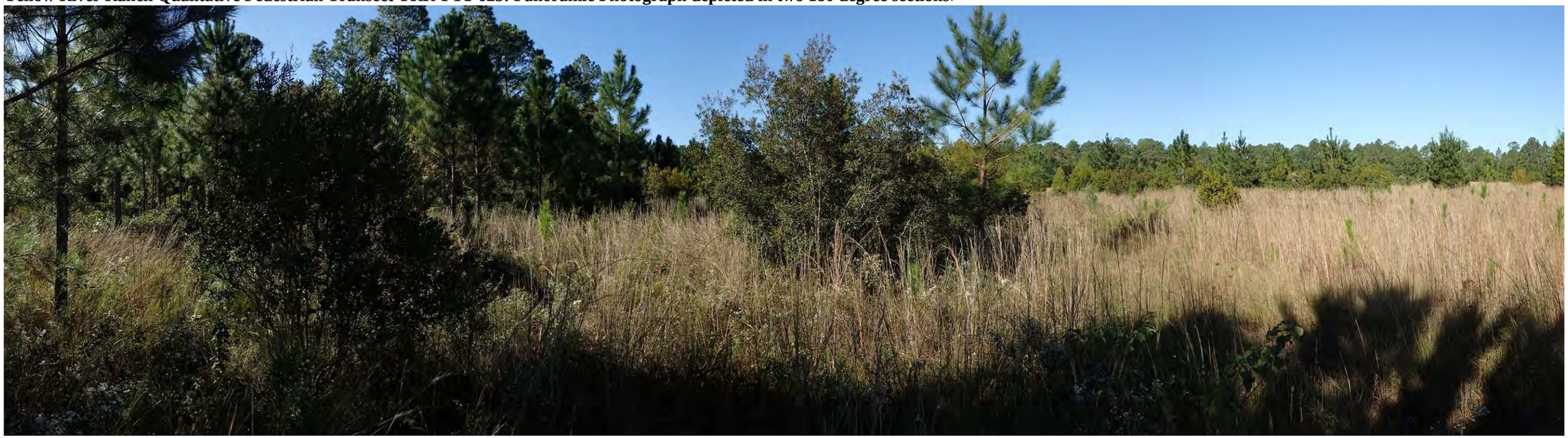
180^0 **360^0**

Yellow River Ranch Quantitative Transect YRR-T2-625: Panoramic Photograph depicted in two 180 degree sections.

0^0 **180^0**

180^0 **360^0**

Yellow River Ranch Qualitative Pedestrian Transect YRR-PT1-625: Panoramic Photograph depicted in two 180 degree sections.



0^0 **180^0**

180^0 **360^0**

Yellow River Ranch Photo point YRR-PP1: Panoramic Photograph taken at photo point depicted in two 180 degree sections.

0^0 **180^0**

180^0 **360^0**

Yellow River Ranch Photo point YRR-PP2: Panoramic Photograph taken at photo point depicted in two 180 degree sections.

0^0 **180^0**

180^0 **360^0**

Yellow River Ranch Photo point YRR-PP3: Panoramic Photograph taken at photo point depicted in two 180 degree sections.

0^0 **180^0**

180^0 **360^0**

APPENDIX C

QUANTITATIVE MONITORING PLOT PHOTOGRAPHS

TRANSECT YRR-T1-625 HYDRIC PINE FLATWOODS


Photographs (left to right): 1) Transect YRRT1-625 Plot – 10 feet; 2) Transect YRRT1-625 Plot – 20 feet


Photographs (left to right): 1) Transect YRRT1-625 Plot – 30 feet; 2) Transect YRRT1-625 Plot – 40 feet


Photographs (left to right): 1) Transect YRRT1-625 Plot – 50 feet; 2) Transect YRRT1-625 Plot – 60 feet


Photographs (left to right): 1) Transect YRRT1-625 Plot – 70 feet; 2) Transect YRRT1-625 Plot – 80 feet


Photographs (left to right): 1) Transect YRRT1-625 Plot – 90 feet; 2) Transect YRRT1-625 Plot – 100 feet

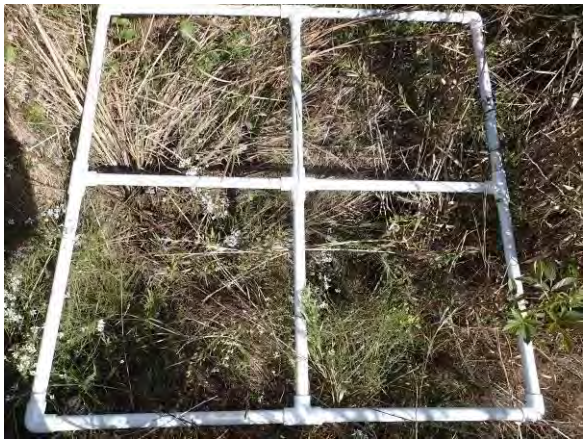

Photographs (left to right): 1) Transect YRRT1-625 Plot – 110 feet; 2) Transect YRRT1-625 Plot – 120 feet


Photographs (left to right): 1) Transect YRRT1-625 Plot – 130 feet; 2) Transect YRRT1-625 Plot – 140 feet

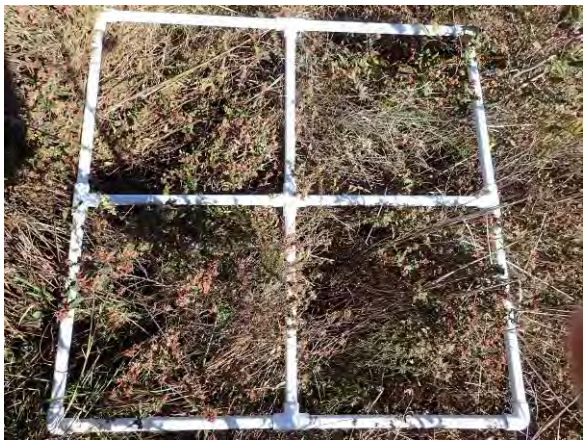
Photographs (left to right): 1) Transect YRRT1-625 Plot – 150 feet

TRANSECT YRR-T2-625 HYDRIC PINE FLATWOODS


Photographs (left to right): 1) Transect YRRT2-625 Plot – 10 feet; 2) Transect YRRT2-625 Plot – 20 feet

Photographs (left to right): 1) Transect YRRT2-625 Plot – 30 feet; 2) Transect YRRT2-625 Plot – 40 feet

Photographs (left to right): 1) Transect YRRT2-625 Plot – 50 feet; 2) Transect YRRT2-625 Plot – 60 feet


Photographs (left to right): 1) Transect YRRT2-625 Plot – 70 feet; 2) Transect YRRT2-625 Plot – 80 feet


Photographs (left to right): 1) Transect YRRT2-625 Plot – 90 feet; 2) Transect YRRT2-625 Plot – 100 feet


Photographs (left to right): 1) Transect YRRT2-625 Plot – 110 feet; 2) Transect YRRT2-625 Plot – 120 feet


Photographs (left to right): 1) Transect YRRT2-625 Plot – 130 feet; 2) Transect YRRT2-625 Plot – 140 feet

Photographs (left to right): 1) Transect YRRT2-625 Plot – 150 feet