

**STATUS SURVEY AND SEARCH EFFORTS FOR *SCHWALBEA AMERICANA* L.
(AMERICAN CHAFFSEED) IN GEORGIA**



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FINAL REPORT

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INTRODUCTION

Schwalbea americana L. (American chaffseed) is listed federally and by the State of Georgia as *Endangered* (U.S. Fish and Wildlife Service 1992; Anonymous 2008). Its rarity resulting from habitat fragmentation and the exclusion of fire has been well documented (Musselman and Mann 1978, Kral 1983, U.S. Fish and Wildlife Service 1995). Few plants are as closely adapted to fire as *S. americana* (cf. U.S. Fish and Wildlife Service 1995; Kirkman et al. 1998; Norden and Kirkman 2004a, b), and all extant sites in Georgia appear to be managed with prescribed fire and have a wiregrass component. Moreover, recent publications on the life history and ecology of *S. americana* (Townsend 1997; Kirkman et al. 1998; Helton et al. 2000; Norden and Kirkman 2004a, b) have provided much information on its relationship with fire. During 2006, new populations of *S. americana* were discovered in Thomas County and in a other counties in southwestern Georgia, all in longleaf pine / wiregrass communities with historical and currently active programs of fire management. Over the past decade the application of prescribed fire in the management of longleaf pine / wiregrass plant communities in Georgia's coastal plain has greatly increased. Our purpose is to document these recent discoveries of chaffseed and, secondarily, to explore additional sites where fire has been re-introduced into longleaf pine-wiregrass habitats. By assessing and documenting known sites and populations and searching for new populations, we expect to obtain a better understanding of the conservation status of chaffseed in Georgia. Following are specific goals of this project.

1. To determine areas of potential habitat for chaffseed where fire management plays a key role, especially on permanently protected lands and on sites with other extant rare plants and animals.
2. To conduct surveys following prescribed burns whenever possible in areas with intact wiregrass ground cover.
3. To begin monitoring selected sites in an effort to determine population trends.
4. To recommend populations suitable for protection efforts.
5. To assess presence of other selected rare plants, animals and significant natural communities associated with or adjacent to both known and potential chaffseed localities.
6. To provide current information on all Georgia records for chaffseed with population estimates, precise locations, and landowner information.

Rare plants known or suspected to be associated with *Schwalbea americana* habitats include purple honeycomb-head (*Balduina atropurpurea*), hummingbird flower (*Macranthera flammea*), wiregrass dropseed (*Sporobolus teretifolius*), dewthreads (*Drosera tracyi*), Stoke's aster (*Stokesia laevis*), crestless plume orchid (*Pteroglossaspis ecristata*) and savanna cowbane (*Oxypolis denticulata*). Other rarities of longleaf pine-wiregrass habitats include Bachman's sparrow, red-cockaded woodpecker, pocket gopher, indigo snake, gopher tortoise, and pine snake.

Additional essential benefits to the chaffseed status survey are landowner contact and the potential for on-the-ground protection efforts and the potential discovery of rarities on public lands or areas suitable for public acquisition. Observations on timing of fires and the phenology of chaffseed can be invaluable in development of search methods for and management of chaffseed, and it is anticipated that additional evidence about the timing of prescribed burning will be acquired.

In addition to inducing the flowering of chaffseed, fire reduces plant cover and dead plant debris that hinder observation of chaffseed. Therefore, most observations on chaffseed are made on

lands managed with prescribed fire. Searches in areas where fire has not occurred in the past decade will have a low priority. Since the persistent blackened old stems of chaffseed plants are conspicuous, searches may be fruitful right up to the next fire event, at least into the winter months. A special emphasis on public lands, such as the newly purchased River Creek Wildlife Management Area in Thomas County and the fire-maintained Doerun Pitcherplant Bog Natural Area in Colquitt County will be undertaken. Similarly, private lands that are well managed as natural areas will have high priority.

METHODS

Surveys were conducted primarily in southwestern Georgia on the Gulf Coastal Plain south of the Fall Line Red Hills. Specific survey sites were selected based upon the location of extant populations of *S. americana* in Georgia that lie within the Tifton Upland (including areas with exposures of or underlain by Altamaha Grit), the Dougherty Plain, Pelham Escarpment, Tallahassee Hills and Valdosta Limesink Region. Sites with longleaf pine / wiregrass savanna, particularly those with a history of fire management, were targeted. Some exploration of sites with suitable habitat or historical records of *S. americana* was also done in other areas.

Surveys were primarily restricted to sites known or suspected to harbor populations of *S. americana* and sites with longleaf pine / native ground cover subject to regular fire management, largely based upon W.W. Baker's knowledge acquired from more than 30 years of experience working in the southern Georgia, particularly on numerous quail plantations. Because of the difficulty of locating plants in habitats not recently burned and the general beneficial effect of fire on *S. americana*, most survey effort was made in areas burned during the current year. Nearly all of the sites reported herein are on private property, and all data reported should be treated as sensitive information unless otherwise indicated. We will work with Georgia DNR to secure permissions when necessary.

GENERAL SURVEY METHODS. The following were primary considerations in locating and prioritizing sites to survey for the presence of *S. americana*.

1. records of historical or recent observations of the target species (Table 1)
2. presence of Longleaf Pine / Wiregrass community with intact native ground cover
3. historical or current use of fire in the management program
4. knowledge of recent (within the current year) burning, usually obtained through landowner/manager contact

In general, surveys of sites with the potential for supporting populations of *S. americana* were conducted using a four-wheel drive vehicle, covering as much of the area as possible via roads, jeep trails, fire breaks, and edges of fields. Generally, a team of two individuals was involved, with the team members searching from opposite sides of the survey vehicle, using binoculars when necessary. Additionally, frequent and regular foot surveys were made along these routes by the survey team.

When populations of *S. americana* were found, individual plants were counted. *Schwalbea americana* plants often branch basally producing multiple aerial stems. Thus, tight basal clumps of stems were generally counted as one individual plant – not multiple plants. Care was taken to examine the bases of plants with multiple stems to determine as accurately as possible the number of individuals at hand. In order to locate plants more precisely, large populations were generally broken down into smaller subpopulations. Global Positioning System (GPS) data

Table 1. Historical data on *Schwalbea americana* in Georgia from the database (08/15/2007) of the Department of Natural Resources, Natural Heritage Program, Social Circle, Georgia.

EO Number	Last Observation	Latitude Longitude	County	USGS Topographic Quad	Site Name
001	1987-06-08	31.271111N 84.543889W	Baker	Bethany	Ichauway Plantation Macrosite
002	1938-05-11	31.148333N 84.976111N	Early	Lucile	
003	1947-05-14	31.074444N 84.875833W	Miller	Donalsonville West	
004	1948-05-21	32.999444N 84.324167W	Pike	Thomaston	
005	1989-06-02	31.451111N 84.286111W	Dougherty	Red Store Crossroads	Nilo Plantation
006	1989-06-02	31.443889N 84.286944W	Dougherty	Red Store Crossroads	Nilo Plantation
008	1990	31.391389N 84.239444W	Baker	Baconton North	Pineland Plantation
009	1987-06-08	31.265000N 84.546944W	Baker	Bethany	Ichauway Plantation (Pond #27, P-27)

(latitude, longitude) were taken to locate and delimit each population. GPS data were taken using a Magellan Meridian Color GPS unit (accuracy: with Wide Area Augmentation System <3 meters, 95% 2D RMS). These data were subsequently used to map each population with ArcGIS (Version 9.3) and, whenever practicable, to estimate the area of populations. Unless otherwise indicated, all GPS data provided herein are given as decimal degrees latitude/longitude. Additional data were recorded in the field, including date of survey, phenology (e.g., plant vegetative, plant in bud, plant in flower, plant in fruit), estimates of population area, community type, lists of associated species, attributes of topography (e.g., steepness of slope, exposure of slope), evidence of disturbance, evidence of threats, information about ownership and management, observations on management practices, and observations of other rare or unusual species.

ASSESSMENT OF STATUS OF POPULATIONS AND ELEMENT OCCURRENCES. Each element occurrence (EO) was ranked according to the following scheme, and these values were averaged to determine an overall ranking for each EO based upon attributes of population and habitat.

ELEMENT OCCURRENCE (EO) ASSESSMENT CRITERIA
Quality – based upon size and productivity of the population and vigor of its individuals
Condition – based upon whether the habitat is pristine or degraded and upon its potential for recovery and whether it is or has been subjected to regular and frequent burning
Viability – based upon the long-term prospects for the continued existence of the population at the indicated level of quality
Defensibility – based upon the degree to which the population can be protected from detrimental anthropogenic effects
Each EO was rated in each of the preceding criteria, using the following scale: A (value of 4) = excellent, B (value of 3) = good, C (value of 2) = fair, D (value of 1) = poor

PREPARATION OF VOUCHERS AND PHOTOGRAPHS. In order to document certain populations of *S. americana* and associated species, including other rare or unusual flora, voucher specimens were prepared from selected populations. Additionally, digital photographs were made to document the life history and habitat of *S. americana*.

PLOT SAMPLING. Permanent plots were established in order to gather baseline data on density of *S. americana* populations as it relates to fire management and to quantify community structure and associated species. Four 250m² (10X25m) plots were established at sites with robust populations of *S. americana*. A Magellan Meridian Color GPS unit was used to locate the primary corner of each plot, which was marked with a 24-inch permanent steel survey marker. The plots were laid out along cardinal compass directions using a lensatic compass, two 30-m tapes, and 18 36-inch wire flags. The essential attributes of these permanent 250m² plots are given in Table 2. *Schwalbea americana* plants were counted in each 250m² plot and phenological data (i.e., plant vegetative, plant in bud, plant in flower, plant in fruit) were taken for each plant. These data were used to calculate density of *S. americana* plants in each of the plots. These plots will be sampled in future years to document *S. americana* population dynamics over time, particularly as they relate to frequency of fire.

Table 2. Attributes of permanent 250m² plots, with reference to EO site, state, county, USGS topographic quadrangle, GPS coordinates, orientation of plot, position of primary plot corner, and survey date.

EO Site Name	State / County	USGS Topo Quad	GPS Coordinates	Orientation of Plot / Position of Primary Corner	Survey Date
Arcadia 01	Georgia / Thomas Co.	Pine Park, GA	30.77113N 84.00268W	N to S / SE	12 June 2008
Arcadia 04	Georgia / Thomas Co.	Pine Park, GA	30.76464N 84.00242W	N to S / SW	12 June 2008
Jeffords 01	Georgia / Worth Co.	Tempy, GA	31.40547N 83.85597W	N to S / NE	10 July 2008
Quail Ridge 01	Georgia / Worth Co.	Norman Park, GA	31.32169N 83.72299W	E to W / NE	20 June 2008

Within each 250m² plot, nested plots were established and sampled in order to document and quantify community composition and structure and species associated with *S. americana*. One 25m² (5X5m) plot and ten 1m² stratified random plots were located within each 250m² plot (Figure 1). Each 1m² plot was centered in one of ten 5X5m sectors of the 250m² plot. All plots within each class were independent. In the 250m² plots, stem diameters of all woody perennial plants (trees) with diameter at breast height (DBH, measured ca. 1.5 m above ground level) ≥7.5 cm were measured with a metric steel diameter tape (cm) and recorded by species. Basal Area was calculated from these data by the following formula.

$$\begin{aligned} \text{Basal Area (BA) (m}^2\text{)} &= \pi r^2 \\ &= 3.142 \times (\text{DBH}/200)^2 \end{aligned}$$

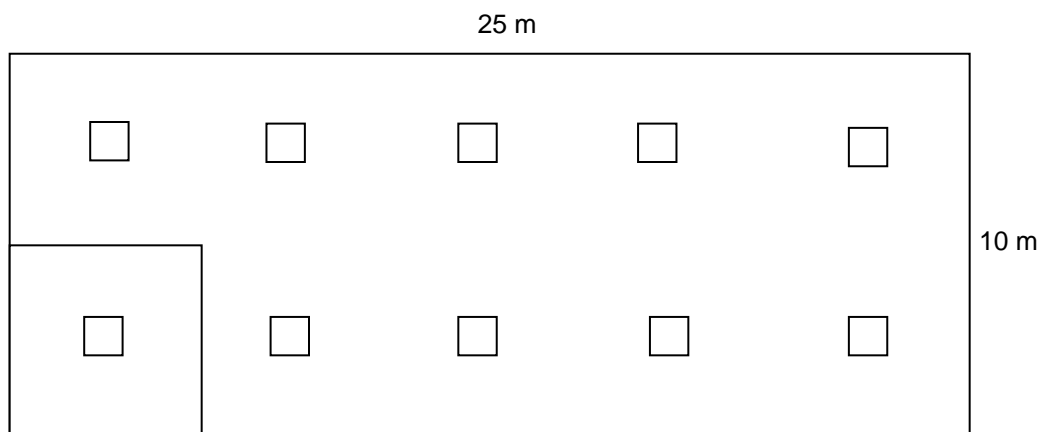


Figure 1. Configuration of nested plots: 250m², 25m² and 1 m².

In the 25m² plots, individuals of shrubs and woody vines at least 30cm high (long) were identified and counted by species and the counts recorded. Percent areal cover was estimated and recorded for each species in the 1m² plots. Relative Dominance was calculated for each species in the 250m² tree plots, and Relative Density was calculated for each species in the 25m² shrub plots. For each species in the 1m² herb plots Relative Dominance and Relative Frequency were calculated and then averaged to determine Relative Importance for each species. Calculations were done based upon equations in Cox (1967).

RESULTS

EO SITES, POPULATIONS, AND NUMBERS OF INDIVIDUALS. In order to map EOs at a finer scale, EO sites were narrowly defined based upon multiple subpopulations. Our field survey resulted in the location of 47 separate EO sites, including subpopulations, supporting more than 4100 individual plants of *S. americana* (Tables 3, 4 and 5). When grouped based upon factors of geographical proximity, patterns of fragmentation, and ownership, these sites comprise nine larger metapopulations in Colquitt, Dougherty, Mitchell, Thomas, and Worth counties (Table 4). Additionally, EOs are known and well documented from Baker County (Ichauway), but we did not survey these sites (cf. Drew et al. 1998, Kirkman et al. 1998, Appendix A). Of our 47 EO records, all but two are new additions to the Georgia DNR Natural Heritage database (cf. Table 1). Data for each EO are presented in Appendix A and maps in Appendix B.

RANKING OF ELEMENT OCCURRENCES. The systematic ranking of each EO by the four criteria (Quality, Condition, Viability, Defensibility) and their overall rankings are given in Appendix A, and the overall rankings for each EO are summarized in Table 5. EOs and metapopulations are sorted in descending order by size in Tables 6 and 7 and by overall rankings in Tables 8 and 9, respectively. Approximately, 49% (23 out of 47) of the EOs received a ranking of A, 32% (15 out of 47) a B ranking, 13% (6 out of 47) a C ranking, and 6% (3 out of 47) a D ranking.

Table 3. Index of *Schwalbea americana* Element Occurrences (EOs) for all populations and subpopulations with reference to state, county, and USGS topographic quadrangle.

EO Site Name	State/County	USGS Topo Quad
Arcadia 01	Georgia, Thomas County	Pine Park, GA
Arcadia 01a	Georgia, Thomas County	Pine Park, GA
Arcadia 02	Georgia, Thomas County	Thomasville, GA
Arcadia 02a	Georgia, Thomas County	Thomasville, GA
Arcadia 03	Georgia, Thomas County	Pine Park, GA
Arcadia 03a	Georgia, Thomas County	Pine Park, GA
Arcadia 04	Georgia, Thomas County	Pine Park, GA
Arcadia 04a	Georgia, Thomas County	Pine Park, GA
Arcadia 05	Georgia, Thomas County	Pine Park, GA
Arcadia 06	Georgia, Thomas County	Pine Park, GA
Arcadia 07	Georgia, Thomas County	Pine Park, GA
Arcadia 07a	Georgia, Thomas County	Pine Park, GA
Arcadia 08	Georgia, Thomas County	Pine Park, GA
Arcadia 09	Georgia, Thomas County	Pine Park, GA
Doerun 01	Georgia, Colquitt County	Doerun, GA
Doerun 02	Georgia, Colquitt County	Doerun, GA
Doerun 03	Georgia, Colquitt County	Doerun, GA
Freeman 01	Georgia, Mitchell County	Putney, GA
Freeman 01a	Georgia, Mitchell County	Putney, GA
Freeman 01b	Georgia, Mitchell County	Putney, GA
Freeman 01c	Georgia, Mitchell County	Putney, GA
Freeman 01d	Georgia, Mitchell County	Putney, GA
Jeffords 01	Georgia, Worth County	Tempy, GA
Jeffords 01a	Georgia, Worth County	Tempy, GA
Jeffords 01b	Georgia, Worth County	Tempy, GA
Jeffords 01c	Georgia, Worth County	Tempy, GA
Jeffords 02	Georgia, Worth County	Tempy, GA
Jeffords 03	Georgia, Worth County	Tempy, GA
Jeffords 04	Georgia, Worth County	Tempy, GA
Jeffords 04a	Georgia, Worth County	Tempy, GA
Jeffords 05	Georgia, Worth County	Tempy, GA
Jeffords 05a	Georgia, Worth County	Tempy, GA
Jeffords-Hancock 01	Georgia, Worth County	Tempy, GA
Nilo 01	Georgia, Dougherty County	Red Store Crossroads, GA
Nilo 01a	Georgia, Dougherty County	Red Store Crossroads, GA
Pinewood 01	Georgia, Mitchell County	Putney, GA
Pinewood 02	Georgia, Mitchell County	Putney, GA
Pinewood 03	Georgia, Mitchell County	Putney, GA
Pinewood 03a	Georgia, Mitchell County	Putney, GA
Pinewood 04	Georgia, Mitchell County	Putney, GA
Pinewood 05	Georgia, Mitchell County	Putney, GA
Pinewood 06	Georgia, Mitchell County	Putney, GA
Pinewood 07	Georgia, Mitchell County	Putney, GA
Quail Ridge 01	Georgia, Worth County	Norman Park, GA
Quail Ridge 01a	Georgia, Worth County	Norman Park, GA
Weatherby 01	Georgia, Dougherty County	Putney, GA
Weatherby 02	Georgia, Dougherty County	Putney, GA

Table 4. *Schwalbea americana* metapopulations with reference to state, county, and USGS topographic quadrangle.

Name of Metapopulation	State/County	USGS Topo Quad
Arcadia	Georgia, Thomas County	Pine Park & Thomasville, GA
Doerun	Georgia, Colquitt County	Doerun, GA
Freeman	Georgia, Mitchell County	Putney, GA
Jeffords	Georgia, Worth County	Tempy & Bridgeboro, GA
Jeffords-Hancock	Georgia, Worth County	Tempy, GA
Nilo	Georgia, Dougherty County	Red Store Crossroads, GA
Pinewood	Georgia, Mitchell County	Putney, GA
Quail Ridge	Georgia, Worth County	Norman Park, GA
Weatherby	Georgia, Dougherty County	Putney, GA

Table 5. Summary of *Schwalbea americana* populations and subpopulations showing population area, numbers of individuals, and ranking. NA=not applicable, incl=included within preceding site.

EO Site Name	Area (m ²)	Number of Individuals (Year)	Ranking
Arcadia 01	1886	283 (2007)	B- (2.75)
Arcadia 01a	20	5 (2007)	B- (2.75)
Arcadia 02	12352	4 (2007)	B- (2.75)
Arcadia 02a	incl	17 (2007)	B- (2.75)
Arcadia 03	NA	7 (2006)	B (3.00)
Arcadia 03a	28	26 (2007)	B (3.00)
Arcadia 04	3649	86 (2007)	A- (3.75)
Arcadia 04a	3	4 (2007)	C (2.25)
Arcadia 05	2910	126 (2007)	A- (3.75)
Arcadia 06	NA	15 (2007)	A- (3.75)
Arcadia 07	1603	30 (2006), 8 (2007)	A- (3.75)
Arcadia 07a	1331	70 (2006), 4 (2007)	A- (3.75)
Arcadia 08	1342	125 (2006), 18 (2007)	B (3.00)
Arcadia 09	10	9 (2007)	B (3.00)
Doerun 01	NA	2 (2008)	B+ (3.25)
Doerun 02	NA	1 (2008)	B+ (3.25)
Doerun 03	2150	100 (2008)	A (4.00)
Freeman 01	124685	581 (2008)	A (4.00)
Freeman 01a	138	13 (2008)	A (4.00)
Freeman 01b	1687	242 (2008)	A (4.00)
Freeman 01c	NA	6 (2008)	A (4.00)
Freeman 01d	NA	4 (2008)	A (4.00)
Jeffords 01	3241	393 (2007)	A (4.00)
Jeffords 01a	696	449 (2007)	A (4.00)
Jeffords 01b	1873	154 (2007)	A (4.00)
Jeffords 01c	NA	6 (2007)	A (4.00)
Jeffords 02	568	198 (2007)	A (4.00)
Jeffords 03	488	76 (2007)	A (4.00)
Jeffords 04	11	8 (2007), 26 (2008)	A- (3.75)
Jeffords 04a	557	13 (2008)	A- (3.75)
Jeffords 05	1911	335 (2007)	A (4.00)
Jeffords 05a	169	9 (2007)	A (4.00)
Jeffords-Hancock 01	9	7 (2007)	B+ (3.50)
Nilo 01	51	13 (2007)	D (1.25)
Nilo 01a	512	108 (2007)	D (1.25)
Pinewood 01	44	8 (2007), 6 (2008)	C (2.00)
Pinewood 02	132	9 (2007), 5 (2008)	B- (2.75)
Pinewood 03	79	1 (2007), 16 (2008)	C- (1.75)
Pinewood 03a	11	3 (2008)	B- (2.50)
Pinewood 04	580	9 (2008)	B- (2.75)
Pinewood 05	NA	1 (2008)	C- (1.75)
Pinewood 06	5	3 (2008)	C (2.00)
Pinewood 07	53	10 (2008)	C- (1.50)
Quail Ridge 01	5121	31 (2007), 283 (2008)	A (4.00)
Quail Ridge 01a	incl	0 (2007), 13 (2008)	A (4.00)
Weatherby 01	6072	255 (2007)	B (3.00)
Weatherby 02	NA	5 (2008)	D (1.00)

Table 6. *Schwalbea americana* populations and subpopulations sorted in descending order by size numbers of individual plants. Only actual counts were used. In cases where data were available for multiple years, only the higher count was tabulated.

EO Site Name	Number of Plants (Year)
Freeman 01	581 (2008)
Jeffords 01a	449 (2007)
Jeffords 01	393 (2007)
Jeffords 05	335 (2007)
Arcadia 01	283 (2007)
Quail Ridge 01	283 (2008)
Weatherby 01	255 (2007)
Freeman 01b	242 (2008)
Jeffords 02	198 (2007)
Jeffords 01b	154 (2007)
Arcadia 05	126 (2007)
Arcadia 08	125 (2006)
Nilo 01a	108 (2007)
Doerun 03	100 (2008)
Arcadia 04	86 (2007)
Jeffords 03	76 (2007)
Arcadia 07a	70 (2006)
Arcadia 07	30 (2006)
Arcadia 03a	26 (2007)
Jeffords 04	26 (2008)
Arcadia 02a	17 (2007)
Pinewood 03	16 (2008)
Arcadia 06	15 (2007)
Nilo 01	13 (2007)
Freeman 01a	13 (2008)
Jeffords 04a	13 (2008)
Quail Ridge 01a	13 (2008)
Arcadia 09	9 (2007)
Jeffords 05a	9 (2007)
Pinewood 02	9 (2007)
Pinewood 07	10 (2008)
Pinewood 04	9 (2008)
Pinewood 01	8 (2007)
Arcadia 03	7 (2006)
Jeffords-Hancock 01	7 (2007)
Jeffords 01c	6 (2007)
Freeman 01c	6 (2008)
Arcadia 01a	5 (2007)
Weatherby 02	5 (2008)
Arcadia 02	4 (2007)
Arcadia 04a	4 (2007)
Freeman 01d	4 (2008)
Pinewood 03a	3 (2008)
Pinewood 06	3 (2008)
Doerun 01	2 (2008)
Doerun 02	1 (2008)
Pinewood 05	1 (2008)

Table 7. Metapopulations of *Schwalbea americana* sorted in descending order by numbers of individual plants, derived from data in Table 6.

Name of Metapopulation	Number of Plants
Jeffords	1659
Freeman	846
Arcadia	807
Quail Ridge	296
Weatherby	260
Nilo	121
Doerun	103
Pinewood	59
Jeffords-Hancock	7
TOTAL	4158

Table 8. *Schwalbea americana* populations and subpopulations sorted in descending order by overall EO ranking (A/4=excellent, B/3=good, C/2=fair, D/4=poor).

EO Site Name	Ranking
Doerun 03	A (4.00)
Freeman 01	A (4.00)
Freeman 01a	A (4.00)
Freeman 01b	A (4.00)
Freeman 01c	A (4.00)
Freeman 01d	A (4.00)
Jeffords 01	A (4.00)
Jeffords 01a	A (4.00)
Jeffords 01b	A (4.00)
Jeffords 01c	A (4.00)
Jeffords 02	A (4.00)
Jeffords 03	A (4.00)
Jeffords 05	A (4.00)
Jeffords 05a	A (4.00)
Quail Ridge 01	A (4.00)
Quail Ridge 01a	A (4.00)
Arcadia 04	A- (3.75)
Arcadia 05	A- (3.75)
Arcadia 06	A- (3.75)
Arcadia 07	A- (3.75)
Arcadia 07a	A- (3.75)
Jeffords 04	A- (3.75)
Jeffords 04a	A- (3.75)
Jeffords-Hancock 01	B+ (3.50)
Doerun 01	B+ (3.25)
Doerun 02	B+ (3.25)
Arcadia 03	B (3.00)
Arcadia 03a	B (3.00)
Arcadia 08	B (3.00)
Arcadia 09	B (3.00)
Weatherby 01	B (3.00)
Arcadia 01	B- (2.75)
Arcadia 01a	B- (2.75)
Arcadia 02	B- (2.75)
Arcadia 02a	B- (2.75)
Pinewood 02	B- (2.75)
Pinewood 04	B- (2.75)
Pinewood 03a	B- (2.50)
Arcadia 04a	C (2.25)
Pinewood 01	C (2.00)
Pinewood 06	C (2.00)
Pinewood 03	C- (1.75)
Pinewood 05	C- (1.75)
Pinewood 07	C- (1.50)
Nilo 01	D (1.25)
Nilo 01a	D (1.25)
Weatherby 02	D (1.00)

Table 9. Metapopulations of *Schwalbea americana* sorted in descending order by average rankings of component subpopulations.

Name of Metapopulation	Ranking
Freeman	A (4.00)
Quail Ridge	A (4.00)
Jeffords	A (3.95)
Doerun	B+ (3.50)
Jeffords-Hancock	B+ (3.50)
Arcadia	B (3.14)
Pinewood	C (2.13)
Weatherby	C (2.00)
Nilo	D (1.25)

DESCRIPTION OF HABITAT AND COMMUNITY. All populations documented herein (Appendix A) were found in longleaf pine / wiregrass savanna. Although the possibility of finding populations of *S. americana* in other habitats and communities should not be completely dismissed, historical records and the results of this study indicate a close – nearly obligate – association between *S. americana* and the longleaf pine / wiregrass community. Moreover, *S. americana* was found in most phases of this community type from subxeric to mesic to nearly hydric. The land surface supporting *S. americana* is generally undulating, and plants were found in a variety of topographic situations from nearly flat hill crests, to slopes of gentle to moderate gradient, to nearly flat zones along streams. Thus, *S. americana* exhibits a broad ecological amplitude. Plants occurred on xeric to subxeric hill crests and shoulders and associated slopes, dominated by a sparse canopy of *Pinus palustris*, *Quercus laevis*, *Q. incana*, and *Q. margareta* and were also observed on mesic to subhydric sites with little topographic relief, adjacent to creeks and associated ecotonal *Sarracenia* Bog Communities. The Arcadia 04 site on a hill crest and upper slope is underlain by clay and supported *Q. marilandica* in addition to the associates listed above.

The full range of *S. americana* habitats was observed on the Jeffords tract in Worth County, where large populations were found (1) on a xeric to subxeric, nearly flat hill-crest, (2) along moderate to gentle subxeric to mesic slopes, and (3) on nearly flat mesic terrain adjacent to hydric *Sarracenia* bogs. Similarly, at the Doerun site, *S. americana* was associated with substantial topographic diversity. Yet, at the Quail Ridge tract, despite the presence of substantial upland habitat maintained by regular burning, *S. americana* was only observed in the lower phase of the longleaf pine / wiregrass community, where an extensive population occurred mostly just upslope and along a *Sarracenia* bog adjacent to a small stream, with plants reaching the upper edge of the bog at one extreme and extending away from the bog into a nearly level expanse, at the other.

Under the classification scheme of NatureServe (2008), the following three community types seem to correspond best with our observations of chaffseed habitat:

1. Longleaf Pine / Turkey Oak - Bluejack Oak - Sand Post Oak / Michaux's Gopher-apple / Southern Wiregrass Woodland (CEGL004492)
2. Longleaf Pine / Bluejack Oak / Carolina Wiregrass - Yellow Indiangrass - Green Silkscale Woodland (CEGL003578)
3. Longleaf Pine - Slash Pine / Toothache Grass - Southern Wiregrass - (Florida Dropseed) Woodland (CEGL004790)

Types 1 and 2 are drier phases of the Longleaf Pine / Wiregrass system classified under the *Pinus palustris* / *Quercus* spp. Woodland Alliance, whereas Type 3 is a lower, more hydric phase in the *Pinus palustris* - *Pinus (elliottii, serotina)* Saturated Woodland Alliance (NatureServe 2008).

ROLE OF FIRE. The disclimax longleaf pine / wiregrass community is fire-dependent, and its perpetuation depends upon periodic burning. Thus, the association of *S. americana* with this ecosystem would indicate at least an indirect relationship between the species and fire. Both qualitative observations and limited quantitative data obtained during this study indicate an obligate relationship between *S. americana* and fire. Our observations at the Jeffords, Quail Ridge, and Freeman tracts have been particularly beneficial in understanding the relationship between *S. americana* and fire. When we made our survey in 2007, the Quail Ridge tract had not been burned in more than a year (1-year rough), and an intensive search revealed only 31 plants. Subsequently, in 2008 we re-visited the site about six weeks after it had been burned

and counted 283 plants. Similarly, the Freeman tract had not been burned in three or four years when we surveyed it in 2007, and only a single *S. americana* plant was found. In 2008 we re-visited the site 75 days (March 21 to June 03) after prescribed burning and counted 846 plants. Conversely, our 2007 survey of EO site Jeffords 05, about six weeks after burning, revealed 335 plants. In 2008, we surveyed the site again when it had not been burned for more than a year (1-year rough) and found only about 30 plants. Thus, our observations indicate a direct influence by fire on population levels of *S. americana*, confirming the observations of earlier workers (e.g., Kirkman, et al. 1998; Norden and Kirkman 2004a, b).

EFFECTS OF ANTHROPOGENIC DISTURBANCE. As discussed previously, *S. americana* appears to be almost exclusively associated with the longleaf pine / wiregrass ecosystem maintained through regular burning. In fact the largest and most vigorous *S. americana* populations we observed were on relatively natural sites with minimal soil disturbance and a long history of management with frequent controlled burning (e.g., Jeffords and Freeman tracts). Nevertheless, some *S. americana* populations were observed at several sites degraded by soil disturbance so severe that the wiregrass component had been eliminated (e.g., Nilo, Arcadia 01 and 02). The Nilo site was the most disturbed, with *S. americana* growing along the bank of a drainage ditch. However, it should be noted that even these degraded sites are embedded within extensive longleaf pine / wiregrass ecosystems subject to intensive fire management, and the degraded Arcadia sites are relatively small by comparison with the extensive, surrounding longleaf pine / wiregrass habitat of exceptionally high quality, which supports large populations of *S. americana*. Moreover, the soil disturbance at the Arcadia sites occurred more than 50 years ago, and subsequently the sites have been left to recover. It is not possible to know if *S. americana* originally occurred on the degraded sites at Arcadia and has persisted there following the disturbance or if it has dispersed onto these sites from adjacent populations post disturbance. Regardless, our observations suggest efforts to introduce *S. americana* into restored longleaf pine / wiregrass communities would be successful, especially if a program of regular, controlled burning is employed in the management scheme.

PREPARATION OF VOUCHERS AND PHOTOGRAPHS. Voucher specimens and photographs are listed in Appendices C and D, respectively. Vouchers are deposited at the Valdosta State University Herbarium (VSC), and digital image files are deposited at the Georgia Department of Natural Resources, Natural Heritage Program, Social Circle, Georgia.

OTHER RARE OR UNUSUAL SPECIES OBSERVED. Locality and other data on additional rare and unusual species observed and vouchered during this study are presented in Appendix E.

ANALYSIS OF DATA FROM PERMANENT PLOTS. Table 10 is a checklist of all species identified in the 1m² herb plots at all four sites, indicating at which site(s) each species occurred. Excluding *S. americana*, seven species were found at all four sites: *Dichanthelium dichotomum*, *Dyschoriste oblongifolia*, *Galactia erecta*, *Pityopsis graminifolia*, *Pteridium aquilinum*, *Scleria ciliata*, and *Tragia urens*. *Angelica dentata*, *Aristida stricta*, *Gaylussacia dumosa*, *Schrankia microphylla*, *Tephrosia virginiana*, and *Vernonia angustifolia* were found at all but the most heavily disturbed Arcadia 01 site. Species sampled in the herb plots are listed in descending order by relative importance in Tables 11-14, and graphed in Figures 2-5. Binomials are abbreviated using the first three letters each of genus name and the specific epithet (e.g., *Schwalbea americana* = SCHAAME). *Aristida stricta* was the most important species at three sites. Additionally, *Dyschoriste oblongifolia*, *Pteridium aquilinum*, and *Tephrosia virginiana* were among the five most important species at three sites, and *Gaylussacia dumosa* at two (Table 15). Of the four sites sampled Quail Ridge 01 was the most diverse and Arcadia 01 the least (cf. Tables 11-14).

Densities of *Schwalbea americana* plants in the 250m² permanent plots are given in Table 16. The densest populations of *S. americana* were found at Arcadia 01 and Quail Ridge 01, sites with very different attributes. Arcadia 01 was the most disturbed site and Quail Ridge 01 one of the least disturbed and the most diverse of the four sites studied. Also, there appeared to be greater seedling recruitment at Arcadia 01 where 32.4% of the *S. americana* plants were vegetative (cf. Table 16), the enhanced recruitment possibly resulting from niche release associated with the elimination of *Aristida stricta* by past soil disturbance. One could reasonably expect that invasion of disturbed sites by exotics would interfere with *S. americana*. However, exotic species were absent from the Arcadia 01 plot, despite past disturbance. Although our observations suggest that *S. americana* can tolerate some anthropogenic disturbance, our data are limited, and one should be cautious in interpreting them, especially since we have no data on the effects of invasive plants.

Tables 18-21 show data taken from the 25m² shrub plots at the four sites. Both Arcadia sites had a substantially greater shrub component than the Jeffords 01 and Quail Ridge 01 sites, which probably relates to past disturbance as well as the timing of our surveys relative to the most recent fire event. The Quail Ridge 01 site was sampled about 60 days post fire, whereas the other sites were sampled about 90-120 days post fire. Therefore, most of the woody plants at Quail Ridge were less than 30cm high and consequently were not sampled in the shrub plots using our methods. Table 22 summarizes the data on trees sampled in the 250m² plots. Only two species were found in our plots: *Pinus palustris* and *P. taeda*. All four plots had *P. palustris*, and three plots had only *P. palustris*. *Pinus taeda* was found only in the Arcadia 01 plot in addition to *P. palustris*, indicative of past disturbance.

Table 10. Checklist of all species identified in herb plots indicating at which site(s) each species occurred.

	Arcadia 01	Arcadia 04	Jeffords 01	Quail Ridge 01
<i>Aletris obovata</i>				x
<i>Andropogon</i> sp.	x			
<i>Andropogon ternarius</i>		x		
<i>Andropogon virginicus</i>	x			
<i>Anemone caroliniana</i>			x	
<i>Angelica dentata</i>		x	x	x
<i>Aristida longispica</i>	x			
<i>Aristida stricta</i>		x	x	x
<i>Asclepias michauxii</i>			x	
<i>Asclepias tuberosa</i>	x			
<i>Aster adnatus</i>	x	x	x	
<i>Aster concolor</i>	x	x	x	
<i>Aster lineariifolius</i>			x	x
<i>Aster tortifolius</i>			x	
<i>Aster walteri</i>				x
<i>Baptisia lanceolata</i>			x	
<i>Bigelovia nudata</i>				x
<i>Carphephorus odoratissima</i>				x
<i>Chamaecrista nictitans</i>	x			
<i>Chaptalia tomentosa</i>				x

	Arcadia 01	Arcadia 04	Jeffords 01	Quail Ridge 01
<i>Chrysopsis mariana</i>			x	x
<i>Cnidocolus stimulosus</i>	x			
<i>Coreopsis delphinifolia</i>			x	
<i>Crotalaria purshii</i>			x	x
<i>Ctenium aromaticum</i>				x
<i>Cyperus filiculmis</i>			x	x
<i>Desmodium linearis</i>	x	x		
<i>Dichantherium consanguineum</i>		x		
<i>Dichantherium dichotomum</i>	x	x	x	x
<i>Dichantherium oligosanthes</i>			x	x
<i>Dyschoriste oblongifolia</i>	x	x	x	x
<i>Elephantopus elatus</i>			x	x
<i>Elephantopus nudatus</i>		x		
<i>Eupatorium album</i>		x	x	
<i>Eupatorium capillifolium</i>			x	
<i>Eupatorium hyssopifolium</i>		x		
<i>Eupatorium jucundum</i>		x		
<i>Eupatorium rotundifolium</i>				x
<i>Eupatorium sp.</i>			x	
<i>Euphorbia curtissii</i>		x		x
<i>Euphorbia discoidalis</i>			x	x
<i>Galactia erecta</i>	x	x	x	x
<i>Galactia floridana</i>	x			
<i>Galactia regularis</i>				x
<i>Galactia volubilis</i>		x		
<i>Gaura filipes</i>				x
<i>Gaylussacia dumosa</i>		x	x	x
<i>Gaylussacia frondosa</i>				x
<i>Hedyotis procumbens</i>	x		x	
<i>Helianthus radula</i>		x	x	x
<i>Hieracium gronovii</i>	x			x
<i>Hypericum suffruticosum</i>			x	x
<i>Ilex glabra</i>			x	x
<i>Lachnocaulon anceps</i>				x
<i>Lechea minor</i>	x		x	x
<i>Lespedeza repens</i>	x	x	x	
<i>Liatris sp.</i>	x			x
<i>Ludwigia maritima</i>				x
<i>Muhlenbergia capillaris</i>	x			
<i>Myrica cerifera</i>			x	
<i>Phlox pilosa</i>				x
<i>Pinus palustris</i>			x	x
<i>Piriqueta cistoides</i>		x		
<i>Pityopsis graminifolia</i>	x	x	x	x
<i>Pteridium aquilinum</i>	x	x	x	x
<i>Pterocaulon pyncnostichum</i>	x			

	Arcadia 01	Arcadia 04	Jeffords 01	Quail Ridge 01
<i>Quercus nigra</i>				x
<i>Quercus pumila</i>				x
<i>Rhexia alifanus</i>				x
<i>Rhexia nuttallii</i>				x
<i>Rhus copallinus</i>	x	x		x
<i>Rhynchosia reniformis</i>	x	x		x
<i>Rhynchospora globularis</i>			x	x
<i>Rhynchospora grayi</i>				x
<i>Rhynchospora harveyi</i>			x	
<i>Rhynchospora sp.</i>	x			
<i>Rubus trivialis</i>			x	
<i>Rudbeckia hirta</i>			x	
<i>Ruellia ciliosa</i>			x	
<i>Schizachyrium rhizomatum</i>	x		x	x
<i>Schrankia microphylla</i>		x	x	x
<i>Schwalbea americana</i>	x	x	x	x
<i>Scleria ciliata</i>	x	x	x	x
<i>Seymeria cassioides</i>				x
<i>Sisyrinchium nashii</i>			x	x
<i>Smilax glauca</i>				x
<i>Solidago odora</i>		x	x	x
<i>Sporobolus curtissii</i>			x	x
<i>Stylisma patens</i>			x	x
<i>Stylingia sylvatica</i>				x
<i>Stylodon carneum</i>		x		
<i>Stylosanthes biflora</i>	x	x	x	x
<i>Tephrosia spicata</i>			x	x
<i>Tephrosia virginiana</i>		x	x	x
<i>Toxicodendron pubescens</i>	x	x		
<i>Tragia linearifolia</i>			x	
<i>Tragia smallii</i>			x	
<i>Tragia urens</i>	x	x	x	x
<i>Vaccinium myrsinites</i>			x	
<i>Vaccinium stamineum</i>		x	x	
<i>Vaccinium tenellum</i>			x	
<i>Vernonia angustifolia</i>		x	x	x
<i>Viola palmata</i>	x			x
<i>Viola septemloba</i>			x	
<i>Xyris caroliniana</i>				x

Table 11. Relative importance of all species sampled in herb plots at the Arcadia 01 site.

Species	Relative Importance
PITGRA	15.824
PTEAQU	12.444
DYSOBL	8.167
GALERE	6.486
TRAURE	5.554
SCLCIL	5.390
RHYREN	5.079
SCHAME	3.928
CHANIC	3.764
VIOPAL	3.764
CNISTI	2.558
RHYsp	2.412
TOXPUB	2.302
DICDIC	1.991
GALFLO	1.991
ANDsp	1.937
RHUCOP	1.772
LIAsp	1.772
LECMIN	1.772
ASCTUB	1.206
ASTADN	1.206
LESREP	1.206
ANDVIR	1.206
MUHCAP	1.151
ARILON	0.566
DESLIN	0.566
STYBIF	0.566
SCHRHI	0.566
PTEPYN	0.566
ASTCON	0.566
HIEGRO	0.566
HEDPRO	0.566

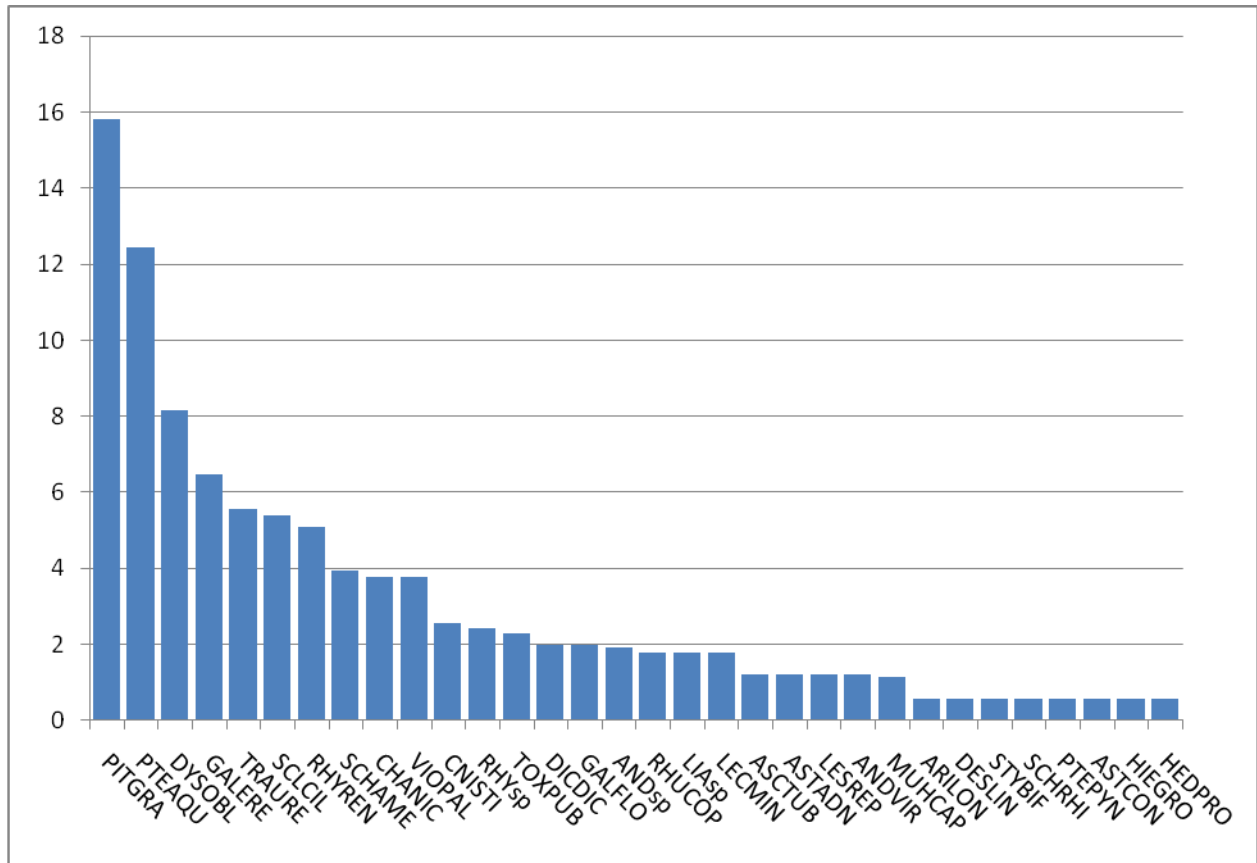


Figure 2. Relative importance of all species sampled in herb plots at the Arcadia 01 site.

Table 12. Relative importance of all species sampled in herb plots at the Arcadia 04 site.

Species	Relative Importance
ARISTR	21.362
TEPVIR	8.461
PTEAQU	5.753
GAYDUM	5.753
DYSOBL	4.993
RHYREN	4.894
SCHMIC	4.354
PITGRA	3.758
VACSTA	3.726
HELRAD	3.627
GALERE	3.114
ANDTER	2.637
SOLODO	2.637
STYCAR	2.488
DESLIN	2.109
DICDIC	2.010
LESREP	1.631
STYBIF	1.483
SCHAME	1.483
TRAURE	1.483
SCLCIL	1.483
RHUCOP	1.369
ELENUD	1.104
RHYHAR	1.005
ASTADN	1.005
VERANG	1.005
TOXPUB	0.478
ASTCON	0.478
GALVOL	0.478
PIRCIS	0.478
ANGDEN	0.478
EUPCUR	0.478
DICCON	0.478
EUPHYS	0.478
EUPJUC	0.478
EUPALB	0.478

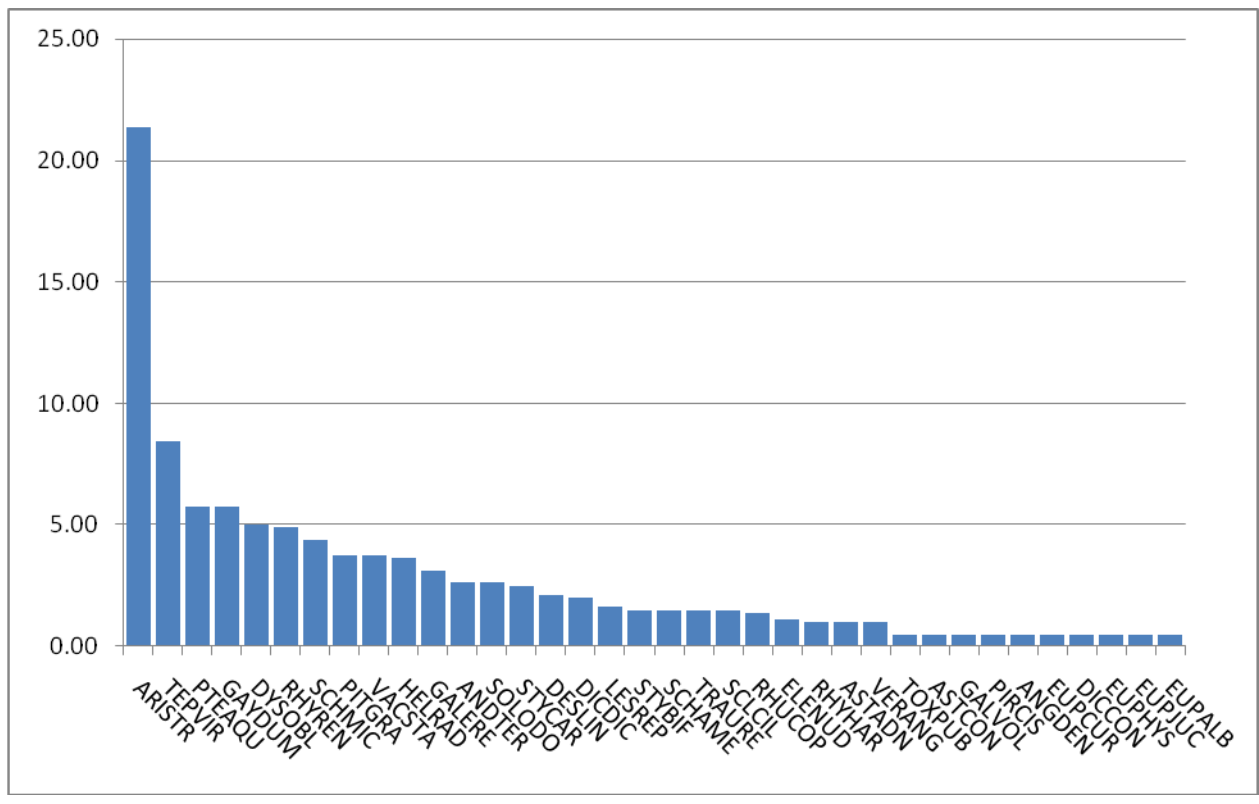


Figure 3. Relative importance of all species sampled in herb plots at the Arcadia 04 site.

Table 13. Relative importance of all species sampled in the herb plots at the Jeffords 01 site.

Species	Relative Importance	Species	Relative Importance
ARISTR	12.600	VERANG	1.107
SPOCUR	7.263	ILEGLA	0.854
PTEAQU	6.864	VACSTA	0.854
TEPVIR	5.359	ANGDEN	0.854
SCHMIC	4.857	STYPAT	0.754
DYSOBL	4.770	SISNAS	0.754
PITGRA	4.620	HYPUSF	0.754
GAYDUM	3.516	PINPAL	0.502
STYBIF	3.267	CORDEL	0.352
SCLCIL	2.765	CROPUR	0.352
RUBTRI	2.616	CYPFIL	0.352
HELRAD	2.363	ASTTOR	0.352
DICOLI	2.263	VIOSEP	0.352
SCHAME	2.111	MYRCER	0.352
GALERE	2.011	HEDPRO	0.352
LECMIN	1.861	ELEELA	0.352
SOLODO	1.609	CHRMAR	0.352
BAPLAN	1.605	ASCMIC	0.352
ASTCON	1.509	EUPALB	0.352
ASTLIN	1.509	EUPsp	0.352
LESREP	1.509	RHYGLO	0.352
SCHRHI	1.509	ANECAR	0.352
TEPSPI	1.509	RUDHIR	0.352
ASTADN	1.256	EUPCAP	0.352
TRALIN	1.107	DICDIC	0.352
TRASMA	1.107	TRAURE	0.352
VACMYR	1.107	EUPDIS	0.352
RUECIL	1.107	VACTEN	0.352

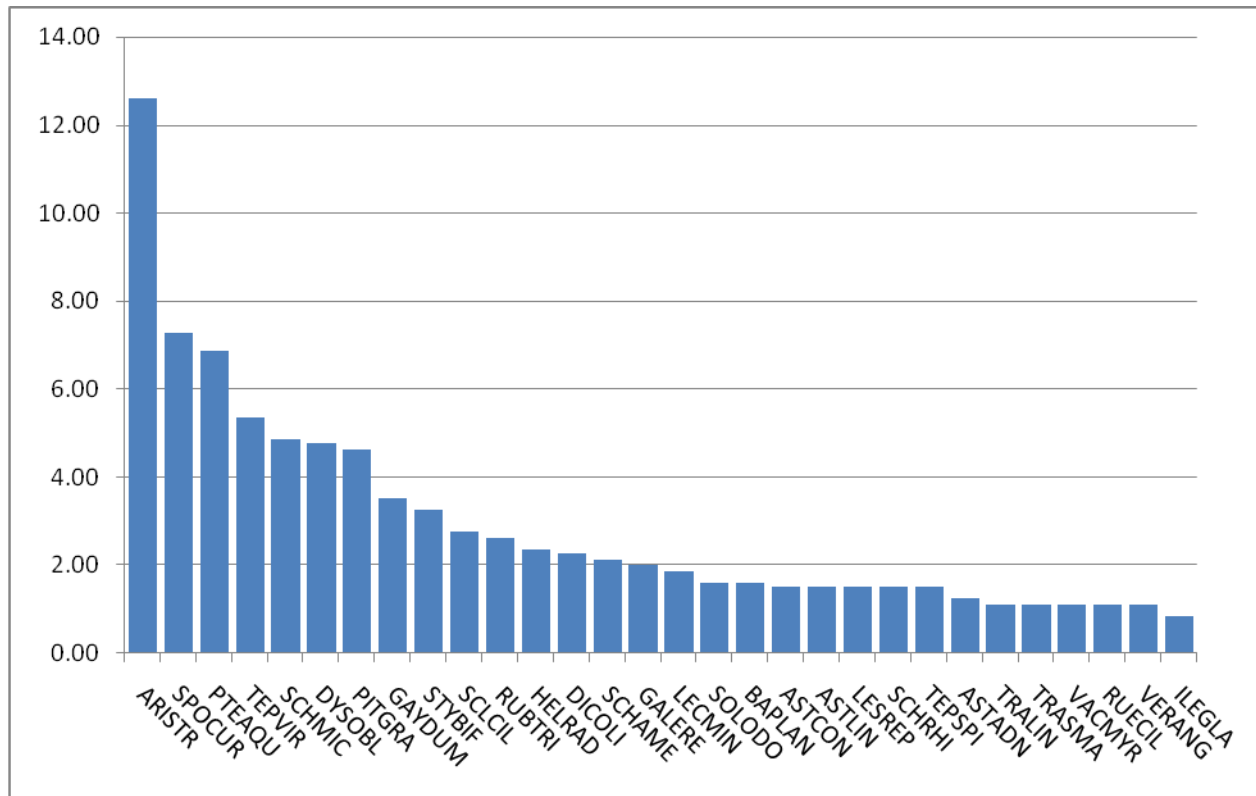


Figure 4. Relative importance of the 30 most important species sampled in herb plots at the Jeffords 01 site.

Table 14. Relative importance of all species sampled in herb plots at the Quail Ridge 01 site.

Species	Relative Importance	Species	Relative Importance
ARISTR	11.297	RHEALI	0.974
HELRAD	9.301	CHRMAR	0.974
TEPVIR	4.894	SOLODO	0.742
GAYDUM	3.880	RHUCOP	0.742
DYSOBL	3.848	BIGNUD	0.742
PTEAQU	3.553	CYPFIL	0.663
SCHMIC	3.201	CARODO	0.663
SCHRHI	3.161	RHENUT	0.663
SPOCUR	3.153	GAYFRO	0.663
GALERE	2.898	RHYGLO	0.663
TRAURE	2.730	RHYREN	0.663
DICOLI	2.419	EUPDIS	0.663
STYBIF	2.299	ILEGLA	0.631
QUEPUM	2.291	LIAsp	0.431
DICDIC	2.235	QUENIG	0.431
PITGRA	2.068	ASTLIN	0.311
HIEGRO	1.988	ELEELA	0.311
ANGDEN	1.636	EUPROT	0.311
VIOPAL	1.636	TEPSPI	0.311
SCHAME	1.605	CTEARO	0.311
XYRCAR	1.525	CHATOM	0.311
EUPCUR	1.325	LUDMAR	0.311
STYPAT	1.325	SEYCAS	0.311
SCLCIL	1.325	PINPAL	0.311
SMIGLA	1.325	RHYGRA	0.311
HYPUSF	1.325	VERANG	0.311
ASTWAL	1.325	STYSYL	0.311
LECMIN	1.325	GAUFIL	0.311
ALEOBO	1.094	GALREG	0.311
LACANC	1.094	PHLPIL	0.311
CROPUR	0.974	SISNAS	0.311

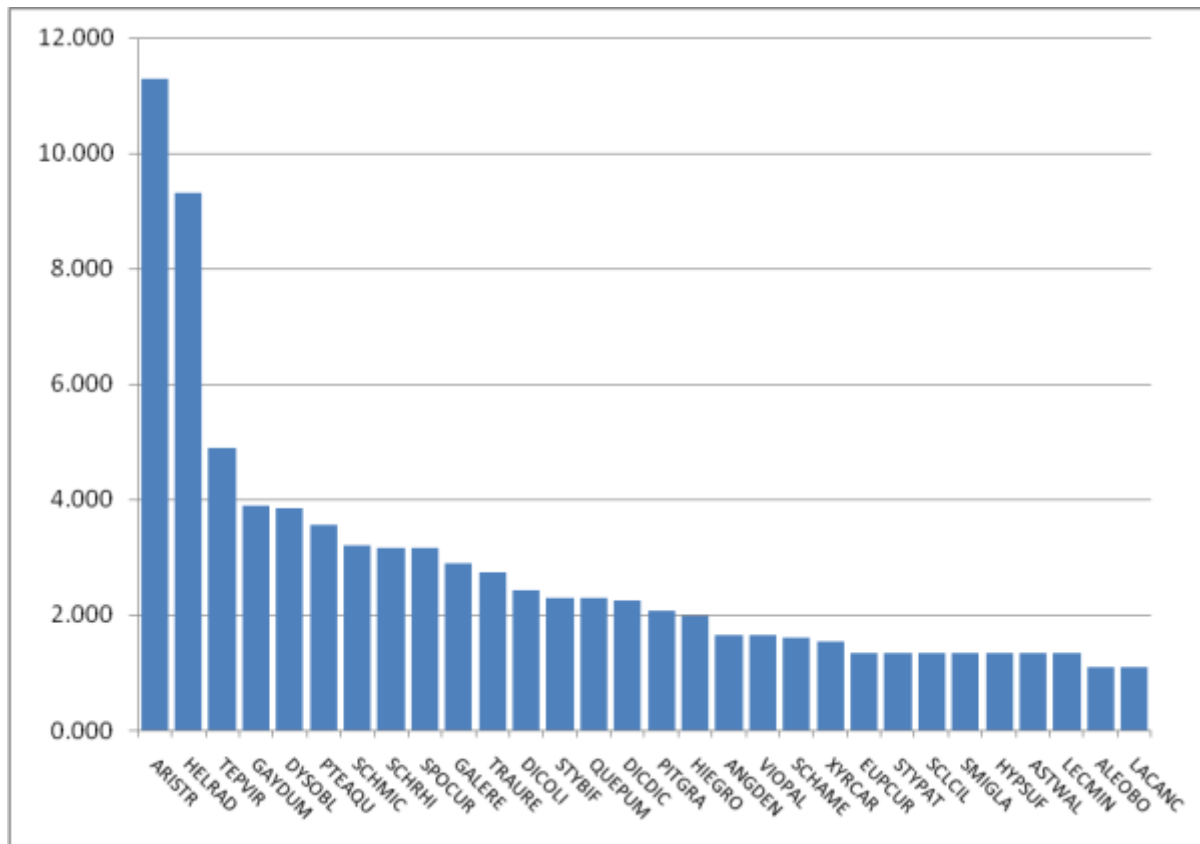


Figure 5. Relative importance of the 30 most important species sampled in herb plots at the Quail Ridge 01 site.

Table 15. The five most important species in herb plots for each site ranked by order of relative importance (1=highest relative importance).

	Arcadia 01	Arcadia 04	Jeffords 01	Quail Ridge 01
<i>Aristida stricta</i>		1	1	1
<i>Dyschoriste oblongifolia</i>	3	5		2
<i>Galactia erecta</i>	4			
<i>Gaylussacia dumosa</i>		4		4
<i>Helianthus radula</i>				2
<i>Pityopsis graminifolia</i>	1			
<i>Pteridium aquilinum</i>	2	3	3	
<i>Schrankia microphylla</i>			5	
<i>Sporobolus curtissii</i>			2	
<i>Tephrosia virginiana</i>		2	4	3
<i>Tragia urens</i>	5			

Table 16. Quantitative data on phenology and density of *Schwalbea americana* in 250m² plots.

	Days Post Fire	Vegetative Plants	Flowering/Fruiting Plants	Total Number of Plants (N)	Density (N/250m ²)
Arcadia 01	~90	45 (32.4%)	94 (67.6%)	139	0.556
Arcadia 04	~120	9 (25%)	27 (75%)	36	0.144
Jeffords 01	~120	9 (14.3%)	54 (85.7%)	63	0.252
Quail Ridge 01	~60	4 (3.8%)	100 (96.2%)	104	0.416

Table 17. Relative importance and density of *Schwalbea americana* and species diversity in herb plots.

	Arcadia 01	Arcadia 04	Jeffords 01	Quail Ridge 01
Number of species in herb plots	32	36	56	62
Relative importance of <i>S. americana</i>	3.928	1.483	2.111	1.605
Density of <i>S. americana</i> (N/250m ²)	0.556	0.144	0.252	0.416

Table 18. Relative density of species sampled in shrub plots at the Arcadia 01 site.

Species	Number of Individuals	Relative Density
<i>Quercus nigra</i>	6	0.103448
<i>Quercus pumila</i>	3	0.051724
<i>Quercus stellata</i>	4	0.068966
<i>Quercus marilandica</i>	4	0.068966
<i>Rubus cuneifolius</i>	1	0.017241
<i>Sassafras albidum</i>	6	0.103448
<i>Rhus copallinus</i>	14	0.241379
<i>Vaccinium darrowi</i>	4	0.068966
<i>Vaccinium myrsinites</i>	12	0.206897
<i>Vaccinium stamineum</i>	2	0.034483
<i>Quercus falcata</i>	1	0.017241
<i>Smilax pumila</i>	1	0.017241
	58	1

Table 19. Relative density of species sampled in shrub plots at the Arcadia 04 site.

Species	Number of Individuals	Relative Density
<i>Castanea pumila</i>	9	0.077586
<i>Quercus pumila</i>	2	0.017241
<i>Quercus laevis</i>	5	0.043103
<i>Quercus marilandica</i>	2	0.017241
<i>Quercus incana</i>	5	0.043103
<i>Gaylussacia dumosa</i>	75	0.646552
<i>Vaccinium myrsinites</i>	9	0.077586
<i>Vaccinium stamineum</i>	2	0.017241
<i>Pinus palustris</i>	2	0.017241
<i>Toxicodendron pubescens</i>	1	0.008621
<i>Rhus copallinus</i>	1	0.008621
<i>Vaccinium darrowi</i>	3	0.025862
	116	1

Table 20. Relative density of species sampled in shrub plots at the Jeffords 01 site.

Species	Number of Individuals	Relative Density
<i>Quercus incana</i>	1	0.0625
<i>Ilex glabra</i>	14	0.875
<i>Quercus pumila</i>	1	0.0625
	16	1

Table 21. Relative density of species sampled in shrub plots at the Quail Ridge 01 site.

Species	Number of Individuals	Relative Density
<i>Quercus nigra</i>	2	0.08
<i>Quercus pumila</i>	11	0.44
<i>Ilex glabra</i>	9	0.36
<i>Smilax glauca</i>	3	0.12
	25	1

Table 22. Relative dominance of trees sampled in plots.

Species	Arcadia 01		Arcadia 04		Jeffords 01		Quail Ridge 01	
	No. of Plants	Relative Dominance	No. of Plants	Relative Dominance	No. of Plants	Relative Dominance	No. of Plants	Relative Dominance
<i>Pinus palustris</i>	8	0.980	2	1.000	2	1.000	3	1.000
<i>Pinus taeda</i>	1	0.020	–	–	–	–	–	–
	9	1.000	2	1.000	2	1.000	3	1.000

SURVEY SITES AND NEGATIVE RESULTS. Maps showing all sites surveyed with approximate boundaries are provided in Appendix F, and data on surveyed sites where *S. americana* was not found (i.e., negative survey results) are presented in Appendix G. Negative results indicate only that *S. americana* was not observed on these sites during the survey period using the methods described herein and are not intended to preclude the possibility of the existence of *S. americana* on sites with suitable, high-quality habitat and fire management. It is certainly possible that small, isolated populations of *S. americana* went undetected and could be found through more intensive survey efforts in future, especially where fire is routinely and frequently used in management programs.

DISCUSSION

PRIORITIES FOR CONSERVATION. To facilitate establishment of conservation priorities, EOs and metapopulations are listed in order by numbers of plants comprising each population and by overall EO assessment rankings in Tables 6-9. The Freeman, Jeffords and Quail Ridge metapopulations rank highest both in terms of numbers of plants and overall assessment of their constituent EOs. Moreover, as the assessment rankings suggest, these sites support longleaf pine / wiregrass communities of exceptionally high quality and should be at the top of any list for preservation. The Arcadia EOs also ranked very high and should receive very high priority for preservation. Notwithstanding its smaller population size, the Doerun site ranked high – with the Doerun 03 EO receiving an overall ranking of A(4). Fortunately, this site is a state-owned designated natural area with an excellent fire-management program, and its preservation status is secure.

NOTES ON EFFECTIVE SURVEY METHODS. As we anticipated, our most effective survey efforts were in longleaf pine / wiregrass habitats subject to regular and frequent use of prescribed fire. Our results also indicate that the most effective time for conducting *S. americana* survey work is four to eight weeks post fire, with the controlled burn occurring from March through June. Four to eight weeks after the fire event, the aerial stems of chaffseed are tall enough to be readily visible but have not yet been overgrown and obscured by the associated wiregrass and other plants. Also, we found that chaffseed plants can be effectively detected against the surrounding vegetation after their erect aerial stems have died and blackened, making it possible to survey nearly until the end of the growing season.

FUTURE WORK. All of the metapopulation sites found to support populations of *S. americana* – particularly those with A and B rankings – should be systematically and intensively surveyed in future (1) to detect additional populations of *S. americana*, (2) to monitor population trends, and (3) to search for populations of other rare plants. E.g., although the habitat quality was outstanding, only seven individuals of *S. americana* were found at the Jeffords-Hancock site, and further efforts should be made to search this site and the adjacent sites subject to intensive fire management. Also, further attempts should be made to access and survey other privately owned sites with longleaf pine / wiregrass habitat subject to frequent prescribed burning. Additionally, the permanent plots established in this study (cf. Table 2) should be monitored annually to gather comparative data on *S. americana* population levels and trends as they relate to burning patterns.

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Appendix A. Element occurrence (EO) data for all populations and subpopulations of *Schwalbea americana* discovered or confirmed.

EO Site Name: **Arcadia 01**

Survey date(s): 05 July 2007

2007 count – 283 plants

Surveyors: W. Wilson Baker & Richard Carter

Phenology: 60% of plants observed in capsule; the rest vegetative, including 30% without last years capsules

Historical note(s): Population discovered by Greg Nelms in 1995. Population observed by W.W. Baker on 28 April 2006 and 14 May 2006.

Community: disturbed pine / oak community / wiregrass absent / ground mostly bare

State/County: Georgia, Thomas County

Dominant or characteristic species: *Pinus palustris*, *P. taeda*, *P. echinata*, *Quercus falcata*, *Q. nigra*, *Vaccinium arboreum*, *Asclepias obovata*, *Pteridium aquilinum*

USGS quad name: Pine Park, GA

Site description: Arcadia Plantation; 0.2 mile north of Wade Lane at crossroads; on west side of woods road; site in Buffer Conservation Easement; site not burned in 2007; Figures B1, B3 and F1.

Ownership concerns: Owner is aware of occurrence and is protecting plants in Buffer Conservation Easement. Discussion of the distribution and management of this species with the landowner has not taken place. Therefore, these data should be treated as sensitive.

Aspect: more-or-less flat

Slope: 0-3%

Light: open to partial

Topo position: crest and upper slope

Moisture regime: dry-mesic

Disturbance: Site heavily disturbed, ground mostly bare and wiregrass absent

Threats: Any major soil disturbances

GPS coordinates:

30.7709167N 84.0027000W

30.7715667N 84.0028167W

30.7712167N 84.0033000W

Management needs: Maintain present system of management.

Population area: 1886 m²

Population status:

Quality – B

Condition – C

Viability – B

Defensibility – B

Overall EO Ranking – B- (2.75)

Population size:

2006 estimate – ca. 700 plants (W.W. Baker, 14 May 2006)

EO Site Name: **Arcadia 01a**

Survey date(s): 05 July 2007

Surveyors: W. Wilson Baker & Richard Carter

Historical note(s): Population observed by W.W. Baker on 24 May 2006.

State/County: Georgia, Thomas County

USGS quad name: Pine Park, GA

Site description: Arcadia Plantation; 0.2 mile north of Wade Lane at crossroads; on east side of woods road, adjacent to Arcadia 01; site in Buffer Conservation Easement; site burned winter 2006-2007; Figures B1, B3 and F1.

Aspect: more-or-less flat

Slope: 0-3%

Light: open to partial

Topo position: crest and upper slope

Moisture regime: dry-mesic

GPS coordinates:

30.7717333N 84.0025167W

Population area: 10 X 2 m

Population size:

2006 count – 15 plants (W.W. Baker, 24 May 2006)

2007 count – 5 plants

Phenology: plants vegetative or with abnormally withered flowers, apparently affected by drought

Community: Disturbed pine / oak / wiregrass community, ground mostly bare

Dominant or characteristic species: *Pinus palustris*, *P. taeda*, *P. echinata*, *Quercus falcata*, *Q. nigra*, *Vaccinium arboreum*, *Aristida stricta*, *Pteridium aquilinum*

Ownership concerns: Owner is aware of occurrence and is protecting plants in Buffer Conservation Easement. Discussion of the distribution and management of this species with the landowner has not taken place. Therefore, these data should be treated as sensitive.

Disturbance: Site heavily disturbed, ground mostly bare

Threats: Any major soil disturbances

Management needs: Maintain present system of management, i.e., regular burning and no major disturbance.

Population status:

Quality – B

Condition – C

Viability – B

Defensibility – B

Overall EO Ranking – B- (2.75)

EO Site Name: **Arcadia 02**

Survey date(s): 18 August 2007

Surveyors: W. Wilson Baker, Richard Carter & Gil Nelson

Historical note(s): Population discovered by S. Hermann and Leon Neal in 1995 or 1996.

State/County: Georgia, Thomas County

USGS quad name: Thomasville, GA

Site description: Arcadia Plantation; on north side of ridge road, westernmost GPS taken at red/pink flag; Figures B1, B4 and F1.

GPS coordinates:

30.7806500N 83.9993000W

30.7807167N 83.9986667W

30.7800500N 83.9992167W

30.7798667N 83.9977500W

Aspect: more-or-less S

Slope: 0-3%

Light: open

Topo position: crest

Moisture regime: dry-mesic

Population area: 12352 m² (area includes both Arcadia 02 and 02a)

Population size:

2006 count – 400+ plants on recent burn (W.W. Baker, 28 April 2006)

2007 count – 4 plants observed at various stages, i.e., in leaf, with immature and

mature fruit; plants did not come up as expected after burn!

Community: Old field?

Dominant or characteristic species: *Pinus palustris*, *P. elliotii*, *P. echinata*, *Quercus pumila*, *Asimina longifolia*, *Rhus copallina*, *Schizachyrium tenerum*, *Pityopsis graminifolia*, *Polygala grandifolia*, *Asclepias verticillata*, *Aletris farinosa*, *Piriqueta cistoides caroliniana*, earth star fungus

Ownership concerns: Owner is aware of occurrence and is protecting plants in Buffer Conservation Easement. Discussion of the distribution and management of this species with the landowner has not taken place. Therefore, these data should be treated as sensitive.

Disturbance: Site heavily disturbed, ground mostly bare

Threats: Any major soil disturbances

Management needs: Avoid further mechanical disturbance of soil.

Population status:

Quality – B

Condition – C

Viability – B

Defensibility – B

Overall EO Ranking – B- (2.75)

EO Site Name: **Arcadia 02a**

Survey date(s): 18 August 2007

Surveyors: W. Wilson Baker, Richard Carter & Gil Nelson

Historical note(s): Population discovered by S. Hermann and Leon Neal in 1995 or 1996.

State/County: Georgia, Thomas County

USGS quad name: Thomasville, GA

Site description: Arcadia Plantation; on south side of ridge road; Figures B1, B4 (mapped with Arcadia 02) and F1.

GPS coordinates:

30.7795500N 83.9973333W

30.7793167N 83.9974000W

30.7798167N 83.9980500W

30.7801167N 83.9983500W

Aspect: more-or-less S

Slope: 0-3%

Light: open

Topo position: crest

Moisture regime: dry-mesic

Population area: included within Arcadia 02

Population size:

2006 count – 100 plants on recent burn (W.W. Baker, 28 April 2007)

2007 count – 17 plants observed; burned in 2007

Community: Old field?

Dominant or characteristic species: *Pinus palustris*, *P. elliotii*, *P. echinata*, *Quercus pumila*, *Asimina longifolia*, *Rhus copallina*, *Schizachyrium tenerum*, *Pityopsis graminifolia*, *Polygala grandifolia*, *Asclepias verticillata*, *Aletris farinosa*, *Piriqueta cistoides caroliniana*, earth star

Ownership concerns: Owner is aware of occurrence and is protecting plants in Buffer Conservation Easement. Discussion of the distribution and management of this species with the landowner has not taken place. Therefore, these data should be treated as sensitive.

Disturbance: Site heavily disturbed, ground mostly bare

Threats: Any major soil disturbances

Management needs: Avoid further mechanical disturbance of soil.

Population status:

Quality – B

Condition – C

Viability – B

Defensibility – B

Overall EO Ranking – B- (2.75)

EO Site Name: **Arcadia 03**

Survey date(s): 18 August 2007

Surveyors: W. Wilson Baker, Richard Carter & Gil Nelson

Historical note(s): Population discovered by W.W. Baker and Gil Nelson in 2005.

State/County: Georgia, Thomas County

USGS quad name: Pine Park, GA

Site description: Arcadia Plantation; south side of road, ca. 0.2 mile from Arcadia 01 and ca. 0.5 mi SW of Metcalf Road gate; Figures B1, B3 and F1.

GPS coordinates:
30.7742500N 84.0013333W

Aspect: more-or-less flat

Slope: 0-3%

Light: open

Topo position: crest

Moisture regime: mesic

Population area: not applicable

Population size:
2006 count – 7 plants on one-year rough
(W.W. Baker, 03 April 2006)

2007 – no plants seen; one-year rough
Community: Disturbed pine / oak / wiregrass
community, ground mostly bare

Dominant or characteristic species: *Pinus palustris*, *P. taeda*, *P. echinata*, *Quercus falcata*, *Q. nigra*, *Vaccinium arboretum*, *Aristida stricta*, *Pteridium aquilinum*

Ownership concerns: Owner is aware of occurrence and is protecting plants in Buffer Conservation Easement. Discussion of the distribution and management of this species with the landowner has not taken place. Therefore, these data should be treated as sensitive.

Disturbance: minimal

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status:

Quality – B

Condition – B

Viability – B

Defensibility – B

Overall EO Ranking – B (3.00)

EO Site Name: **Arcadia 03a**

Survey date(s): 18 August 2007

Surveyors: W. Wilson Baker, Richard Carter & Gil Nelson

Historical note(s): Population discovered by W.W. Baker and Gil Nelson in 2005.

State/County: Georgia, Thomas County

USGS quad name: Pine Park, GA

Site description: Arcadia Plantation, extension of Arcadia 03 on north side of road; Figures B1, B3 and F1.

GPS coordinates:

30.7745333N 84.0012333W

30.7745167N 84.0013167W

30.7744667N 84.0012500W

Aspect: more-or-less flat

Slope: 0-3%

Light: open

Topo position: crest and upper slope

Moisture regime: mesic

Population area: 28 m²

Population size:

2006 – 15 plants (W.W. Baker, 24 May 2006)

2007 – 16 plants observed on 2007 burn

Phenology: mature fruit

Community: Longleaf pine / wiregrass community

Dominant or characteristic species: *Pinus palustris*, *Quercus margaretta*, *Q. pumila*, *Carya tomentosa*, *Aristida stricta*, *Pteridium aquilinum*

Ownership concerns: Owner is aware of occurrence and is protecting plants in Buffer Conservation Easement. Discussion of the distribution and management of this species with the landowner has not taken place. Therefore, these data should be treated as sensitive.

Disturbance: minimal

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status:

Quality – B

Condition – B

Viability – B

Defensibility – B

Overall EO Ranking – B (3.00)

EO Site Name: **Arcadia 04**

Survey date(s): 05 July 2007

Surveyors: W. Wilson Baker & Richard Carter

Historical note(s): Population discovered by W.W. Baker on 03 April 2006.

State/County: Georgia, Thomas County

USGS quad name: Pine Park, GA

Site description: Arcadia Plantation; north of Wade tract (Research area = Wade tract, 1st easement on Arcadia Plantation) in buffer conservation easement (2nd Arcadia easement); east of dirt road; area last burned 28 April 2006; Figures B1, B2 and F1.

GPS coordinates:

30.7649333N 84.0027000W

30.7650000N 84.0019000W

30.7648500N 84.0018167W

30.7645167N 84.0019333W

30.7644333N 84.0020167W

30.7645167N 84.0024500W

30.7647167N 84.0025667W

Aspect: more-or-less flat with SE exposure

Slope: 0-3%

Light: open to partial

Topo position: crest and upper slope

Moisture regime: dry-mesic

Population area: 3649 m²

Population size:

2007 count – 86 plants on 1-year+ rough

Phenology: plants in leaf, in bud, in flower and post mature; ca. 25% of plants in flower; most of remainder with capsules from previous year; a few individuals showing signs of herbivory

Community: Longleaf Pine / Wiregrass / Oak Savanna

Dominant or characteristic species: *Pinus palustris*, *Quercus laevis*, *Q. marilandica*, *Q. margaretta*, *Q. stellata*, *Q. falcata*, *Q. pumila*, *Castanea pumila*, *Toxicodendron pubescens*, *Aristida stricta*, *Tephrosia virginiana*, *Rhynchosia tomentosa*, *Pteridium aquilinum*

Additional associates: *Quercus falcata*, *Carya glabra*, *Diospyros virginiana*, *Asimina longifolia*, *Sassafras albidum*, *Cornus florida*, *Rhus copallina*, *Vaccinium myrsinites*, *V. stamineum*, *Gaylussacia frondosa*, *Helianthus radula*, *Pityopsis graminifolia*, *Cnidioscolus stimulosus*, *Stylisma patens*, *Schrankia microphylla*, *Orbexilum pedunculatum*, *Eryngium yuccifolium*, *Stylingia sylvatica*, *Spiranthes tuberosa*, *Clitoria mariana*, *Polygala grandiflora*, *Tragia urens*, *Stylosanthes biflora*, *Angelica dentata*, *Asclepias tuberosa*, *Solidago odora*, *Aster adnatus*, *Ruellia caroliniana*, *Viola palmata*, *Dyschoriste oblongifolia*, *Lespedeza repens*, *Galactia regularis*, *Physalis walteri*, *Seymeria pectinata*

Voucher: 14 June 2006, R. Carter 16839 and W.W. Baker (VSC)

Photographs: 14 June 2006, taken by R. Carter and W.W. Baker

Ownership concerns: Owner is aware of occurrence and is protecting plants in buffer conservation easement. Discussion of the distribution and management of this species with the landowner has not taken place. Therefore, these data should be treated as sensitive.

Disturbance: There is little evidence of disturbance.

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status:

Quality – B

Condition – A

Viability – A

Defensibility – A

Overall EO Ranking – A- (3.75)

Other rare or unusual species:

- Northeast corner of site with more-or-less active *Gopherus* colony
- Bachman's sparrows singing and flushed

EO Site Name: **Arcadia 04a**

Survey date(s): 05 July 2007

Surveyors: W. Wilson Baker & Richard Carter

Historical note(s): Population discovered by W.W. Baker on 06 May 2006.

State/County: Georgia, Thomas County

USGS quad name: Pine Park, GA

Site description: Arcadia Plantation; west side of dirt road, ca. 30 m west of site Arcadia 04, but still in Buffer Conservation Easement; last burned 28 April 2006 – 1 year+ rough; Figures B1, B2 and F1.

GPS coordinates:

30.7649833N 84.0027667W

30.7650333N 84.0027500W

Aspect: more-or-less flat with SE exposure

Slope: 0-3%

Light: open to partial

Topo position: crest and upper slope

Moisture regime: dry-mesic

Population area: 3 m²

Population size:

2006 count – 3 plants (W.W. Baker, 06 May 2006)

2007 count – 4 plants

Phenology: plants in bud and in flower

Community: Longleaf Pine / Wiregrass / Oak Savanna becoming too woody, especially to the west

Dominant or characteristic species: *Pinus palustris*, *Quercus laevis*, *Q. marilandica*, *Q. margaretta*, *Q. stellata*, *Q. falcata*, *Q. pumila*, *Castanea pumila*, *Toxicodendron*

pubescens, *Aristida stricta*, *Tephrosia virginiana*, *Rhynchosia tomentosa*, *Pteridium aquilinum*

Additional associates: *Quercus falcata*, *Carya glabra*, *Diospyros virginiana*, *Asimina longifolia*, *Sassafras albidum*, *Cornus florida*, *Rhus copallina*, *Vaccinium myrsinites*, *V. stamineum*, *Gaylussacia frondosa*, *Helianthus radula*, *Pityopsis graminifolia*, *Cnidioscolus stimulosus*, *Stylisma patens*, *Schrankia microphylla*, *Orbexilum pedunculatum*, *Eryngium yuccifolium*, *Stylingia sylvatica*, *Spiranthes tuberosa*, *Clitoria mariana*, *Polygala grandiflora*, *Tragia urens*, *Stylosanthes biflora*, *Angelica dentata*, *Asclepias tuberosa*, *Solidago odora*, *Aster adnatus*, *Ruellia caroliniana*, *Viola palmata*, *Dyschoriste oblongifolia*, *Lespedeza repens*, *Galactia regularis*, *Physalis walteri*, *Seymeria pectinata*

Ownership concerns: Owner is aware of occurrence and is protecting plants in buffer conservation easement. Discussion of the distribution and management of this species with the landowner has not taken place. Therefore, these data should be treated as sensitive.

Disturbance: There is little evidence of disturbance.

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status:

Quality – C

Condition – C

Viability – C

Defensibility – B

Overall EO Ranking – C (2.25)

EO Site Name: **Arcadia 05**

Survey date(s): 05 July 2007

Surveyors: W. Wilson Baker & Richard Carter

Historical note(s): Population discovered by W.W. Baker on 14 June 2006.

State/County: Georgia, Thomas County

USGS quad name: Pine Park, GA

Site description: Arcadia Plantation; south side of Wade Lane just before crossroads, east side of dirt road; site in buffer conservation easement; last burned 28 April 2006 – 1 year+ rough; Figures B1, B2 and F1.

GPS coordinates:

30.7681167N 84.0012500W

30.7677500N 84.0009000W

30.7683000N 84.0010167W

30.7678833N 84.0007167W

30.7686833N 84.0006167W

Aspect: more-or-less flat with E exposure

Slope: 0-3%

Light: open

Topo position: crest and upper slope

Moisture regime: dry-mesic

Population area: 2910 m²

Population size:

2006 estimate – ca. 300 plants, after 28 April 2006 burn (W.W. Baker, 14 June 2006)

2007 count – 126 plants (probably representing 50% of actual population; as it was likely that many young, vegetative plants were not seen)

Phenology: plants in leaf, in bud, in flower and post mature

Community: Longleaf Pine / Wiregrass / Oak Savanna

Dominant or characteristic species: *Pinus palustris*, *Quercus laevis*, *Q. marilandica*, *Q. margaretta*, *Q. stellata*, *Q. falcata*, *Q. pumila*, *Castanea pumila*, *Toxicodendron pubescens*, *Aristida stricta*, *Tephrosia virginiana*, *Rhynchosia tomentosa*, *Pteridium aquilinum*

Additional associates: *Quercus falcata*, *Carya glabra*, *Diospyros virginiana*, *Asimina longifolia*, *Sassafras albidum*, *Cornus florida*, *Myrica cerifera*, *Rhus copallina*, *Vaccinium myrsinities*, *V. stamineum*, *Gaylussacia frondosa*, *Helianthus radula*, *Pityopsis graminifolia*, *Cnidioscolus stimulosus*, *Stylisma patens*, *Schrankia microphylla*, *Orbexilum pedunculatum*, *Eryngium yuccifolium*, *Stylingia sylvatica*, *Spiranthes tuberosa*, *Clitoria mariana*, *Polygala grandiflora*, *Tragia urens*, *Stylosanthes biflora*, *Angelica dentata*, *Asclepias tuberosa*, *Solidago odora*, *Aster adnatus*, *Ruellia caroliniana*, *Viola palmata*, *Dyschoriste oblongifolia*, *Lespedeza repens*, *Galactia regularis*, *Physalis walteri*, *Seymeria pectinata*, *Stylodon carnea*, *Aletris obovata*, *Vernonia angustifolia*, *Buchnera americana*, *Verbesina aristata*, *Rhynchosia reniformis*, *R. michauxii*, *Andropogon gyrans*, *Galium hispidulum*

Ownership concerns: Owner is aware of occurrence and is protecting plants through buffer conservation easement. Discussion of the distribution and management of this species with the landowner has not taken place. Therefore, these data should be treated as sensitive.

Disturbance: There is very little evidence of disturbance.

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status:

Quality – B

Condition – A

Viability – A

Defensibility – A

Overall EO Ranking – A- (3.75)

Other rare or unusual species

- Four (4) *Gopherus* burrows seen
- Bachman's sparrows singing and flushed

EO Site Name: **Arcadia 06**

Survey date(s): 05 July 2007

Surveyors: W. Wilson Baker & Richard Carter

Historical note(s): Population discovered by W.W. Baker on 24 May 2006.

State/County: Georgia, Thomas County

USGS quad name: Pine Park, GA

Site description: Arcadia Plantation; 0.1 mile north of Arcadia site 01; Figures B1, B3 and F1.

Burned winter 2007

GPS coordinates:
30.7734667N 84.0034833W

Aspect: more-or-less flat with E exposure

Slope: 3-8%

Light: open to partial shade

Topo position: mid-slope

Moisture regime: dry-mesic

Population area: not applicable

Population size:
2007 count – 15 plants

Phenology: dead plants with capsules from previous year and flowering and fruiting plants of the current year observed.

Community: Longleaf Pine / Wiregrass / Oak Savanna

Dominant or characteristic species: *Pinus palustris*, *Quercus laevis*, *Q. marilandica*, *Q. margaretta*, *Q. stellata*, *Q. falcata*, *Q. pumila*, *Castanea pumila*, *Toxicodendron pubescens*, *Aristida stricta*, *Tephrosia virginiana*, *Rhynchosia tomentosa*, *Pteridium aquilinum*

Additional associates: *Quercus falcata*, *Carya glabra*, *Diospyros virginiana*, *Asimina longifolia*, *Sassafras albidum*, *Cornus florida*, *Myrica cerifera*, *Rhus copallina*, *Vaccinium myrsinites*, *V. stamineum*, *Gaylussacia frondosa*, *Helianthus radula*, *Pityopsis graminifolia*, *Cnidioscolus stimulosus*, *Stylisma patens*, *Schrankia microphylla*, *Orbexilum pedunculatum*, *Eryngium yuccifolium*, *Stylingia sylvatica*, *Spiranthes tuberosa*, *Clitoria mariana*, *Polygala grandiflora*, *Tragia urens*, *Stylosanthes biflora*, *Angelica dentata*, *Asclepias tuberosa*, *Solidago odora*, *Aster adnatus*, *Ruellia caroliniana*, *Viola palmata*, *Dyschoriste oblongifolia*, *Lespedeza repens*, *Galactia regularis*, *Physalis walteri*, *Seymeria pectinata*, *Stylodon carnea*, *Aletris obovata*, *Vernonia angustifolia*, *Buchnera americana*, *Verbesina aristata*, *Rhynchosia reniformis*, *R. michauxii*, *Andropogon gyrans*, *Galium hispidulum*

Ownership concerns: Owner is aware of occurrence and is protecting plants through buffer conservation easement. Discussion of the distribution and management of this species with the landowner has not taken place. Therefore, these data should be treated as sensitive.

Disturbance: There is very little evidence of disturbance.

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status:
Quality – B
Condition – A
Viability – A
Defensibility – A
Overall EO Ranking – A- (3.75)

EO Site Name: **Arcadia 07**

Survey date(s): 18 August 2007

Surveyors: W. Wilson Baker, Richard Carter & Gil Nelson

Historical note(s): Population discovered by W.W. Baker on 18 June 2006.

State/County: Georgia, Thomas County

USGS quad name: Pine Park, GA

Site description: Arcadia Plantation; burned winter 2007; Figures B1, B3 and F1.

GPS coordinates:

30.7742667N 84.0062000W

30.7739000N 84.0061833W

30.7742833N 84.0060833W

30.7743167N 84.0054000W

Aspect: more-or-less flat with E exposure

Slope: 3-8%

Light: open

Topo position: crest, upper slope, mid-slope

Moisture regime: mesic

Population area: 1603 m²

Population size:

2006 count – 30 plants (W.W. Baker, 18 June 2006)

2007 count – 8 plants; plants mature, vigor normal

Phenology: mature fruit (18 August 2007)

Community: Longleaf Pine / Wiregrass / Oak Savanna

Dominant or characteristic species: *Pinus palustris*, *Quercus laevis*, *Q. marilandica*, *Q. incana*, *Q. pumila*, *Aristida stricta*

Additional associates: *Carya alba*, *Rhus copallina*, *Gaylussacia dumosa*, *Asimina longifolia*, *Ceanothus microphyllus*, *galactia erecta*, *Tephrosia virginiana*, *Pteridium aquilinum*, *Rhynchosia tomentosa*, *Stylosanthes biflora*, *Galacta erecta*, *Helianthus radula*, *Aster adnatus*, *Cyperus filiculmis*, *Panicum virgatum*, *Vernonia angustifolia*, *Euphorbia pubentissima*, *Eupatorium hyssopifolium*, *Dyschoriste oblongifolia*, *Asclepias verticillata*

Ownership concerns: Discussion of the distribution and management of this species with the landowner has not taken place. Therefore, these data should be treated as sensitive.

Disturbance: There is very little evidence of disturbance.

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status:

Quality – B

Condition – A

Viability – A

Defensibility – A

Overall EO Ranking – A- (3.75)

EO Site Name: **Arcadia 07a**

Survey date(s): 18 August 2007

Surveyors: W. Wilson Baker, Richard Carter & Gil Nelson

Historical note(s): Population discovered by W.W. Baker on 18 June 2006.

State/County: Georgia, Thomas County

USGS quad name: Pine Park, GA

Site description: Arcadia Plantation; Figures B1, B3 and F1.

GPS coordinates:

30.7735500N 84.0073333W

30.7732667N 84.0075333W

30.7736333N 84.0066667W

30.7737333N 84.0062167W

Aspect: more-or-less flat with E and S exposure

Slope: 3-8%

Light: open

Topo position: crest, upper slope

Moisture regime: mesic

Population area: 1331 m²

Population size:

2006 count – 70 plants (W.W. Baker, 18 June 2006)

2007 count – 4 plants; area of coverage ca. 1 X 5 m²

Phenology: mature fruit (18 August 2007)

Community: Longleaf Pine / Wiregrass / Oak Savanna

Dominant or characteristic species: *Pinus palustris*, *Quercus laevis*, *Q. marilandica*, *Q. incana*, *Q. pumila*, *Aristida stricta*

Additional associates: *Carya alba*, *Rhus copallina*, *Gaylussacia dumosa*, *Asimina longifolia*, *Ceanothus microphyllus*, *galactia erecta*, *Tephrosia virginiana*, *Pteridium aquilinum*, *Rhynchosia tomentosa*, *Stylosanthes biflora*, *Galacta erecta*, *Helianthus radula*, *Aster adnatus*, *Cyperus filiculmis*, *Panicum virgatum*, *Vernonia angustifolia*, *Euphorbia pubentissima*, *Eupatorium hyssopifolium*, *Dyschoriste oblongifolia*, *Asclepias verticillata*

Ownership concerns: Discussion of the distribution and management of this species with the landowner has not taken place. Therefore, these data should be treated as sensitive.

Disturbance: There is very little evidence of disturbance.

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status:

Quality – B

Condition – A

Viability – A

Defensibility – A

Overall EO Ranking – A- (3.75)

Other rare or unusual species:

- Bachman's sparrows singing

EO Site Name: **Arcadia 08**

Survey date(s): 18 August 2007

Surveyors: W. Wilson Baker, Richard Carter & Gil Nelson

Population discovered by W.W. Baker on 16 May 2006.

State/County: Georgia, Thomas County

USGS quad name: Pine Park, GA

Site description: Arcadia Plantation; east side of N-S road, 0.15 mile north of site Arcadia 06; NE of site Arcadia 07; Figures B1, B3 and F1.

GPS coordinates:

30.7760167N 84.0035667W

30.7759667N 84.0031833W

30.7758500N 84.0032833W

30.7759167N 84.0034500W

30.7756667N 84.0034500W

30.7753333N 84.0035667W

30.7754833N 84.0034667W

Aspect: more-or-less flat with E exposure

Slope: 3-8%

Light: partial

Topo position: mid-slope

Moisture regime: mesic

Population area: 1342 m²

Population size:

2006 count – ca. 125 plants on winter burn (W.W. Baker, 24 May 2006)

2007 count – 18 plants (1 year rough, hence low count)

Phenology: immature and mature fruit (18 August 2007)

Community: longleaf pine/oak savanna, with evidence of past disturbance

Dominant or characteristic species: *Pinus palustris*, *Quercus marilandica*, *Q. pumila*, *Schizachyrium tenerum*

Additional associates: *Pinus taeda*, *Diospyros virginiana*, *Rhus copallina*, *Quercus hemisphaerica*, *Q. falcata*, *Vaccinium stamineum*, *V. myrtifolium*, *Toxicodendron pubescens*, *Rhus copallina*, *Asimina longifolia*, *Tephrosia virginiana*, *Pteridium aquilinum*, *Rhynchosia tomentosa*, *Vernonia angustifolia*, *Eupatorium hyssopifolium*, *E. compositifolium*, *Eupatorium jucunda*, *Viola sororia*, *Polygala grandifolia*, *Cnidioscolus stimulosus*, *Asclepias verticillata*, *Schrankia microphylla*, *Pityopsis graminifolia*, *Tragia* sp.

Ownership concerns: Owner is aware of occurrence and is protecting plants through buffer conservation easement. Discussion of the distribution and management of this species with the landowner has not taken place. Therefore, these data should be treated as sensitive.

Disturbance: There is evidence of disturbance.

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status:

Quality – B

Condition – B

Viability – B

Defensibility – B

Overall EO Ranking – B (3.00)

Other rare or unusual species:

- Bachman's sparrows singing

EO Site Name: **Arcadia 09**

Survey date(s): 18 August 2007

Surveyors: W. Wilson Baker, Richard Carter & Gil Nelson

State/County: Georgia, Thomas County

USGS quad name: Pine Park, GA

Site description: Arcadia Plantation; east side of N-S road, between road and small depression; between sites Arcadia 04 and 05; 1 year rough; Figures B1 and F1.

GPS coordinates:
30.76605N 84.0023333W

Aspect: flat
Slope: 0-3%
Light: open
Topo position: lower slope
Moisture regime: mesic

Population area: 10 m²

Population size:
2007 count – 5 plants

Phenology: mature fruit

Community: Longleaf Pine / Wiregrass / Oak Savanna

Dominant or characteristic species: *Pinus palustris*, *Quercus marilandica*, *Q. pumila*, *Aristida stricta*

Additional associates: *Carya alba*, *Quercus falcata*, *Prunus serotina*, *Rhus copallina*, *Toxicodendron pubescens*, *Vaccinium stamineum*, *Rhus copallina*, *Tephrosia virginiana*, *Rhynchosia tomentosa*, *Piriqueta cistoides caroliniana*, *Pityopsis graminifolia*

Ownership concerns: Owner is aware of occurrence and is protecting plants through buffer conservation easement. Discussion of the distribution and management of this species with the landowner has not taken place. Therefore, these data should be treated as sensitive.

Disturbance: There is some evidence of soil disturbance.

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status:
Quality – B
Condition – B
Viability – B
Defensibility – B
Overall EO Ranking – B (3.00)

EO Site Name: **Doerun 01**

Survey date(s): 17 September 2008

Surveyors: W. Wilson Baker & Phil Spivey

State/County: Georgia, Colquitt County

USGS quad name: Doerun, GA

Site description: Doerun Pitcherplant Bog Natural Area (Georgia DNR); 2.47 airmiles SE Doerun town center; burned 20 June 2008; Figures B5, B6 and F18.

GPS coordinates:

31.295963N 83.885802W

Aspect: N

Slope: 0-3%

Light: open

Topo position: lower slope

Moisture regime: mesic

Population area: not applicable

Population size:

2 plants observed

Phenology: mature fruit

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Pteridium aquilinum*, *Quercus pumila*, *Pityopsis graminifolia*, *Euphorbia pubentissima*, *Dyschoriste oblongifolia*, *Baptisia lanceolata*, *Yucca filamentosa*, *Liatris tenuifolia*, *Stylosanthes biflora*, *Rhynchosia tomentosa*, *Mimosa quadrivalvis*

Ownership concerns: Georgia Department of Natural Resources

Disturbance: minimal

Threats: Any major soil disturbances

Management needs: Maintain present system of management, i.e., regular burning.

Population status:

Quality – B

Condition – B

Viability – B

Defensibility – A

Overall EO Ranking – B+ (3.25)

Additional note: Check area after next burn for more plants.

EO Site Name: **Doerun 02**

Survey date(s): 17 September 2008

Surveyors: W. Wilson Baker & Phil Spivey

State/County: Georgia, Colquitt County

USGS quad name: Doerun, GA

Site description: Doerun Pitcherplant Bog Natural Area (Georgia DNR); 2.72 airmiles SE Doerun town center; east end of planted pine stand, ca. 50m N of drain; burned 01 November 2007; Figures B5, B6 and F18.

GPS coordinates:
31.294928N 83.881292W

Aspect: S
Slope: 0-3%
Light: open
Topo position: lower slope
Moisture regime: mesic

Population area: not applicable

Population size:
1 plant observed

Phenology: plant with mature fruit

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Pteridium aquilinum*, *Baptisia lanceolata*, *Pityopsis graminifolia*, *Liatris tenuifolia*, *Angelica dentata*, *Carphephorus odoratissimus*

Ownership concerns: Georgia Department of Natural Resources

Disturbance: minimal

Threats: Any major soil disturbances

Management needs: Maintain present system of management, i.e., regular burning.

Population status:
Quality – B
Condition – B
Viability – B
Defensibility – A
Overall EO Ranking – B+ (3.25)

Additional note: Check area after next burn for more plants.

EO Site Name: **Doerun 03**

Survey date(s): 23 October 2008

Surveyors: W. Wilson Baker & Richard Carter

State/County: Georgia, Colquitt County

USGS quad name: Doerun, GA

Site description: Doerun Pitcherplant Bog Natural Area (Georgia DNR); 2.62 airmiles SE Doerun town center; burned 20 June 2008; Figures B5, B6 and F18.

GPS coordinates:

31.29177N 83.88663W

31.29185N 83.88689W

31.29169N 83.88699W

31.29152N 83.88723W

31.29133N 83.88712W

31.29129N 83.88690W

31.29135N 83.88670W

31.29149N 83.88673W

Aspect: flat

Slope: 0-3%

Light: open

Topo position: crest

Moisture regime: dry-mesic

Population area: 2150 m²

Population size:

100 plants counted

Phenology: post-mature fruit

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Hieracium gronovii*, *Tephrosia virginiana*, *Stillingia sylvatica*, *Vernonia angustifolia*, *Euphorbia pubentissima*, *Sericocarpus tortifolius*, *Pteridium aquilinum*, *Helianthus radula*,

Pityopsis graminifolia, *Baptisia lanceolata*, *Rubus cuneifolius*, *Stylisma patens*, *Schrankia microphylla*, *Elephantopus elatus*, *Symphiotrichum concolor*, *Stylosanthes biflora*, *Quercus laevis*, *Q. pumila*, *Chrysopsis mariana*, *Ilex glabra*, *Angelica dentata*, *Yucca filamentosa*, *Piriqueta cistoides* subsp. *caroliniana*, *Eupatorium jucundum*, *E. sp.*, *Tragia linearifolia*, *Gaylussacia dumosa*, *Licania michauxii*, *Rubus trivialis*, *Rhus copallinum*, *Solidago odora*, *Sorghastrum nutans*, *Anthaenantia villosa*, *Andropogon gyrans*, *Liatris tenuifolia*, *Rhynchosia michauxii*, *Viola septemloba*, *Vaccinium myrsinites*

Voucher: 23 October 2008, R. Carter 18713 and W.W. Baker (VSC)

Ownership concerns: Georgia Department of Natural Resources

Disturbance: minimal

Threats: Any major soil disturbances; possible encroachment by invasive species from nearby western boundary

Management needs: Maintain present system of management, i.e., regular burning. This is the only population known on state property; following next burn, Carter & Baker plan to establish a permanent plot to facilitate long-term monitoring of population.

Threats: Proximity of population (ca. 150m) to adjacent privately owned agricultural property poses potential threat from invasive plant species, particularly if soil disturbance occurs on site.

Population status:

Quality – A

Condition – A

Viability – A

Defensibility – A

Overall EO Ranking – A (4.00)

EO Site Name: **Freeman 01**

Survey date(s): 17 July 2007, 03 June 2008

Surveyors: W. Wilson Baker, Richard Carter & Charles Erwin

Historical note(s): Heather Norden had study site here, which she compared to Ichauway population. Cf. Tom Patrick or Charles Erwin for initial discovery date for this metapopulation.

State/County: Georgia, Mitchell County

USGS quad name: Putney, GA

Site description: ca. 4.98 airmiles WSW Bridgeboro jct. GA 133 and GA 112; 625 acres, of which 400 acres in longleaf pine/wiregrass; entrance to Freeman Place is on W side Briarwood Road, 1.5 miles S of Pleasant Grove Church Road (and Pleasant Grove Baptist Church), or 0.3 mile N of Hatcher Hill Road; 2007 survey on 3- to 4-year rough – habitat in great need of fire-management; 2008 survey on site burned 21 March 2008 by F&W Forestry; Figures B7, B8 and F20.

GPS coordinates:

31.40193N 84.03071W
 31.40134N 84.03076W
 31.40027N 84.03052W
 31.40012N 84.03046W
 31.39967N 84.03020W
 31.39903N 84.03035W
 31.39899N 84.03015W
 31.39873N 84.03301W
 31.39897N 84.03380W
 31.39890N 84.03401W
 31.39909N 84.03428W
 31.39915N 84.03438W
 31.39973N 84.03460W
 31.40009N 84.03494W
 31.40121N 84.03433W
 31.40157N 84.03472W

Aspect: variable

Slope: 0-3%

Light: open

Topo position: crest, upper slope, mid-slope
 Moisture regime: mesic to dry-mesic

Population area: 124,685 m²

Population size:

2007 count – 1 plant observed on 3- to 4-year rough; plant in fruit

2008 count – 581 plants counted; estimate that we possibly missed 20% of the individuals (unseen vegetative plants)

Phenology: ca. 10% in leaf, ca. 20% in flower, ca. 70% with immature fruit

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Pteridium aquilinum*, *Tephrosia virginiana*, *Euphorbia pubentissima*, *Aster adnatus*, *Pityopsis graminifolia*, *Asclepias cinerea*, *Piriqueta caroliniana*, *Rubus cuneifolius*, *Rhynchosia tomentosa*, *Eupatorium rotundifolium*, *Dyschoroste oblongifolia*, *Ruellia caroliniana*, *Schrankia microphylla*, *Baptisia lanceolata*, *B. albescens*, *Eryngium yuccifolium*, *Panicum virgatum*, *Stylosanthes biflora*, *Pterocaulon pycnostachyum*, *Vernonia angustifolia*, *Hypericum suffruticosum*

Ownership concerns: Erwin family (owner); Charles Erwin is well aware of and interested in *Schwalbea* and longleaf pine/wiregrass forest diversity.

Disturbance: Part of tract selectively harvested 2007

Threats: Any major soil disturbances

Management needs: Avoid soil disturbance during timber harvest; continue regular burning; additional survey work needed after plants have turned brown, in order to

detect a higher proportion of individuals in population

Population status:

Quality – A

Condition – A

Viability – A

Defensibility – A

Overall EO Ranking – A (4.00)

Additional notes: Total area of subpopulations documented in 2008 was ca. 40 acres; Charles Erwin estimates ca. 200 acres of potential habitat exist out of a total of 400 acres on tract.

Other rare or unusual species:

- Gopherus
- Bachman's sparrow
- Field sparrow

EO Site Name: **Freeman 01a**

Survey date(s): 03 June 2008

Surveyors: W. Wilson Baker, Richard Carter & Charles Erwin

Historical note(s): Heather Norden had study site here, which she compared to Ichauway population. Cf. Tom Patrick or Charles Erwin for initial discovery date for this metapopulation.

State/County: Georgia, Mitchell County

USGS quad name: Putney, GA

Site description: ca. 4.98 airmiles WSW Bridgeboro jct. GA 133 and GA 112; 625 acres, of which 400 acres in longleaf pine/wiregrass; entrance to Freeman Place is on W side Briarwood Road, 1.5 miles S of Pleasant Grove Church Road (and Pleasant Grove Baptist Church), or 0.3 mile N of Hatcher Hill Road; site burned 21 March 2008 by F&W Forestry; Figures B7, B8 and F20.

GPS coordinates:

31.40488N 84.03133W

31.40496N 84.03116W

31.40490N 84.03096W

Aspect: variable

Slope: 0-3%

Light: open

Topo position: crest, upper and mid-slope

Moisture regime: mesic to dry-mesic

Population area: 138 m²

Population size:

13 plants counted

Phenology: ca. 10% in leaf, ca. 20% in flower, ca. 70% with immature fruit

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Pteridium aquilinum*, *Tephrosia virginiana*, *Euphorbia pubentissima*, *Aster adnatus*, *Pityopsis graminifolia*, *Asclepias cinerea*, *Piriqueta caroliniana*, *Rubus cuneifolius*, *Rhynchosia tomentosa*, *Eupatorium rotundifolium*, *Dyschoroste oblongifolia*, *Ruellia caroliniana*, *Schrankia microphylla*, *Baptisia lanceolata*, *B. albescens*, *Eryngium yuccifolium*, *Panicum virgatum*, *Stylosanthes biflora*, *Pterocaulon pycnostachyum*, *Vernonia angustifolia*, *Hypericum suffruticosum*

Ownership concerns: Erwin family (owner); Charles Erwin is well aware of and interested in *Schwalbea* and longleaf pine/wiregrass forest diversity.

Disturbance: Part of tract selectively harvested 2007

Threats: Any major soil disturbances

Management needs: Avoid soil disturbance during timber harvest; continue regular burning; additional survey work needed after plants have turned brown, in order to detect a higher proportion of individuals in population

Population status:

Quality – A

Condition – A

Viability – A

Defensibility – A

Overall EO Ranking – A (4.00)

Additional notes: Total area of subpopulations documented in 2008 was ca. 40 acres; Charles Erwin estimates ca. 200 acres of potential habitat exist out of a total of 400 acres on tract.

Other rare or unusual species:

- *Gopherus*
- Bachman's sparrow
- Field sparrow

EO Site Name: **Freeman 01b**

Survey date(s): 03 June 2008

Surveyors: W. Wilson Baker, Richard Carter & Charles Erwin

Historical note(s): Heather Norden had study site here, which she compared to Ichauway population. Cf. Tom Patrick or Charles Erwin for initial discovery date for this metapopulation.

State/County: Georgia, Mitchell County

USGS quad name: Putney, GA

Site description: ca. 4.98 airmiles WSW Bridgeboro jct. GA 133 and GA 112; 625 acres, of which 400 acres in longleaf pine/wiregrass; entrance to Freeman Place is on W side Briarwood Road, 1.5 miles S of Pleasant Grove Church Road (and Pleasant Grove Baptist Church), or 0.3 mile N of Hatcher Hill Road; site burned 21 March 2008 by F&W Forestry; Figures B7, B8 and F20.

GPS coordinates:

31.40632N 84.03401W
 31.40624N 84.03450W
 31.40600N 84.03396W
 31.40613N 84.03378W
 31.40638N 84.03379W
 31.40650N 84.03400W

Aspect: variable

Slope: 0-3%

Light: open

Topo position: crest, upper slope, mid-slope

Moisture regime: mesic to dry-mesic

Population area: 1687 m²

Population size:

242 plants counted

Phenology: ca. 10% in leaf, ca. 20% in flower, ca. 70% with immature fruit

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Pteridium aquilinum*, *Tephrosia virginiana*, *Euphorbia pubentissima*, *Aster adnatus*, *Pityopsis graminifolia*, *Asclepias cinerea*, *Piriqueta caroliniana*, *Rubus cuneifolius*, *Rhynchosia tomentosa*, *Eupatorium rotundifolium*, *Dyschoroste oblongifolia*, *Ruellia caroliniana*, *Schrankia microphylla*, *Baptisia lanceolata*, *B. albescens*, *Eryngium yuccifolium*, *Panicum virgatum*, *Stylosanthes biflora*, *Pterocaulon pycnostachyum*, *Vernonia angustifolia*, *Hypericum suffruticosum*

Ownership concerns: Erwin family (owner); Charles Erwin is well aware of and interested in *Schwalbea* and longleaf pine/wiregrass forest diversity.

Disturbance: Part of tract selectively harvested 2007

Threats: Any major soil disturbances

Management needs: Avoid soil disturbance during timber harvest; continue regular burning; additional survey work needed after plants have turned brown, in order to detect a higher proportion of individuals in population

Population status:

Quality – A

Condition – A

Viability – A

Defensibility – A

Overall EO Ranking – A (4.00)

Additional notes: Total area of subpopulations documented in 2008 was ca. 40 acres; Charles Erwin estimates ca. 200 acres of potential habitat exist out of a total of 400 acres on tract.

Other rare or unusual species:

- *Gopherus*
- Bachman's sparrow
- Field sparrow

EO Site Name: **Freeman 01c**

Survey date(s): 03 June 2008

Surveyors: W. Wilson Baker, Richard Carter & Charles Erwin

Historical note(s): Heather Norden had study site here, which she compared to Ichauway population. Cf. Tom Patrick or Charles Erwin for initial discovery date for this metapopulation.

State/County: Georgia, Mitchell County

USGS quad name: Putney, GA

Site description: ca. 4.98 airmiles WSW Bridgeboro jct. GA 133 and GA 112; 625 acres, of which 400 acres in longleaf pine/wiregrass; entrance to Freeman Place is on W side Briarwood Road, 1.5 miles S of Pleasant Grove Church Road (and Pleasant Grove Baptist Church), or 0.3 mile N of Hatcher Hill Road; site burned 21 March 2008 by F&W Forestry; Figures B7, B8 and F20.

GPS coordinates:
31.39980N 84.03761W

Aspect: variable
Slope: 0-3%
Light: open
Topo position: crest, upper & mid-slope
Moisture regime: mesic to dry-mesic

Population area: not applicable

Population size:
6 plants counted

Phenology: ca. 10% in leaf, ca. 20% in flower, ca. 70% with immature fruit

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Pteridium aquilinum*, *Tephrosia virginiana*, *Euphorbia pubentissima*, *Aster adnatus*, *Pityopsis graminifolia*, *Asclepias cinerea*, *Piriqueta caroliniana*, *Rubus cuneifolius*, *Rhynchosia tomentosa*, *Eupatorium rotundifolium*, *Dyschoroste oblongifolia*, *Ruellia caroliniana*, *Schrankia microphylla*, *Baptisia lanceolata*, *B. albescens*, *Eryngium yuccifolium*, *Panicum virgatum*, *Stylosanthes biflora*, *Pterocaulon pycnostachyum*, *Vernonia angustifolia*, *Hypericum suffruticosum*

Ownership concerns: Erwin family (owner); Charles Erwin is well aware of and interested in *Schwalbea* and longleaf pine/wiregrass forest diversity.

Disturbance: Part of tract selectively harvested 2007

Threats: Any major soil disturbances

Management needs: Avoid soil disturbance during timber harvest; continue regular burning; additional survey work needed after plants have turned brown, in order to detect a higher proportion of individuals in population

Population status:
Quality – A
Condition – A
Viability – A
Defensibility – A
Overall EO Ranking – A (4.00)

Additional notes: Total area of subpopulations documented in 2008 was ca. 40 acres; Charles Erwin estimates ca. 200 acres of potential habitat exist out of a total of 400 acres on tract.

Other rare or unusual species:

- *Gopherus*
- Bachman's sparrow
- Field sparrow

EO Site Name: **Freeman 01d**

Survey date(s): 03 June 2008

Surveyors: W. Wilson Baker, Richard Carter & Charles Erwin

Historical note(s): Heather Norden had study site here, which she compared to Ichauway population. Cf. Tom Patrick or Charles Erwin for initial discovery date for this metapopulation.

State/County: Georgia, Mitchell County

USGS quad name: Putney, GA

Site description: ca. 4.98 airmiles WSW Bridgeboro jct. GA 133 and GA 112; 625 acres, of which 400 acres in longleaf pine/wiregrass; entrance to Freeman Place is on W side Briarwood Road, 1.5 miles S of Pleasant Grove Church Road (and Pleasant Grove Baptist Church), or 0.3 mile N of Hatcher Hill Road; site burned 21 March 2008 by F&W Forestry; Figures B7, B8 and F20.

GPS coordinates:
31.40017N 84.03681W

Aspect: variable
Slope: 0-3%
Light: open
Topo position: crest, upper & mid-slope
Moisture regime: mesic to dry-mesic

Population area: not applicable

Population size:
4 plants counted

Phenology: ca. 10% in leaf, ca. 20% in flower, ca. 70% with immature fruit

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Pteridium aquilinum*, *Tephrosia virginiana*, *Euphorbia pubentissima*, *Aster adnatus*, *Pityopsis graminifolia*, *Asclepias cinerea*, *Piriqueta caroliniana*, *Rubus cuneifolius*, *Rhynchosia tomentosa*, *Eupatorium rotundifolium*, *Dyschoroste oblongifolia*, *Ruellia caroliniana*, *Schrankia microphylla*, *Baptisia lanceolata*, *B. albescens*, *Eryngium yuccifolium*, *Panicum virgatum*, *Stylosanthes biflora*, *Pterocaulon pycnostachyum*, *Vernonia angustifolia*, *Hypericum suffruticosum*

Ownership concerns: Erwin family (owner); Charles Erwin is well aware of and interested in *Schwalbea* and longleaf pine/wiregrass forest diversity.

Disturbance: Part of tract selectively harvested 2007

Threats: Any major soil disturbances

Management needs: Avoid soil disturbance during timber harvest; continue regular burning; additional survey work needed after plants have turned brown, in order to detect a higher proportion of individuals in population

Population status:
Quality – A
Condition – A
Viability – A
Defensibility – A
Overall EO Ranking – A (4.00)

Additional notes: Total area of subpopulations documented in 2008 was ca. 40 acres; Charles Erwin estimates ca. 200 acres of potential habitat exist out of a total of 400 acres on tract.

Other rare or unusual species:

- *Gopherus*
- Bachman's sparrow
- Field sparrow

EO Site Name: **Jeffords 01**

Survey date(s): 10 July 2007

Surveyors: W. Wilson Baker & Richard Carter

Historical note(s): Population discovered by W.W. Baker, E. Bridges & S. Orzell on 12 October 1991.

State/County: Georgia, Worth County

USGS quad name: Tempy, GA

Site description: ca. 2.0 airmiles north of Anderson City; east of Old Hwy. 33, 0.2 mile north of powerline right-of-way; burned ca. 4 weeks before 2007 survey; Figures B9, B10 and F26.

GPS coordinates:

31.4054333N 83.8564000W

31.4059167N 83.8562667W

31.4056833N 83.8560667W

31.4055833N 83.8558333W

31.4053667N 83.8557000W

31.4051500N 83.8556667W

31.4050167N 83.8556833W

Aspect: S and SE exposure

Slope: 3-8%

Light: open

Topo position: mid-slope, lower slope, bottom

Moisture regime: mesic

Population area: 3241 m²

Population size:

393 plants counted

Phenology: all but one plant in leaf (sterile) or in bud; only one flowering plant observed.

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Pteridium aquilinum*, *Baptisia lanceolata*, *Pterocaulon pycnostachyum*, *Tephrosia virginiana*, *Ilex glabra*, *Asclepias michauxii*, *Ruellia ciliate*, *Rhexia alifanus*, *Hypoxis juncea*, *Carphephorus corymbosus*, *Quercus pumila*, *Helianthus radula*, *Stylosanthes biflora*, *Schrankia microphylla*, *Angelica dentata*, *Yucca filamentosa*

Voucher: *R. Carter 17661 and W.W. Baker (VSC)*

Ownership concerns: Owner is aware of occurrence and is protecting plants. Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Little except for past logging

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status:

Quality – A

Condition – A

Viability – A

Defensibility – A

Overall EO Ranking – A (4.00)

EO Site Name: **Jeffords 01a**

Survey date(s): 10 July 2007

Surveyors: W. Wilson Baker & Richard Carter

State/County: Georgia, Worth County

USGS quad name: Tempy, GA

Site description: ca. 2.0 airmiles north of Anderson City; east of Old Hwy. 33, 0.2 mile north of powerline right-of-way; on south side of slight drain, just south of Jeffords 01; burned ca. 4 weeks before survey; Figures B9, B10 and F26.

GPS coordinates:

31.4049167N 83.8553667W

31.4048500N 83.8558833W

31.4050667N 83.8561833W

Aspect: flat

Slope: 0-3%

Light: open

Topo position: upper slope and crest of low ridge

Moisture regime: dry-mesic

Population area: 696 m²

Population size:

449 plants counted; apparently more recruitment than at adjacent Jeffords 01

Phenology: all plants in leaf (sterile) or in bud.

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Pteridium aquilinum*, *Baptisia lanceolata*, *Pterocaulon pycnostachyum*, *Tephrosia virginiana*, *Ilex glabra*, *Asclepias michauxii*, *Ruellia ciliate*, *Rhexia alifanus*, *Hypoxis juncea*, *Carphephorus corymbosus*, *Quercus pumila*, *Helianthus radula*, *Stylosanthes biflora*, *Schrankia microphylla*, *Angelica dentata*, *Yucca filamentosa*

Ownership concerns: Owner is aware of occurrence and is protecting plants.

Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Little except for past logging

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status:

Quality – A

Condition – A

Viability – A

Defensibility – A

Overall EO Ranking – A (4.00)

Other rare or unusual species:

- *Gopherus* active adult

EO Site Name: **Jeffords 01b**

Survey date(s): 10 July 2007

Surveyors: W. Wilson Baker & Richard Carter

State/County: Georgia, Worth County

USGS quad name: Tempy, GA

Site description: ca. 2.0 airmiles north of Anderson City; east of Old Hwy. 33, 0.2 mile north of powerline right-of-way; 150 m south of Jeffords 01A; burned ca. 4 weeks before survey; Figures B9, B10 and F26.

GPS coordinates:

31.4047333N 83.8563167W

31.4044833N 83.8560833W

31.4046333N 83.8558333W

31.4044500N 83.8556000W

31.4043500N 83.8553167W

31.4046000N 83.8552500W

Aspect: S

Slope: 0-3%

Light: open

Topo position: mid-slope

Moisture regime: mesic

Population area: 1873 m²

Population size: 154 plants counted

Phenology: all plants in leaf (sterile) or in bud.

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Pteridium aquilinum*, *Baptisia lanceolata*, *Pterocaulon pycnostachyum*, *Tephrosia virginiana*, *Ilex glabra*, *Asclepias michauxii*, *Ruellia ciliate*, *Rhexia alifanus*, *Hypoxis juncea*, *Carphephorus corymbosus*, *Quercus pumila*, *Helianthus radula*, *Stylosanthes biflora*, *Schrankia microphylla*, *Angelica dentata*, *Yucca filamentosa*

Ownership concerns: Owner is aware of occurrence and is protecting plants. Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Little except for past logging

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status:

Quality – A

Condition – A

Viability – A

Defensibility – A

Overall EO Ranking – A (4.00)

Other rare or unusual species:

- *Gopherus* – 3 active burrows

EO Site Name: **Jeffords 01c**

Survey date(s): 10 July 2007

Surveyors: W. Wilson Baker & Richard Carter

State/County: Georgia, Worth County

USGS quad name: Tempy, GA

Site description: ca. 2.0 airmiles north of Anderson City; east of Old Hwy. 33, 0.2 mile north of powerline right-of-way; east of Jeffords 01, north of Jeffords 01B; burned ca. 4 weeks before survey; Figures B9, B10 and F26.

GPS coordinates:
31.40505N 83.8548167W

Aspect: S
Slope: 0-3%
Light: open
Topo position: mid-slope
Moisture regime: mesic

Population area: not applicable

Population size:
6 plants counted

Phenology: all plants in leaf (sterile) or in bud.

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Pteridium aquilinum*, *Baptisia lanceolata*, *Pterocaulon pycnostachyum*, *Tephrosia virginiana*, *Ilex glabra*, *Asclepias michauxii*, *Ruellia ciliate*, *Rhexia alifanus*, *Hypoxis juncea*, *Carphephorus corymbosus*, *Quercus pumila*, *Helianthus radula*, *Stylosanthes biflora*, *Schrankia microphylla*, *Angelica dentata*, *Yucca filamentosa*

Ownership concerns: Owner is aware of occurrence and is protecting plants. Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Little except for past logging

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status:
Quality – A
Condition – A
Viability – A
Defensibility – A
Overall EO Ranking – A (4.00)

EO Site Name: **Jeffords 02**

Survey date(s): 10 July 2007; 01 August 2007

Surveyors: W. Wilson Baker & Richard Carter

State/County: Georgia, Worth County

USGS quad name: Tempy, GA

Site description: 3.45 airmiles SSE of Gordy; knoll between two drains; burned late June 2007; Figures B9, B12 and F26.

GPS coordinates:

31.4335667N 83.8719500W

31.4336167N 83.8718167W

31.4336667N 83.8717167W

31.4339333N 83.8717167W

31.4338333N 83.8719000W

Aspect: more-or-less flat to eastern

Slope: 0-3%

Light: open

Topo position: crest and upper slope

Moisture regime: dry-mesic

Population area: 568 m²

Population size:

198 plants counted (01 Aug 2007)

Phenology: plants in leaf (sterile), in bud, and in flower

Population area: ca. 0.25 acre

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Pteridium aquilinum*, *Baptisia lanceolata*, *Tephrosia virginiana*, *Dyschoriste oblongifolia*, *Pityopsis graminifolia*, *Coreopsis delphinifolia*, *Cyperus echinatus*, *Eupatorium compositifolium*, *Euphorbia pubentissima*, *Mimosa quadrivalvis* var. *angustata*, *Gaylussacia dumosa*, *Sisyrinchium* sp., *Vernonia angustifolia*, *Polygala grandiflora*, *Rhynchosia reniformis*

Ownership concerns: Owner is aware of occurrence and is protecting plants. Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Past logging

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status:

Quality – A

Condition – A

Viability – A

Defensibility – A

Overall EO Ranking – A (4.00)

Other rare or unusual species:

- This site is 250 m south of *Balduina atropurpurea* bog.
- *Gopherus* – active adult

EO Site Name: **Jeffords 03**

Survey date(s): 10 July 2007

Surveyors: W. Wilson Baker & Richard Carter

State/County: Georgia, Worth County

USGS quad name: Tempy, GA

Site description: ca. 2.0 airmiles north of Anderson City; east of Old Hwy. 33, 0.2 mile north of powerline right-of-way; northeast of Jeffords 01; burned ca. 4 weeks before survey; Figures B9, B10 and F26.

GPS coordinates:

31.4071667N 83.8548333W

31.4071667N 83.8549333W

31.4071000N 83.8550667W

31.4069667N 83.8549667W

31.4069333N 83.8549167W

31.4071833N 83.8546833W

Aspect: E

Slope: 3-8%

Light: open

Topo position: mid-slope

Moisture regime: dry-mesic

Population area: 488 m²

Population size:

76 plants counted

Phenology: all plants in leaf (sterile) or in bud

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Pteridium aquilinum*, *Baptisia lanceolata*, *Pterocaulon pycnostachyum*, *Tephrosia virginiana*, *Ilex glabra*, *Asclepias michauxii*, *Ruellia ciliate*, *Rhexia alifanus*, *Hypoxis juncea*, *Carphephorus corymbosus*, *Quercus pumila*, *Helianthus radula*, *Stylosanthes biflora*, *Schrankia microphylla*, *Angelica dentata*, *Yucca filamentosa*

Ownership concerns: Owner is aware of occurrence and is protecting plants. Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Little except for past logging

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status:

Quality – A

Condition – A

Viability – A

Defensibility – A

Overall EO Ranking – A (4.00)

EO Site Name: **Jeffords 04**

Survey date(s): 10 July 2007, 04 June 2008

Surveyors: W. Wilson Baker & Richard Carter

State/County: Georgia, Worth County

USGS quad name: Tempy, GA

Site description: ca. 2.9 airmiles NNE of Anderson City, 0.3 mile east of GA Hwy. 33, east side of drain; burned April 2007, burned first week of April 2008; Figures B9, B11 and F26.

GPS coordinates:

31.41502N 83.83755W

31.41495N 83.83743W

Aspect: W

Slope: 8-15%

Light: open

Topo position: gradient from lower to mid-slope

Moisture regime: mesic to dry-mesic

Population area: 11 m²

Population size:

2007 count – 8 plants; some plants turning brown early because of drought; others still green where wiregrass still green

2008 count – 26 plants observed

Phenology:

2007 – mature fruits

2008 – flowers & immature fruits

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Pteridium aquilinum*, *Tephrosia virginiana*, *Dyschoriste oblongifolia*, *Rhynchosia tomentosa*, *Stillingia sylvatica*, *Aster walteri*, *Euphorbia pubentissima*, *Rhexia alifanus*, *Gaylussacia frondosa*, *Ilex glabra*

Ownership concerns: Owner is aware of occurrence and is protecting plants.

Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Past logging

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status (both 04 and 04a):

Quality – B

Condition – A

Viability – A

Defensibility – A

Overall EO Ranking – A- (3.75)

Other rare or unusual species:

- Field sparrow singing (2007)

EO Site Name: **Jeffords 04a**

Survey date(s): 04 June 2008

Surveyors: W. Wilson Baker & Richard Carter

State/County: Georgia, Worth County

USGS quad name: Tempy, GA

Site description: ca. 2.9 airmiles NNE of Anderson City, 0.3 mile east of GA Hwy. 33, west side of drain; burned first week of April 2008; Figures B9, B11 and F26.

GPS coordinates:

31.41423N 83.83717W

31.41424N 83.83747W

31.41444N 83.83750W

31.41456N 83.83747W

Aspect: E

Slope: 3-8%

Light: open

Topo position: mid-slope

Moisture regime: mesic

Population area: 557 m²

Population size:

13 plants observed

Phenology: immature flowers and immature fruits

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Pteridium aquilinum*, *Tephrosia virginiana*, *Dyschoriste oblongifolia*, *Rhynchosia tomentosa*, *Stillingia sylvatica*, *Aster walteri*, *Euphorbia pubentissima*, *Rhexia alifanus*, *Gaylussacia frondosa*, *Ilex glabra*

Ownership concerns: Owner is aware of occurrence and is protecting plants. Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Past logging

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status (applies to 04 and 04a):

Quality – B

Condition – A

Viability – A

Defensibility – A

Overall EO Ranking – A- (3.75)

Other rare or unusual species:

- *Sarracenia flava* in drain (not vouchered)
- *Chamaecrista deeringiana*; 31.41400N 83.83931W; Carter 18396 and Baker (VSC)

EO Site Name: **Jeffords 05**

Survey date(s): 01 August 2007

Surveyors: W. Wilson Baker & Richard Carter

State/County: Georgia, Worth County

USGS quad name: Tempy, GA

Site description: ca. 4.47 airmiles NNW of Anderson City, W of Old Hwy. 33; just NE of Long Field; south of jeep trail, elev. ca. 420 ft.; burned ca. six weeks before survey; Figures B9, B12 and F26.

GPS coordinates:

31.4301500N 83.8720167W
 31.4300667N 83.8719667W
 31.4299667N 83.8718500W
 31.4299500N 83.8716667W
 31.4299333N 83.8715000W
 31.4299667N 83.8713833W
 31.4300500N 83.8714667W
 31.4300000N 83.8717000W
 31.4300667N 83.8719000W
 31.4301667N 83.8719167W
 31.4302833N 83.8718500W
 31.4303333N 83.8716333W
 31.4304500N 83.8716500W
 31.4304833N 83.8717167W
 31.4305333N 83.8717833W
 31.4303333N 83.8719167W

Aspect: W

Slope: 3-8%

Light: open

Topo position: crest and upper slope

Moisture regime: dry-mesic

Population area: 1911 m²

Population size:

335 plants counted – estimated 10% of individuals overlooked (small, vegetative plants)

Phenology: some plants vegetative, some with flower buds, some with flowers, some with immature fruits; 1 plant observed with

dead stem bearing brown capsules (formed pre-burn) and green stem with flowers (formed post-burn)

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Tephrosia virginiana*, *Dyschoriste oblongifolia*, *Sisyrinchium* sp., *Stillingia sylvatica*, *Stylodon carneus*, *Euphorbia pubentissima*, *Baptisia albescens*, *B. lanceolata*, *Pteridium aquilinum*, *Solidago odora*, *Quercus pumila*, *Yucca* sp., *Licania michauxii*, *Galactia erecta*, *Pityopsis graminifolia*

Voucher: R. Carter 17882 and W. Baker (VSC) – roots intertwined with and apparently parasitic on roots of *Aristida stricta*

Ownership concerns: Owner is aware of EO. Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Generally little past logging, etc.

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status:

Quality – A

Condition – A

Viability – A

Defensibility – A

Overall EO Ranking – A (4.00)

Other rare or unusual species:

- *Gopherus* – active burrows, adult and juvenile
- Hairy woodpecker

EO Site Name: **Jeffords 05a**

Survey date(s): 01 August 2007

Surveyors: W. Wilson Baker & Richard Carter

State/County: Georgia, Worth County

USGS quad name: Tempy, GA

Site description: ca. 4.47 airmiles NNW of Anderson City, W of Old Hwy. 33; just NE of Long Field; adjacent to and 60 m north of Jeffords 05, north of jeep trail; elev. ca. 420 ft.; burned ca. six weeks before survey (warm season) ; Figures B9, B12 and F26.

GPS coordinates:

31.4307000N 83.8716333W

31.4308000N 83.8714500W

31.4308833N 83.8713833W

31.4308667N 83.8715333W

Aspect: W

Slope: 0-3%

Light: open

Topo position: crest and upper slope

Moisture regime: dry-mesic

Population area: 169 m²

Population size:

9 plants counted

Phenology: plants vegetative, in bud and in flower

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species:
Pinus palustris, *Aristida stricta*

Additional associates:

Tephrosia virginiana, *Dyschoriste oblongifolia*, *Sisyrinchium* sp., *Stillingia sylvatica*, *Stylodon carneus*, *Euphorbia pubentissima*, *Baptisia albescens*, *B. lanceolata*, *Pteridium aquilinum*, *Solidago odora*, *Quercus pumila*, *Yucca* sp., *Licania michauxii*, *Galactia erecta*, *Pityopsis graminifolia*, *Lygodesmia aphylla*, *Castanea pumila*

Ownership concerns:

Owner is aware of EO. Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Generally little past logging, etc.

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status:

Quality – A

Condition – A

Viability – A

Defensibility – A

Overall EO Ranking – A (4.00)

EO Site Name: **Jeffords–Hancock 01**

Survey date(s): 18 July 2007

Surveyors: W. Wilson Baker & Richard Carter

State/County: Georgia, Worth County

USGS quad name: Tempy, GA

Site description: ca. 2.5 airmiles S of Sylvester jct. Hwys. US 82 and GA 33; access via Gammage Lane off Hwy. GA 112; rolling upland along Horse Creek tributary; burned 2007; Figures B13, B14 and F27.

GPS coordinates:

31.4966667N 83.8421167W

31.4965833N 83.8419667W

Aspect: NE

Slope: 3-8%

Light: open

Topo position: lower slope

Moisture regime: dry-mesic

Population area: 9 m²

Population size:

7 plants counted

Phenology: plants fruiting

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Pteridium aquilinum*, *Tephrosia virginiana*, *Dyschoriste oblongifolia*, *Rhynchosia tomentosa*, *Stillingia sylvatica*, *Euphorbia pubentissima*, *Stylosanthes biflora*, *Pediomelum canescens*, *Baptisia lanceolata*, *Quercus pumila*, *Rhus copallina*, *Galium* sp., *Angelica dentata*, *Vaccinium stamineum*, *Ceanothus microphyllus*, *Toxicodendron pubescens*, *Carphephorus corymbosus*, *Polygala grandiflora*, *Coreopsis delphinifolia*, *Eupatorium rotundifolium*

Ownership concerns: Owner not aware of EO. Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Very little, past logging

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status:

Quality – C

Condition – A

Viability – A

Defensibility – A

Overall EO Ranking – B+ (3.50)

Other rare or unusual species:

- *Gopherus* – several active burrows
- Bachman's sparrow
- Wood thrush singing in rich drain north of gas-line

EO Site Name: **Nilo 01**

Survey date(s): 07 August 2007

Surveyors: W. Wilson Baker & Richard Carter

Historical note(s): Population discovered by W.W. Baker in 1989. See Helton et al. (2000).

State/County: Georgia, Dougherty County

USGS quad name: Red Store Crossroads, GA

Site description: Nilo Plantation, west side of Hwy. GA 91; 1.06 airmiles west-southwest of plantation headquarters, 0.13 airmile south of powerline; southeast side of main road at culvert; 1-year rough and droughty; Figures B15, B16 and F36.

GPS coordinates:
31.4508000N 84.2869333W
31.4512833N 84.2872500W

Aspect: S
Slope: 8-15% ditch bank
Light: open
Topo position: slope along edge of elongated pond
Moisture regime: mesic to wet-mesic

Population area: Nilo 01A, 01B, and 01C combined = 51 m²

Population size:
13 plants counted

Phenology: plants vegetative (30%) and with mature fruit (70%)

Community: disturbed site along intermittent pond

Dominant or characteristic species:
Pteridium aquilinum, *Panicum hemitomom*,
Pityopsis graminifolia

Ownership concerns: Owner is aware of EO. Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Site heavily disturbed by clearing activities

Threats: Further clearing; herbicide use

Management needs: continue regular burning; avoid further soil disturbance and herbicide use

Recommendations: Survey again in 2008 after burn

Population status:
Quality – C
Condition – D
Viability – D
Defensibility – D
Overall EO Ranking – D (1.25)

Other rare or unusual species:

- Bachman's sparrow
- Field sparrow

EO Site Name: **Nilo 01a**

Survey date(s): 07 August 2007

Surveyors: W. Wilson Baker & Richard Carter

Historical note(s): Population discovered by W.W. Baker in 1989. See Helton et al. (2000).

State/County: Georgia, Dougherty County

USGS quad name: Red Store Crossroads, GA

Site description: Nilo Plantation, west side of Hwy. GA 91; 1.06 airmiles west-southwest of plantation headquarters, 0.13 airmile south of powerline, along ditched drain north of elongated intermittent pond and just northwest of dirt road; 1-year rough and droughty; Figures B15, B16 and F36.

GPS coordinates:

31.4516667N 84.2871333W

31.4522333N 84.2872500W

31.4522833N 84.2872000W

31.4516833N 84.2870333W

Aspect: NE

Slope: 8-15% ditch bank

Light: open

Topo position:

Moisture regime:

Population area: 512 m²

Population size:

108 plants counted

Phenology: plants vegetative (50%) and with mature fruit (50%)

Community: disturbed site along ditched drain, formerly longleaf pine/wiregrass

Dominant or characteristic species: *Pinus palustris*, *P. elliotii*, *Myrica cerifera*, *Diospyros virginiana*, *Ilex glabra*, *Leucothoe racemosa*, *Aristida stricta*

Additional associates: *Ctenium aromaticum*, *Carphephorus corymbosus*, *Aster adnatus*, *Bigelovia nudata*, *Ludwigia suffruticosa*

Voucher: R. Carter 17904 and W. Baker (VSC)

Ownership concerns: Owner is aware of EO. Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Site heavily disturbed by ditching, road maintenance and herbicide use

Threats: Further ditching and soil disturbance; herbicide use

Management needs: continue regular burning; avoid further soil disturbance and herbicide use

Recommendations: Survey again in 2008 after burn

Population status:

Quality – D

Condition – D

Viability – D

Defensibility – D

Overall EO Ranking – D (1.00)

Other rare or unusual species:

- Bachman's sparrow
- Field sparrow

EO Site Name: **Pinewood 01**

Survey date(s): 17 July 2007, 09 July 2008

Surveyors: W. Wilson Baker and Richard Carter

State/County: Georgia, Mitchell County

USGS quad name: Putney, GA

Site description: ca. 0.4 airmile ENE Pleasant Grove Baptist Church, access off Pleasant Grove Church Road; ca. 270 ft elevation; April 2007 burn; selective timber harvest just prior to 2008 survey; Figures B17, B18 and F39.

GPS coordinates:

31.4282000N 84.0230833W

31.4280500N 84.0232833W

31.4281167N 84.0232500W

Aspect: NE

Slope: 0-3%

Light: open

Topo position: mid-slope

Moisture regime: dry-mesic

Population area: 44 m²

Population size:

2007 count – 8 plants

2008 count – 6 plants

Phenology:

2007 – plants fruiting

2008 – plants fruiting

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Pteridium aquilinum*, *Tephrosia virginiana*, *Euphorbia pubentissima*, *Polygala grandiflora*, *Rubus cuneifolius*, *Stylosanthes biflora*, *Rhexia alifanus*, *Piriqueta caroliniana*, *Rhynchosia reniformis*, *Baptisia lanceolata*, *B. albescens*, *Aster adnatus*

Ownership concerns: Chris Schoen and Paul Conley – Atlanta area (owners); Sean Powell (manager). Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Numerous food plots, food strips, and firebreaks

Threats: Numerous food plots, food strips, and firebreaks

Management needs: Continue regular burning; avoid any further soil disturbance; restore native ground cover on food plot sites

Population status:

Quality – C

Condition – C

Viability – C

Defensibility – C

Overall EO Ranking – C (2.00)

Other rare or unusual species:

- Field sparrow
- Bachmans sparrow

EO Site Name: **Pinewood 02**

Survey date(s): 17 July 2007, 09 July 2008

Surveyors: W. Wilson Baker and Richard Carter

State/County: Georgia, Mitchell County

USGS quad name: Putney, GA

Site description: ca. 0.5 airmile ENE Pleasant Grove Baptist Church, access off Pleasant Grove Church Road; ca. 265 ft elevation; April 2007 burn; much recent disturbance, including installation of new food plot, observed during 2008 survey; Figures B17, B18 and F39.

GPS coordinates:

31.4265500N 84.0201000W

31.4265833N 84.0202333W

31.4263667N 84.0201167W

Aspect: two slopes – W, NW, NE

Slope: 3-8%

Light: open

Topo position: lower-slope

Moisture regime: dry-mesic

Population area: 132 m²

Population size:

2007 count – 9 plants

2008 count – 5 plants

Phenology: plants fruiting

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Pteridium aquilinum*, *Tephrosia virginiana*, *Euphorbia pubentissima*, *Polygala grandiflora*, *Stylosanthes biflora*, *Rhynchosia tomentosa*, *Toxicodendron pubescens*, *Dyschoriste oblongifolia*, *Ceanothus microphyllus*, *Quercus stellata*

Ownership concerns: Chris Schoen and Paul Conley – Atlanta area (owners); Sean Powell (manager). Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Numerous food plots, food strips, and firebreaks

Threats: Numerous food plots, food strips, and firebreaks

Management needs: Continue regular burning; avoid any further soil disturbance; restore native ground cover on food plot sites

Population status:

Quality – C

Condition – B

Viability – B

Defensibility – B

Overall EO Ranking – B- (2.75)

Other rare or unusual species:

- *Chamaecrista deeringiana*, R. Carter 17729 and W. Baker (VSC)
- *Gopherus*

EO Site Name: **Pinewood 03**

Survey date(s): 17 July 2007, 09 July 2008

Surveyors: W. Wilson Baker and Richard Carter

State/County: Georgia, Mitchell County

USGS quad name: Putney, GA

Site description: ca. 1.13 airmiles ENE Pleasant Grove Baptist Church, access off Pleasant Grove Church Road; along main plantation road near junction; April 2007 burn; 2008 current season burn; selective timber harvest just prior to 2008 survey; Figures B17, B19 and F39.

GPS coordinates:

31.43071N 84.01072W

31.43079N 84.01067W

31.43065N 84.01057W

Aspect: flat

Slope: 0-3%

Light: open

Topo position: flat crest

Moisture regime: dry-mesic

Population area: 79 m²

Population size:

2007 count – 1 plant

2008 count – 16 plants

Phenology:

2007 – plant fruiting

2008 – all plants post flower/fruit

Population Area: ca. 10X20m²

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*; but wiregrass

sparser than at Pinewood 01 and Pinewood 02 sites

Additional associates: *Eryngium yuccifolium*, *Pteridium aquilinum*, *Baptisia lanceolata*, *Symphyotrichum walteri*, *Viola septemloba*, *Tephrosia virginiana*, *Pityopsis graminifolia*, *Paspalum plicatulum*, *Sporobolus curtisii*, *Piriqueta cistoides* subsp. *caroliniana*, *Dyschoriste oblongifolia*, *Rhexia alifanus*, *Euphorbia pubentissima*, *Rhynchosia tomentosa*, *Rubus cuneifolius*, *Tragia* sp., *Schrankia microphylla*, *Polygala grandiflora*, *Rhus copallina*

Ownership concerns: Chris Schoen and Paul Conley – Atlanta area (owners); Sean Powell (manager). Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Numerous food plots, food strips, and firebreaks

Threats: Numerous food plots, food strips, and firebreaks

Management needs: Continue regular burning; avoid any further soil disturbance; restore native ground cover on food plot sites

Population status 2007:

Quality – D

Condition – C

Viability – C

Defensibility – C

Overall EO Ranking – C- (1.75)

Population status 2008:

Quality – C

Condition – B

Viability – B

Defensibility – C

Overall EO Ranking – B- (2.50)

EO Site Name: **Pinewood 03a**

Survey date(s): 09 July 2008

Surveyors: W. Wilson Baker and Richard Carter

State/County: Georgia, Mitchell County

USGS quad name: Putney, GA

Site description: ca. 1.13 airmiles ENE Pleasant Grove Baptist Church, access off Pleasant Grove Church Road; along main plantation road near junction; located 100-150m west of Pinewood 03a; 2008 current season burn; selective timber harvest just prior to 2008 survey; some invasion of site by *Lespedeza bicolor*; Figures B17, B19 and F39.

GPS coordinates:

31.43096N 84.01176W

31.43079N 84.01161W

Aspect: flat

Slope: 0-3%

Light: open

Topo position: flat crest

Moisture regime: dry-mesic

Population area: 11 m²

Population size:

3 plants counted

Phenology: all plants post fruit

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*; but wiregrass

sparser than at Pinewood 01 and Pinewood 02 sites

Additional associates: *Eryngium yuccifolium*, *Pteridium aquilinum*, *Baptisia lanceolata*, *Symphytotrichum walteri*, *Viola septemloba*, *Tephrosia virginiana*, *Pityopsis graminifolia*, *Paspalum plicatulum*, *Sporobolus curtisii*, *Piriqueta cistoides* subsp. *caroliniana*, *Dyschoriste oblongifolia*, *Rhexia alifanus*, *Euphorbia pubentissima*, *Rhynchosia tomentosa*, *Rubus cuneifolius*, *Tragia* sp., *Schrankia microphylla*, *Polygala grandiflora*, *Rhus copallina*

Ownership concerns: Chris Schoen and Paul Conley – Atlanta area (owners); Sean Powell (manager). Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Numerous food plots, food strips, and firebreaks

Threats: Numerous food plots, food strips, and firebreaks

Management needs: Continue regular burning; avoid any further soil disturbance; remove *Lespedeza bicolor* and restore native ground cover on food plot sites

Population status 2008:

Quality – C

Condition – B

Viability – B

Defensibility – C

Overall EO Ranking – B- (2.50)

EO Site Name: **Pinewood 04**

Survey date(s): 03 June 2008

Surveyors: W. Wilson Baker and Richard Carter

State/County: Georgia, Mitchell County

USGS quad name: Putney, GA

Site description: ca. 200m W of office, ca. 100m N Pleasant Grove Baptist Church, access off Pleasant Grove Church Road; burned ca. March 2008; Figures B17, B20 and F39.

GPS coordinates:

31.42534N 84.03996W

31.42538N 84.03984W

31.42537N 84.03974W

31.42568N 84.03982W

31.42574N 84.03990W

31.42579N 84.03982W

Aspect: W

Slope: 0-3%

Light: open

Topo position: upper slope

Moisture regime: mesic

Population area: 580 m²

Population size:

9 plants counted

Phenology: flowers and immature fruits

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Pteridium aquilinum*, *Tephrosia virginiana*, *Baptisia lanceolata*, *Dyschoriste oblongifolia*, *Toxicodendron pubescens*, *Euphorbia pubentissima*, *Stillingia sylvatica*, *Schrankia microphylla*, *Stylodon carneus*

Ownership concerns: Chris Schoen and Paul Conley – Atlanta area (owners); Sean Powell (manager). Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Numerous food plots, food strips, firebreaks, and mowed lanes

Threats: Numerous food plots, food strips, firebreaks, and mowed lanes

Management needs: Continue regular burning; avoid any further soil disturbance; restore native ground cover on food plot sites

Population status:

Quality – C

Condition – B

Viability – B

Defensibility – B

Overall EO Ranking – B- (2.75)

Other rare or unusual species:

- *Gopherus*

EO Site Name: **Pinewood 05**

Survey date(s): 09 July 2008

Surveyors: W. Wilson Baker and Richard Carter

State/County: Georgia, Mitchell County

USGS quad name: Putney, GA

Site description: ca. 0.65 airmile ENE Pleasant Grove Baptist Church, access off Pleasant Grove Church Road; burned early April 2008; Figures B17, B18 and F39.

GPS coordinates:
31.42641N 84.01810W

Aspect:
Slope:
Light: open
Topo position:
Moisture regime: mesic

Phenology:

Population area: not applicable

Population size:
1 plant observed

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Pteridium aquilinum*, *Tephrosia virginiana*, *Baptisia lanceolata*, *Vernonia angustifolia*, *Polygala grandiflora*, *Ionactis linarifolia*, *Toxicodendron pubescens*, *Sericocarpus tortifolius*, *Stillingia sylvatica*

Ownership concerns: Chris Schoen and Paul Conley – Atlanta area (owners); Sean Powell (manager). Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Numerous food plots, food strips, firebreaks, and mowed lanes

Threats: Numerous food plots, food strips, firebreaks, and mowed lanes

Management needs: Continue regular burning; avoid any further soil disturbance; restore native ground cover on food plot sites

Population status:
Quality – C
Condition – D
Viability – C
Defensibility – C
Overall EO Ranking – C- (1.75)

Other rare or unusual species:
• *Gopherus*

EO Site Name: **Pinewood 06**

Survey date(s): 09 July 2008

Surveyors: W. Wilson Baker and Richard Carter

State/County: Georgia, Mitchell County

USGS quad name: Putney, GA

Site description: 1.0 airmile NE Pleasant Grove Baptist Church, access off Pleasant Grove Church Road; burned early April 2008; Figures B17, B21 and F39.

GPS coordinates:
31.43548N 84.01709W

Aspect: flat
Slope: flat
Light: open
Topo position: crest
Moisture regime: dry mesic

Population area: 5 m²

Population size:
3 plants observed

Phenology: mature fruits

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Pteridium aquilinum*, *Tephrosia virginiana*, *Baptisia lanceolata*, *B. albescens*, *Rubus cuneifolius*, *Tragia* sp., *Eupatorium album*, *E. hyssopifolium*, *Piriqueta cistoides* subsp. *caroliniana*, *Euphorbia pubentissima*, *Salvia azurea*, *Pityopsis graminifolia*, *Schrankia microphylla*, *Solidago odora*

Ownership concerns: Chris Schoen and Paul Conley – Atlanta area (owners); Sean Powell (manager). Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Numerous food plots, food strips, firebreaks, and mowed lanes

Threats: Numerous food plots, food strips, firebreaks, and mowed lanes

Management needs: Continue regular burning; avoid any further soil disturbance; restore native ground cover on food plot sites

Population status:
Quality – C
Condition – C
Viability – C
Defensibility – C
Overall EO Ranking – C (2.00)

EO Site Name: **Pinewood 07**

Survey date(s): 09 July 2008

Surveyors: W. Wilson Baker and Richard Carter

State/County: Georgia, Mitchell County

USGS quad name: Putney, GA

Site description: 0.80 airmiles NE Pleasant Grove Baptist Church, access off Pleasant Grove Church Road; burned early April 2008; Figures B17, B21 and F39.

GPS coordinates:

31.43413N 84.02088W

31.43421N 84.02097W

31.43420N 84.02103W

31.43424N 84.02095W

Aspect: E

Slope: 0-3%

Light: open

Topo position: mid-slope

Moisture regime: dry mesic

Population area: 53 m²

Population size:

10 plants observed

Phenology: mature fruits

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Rhynchosia tomentosa*, *R. reniformis*, *Polygala incarnata*, *Quercus virginiana*, *Rubus*

cuneifolius, *Pteridium aquilinum*, *Tephrosia virginiana*, *Baptisia lanceolata*, *Vernonia angustifolia*, *Euphorbia discoidalis*, *Vaccinium stamineum*, *Gaylussacia dumosa*, *G. frondosa*, *Pityopsis graminifolia*, *Pediomelum canescens*, *Tragia linearifolia*, *Symphytichum walteri*, *S. adnatus*, *Dyschoriste oblongifolia*, *Licania michauxii*, *Eupatorium hyssopifolium*, *Piriqueta cistoides* subsp. *caroliniana*, *Helianthus radula*, *Ionactis linariifolia*, *Diospyros virginiana*, *Schrankia microphylla*, *Penstemon australis*, *Schizachyrium tenerum*, *Eryngium yuccifolium*, *Scleria ciliaris*

Ownership concerns: Chris Schoen and Paul Conley – Atlanta area (owners); Sean Powell (manager). Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Numerous food plots, food strips, firebreaks, and mowed lanes; recent logging

Threats: Numerous food plots, food strips, firebreaks, and mowed lanes

Management needs: Continue regular burning; avoid any further soil disturbance; restore native ground cover on food plot sites

Population status:

Quality – C

Condition – C

Viability – D

Defensibility – D

Overall EO Ranking – C- (1.50)

EO Site Name: **Quail Ridge 01**

Survey date(s): 11 July 2007, 04 June 2008

Surveyors: W. Wilson Baker & Richard Carter

Historical note(s): Cf. Tom Patrick (Georgia DNR Heritage) for date and details of initial discovery of *Schwalbea* at this site.

State/County: Georgia, Worth County

USGS quad name: Norman Park, GA

Site description: ca. 4.41 airmiles NW Norman Park; near head of drain along tributary of Warrior Creek; narrow ecotone adjacent to Pitcherplant Bog parallel to drain; along north side of jeep trail, between trail and drain; 2007 survey 1-year rough, last burned warm season 2006; 2008 survey last burned mid-April 2008; Figures B22, B23 and F41.

GPS coordinates:

31.3219333N 83.7225667W
 31.3219333N 83.7226000W
 31.3215167N 83.7226667W
 31.3215500N 83.7227667W
 31.3215333N 83.7235667W

Aspect: N, W

Slope: 3-8%

Light: open

Topo position: lower slope

Moisture regime: dry-mesic, ecotonal

Population area: 5121 m² (area includes both Quail Ridge 01 and 01a)

Population size:

2006 count – 75 plants (quick check by W.W. Baker, 29 September 2006)

2007 count – 31 plants

2008 count – 283 plants

Phenology:

2007 – 90.3% (N=28) were dead plants (in capsule) left from 2006; 9.7% (N=3) were

green current season plants (with mature capsules).

2008 – 95% in flower, 5% vegetative

Community: longleaf pine / wiregrass savanna and immediately adjacent to Pitcherplant Bog

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Schizachyrium tenerum*, *Pteridium aquilinum*, *Tephrosia virginiana*, *Kalmia hirsuta*, *Ilex glabra*, *Gaylussacia dumosa*, *Rhexia alifanus*, *Helianthus radula*, *Quercus nigra*, *Q. pumila*, *Asimina longifolia*, *Xyris caroliniana*, *Aletris sp.*, *Hypericum suffruticosum*, *Ludwigia virgata*, *Lyonia mariana*, *Baptisia lanceolata*, *Aster walteri*, *Balduina uniflora*, *Stylosanthes biflora*

Voucher: *R. Carter 18393 and W.W. Baker (VSC)*

Ownership concerns: John Norman, owner, is aware of occurrence and is protecting plants. This block (ca. 300 acres) of Norman's Quail Ridge Plantation placed into a conservation easement by Tall Timbers, September 2007. Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Very little disturbance in narrow ecotone with *Schwalbea*

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status in 2007:

Quality – B

Condition – B

Viability – A

Defensibility – A

Overall EO Ranking – B+ (3.50)

Population status in 2008:

Quality – A

Condition – A

Viability – A

Defensibility – A

Overall EO Ranking – A (4.00)

Other rare or unusual species:

- Borders very special bog community with *Balduina atropurpurea*, *Stokesia laevis*, *Sarracenia flava*, *S. psitticina*, *S. minor*, *Melanthium (Veratrum) virginicum*
- *Gopherus*, Bachman's sparrow in adjacent upland
- Henslow sparrow (winter)

EO Site Name: **Quail Ridge 01a**

Survey date(s): 04 June 2008

Surveyors: W. Wilson Baker & Richard Carter

State/County: Georgia, Worth County

USGS quad name: Norman Park, GA

Site description: ca. 4.41 airmiles NW Norman Park; near head of drain along tributary of Warrior Creek; 2007 survey 1-year rough, last burned warm season 2006; 2008 survey last burned mid-April 2008; Quailridge 01a is an southward extension of population Quailridge 01, along south side of jeep trail; Figures B22, B23 and F41.

GPS coordinates:

31.32204N 83.72189W

31.32174N 83.72227W

31.32126N 83.72295W

Aspect: flat

Slope: 0-3%

Light: open

Topo position: upper portion of gentle slope

Moisture regime: mesic

Population area: included within Quail Ridge 01

Population size:

13 plants observed; no plants were observed here during 2007 on 1-year rough

Phenology: 2008 – 95% in flower, 5% vegetative

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Schizachyrium tenerum*, *Pteridium aquilinum*, *Tephrosia virginiana*, *Kalmia hirsuta*, *Ilex glabra*, *Gaylussacia dumosa*, *Rhexia alifanus*, *Helianthus radula*, *Quercus nigra*, *Q. pumila*, *Asimina longifolia*, *Xyris caroliniana*, *Aletris sp.*, *Hypericum suffruticosum*, *Ludwigia virgata*, *Lyonia mariana*, *Baptisia lanceolata*, *Aster walteri*, *Balduina uniflora*, *Stylosanthes biflora*

Ownership concerns: John Norman, owner, is aware of occurrence and is protecting plants. This block (ca. 300 acres) of Norman's Quail Ridge Plantation placed into a conservation easement by Tall Timbers, September 2007. Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Very little disturbance

Threats: Any major soil disturbances

Management needs: Maintain present system of management.

Population status:

Quality – A

Condition – A

Viability – A

Defensibility – A

Overall EO Ranking – A (4.00)

EO Site Name: **Weatherby 01**

Survey date(s): 17 July 2007

Surveyors: W. Wilson Baker & Richard Carter

State/County: Georgia, Dougherty County

USGS quad name: Putney, GA

Site description: ca. 0.46 airmile NW of Rocky Hill Church; west of Gravel Hill Rd. and south of powerline; access from dim firebreak road, south of powerline; a few 100+ year old *P. palustris* specimens were noted; site was selectively timbered and partially replanted/inter-planted in *P. elliotii*; *P. elliotii* ca. 15 years old; burned March 2007; Figures B24, B25 and F55.

GPS coordinates:

31.4465667N 84.0693833W

31.4463333N 84.0690000W

31.4465333N 84.0688333W

31.4470833N 84.0686333W

31.4475833N 84.0686167W

31.4475667N 84.0687500W

31.4469667N 84.0693667W

Aspect: flat

Slope: 0-3%

Light: open

Topo position: crest

Moisture regime: dry-mesic

Population area: 6072 m²

Population size:

255 plants counted

Phenology: tops of plants brown, lower leaves still green

Population area: ca. 2 acres

Community: longleaf pine / wiregrass savanna inter-planted with slash pine

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates:

Pinus taeda, *Diospyros virginiana*, *Vaccinium stamineum*, *Rhus copallina*, *Rubus cuneifolius*, *Pteridium aquilinum*, *Eupatorium jucundum*, *E. compositifolium*, *Euphorbia pubentissima*, *Dyschoriste oblongifolia*, *Ceanothus microphyllus*, *Aster linearifolius*, *A. adnatus*, *Asclepias tuberosa*, *Vernonia angustifolia*, *Schizachyrium tenerum*, *Pediomelum canescens*, *Tephrosia virginiana*, *Rudbeckia fulgida*

Voucher: R. Carter 17742 and W. Baker (VSC)

Ownership concerns: Frank Weatherby (owner); discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Past logging and inter-planting of slash pine

Threats: Trees to east and west have been marked for harvest

Management needs: Continue regular burning; take special care to avoid mechanical soil disturbance when harvesting timber and replanting

Population status:

Quality – A

Condition – C

Viability – B

Defensibility – B

Overall EO Ranking – B (3.00)

Other rare or unusual species:

- *Gopherus* – several active burrows
- Bachman's sparrow

EO Site Name: **Weatherby 02**

Survey date(s): 03 June 2008

Surveyors: W. Wilson Baker & Richard Carter

Historical note(s): W.W. Baker notes that Kay Kirkman has seen a *Schwalbea* site on F. Weatherby's property and wonders if this is perhaps the same one.

State/County: Georgia, Dougherty County

USGS quad name: Putney, GA

Site description: 1.2 airmile ESE jct. Gravel Hill Road and Nelms Road; burned winter 2008; Figures B24, B26 and F55.

GPS coordinates:
31.45778N 84.04217W

Aspect: flat
Slope: 0-3%
Light: open
Topo position: flat
Moisture regime: mesic

Population area: not applicable

Population size:
5 plants observed

Phenology: Plants in flower and immature fruit

Community: longleaf pine / wiregrass savanna

Dominant or characteristic species: *Pinus palustris*, *Aristida stricta*

Additional associates: *Tephrosia virginiana*, *Pteridium aquilinum*, *Rhus copallinum*, *Rhynchosia tomentosa*, *Rubus cuneifolius*, *Mimosa quadrivalvis*, *Euphorbia pubentissima*, *Piriqueta cistoides subsp. caroliniana*, *Pityopsis graminifolia*, *Eupatorium compositum*, *Yucca filamentosa*, *Rhynchospora grayi*, *Sporobolus junceus*

Ownership concerns: Frank Weatherby (owner). Discussion of the distribution and management of this species with the landowner has not taken place; therefore, these data should be treated as sensitive.

Disturbance: Quail management including fire-breaks, food plots, trails; heavily logged with considerable soil disturbance

Threats: Excessive quail management and logging

Management needs: Continue regular burning; avoid additional disturbance, especially mechanical soil disturbance when harvesting timber

Population status:
Quality – D
Condition – D
Viability – D
Defensibility – D
Overall EO Ranking – D (1.00)

Appendix B. Maps showing locations of *Schwalbea americana* Element Occurrences.

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Arcadia EO sites on Pine Park (GA) and Thomasville (GA) 7.5-min. USGS topos	Figure B1
Arcadia 01, 01a, 04, 04a and 05 EO sites on Pine Park (GA) 7.5-min. USGS topo	Figure B2
Arcadia 01, 01a, 03, 03a, 06, 07, 07a and 08 EO sites on Pine Park (GA) 7.5-min. USGS topo	Figure B3
Arcadia 02 and 09 EO sites on Pine Park (GA) and Thomasville (GA) 7.5-min. USGS topos	Figure B4
Doerun EO sites on Doerun (GA) 7.5-min. USGS topo	Figure B5
Doerun 01, 02 and 03 EO sites on Doerun (GA) 7.5-min. USGS topo	Figure B6
Freeman EO sites on Putney (GA) 7.5-min. USGS topo	Figure B7
Freeman 01, 01a, 01b, 01c and 01d EO sites on Putney (GA) 7.5-min. USGS topo	Figure B8
Jeffords EO sites on Tempy (GA) and Bridgeboro (GA) 7.5-min. USGS topos	Figure B9
Jeffords 01, 01a, 01b, 01c and 03 EO sites on Tempy (GA) 7.5-min. USGS topo	Figure B10
Jeffords 04 and 04a EO sites on Tempy (GA) 7.5-min. USGS topo	Figure B11
Jeffords 02, 05 and 05a EO sites on Tempy (GA) and Bridgeboro (GA) 7.5-min. USGS topos	Figure B12
Jeffords-Hancock EO site on Tempy (GA) 7.5-min. USGS topo	Figure B13
Jeffords-Hancock 01 EO site on Tempy (GA) 7.5-min. USGS topo	Figure B14
Nilo EO sites on Red Store Crossroads (GA) 7.5-min. USGS topo	Figure B15
Nilo 01 and 01a EO sites on Red Store Crossroads (GA) 7.5-min. USGS topo	Figure B16
Pinewood EO sites on Putney (GA) 7.5-min. USGS topo	Figure B17
Pinewood 01, 02 and 05 EO sites on Putney (GA) 7.5-min. USGS topo	Figure B18
Pinewood 03 and 03a EO sites on Putney (GA) 7.5-min. USGS topo	Figure B19
Pinewood 04 EO site on Putney (GA) 7.5-min. USGS topo	Figure B20
Pinewood 06 and 07 EO sites on Putney (GA) 7.5-min. USGS topo	Figure B21
Quail Ridge EO sites on Norman Park (GA) 7.5-min. USGS topo	Figure B22
Quail Ridge 01 and 01a EO sites on Norman Park (GA) 7.5-min. USGS topo	Figure B23
Weatherby EO sites on Putney (GA) 7.5-min. USGS topo	Figure B24
Weatherby 01 EO site on Putney (GA) 7.5-min. USGS topo	Figure B25
Weatherby 02 EO site on Putney (GA) 7.5-min. USGS topo	Figure B26

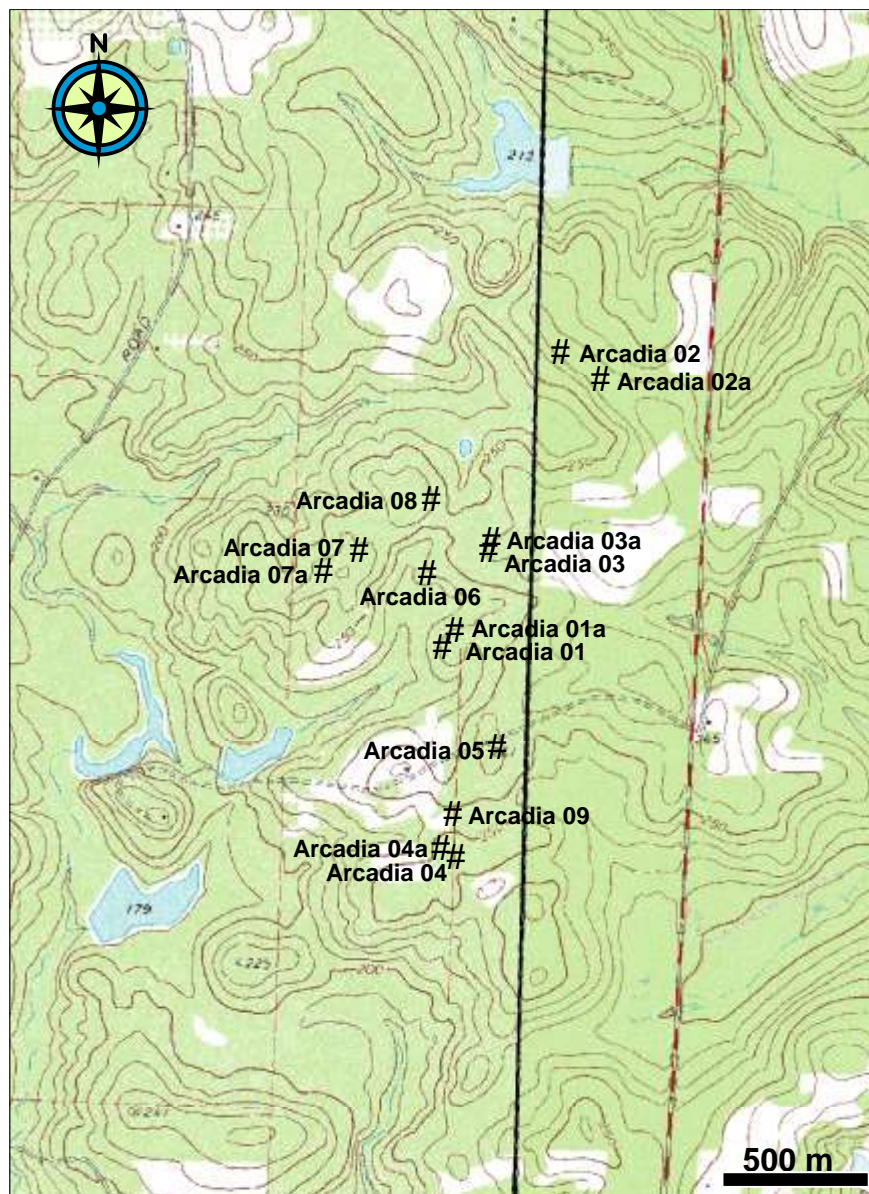


Figure B1. Location of Arcadia EO sites on Pine Park (GA) and Thomasville (GA) 7.5-min. U.S.G.S. topographic quadrangles.

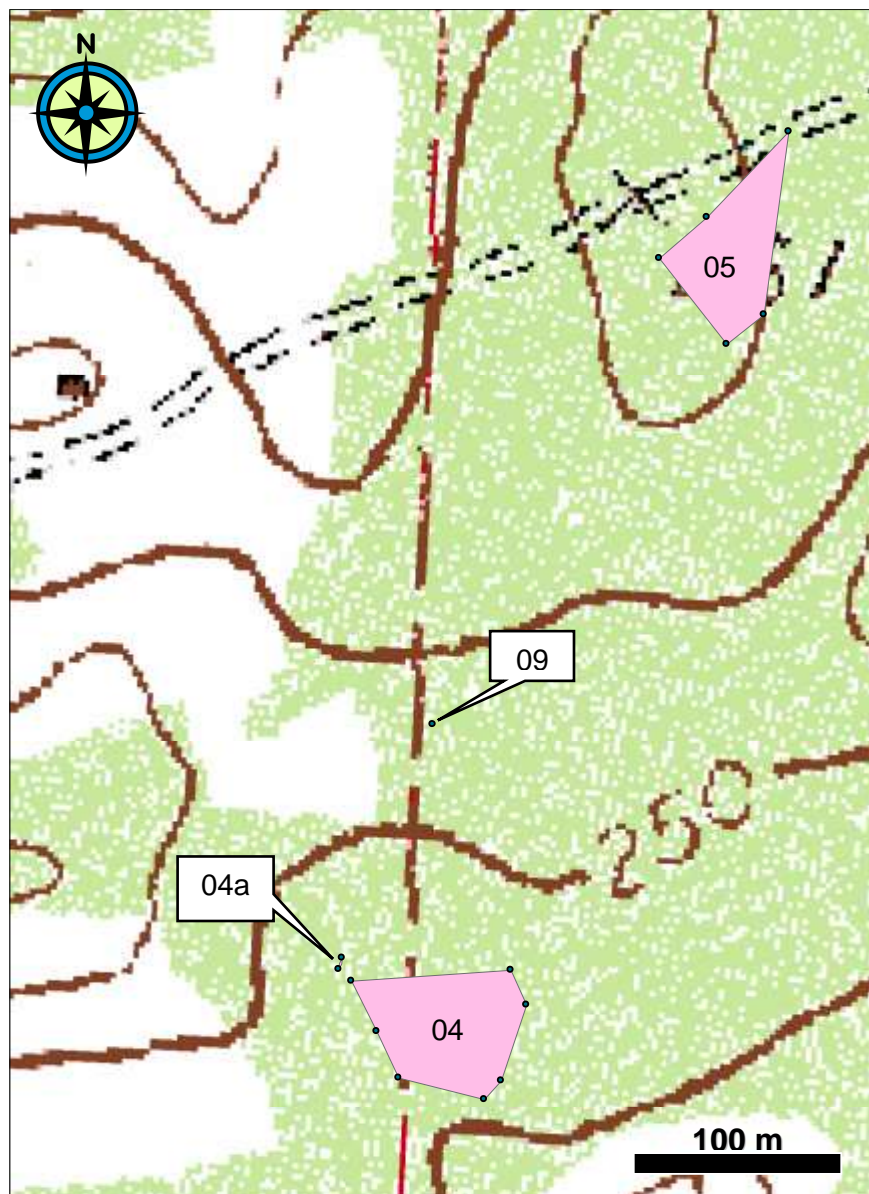


Figure B2. Location of Arcadia 04, 04a, 05 and 09 EO site polygons and point on Pine Park (GA) 7.5-min. U.S.G.S. topographic quadrangle.

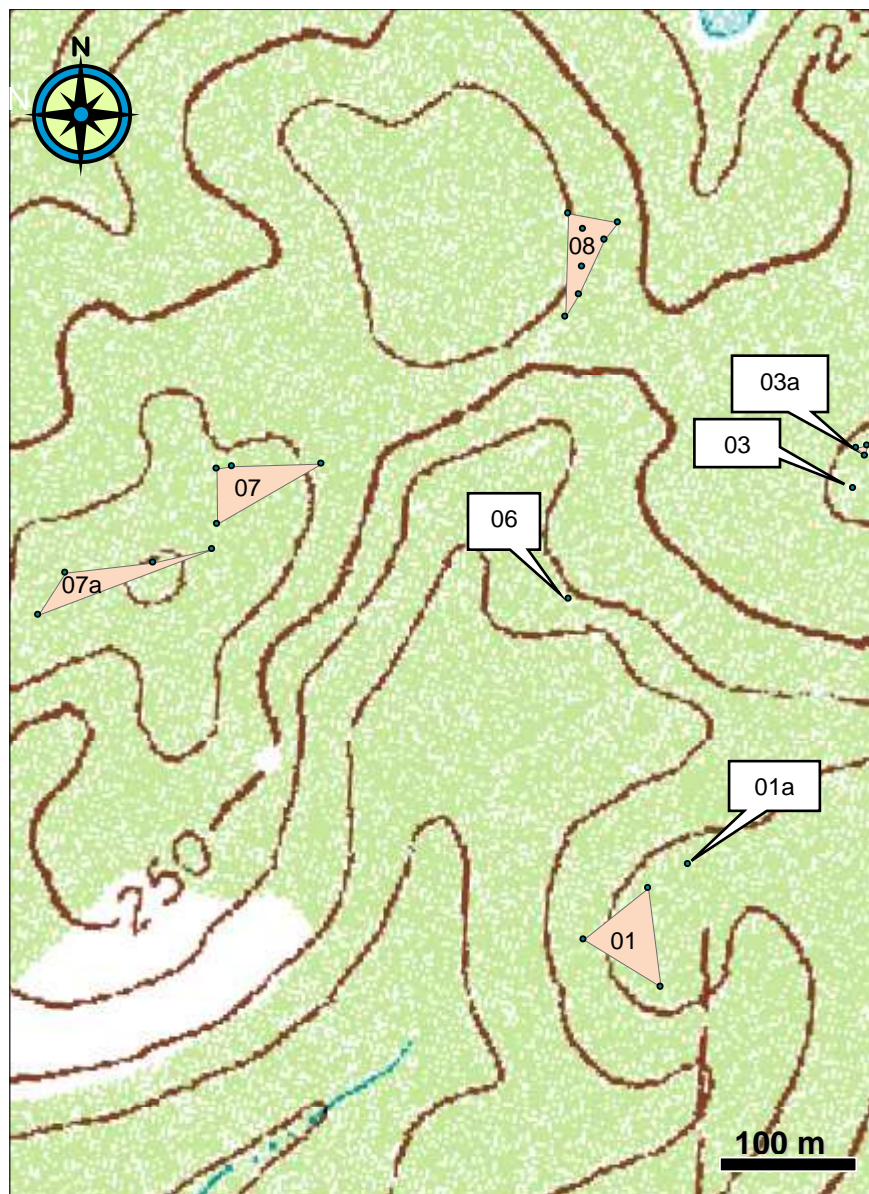


Figure B3. Location of Arcadia 01, 01a, 03, 03a, 06, 07, 07a and 08 EO site polygons and points on Pine Park (GA) 7.5-min. U.S.G.S. topographic quadrangle.

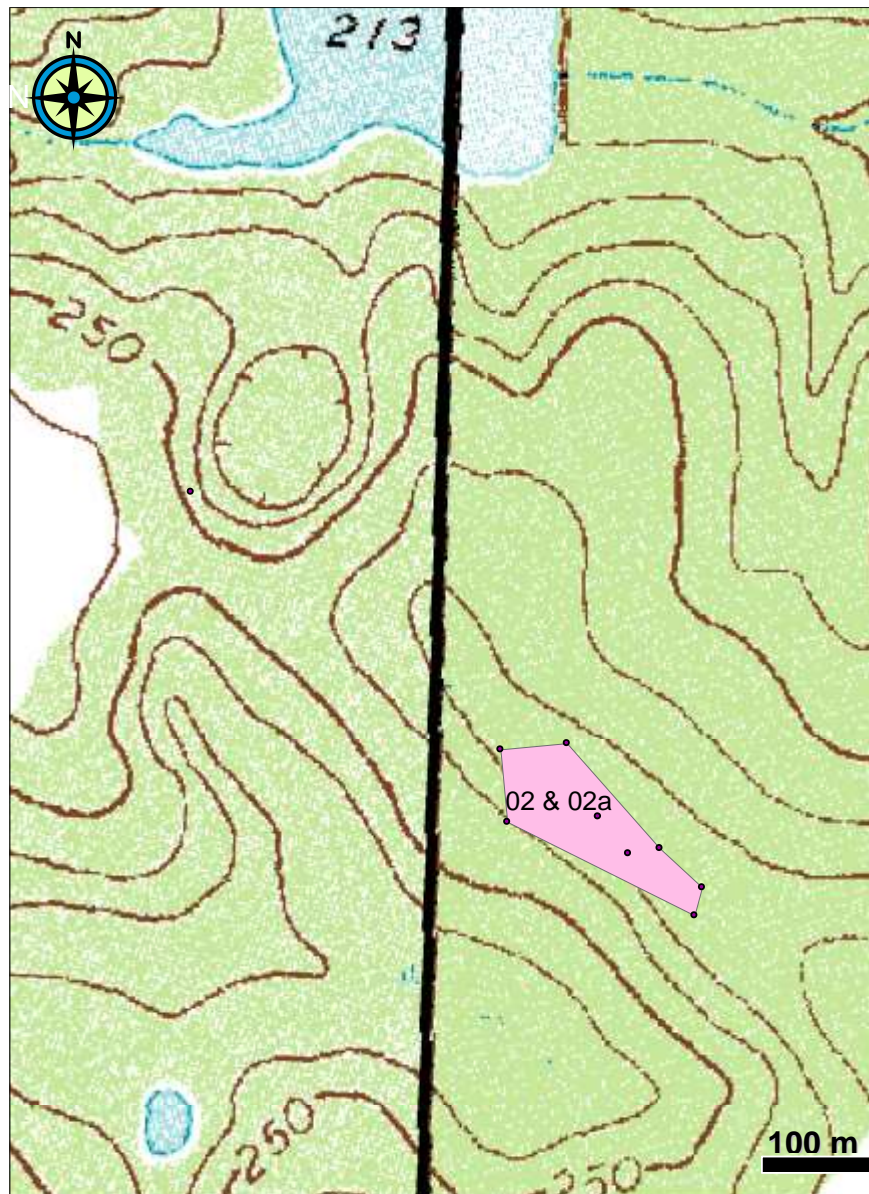


Figure B4. Location of Arcadia 02 and 02a EO site polygon on Pine Park (GA) and Thomasville (GA) 7.5-min. U.S.G.S. topographic quadrangles.

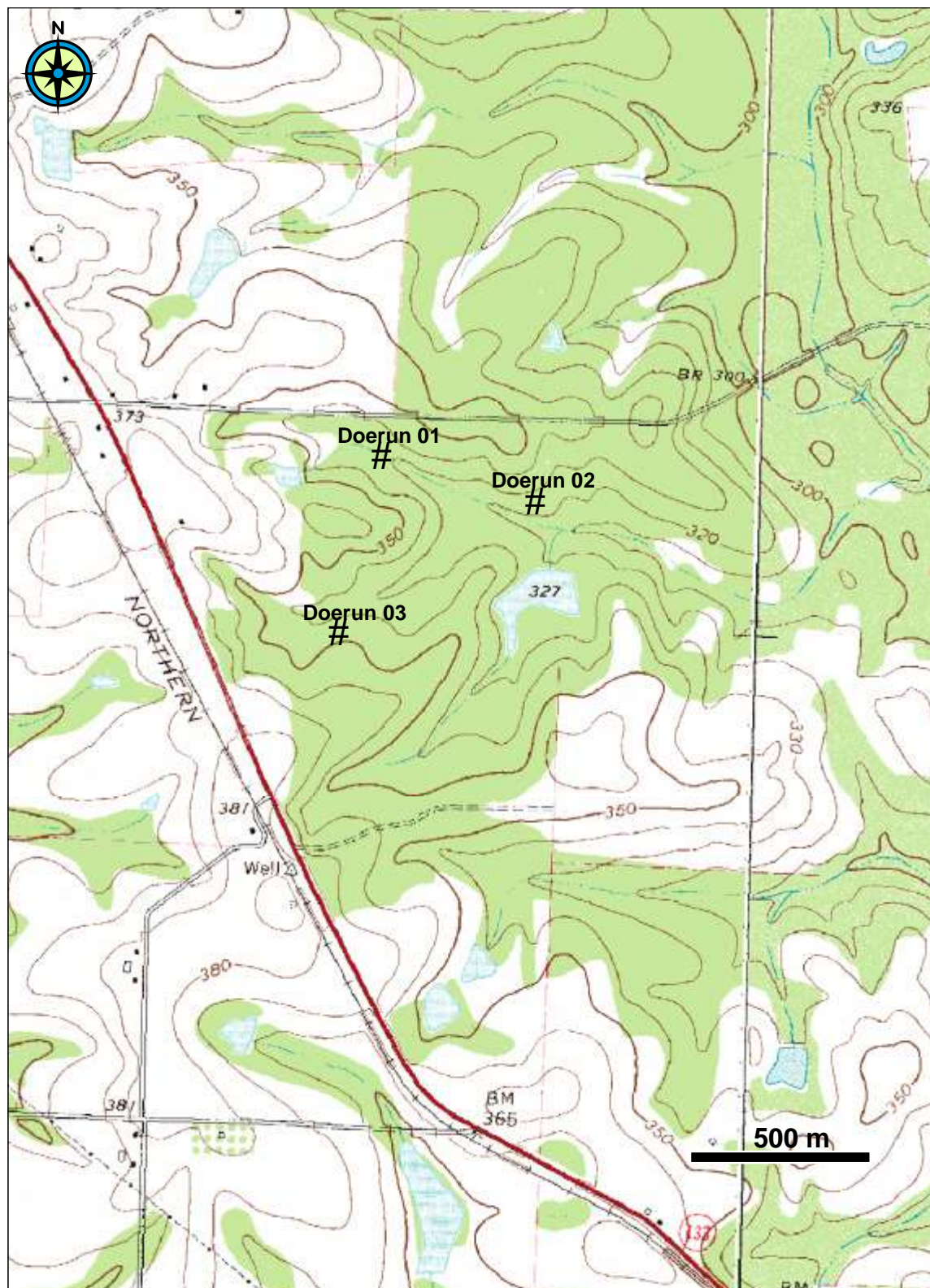


Figure B5. Location of Doerun EO sites on Doerun (GA) 7.5-min. U.S.G.S. topographic quadrangle.

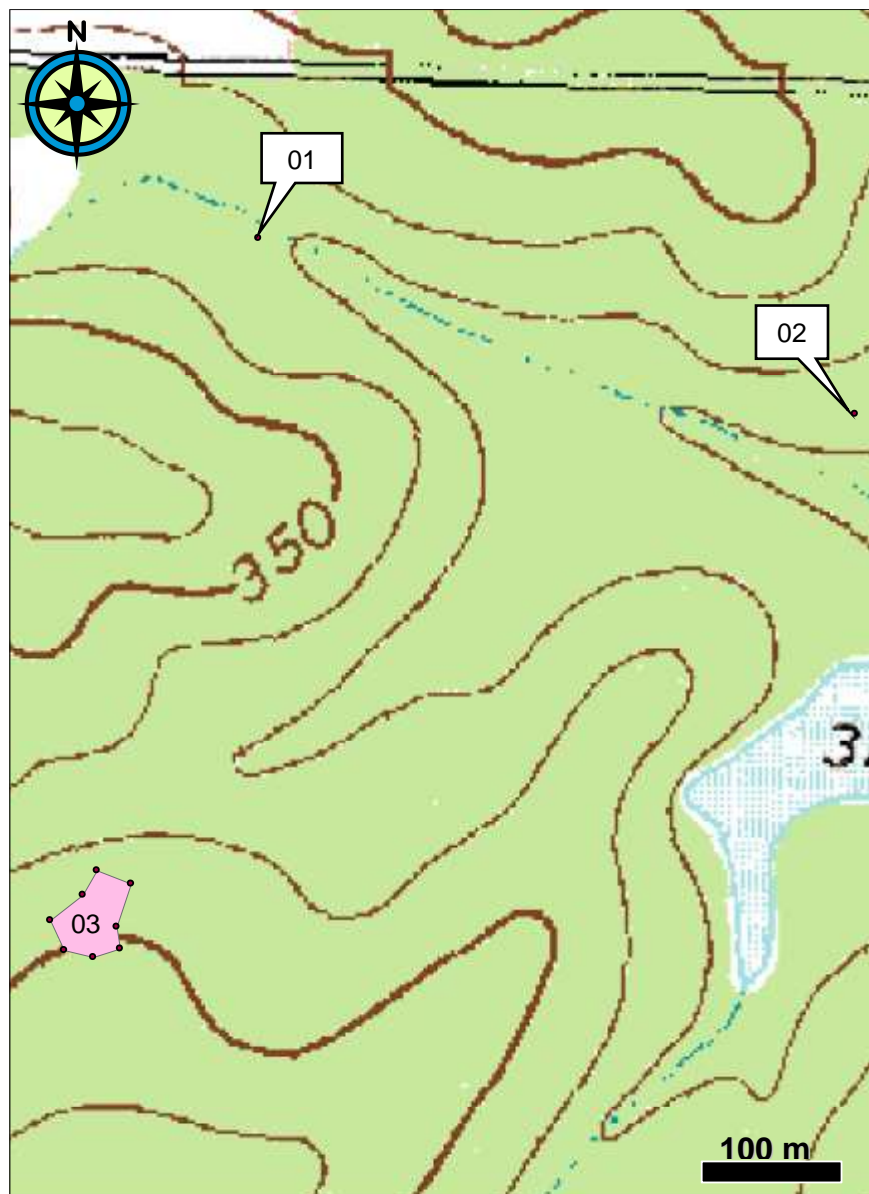


Figure B6. Location of Doerun 01, 02 and 03 EO site polygon and points on Doerun (GA) 7.5-min. U.S.G.S. topographic quadrangle.

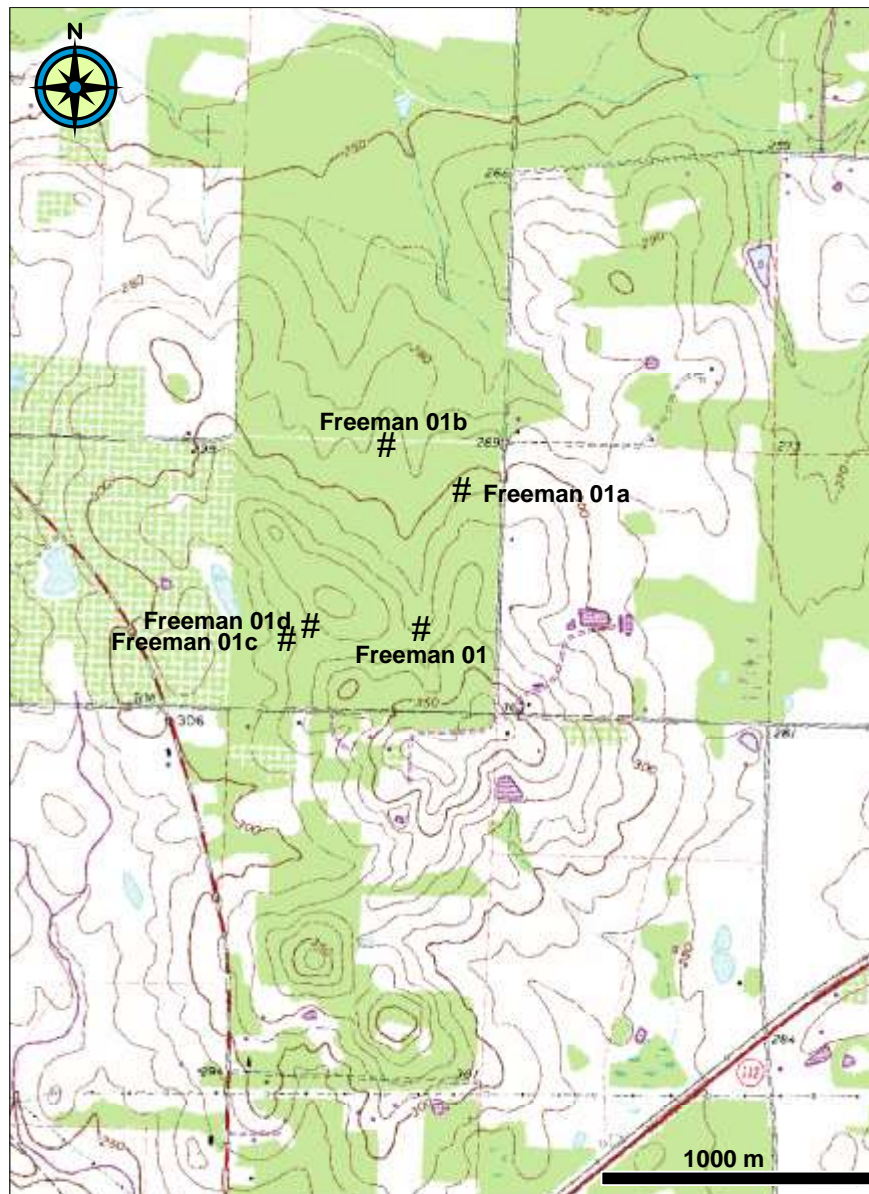


Figure B7. Location of Freeman EO sites on Putney (GA) 7.5-min. U.S.G.S. topographic quadrangle.

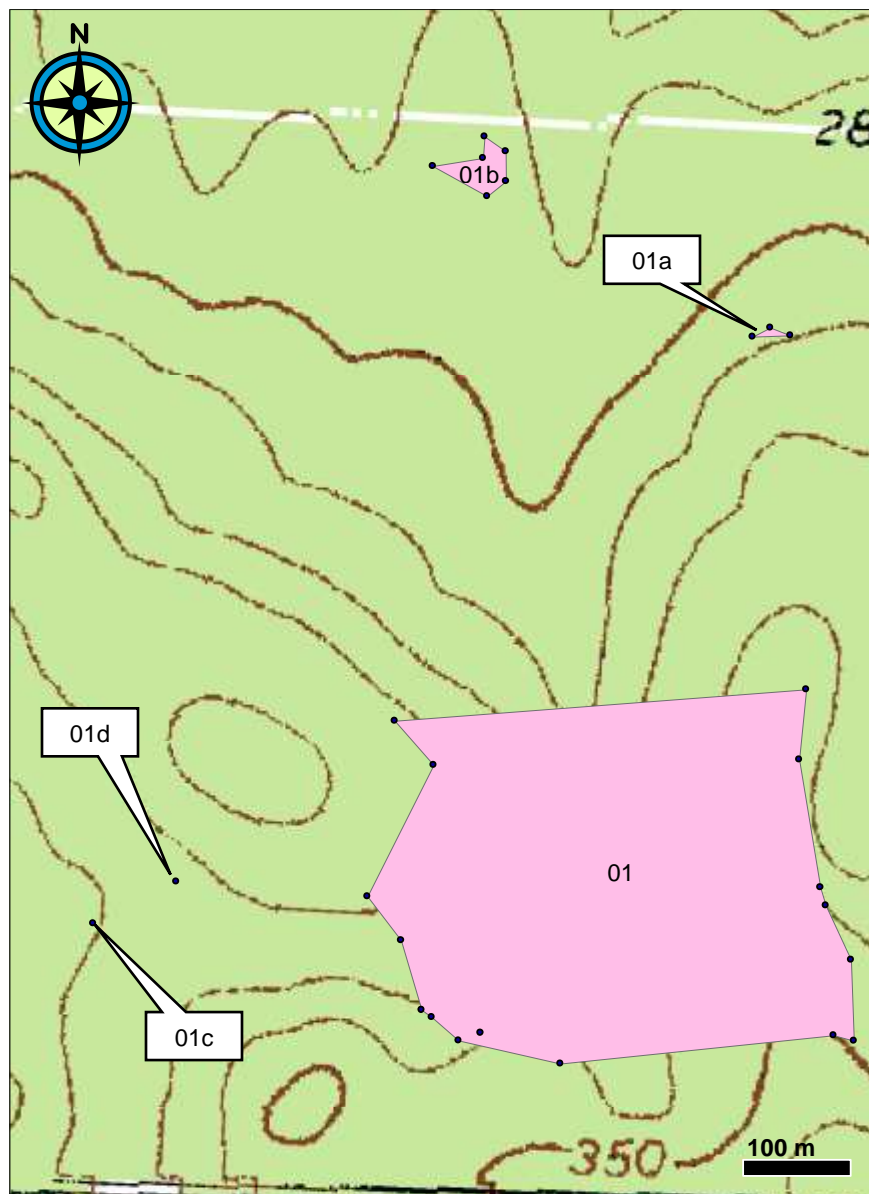


Figure B8. Location of Freeman 01, 01a, 01b, 01c and 01d EO site polygons and points on Putney (GA) 7.5-min. U.S.G.S. topographic quadrangle.

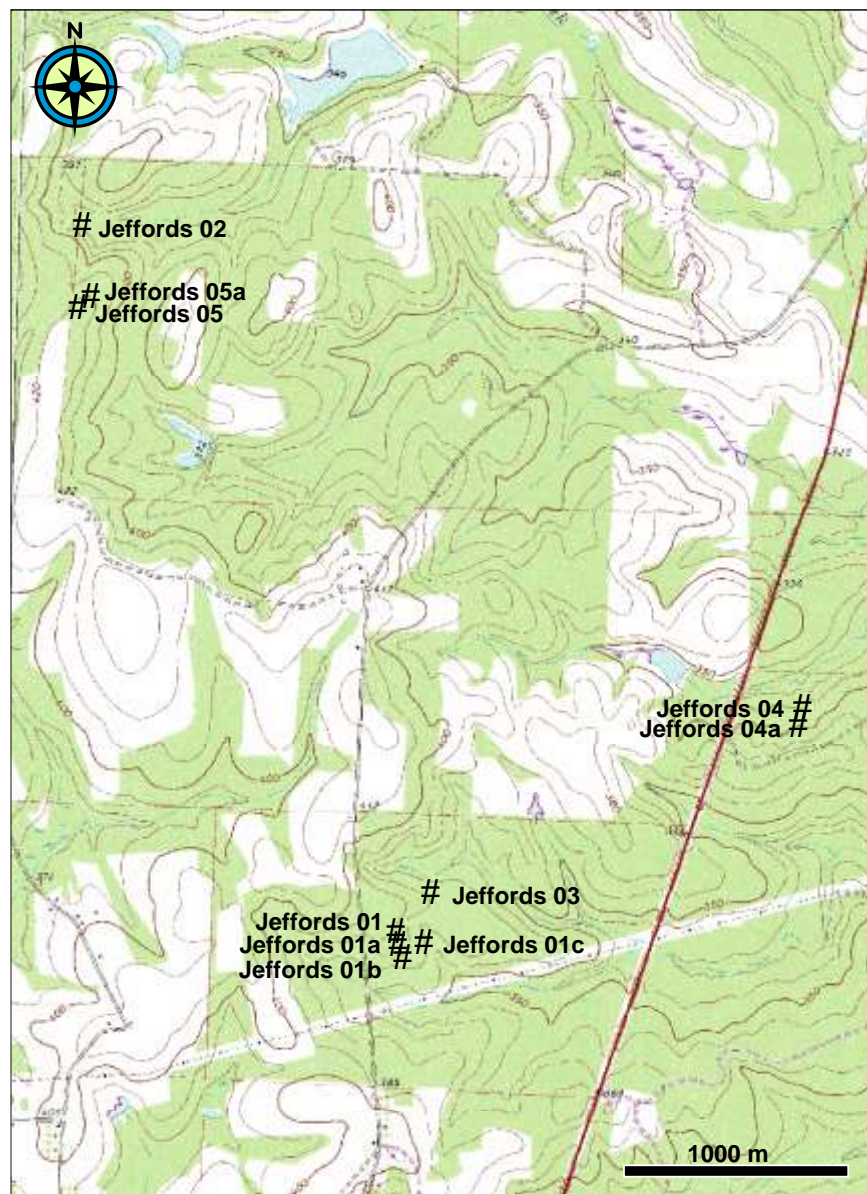


Figure B9. Location of Jeffords EO sites on Tempy (GA) and Bridgeboro (GA) 7.5-min. U.S.G.S. topographic quadrangles.

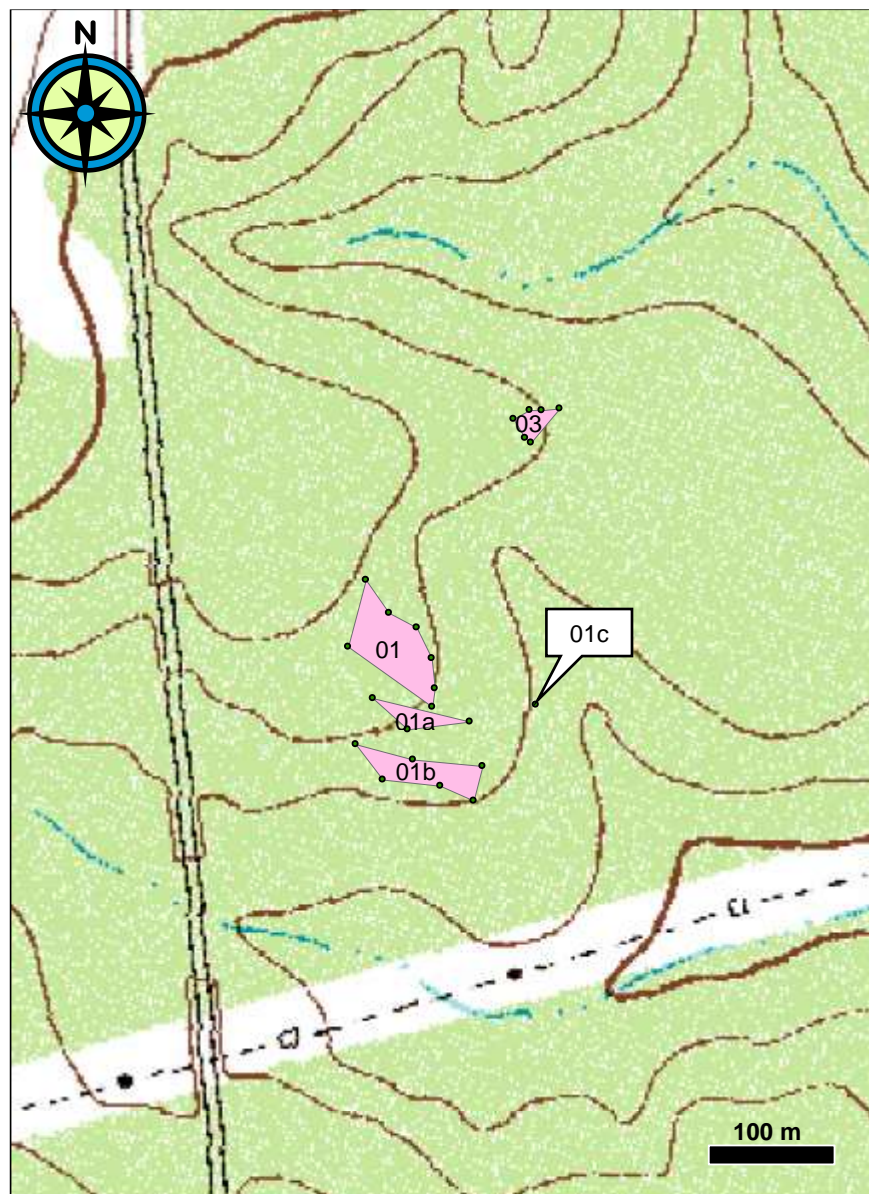


Figure B10. Location of Jeffords 01, 01a, 01b, 01c and 03 EO site polygons and point on Tempy (GA) 7.5-min. U.S.G.S. topographic quadrangle.



Figure B11. Location of Jeffords 04 and 04a EO site polygons on Tempy (GA) 7.5-min. U.S.G.S. topographic quadrangle.

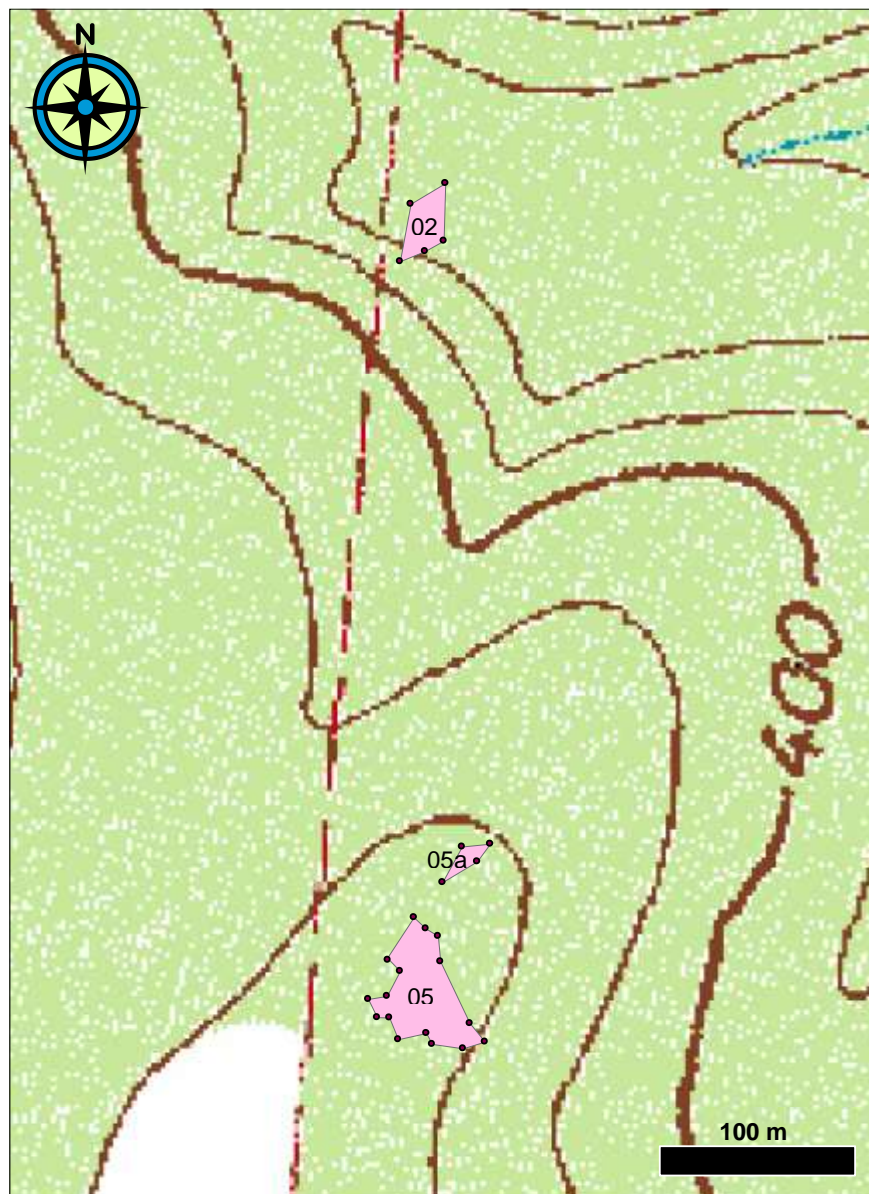


Figure B12. Location of Jeffords 02, 05 and 05a EO site polygons on Tempy (GA) and Bridgeboro (GA) 7.5-min. U.S.G.S. topographic quadrangles.

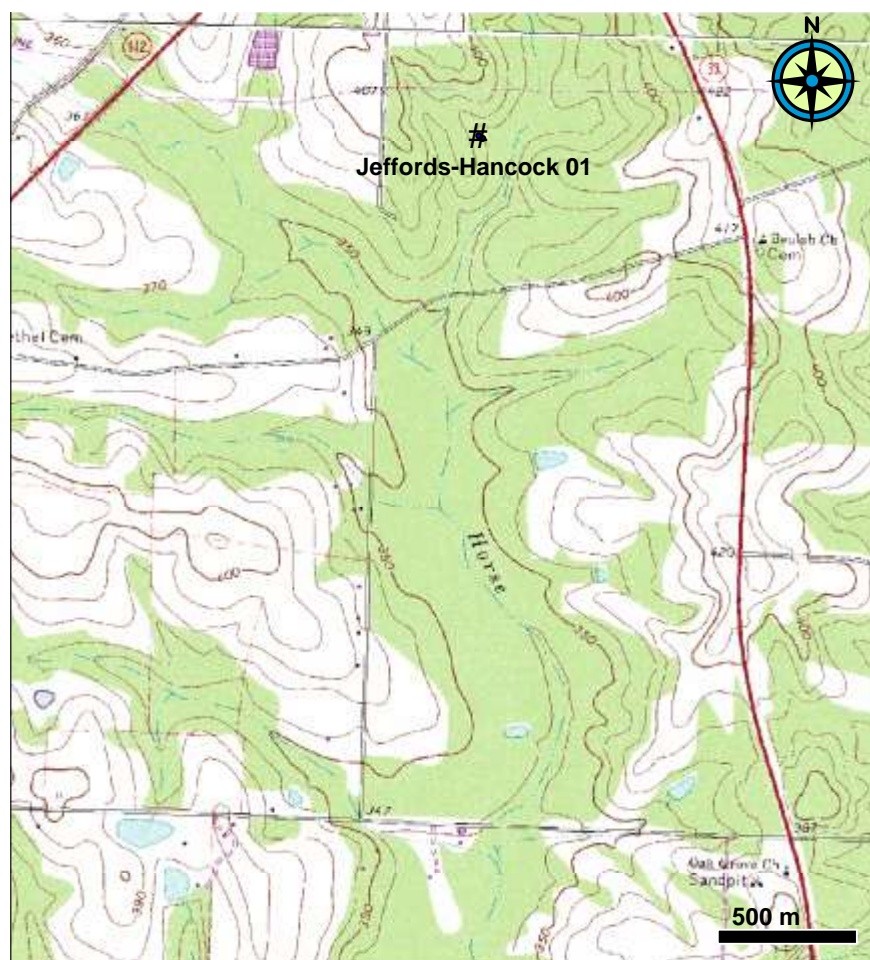


Figure B13. Location of Jeffords-Hancock EO site on Tempy (GA) 7.5-min. U.S.G.S. topographic quadrangle.

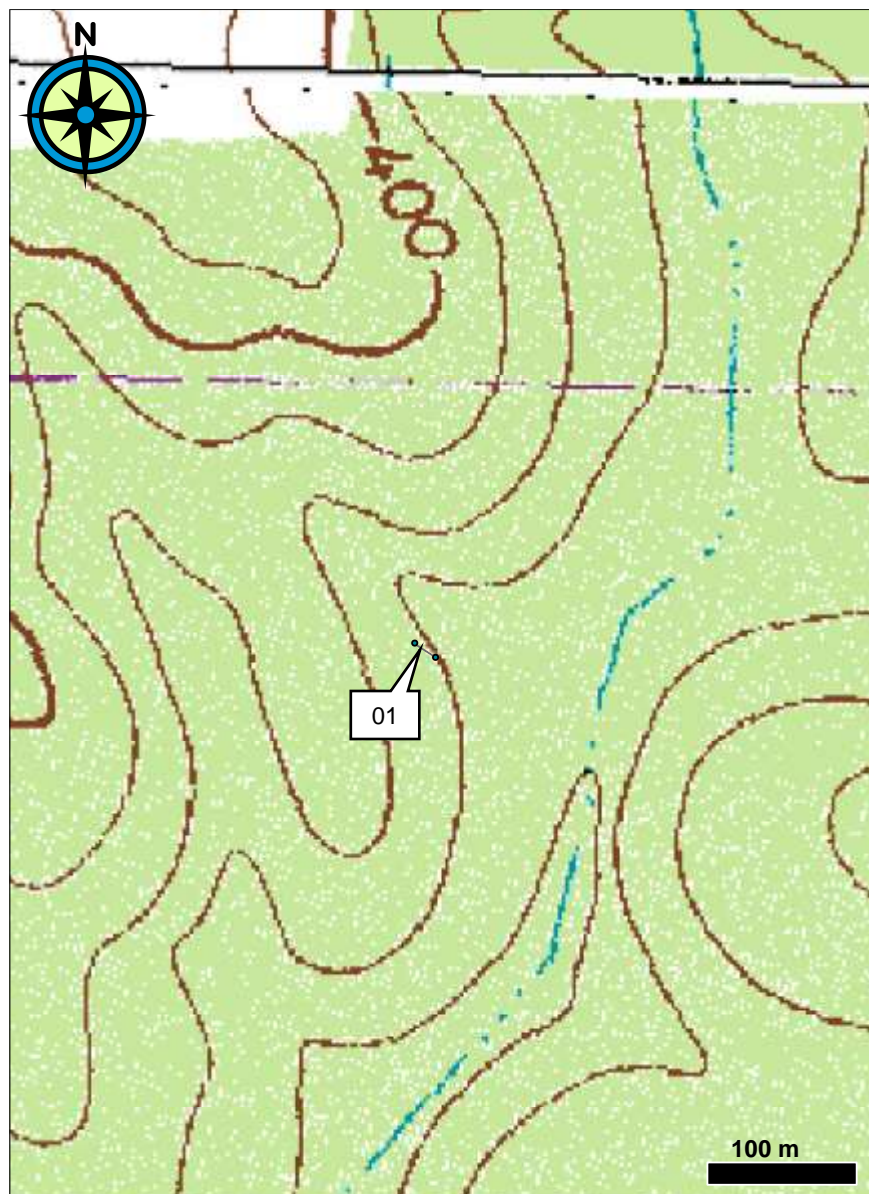


Figure B14. Location of Jeffords-Hancock 01 EO site polygon on Tempy (GA) 7.5-min. U.S.G.S. topographic quadrangle.

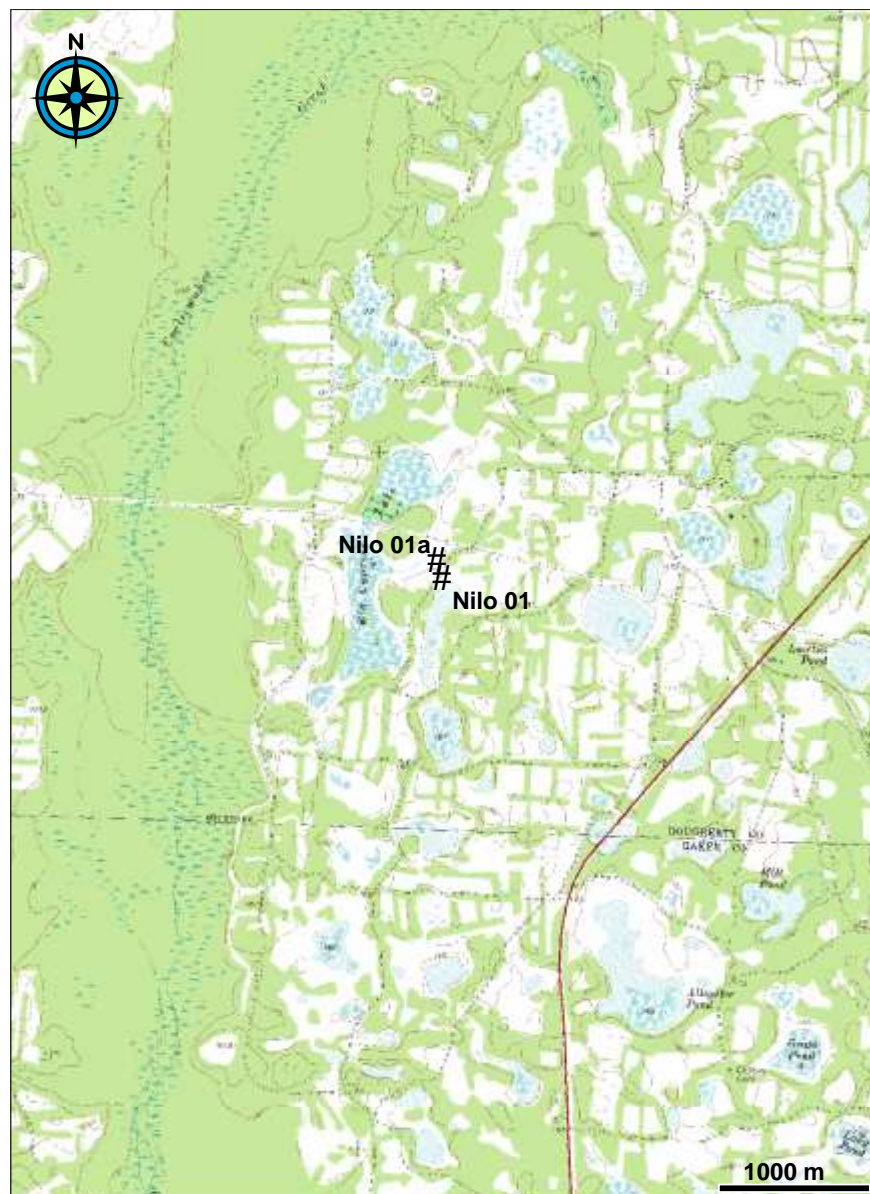


Figure B15. Location of Nilo EO sites on Red Store Crossroads (GA) 7.5-min. U.S.G.S. topographic quadrangle.

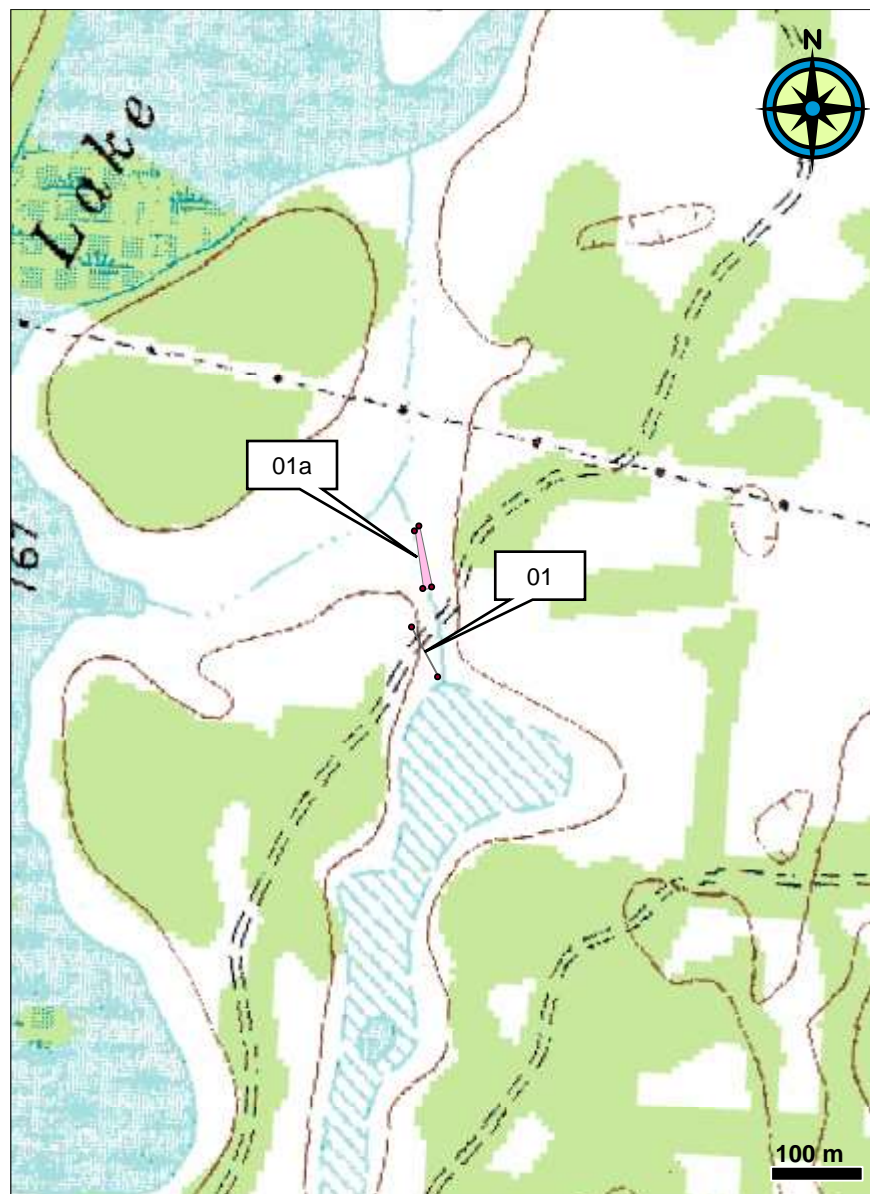


Figure B16. Location of Nilo 01 and 01a EO site polygons on Red Store Crossroads (GA) 7.5-min. U.S.G.S. topographic quadrangle.

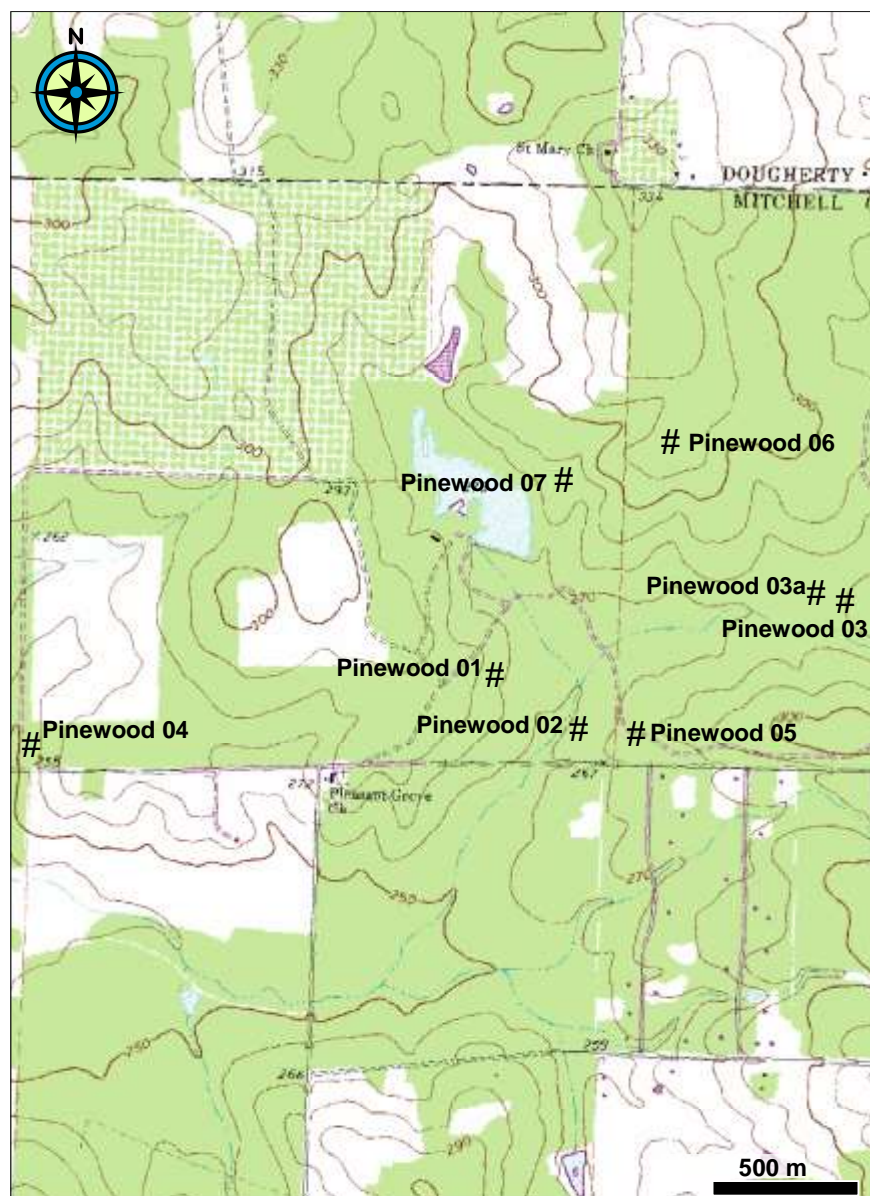


Figure B17. Location of Pinewood EO sites on Putney (GA) 7.5-min. U.S.G.S. topographic quadrangle.

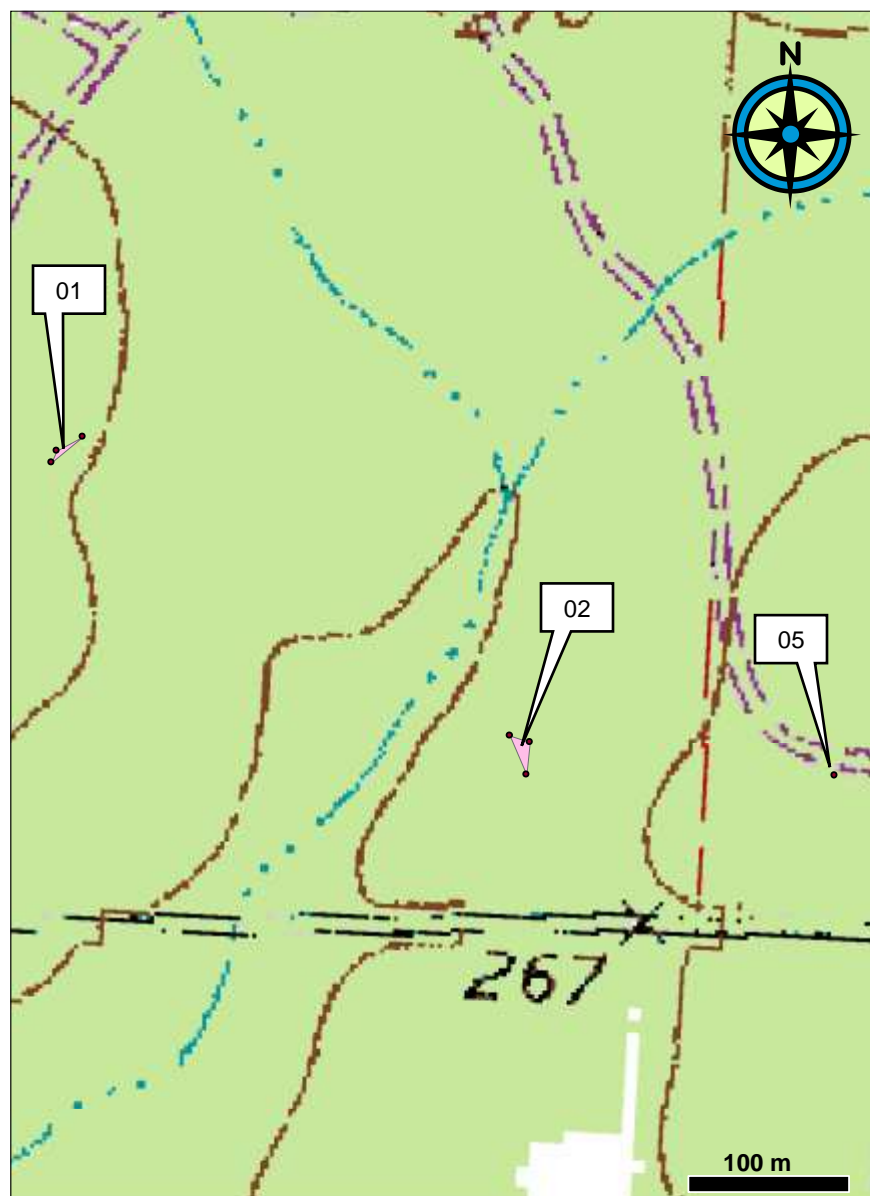


Figure B18. Location of Pinewood 01, 02 and 05 EO site polygons and point on Putney (GA) 7.5-min. U.S.G.S. topographic quadrangle.

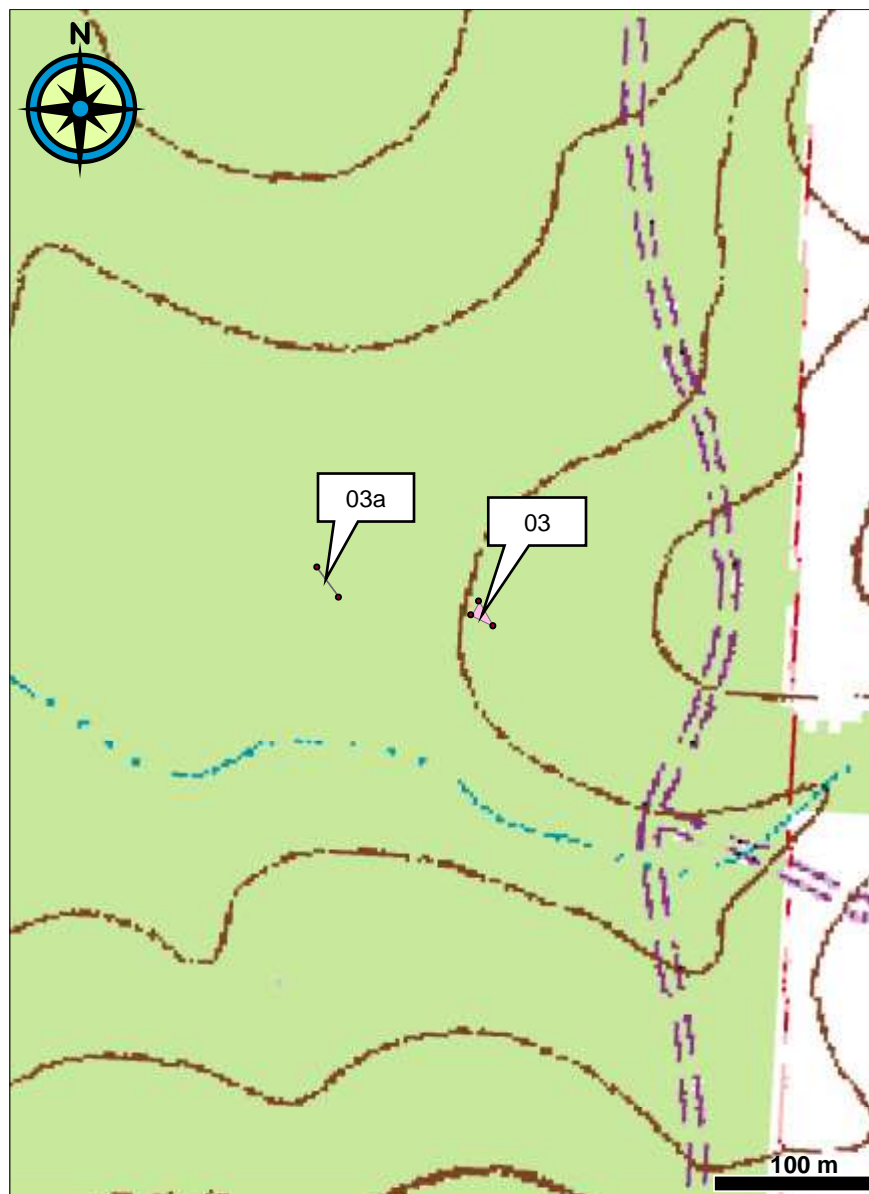


Figure B19. Location of Pinewood 03 and 03a EO site polygons on Putney (GA) 7.5-min. U.S.G.S. topographic quadrangle.

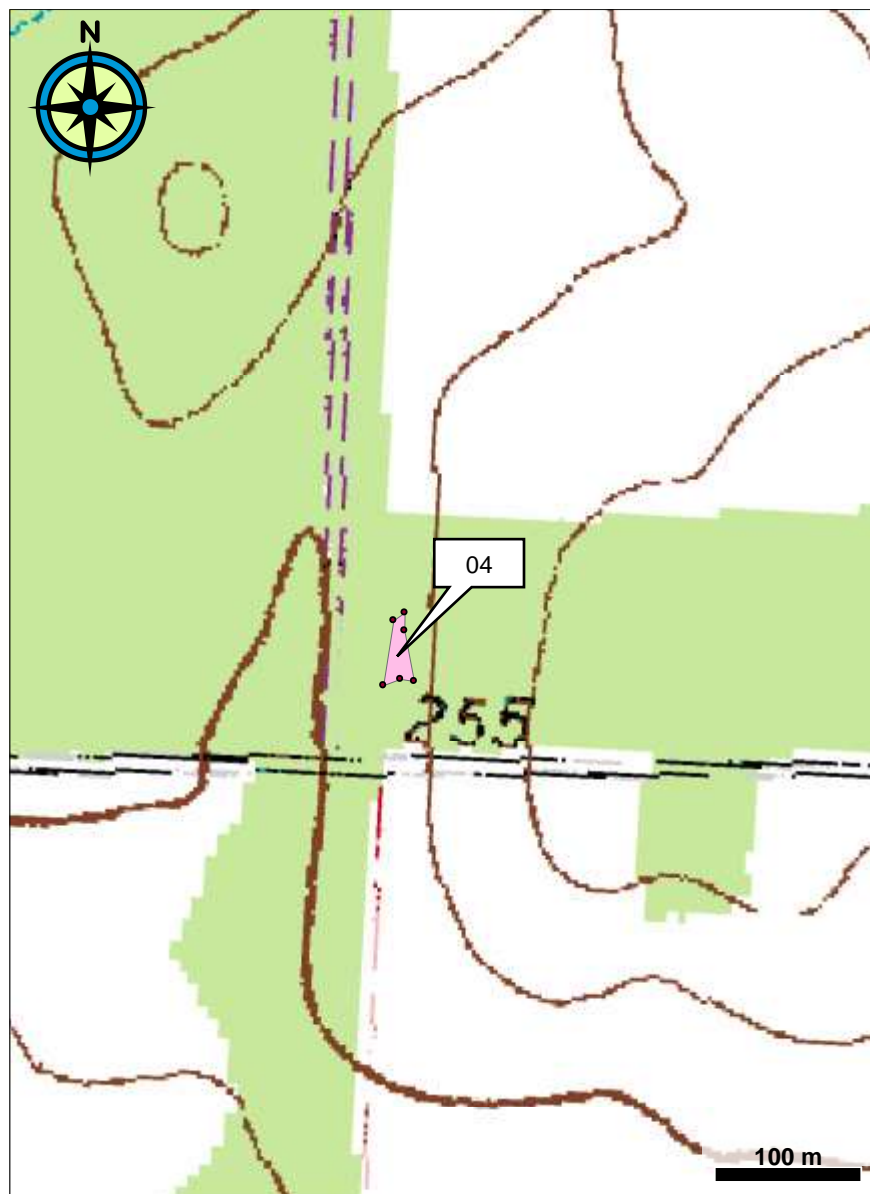


Figure B20. Location of Pinewood 04 EO site polygon on Putney (GA) 7.5-min. U.S.G.S. topographic quadrangle.

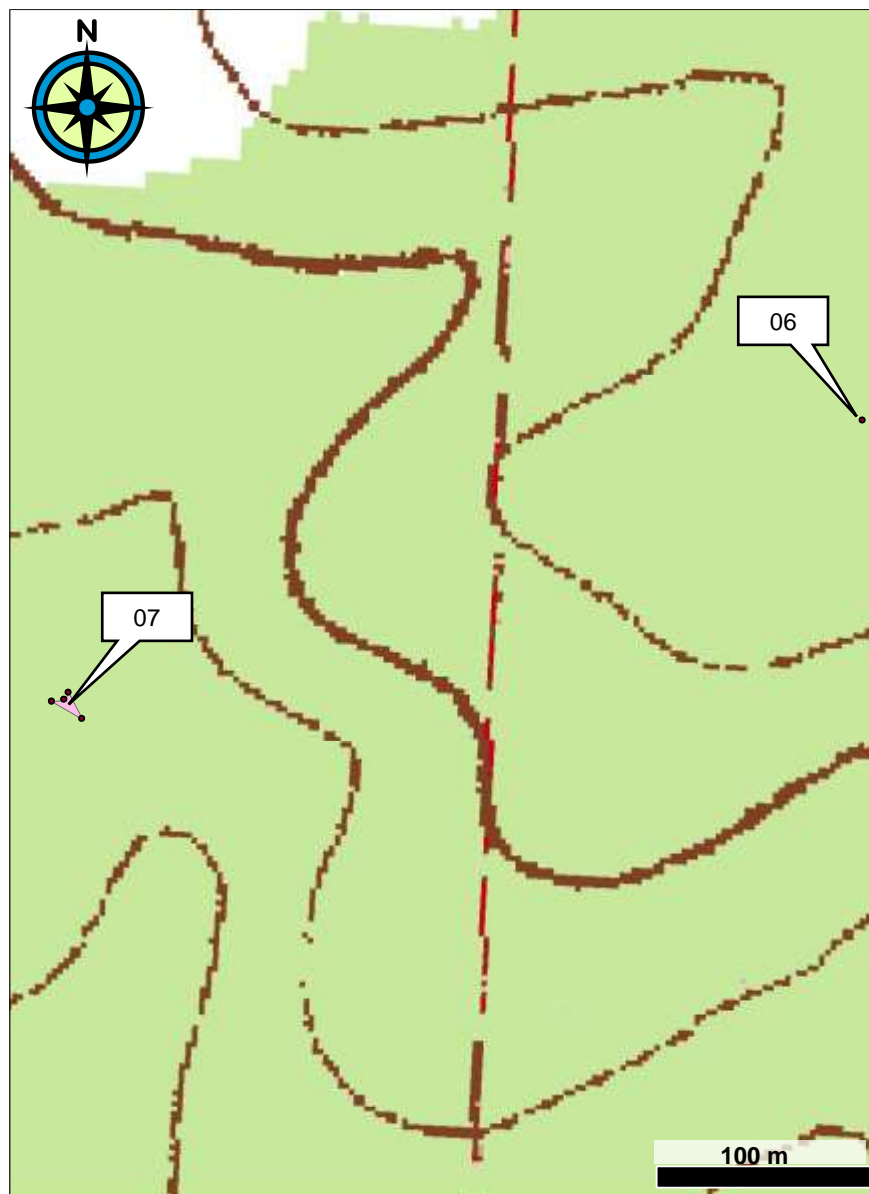


Figure B21. Location of Pinewood 06 and 07 EO site point and polygon on Putney (GA) 7.5-min. U.S.G.S. topographic quadrangle.

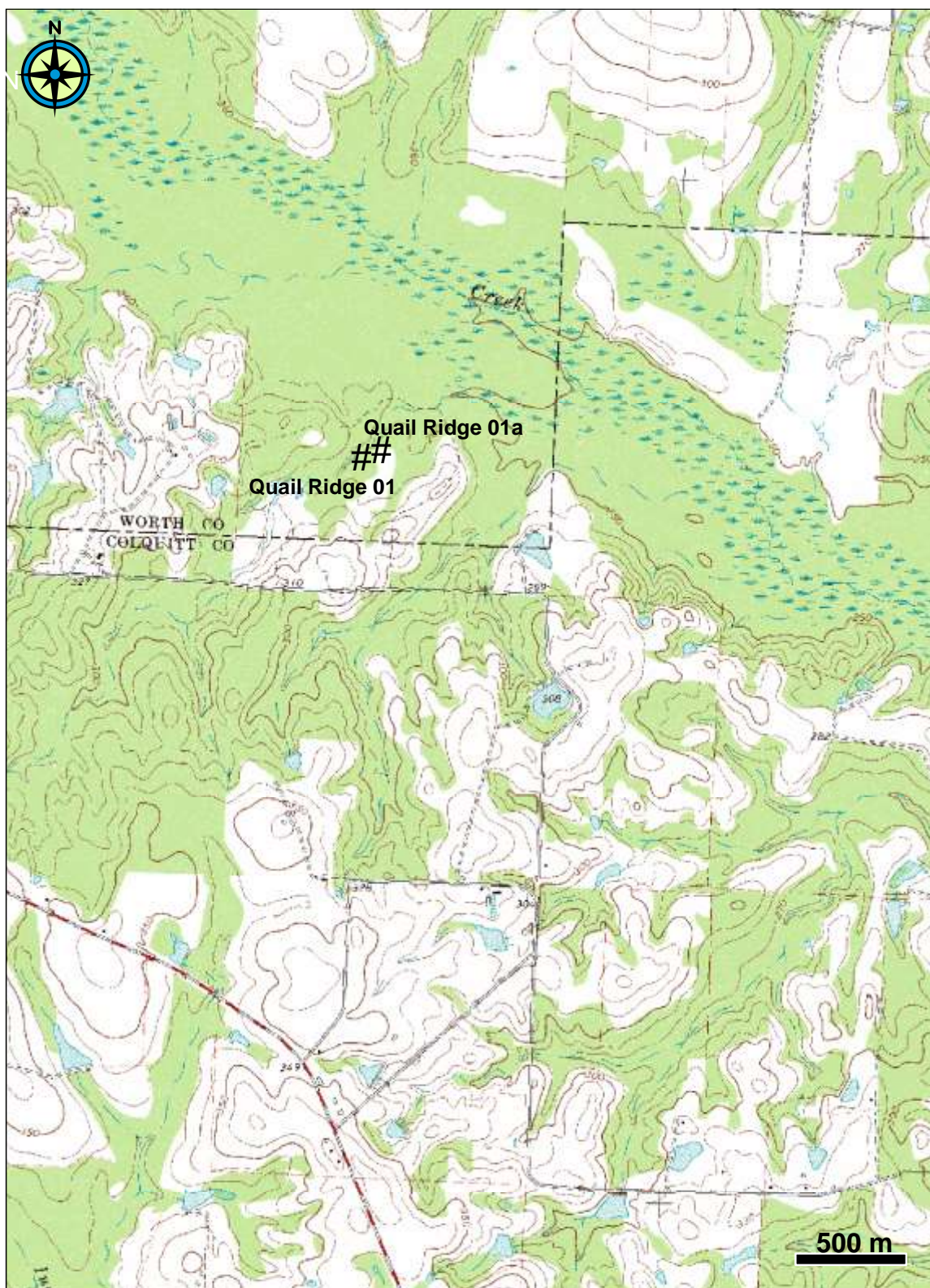


Figure B22. Location of Quail Ridge EO sites on Norman Park (GA) 7.5-min. U.S.G.S. topographic quadrangle.

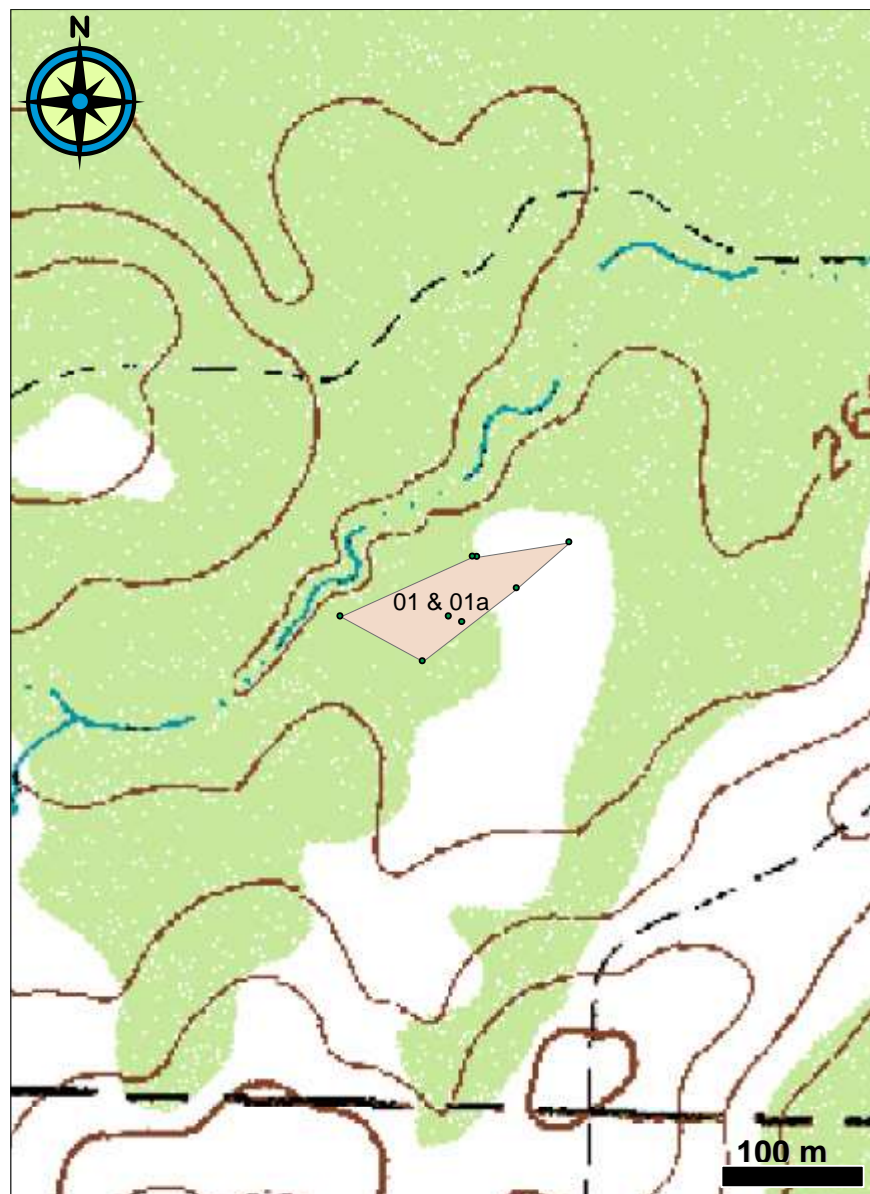


Figure B23. Location of Quail Ridge 01 and 01a EO site polygon on Norman Park (GA) 7.5-min. U.S.G.S. topographic quadrangle.

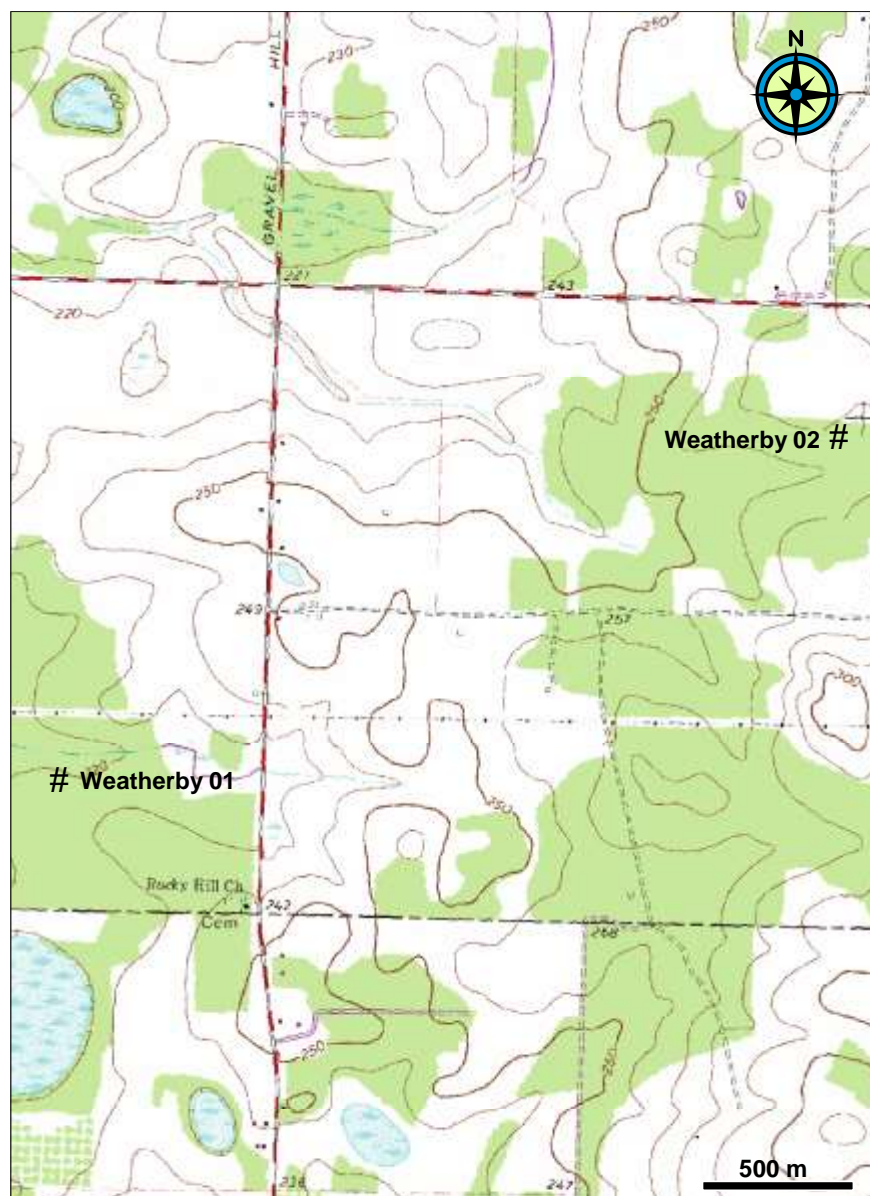


Figure B24. Location of Weatherby EO sites on Putney (GA) 7.5-min. U.S.G.S. topographic quadrangle.

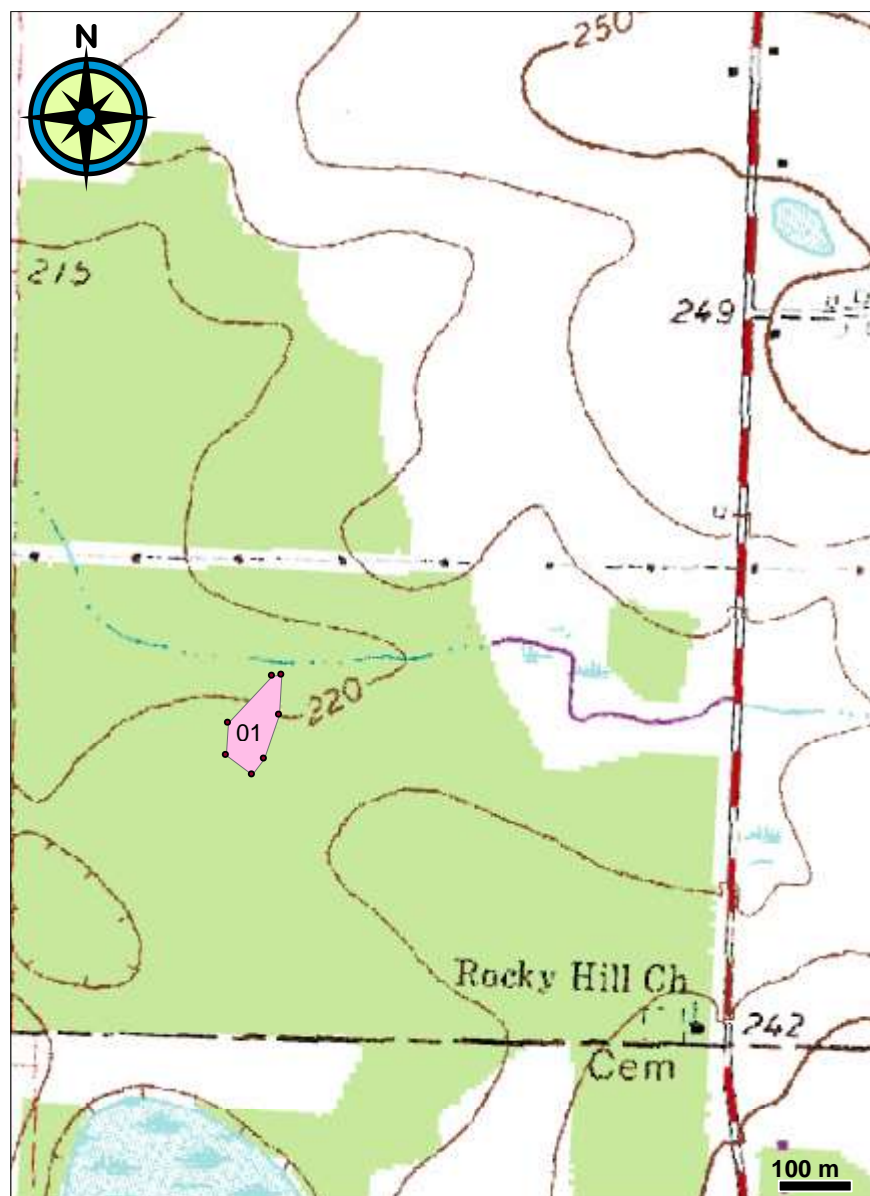


Figure B25. Location of Weatherby 01 EO site polygon on Putney (GA) 7.5-min. U.S.G.S. topographic quadrangle.

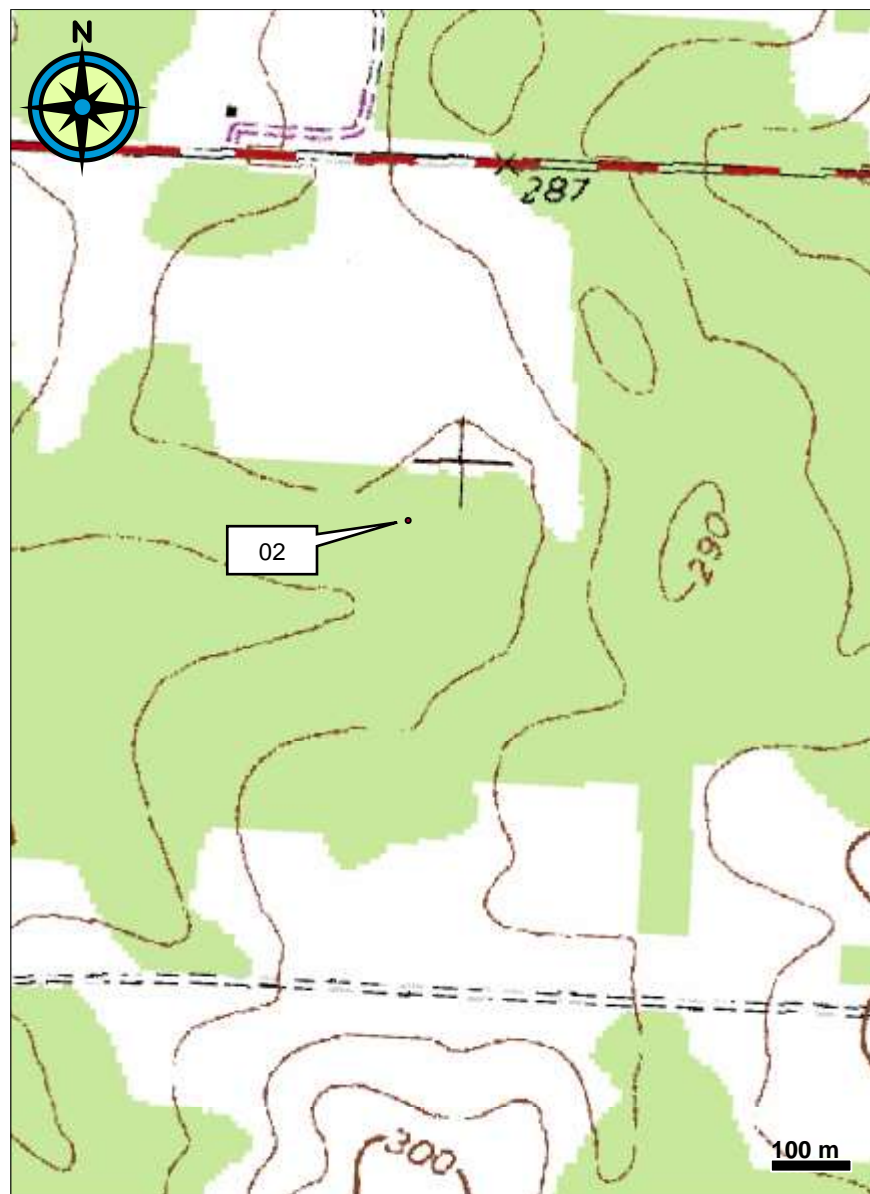


Figure B26. Location of Weatherby 02 EO site point on Putney (GA) 7.5-min. U.S.G.S. topographic quadrangle.

Appendix C. List of voucher specimens of *Schwalbea americana* prepared. Voucher specimens have been deposited at the Valdosta State University Herbarium (VSC).

***Schwalbea americana* L.**

U.S.A. GEORGIA

COLQUITT COUNTY

Doerun 03 EO – 2.62 airmiles SE Doerun town center, along east side of Hwy. GA 133, Doerun Pitcherplant Bog Natural Area; 31.29133°N 83.88712°W; recently burned longleaf / wiregrass savanna; plants locally common, post-mature, 23 October 2008, *R. Carter 18713 and W.W. Baker* (VSC).

DOUGHERTY COUNTY

Weatherby 01 EO – Frank Weatherby place, ca. 0.5 airmile NW of Rocky Hill Church, ca. 6.5 airmiles NW of Bridgeboro, ca. 0.4 airmile W of Gravel Hill Rd., ca. 0.1 airmile S of powerline; 31°26.818'N 84°04.162'W; flat with *P. palustris*, *P. taeda*, *Diospyros virginiana*, *Vaccinium stamineum*, *Rhus copallinus*, *Rubus cuneifolius*, *Aristida stricta*, *Pteridium aquilinum*, *Eupatorium jucundum*, *E. compositifolium*, *Euphorbia pubentissima*, *Dyschoriste oblongifolia*, *Ceanothus microphyllus*, *Psoralea canescens*, *Aster lineariifolius*, *A. adnatus*, *Asclepias tuberosa*, *Vernonia angustifolia*, *Schizachyrium tenerum*; site selectively timbered and partially interplanted with *P. elliotii*; plants locally common, 17 Jul 2007, *R. Carter 17742 and W.W. Baker* (VSC).

Nilo 01a EO – Nilo Plantation, W side of Hwy. GA 91, 1.06 airmiles WSW of headquarters, 0.13 airmile S of powerline; along ditched drain N of elongated intermittent pond; 31°27.100'N 84°17.228'W; degraded pine woods with *Pinus palustris*, *P. elliotii*, *Myrica cerifera*, *Diospyros virginiana*, *Ilex glabra*, *Leucothoe racemosa*, *Aristida stricta*; plants locally common; 07 Aug 2007, *R. Carter 17904 and W.W. Baker* (VSC).

THOMAS COUNTY

Arcadia 04 EO – SE of Thomasville, ca. 3 mi SE of jct. Hwy. US 319 and Metcalf Rd., along W side of Metcalf Rd.; 30°46.811'N 83°59.905'W; Arcadia Plantation; undulating longleaf pine / wiregrass savanna; plants locally common, parasitic on *Pityopsis graminifolia*; 14 Jun 2006, *R. Carter 16839 and W.W. Baker* (VSC).

WORTH COUNTY

Jeffords 05 EO – ca. 4.47 airmiles NNW of Anderson City, W of Old Hwy. GA 33, 31°25.810'N 83°52.315'W; Jeffords property, just NE of Long Field; gentle slope, W of ridge, sandy soil, with *Pinus palustris*, *Aristida stricta*, *Tephrosia virginiana*, *Quercus pumilus*, *Baptisia lanceolata*, *B. albescens*, *Galactia erecta*, *Stylodon carneus*, *Sisyrinchium nashii*, *Dyschoriste oblongifolia*, *Stillingia sylvatica*, *Toxicodendron pubescens*, *Licania michauxii*; plants locally abundant, viscid, apparently parasitic on *A. stricta*; 01 Aug 2007, *R. Carter 17882 and W.W. Baker* (VSC).

Quail Ridge 01 EO – Quail Ridge Plantation, John Norman property, along north side of Moyer Rd.; 31.32242°N 83.72241°W; recently burned longleaf pine / wiregrass savanna, open savanna along south side of drain into Warrior Creek; plants locally common, mostly along ecotone between longleaf pine / wiregrass upland and pitcherplant bog; 03 Jun 2008, *R. Carter 18393 and W.W. Baker* (VSC).

Appendix D. List of digital photographs of *Schwalbea americana* and habitat. Image files have been deposited at the headquarters of the Georgia Department of Natural Resources, Natural Heritage Program, Social Circle, Georgia. All photographs cited below were taken by Richard Carter and should be cited thusly.

Name	Type	Date taken	Size	Camera m...	Authors	Title	Comments
P6140001	TIFF Image	6/14/2006 1:22 AM	15,137 KB	OLY C5050Z	Richard Carter	flowers	Arcadia 04 - fresh burn
P6140002	TIFF Image	6/14/2006 1:23 AM	17,671 KB	OLY C5050Z	Richard Carter	habit, plant in flr	Arcadia 04 - fresh burn
P6140004	TIFF Image	6/14/2006 1:26 AM	15,035 KB	OLY C5050Z	Richard Carter	flowers	Arcadia 04 - fresh burn
P6140007	TIFF Image	6/14/2006 1:28 AM	18,112 KB	OLY C5050Z	Richard Carter	habitat	Arcadia 04 - fresh burn
P6140008	TIFF Image	6/14/2006 1:28 AM	18,519 KB	OLY C5050Z	Richard Carter	habit	Arcadia 04 - fresh burn
P6140009	TIFF Image	6/14/2006 1:43 AM	18,335 KB	OLY C5050Z	Richard Carter	habit	Arcadia 04 - fresh burn
P6140010	TIFF Image	6/14/2006 1:44 AM	18,318 KB	OLY C5050Z	Richard Carter	habit	Arcadia 04 - fresh burn
P6140012	TIFF Image	6/14/2006 1:45 AM	17,417 KB	OLY C5050Z	Richard Carter	habitat	Arcadia 04 - fresh burn
P6140013	TIFF Image	6/14/2006 1:45 AM	18,641 KB	OLY C5050Z	Richard Carter	habit	Arcadia 04 - fresh burn
P6140014	TIFF Image	6/14/2006 2:15 AM	15,053 KB	OLY C5050Z	Richard Carter	fruiting calyx	Arcadia 04 - fresh burn
P6140016	TIFF Image	6/14/2006 2:16 AM	14,778 KB	OLY C5050Z	Richard Carter	fruiting calyx	Arcadia 04 - fresh burn
P6140018	TIFF Image	6/14/2006 2:17 AM	18,146 KB	OLY C5050Z	Richard Carter	habit	Arcadia 04 - fresh burn
DSC_00521	JPEG Image	8/1/2007 3:22 PM	3,799 KB	NIKON D200	Richard Carter	inflorescence	Jeffords 05 - fresh burn
DSC_00531	JPEG Image	8/1/2007 3:23 PM	4,378 KB	NIKON D200	Richard Carter	habit	Jeffords 05 - fresh burn
DSC_00541	JPEG Image	8/1/2007 3:23 PM	4,704 KB	NIKON D200	Richard Carter	habit	Jeffords 05 - fresh burn
DSC_00551	JPEG Image	8/1/2007 3:24 PM	3,541 KB	NIKON D200	Richard Carter	inflorescence	Jeffords 05 - fresh burn
DSC_00561	JPEG Image	8/1/2007 3:24 PM	3,427 KB	NIKON D200	Richard Carter	inflorescence	Jeffords 05 - fresh burn
DSC_00641	JPEG Image	8/1/2007 3:27 PM	3,056 KB	NIKON D200	Richard Carter	flowers	Jeffords 05 - fresh burn
DSC_00661	JPEG Image	8/1/2007 3:27 PM	3,089 KB	NIKON D200	Richard Carter	flowers	Jeffords 05 - fresh burn
DSC_00721	JPEG Image	8/1/2007 3:34 PM	7,302 KB	NIKON D200	Richard Carter	habitat	Jeffords 05 - fresh burn
DSC_00731	JPEG Image	8/1/2007 3:34 PM	6,841 KB	NIKON D200	Richard Carter	habitat	Jeffords 05 - fresh burn
DSC_00751	JPEG Image	8/1/2007 3:36 PM	7,056 KB	NIKON D200	Richard Carter	habitat	Jeffords 05 - fresh burn
DSC_00761	JPEG Image	8/1/2007 3:37 PM	6,765 KB	NIKON D200	Richard Carter	habitat	Jeffords 05 - fresh burn
DSC_00791	JPEG Image	8/1/2007 3:38 PM	6,964 KB	NIKON D200	Richard Carter	habitat	Jeffords 05 - fresh burn
DSC_00801	JPEG Image	8/1/2007 3:39 PM	5,572 KB	NIKON D200	Richard Carter	habitat	Jeffords 05 - fresh burn
DSC_00821	JPEG Image	8/1/2007 3:39 PM	6,344 KB	NIKON D200	Richard Carter	habit	Jeffords 05 - fresh burn
DSC_00861	JPEG Image	8/1/2007 3:41 PM	6,910 KB	NIKON D200	Richard Carter	habitat	Jeffords 05 - fresh burn
DSC_00921	JPEG Image	8/1/2007 3:43 PM	7,337 KB	NIKON D200	Richard Carter	habitat	Jeffords 05 - fresh burn
DSC_00931	JPEG Image	8/1/2007 3:44 PM	6,948 KB	NIKON D200	Richard Carter	habitat	Jeffords 05 - fresh burn
DSC_0216	JPEG Image	9/26/2007 2:42 PM	3,033 KB	NIKON D200	Richard Carter	fr calyx, post mature	Jeffords 01
DSC_0217	JPEG Image	9/26/2007 2:42 PM	3,085 KB	NIKON D200	Richard Carter	fr calyx, post mature	Jeffords 01
DSC_0221	JPEG Image	9/26/2007 2:44 PM	4,553 KB	NIKON D200	Richard Carter	habit, post mature	Jeffords 01
DSC_0231	JPEG Image	9/26/2007 2:50 PM	5,823 KB	NIKON D200	Richard Carter	habit, post mature	Jeffords 01
DSC_0019	JPEG Image	6/20/2008 9:12 AM	7,296 KB	NIKON D200	Richard Carter	plot	Quail Ridge 01
DSC_0020	JPEG Image	6/20/2008 9:12 AM	5,208 KB	NIKON D200	Richard Carter	plot, habit	Quail Ridge 01
DSC_0021	JPEG Image	6/20/2008 9:12 AM	5,160 KB	NIKON D200	Richard Carter	plot, habit	Quail Ridge 01
DSC_0022	JPEG Image	6/20/2008 9:12 AM	4,222 KB	NIKON D200	Richard Carter	plot, habit	Quail Ridge 01
DSC_0001	JPEG Image	7/9/2008 9:48 AM	7,396 KB	NIKON D200	Richard Carter	habitat, plot	Freeman - fresh burn
DSC_0002	JPEG Image	7/9/2008 9:49 AM	7,194 KB	NIKON D200	Richard Carter	plot, W Baker	Freeman - fresh burn
DSC_0004	JPEG Image	7/9/2008 9:49 AM	6,750 KB	NIKON D200	Richard Carter	plot, W Baker	Freeman - fresh burn
DSC_0054	JPEG Image	7/10/2008 9:09 AM	7,182 KB	NIKON D200	Richard Carter	plot, W Baker	Jeffords 01 - fresh burn
DSC_0058	JPEG Image	7/10/2008 9:19 AM	4,176 KB	NIKON D200	Richard Carter	habit, post mature	Jeffords 01 - fresh burn
DSC_0061	JPEG Image	7/10/2008 9:20 AM	7,114 KB	NIKON D200	Richard Carter	habitat	Jeffords 01 - fresh burn
DSC_0073	JPEG Image	7/10/2008 10:14 AM	6,835 KB	NIKON D200	Richard Carter	habitat	Jeffords 05 - 1 yr rough
DSC_0074	JPEG Image	7/10/2008 10:15 AM	7,520 KB	NIKON D200	Richard Carter	habitat	Jeffords 05 - 1 yr rough
DSC_0075	JPEG Image	7/10/2008 10:16 AM	7,601 KB	NIKON D200	Richard Carter	habitat	Jeffords 05 - 1 yr rough
DSC_0076	JPEG Image	7/10/2008 10:17 AM	6,292 KB	NIKON D200	Richard Carter	habitat	Jeffords 05 - 1 yr rough
DSC_0078	JPEG Image	7/10/2008 10:20 AM	6,705 KB	NIKON D200	Richard Carter	habitat	Jeffords 05 - 1 yr rough
DSC_0080	JPEG Image	7/10/2008 10:42 AM	5,946 KB	NIKON D200	Richard Carter	habitat	Jeffords 05 - 1 yr rough
DSC_0081	JPEG Image	7/10/2008 10:42 AM	7,197 KB	NIKON D200	Richard Carter	habitat	Jeffords 05 - 1 yr rough
DSC_0085	JPEG Image	7/10/2008 10:45 AM	7,196 KB	NIKON D200	Richard Carter	habitat	Jeffords 05 - 1 yr rough

Appendix E. Data on other rare or unusual species observed, including voucher specimen citations and official state rank and status. Unless otherwise indicated latitude/longitude coordinates are given as decimal degrees.

***Agalinis georgiana* (Boynnton) Pennell (Scrophulariaceae)**

U.S.A. GEORGIA. Thomas County: Leabo property, Thomasville, between Pinetree Blvd. and Hwy. US 319 west bypass, conservation easement, 30° 49.426'N 84° 00.558'W, longleaf pine-wiregrass savanna, local, 15 Sep 2006, *W.W. Baker s.n.* (FSU, VSC), 17 Sep 2006, *R. Carter 17215*, *W.W. Baker and G. Nelson* (VSC). **Worth County:** Jeffords Tract, 4.35 airmiles NNW Anderson City, W of Old Hwy. 33, 31.43393N 83.86999W, lower slope along drain just upslope from bog, longleaf pine / wiregrass *stricta* community, with *Pinus palustris*, *Aristida stricta*, *Seymeria*, *Carphephorus odoratissimus*, *Ilex glabra*, *Vaccinium stamineum*, *Aronia arbutifolia*, *Baptisia lanceolata*, *Eupatorium rotundifolium*, *Quercus falcata*, *Quercus nigra*, *Myrica cerifera*, *Gaylussacia frondosa*, *Pteridium aquilinum*, *Euphorbia pubentissima*, *Linum medium*, *Symplocos tinctoria*, *Diospyros virginiana*, *Vaccinium tenellum* and *Lespedeza sericea*, 11 Sep 2008, *R. Carter 18529* and *W.W. Baker* (VSC).

***Balduina atropurpurea* Harper (Asteraceae) – S2, R**

U.S.A. GEORGIA. Colquitt County: Ashburn Hill Plantation, 0.7 mi W of jct. Tree Farm Rd. and Paul Murphy Rd., by S side of Paul Murphy Rd., 31.14148N 83.84662W, seepage slope with *Pinus elliotii*, *Magnolia virginiana*, *Nyssa biflora*, *Acer rubrum*, *Cyrilla racemiflora*, *Ilex glabra*, *Arundinaria gigantea*, *Pycnanthemum nudum*, *Lobelia glandulosa*, *Marshallia graminifolia*, *Andropogon glomeratum*, *Eupatorium pilosum*, *Anthaenantia rufa*, *Helianthus angustifolius*, *Osmunda cinnamomea*, *Eryngium integrifolium*, *Sarracenia flava*, *S. minor*, *Scleria reticularis*, *Rhynchospora cephalantha*, *Woodwardia areolata*, *Arnoglossum ovatum*, *Sporobolus teretifolius*, *Sphagnum* sp., 11 Sep 2008, *R. Carter 18553* and *W.W. Baker* (VSC). **Worth County:** 1.6 mi W Sylvester jct. Hwy. US 82 and Hwy. GA 33, 31° 32.157'N 83° 51.690'W, gas line right-of-way N of Hwy. US 82, open boggy slope, local, 26 Sep 2007, *R. Carter 18140* and *W.W. Baker* (VSC); Arrowhead Farms, 31°21.917'N 83°47.865'W, long narrow seepage slope along SW margin of pond head, with *Sarracenia flava*, *S. minor*, *S. psittacina*, *Balduina uniflora*, *Ctenium aromaticum*, *Carphephorus paniculatus*, *Habenaria blepharoglottis*, *H. ciliaris*, *Eriocaulon decangulare*, *Arnoglossum ovatum*, *Aletris* sp., *Hyptis alata*, *Lobelia glandulosa*, *Bigelowia nudata*, *Eupatorium rotundifolium*, *E. mohrii*, *Chaptalea tomentosa*, *Sporobolus teretifolius*, *Sabatia macrophylla*, *Lycopodium alopecuroides*, *Marshallia graminifolia*, *Rhexia alifanus*, *R. petiolata*, *Liatris spicata*, *Anthaenantia rufa*, *Juncus triglomerata*, *Asclepias connivens*, *Coreopsis linifolia*, *Pycnanthemum nudum*, *Eryngium* sp., *Coelorachis rugosa*, *Pluchea* sp., *Arundinaria gigantea*, *Sorbus arbutifolia*, *Liriodendron tulipifera*, *Acer rubrum*, *Ilex glabra*, *Cyrilla racemiflora*, *Myrica heterophylla*, *Nyssa biflora*, plants locally common, 195 individuals counted, 27 Sep 2007, *R. Carter 18157* and *W.W. Baker* (VSC); 4.35 airmiles NNW Anderson City, W of Old Hwy. 33, Jeffords Tract, 31.430329N 83.869458W, bog along edge of drain, adjacent to recently burned longleaf pine / wiregrass community, plants locally common, 11 Sep 2008, *R. Carter 18532* and *W.W. Baker* (VSC).

Additional unvouchered record:

11 July 2007

Georgia. Colquitt County: Victor Beadles property (Page Tract), along south side Moye Road, vic. Norman Park and Crosland, 31.2855833N 83.6919000W, ~0.69 airmile NW Norman Park jct. Hwy. US 319 and Hwy. GA 256, seepage slope in powerline right-of-way, with *Magnolia virginiana*, *Pycnanthemum nudum*, *Sarracenia flava*, *S. minor*, *Rhexia alifanus*, *R. virginica*, *Ctenium aromaticum*, *Aletris aurea*, *Eupatorium rotundifolium*, *Arnoglossum ovatum*, *Tofieldia racemosa*, *Polygala ramosa*, *Eriocaulon* sp., *Oxypolis filiformis*, *Chaptalea tomentosa*, *Centella*

asiatica, *Sabatia macrophylla*, *Balduina uniflora*, *Sphagnum* sp., *Scleria verticillata*, *Stokesia laevis*, *Sporobolus teretifolius*

***Callirhoe papaver* (Cav.) A.Gray (Malvaceae) – S(S2S3)**

U.S.A. GEORGIA. Thomas County: Cassique Plantation, ca. 6.1 airmiles NE of Ochlocknee, ca. 0.7 airmile NNE of jct. Palmer Rd. and Pummy Rd., 31° 02.269'N 84° 00.031'W, slope with *Pinus palustris*, *P. taeda*, *Aristida stricta*, *Schizachyrium tenerum*, *Baptisia albescens*, *Quercus falcata*, *Vernonia angustifolia*, *Penstemon australis*, *Silphium asteriscus*, *Rudbeckia hirta*, *Cyperus echinatus*, *C. filiculmis*, site recently burned, plants local, only two individuals observed, 25 Jul 2007, *R. Carter 17833 and W.W. Baker* (VSC).

***Chamaecrista deeringiana* Small & Pennell (Fabaceae) – S(S1?)**

U.S.A. GEORGIA. Mitchell County: Pinewood Plantation, ca. 0.55 airmile ENE Pleasant Grove Baptist Church, ca. 3.25 airmiles NW Bridgeboro, 31°25.582'N 84°01.207'W, longleaf pine-wiregrass savanna, local, 17 Jul 2007, *R. Carter 17729 and W.W. Baker* (VSC). **Worth County:** Jeffords property, 0.3 mi E Hwy. GA 33, 31.41400°N 83.83931°W, longleaf pine-wiregrass upland, plants rare and local, 03 Jun 2008, *R. Carter 18396 and W.W. Baker* (VSC).

***Croton elliotii* Chapman (Euphorbiaceae) – S2(S3)**

U.S.A. GEORGIA. Dougherty County: Nilo Plantation, W side of Hwy. GA 91, 1.4 airmiles SW of headquarters, northern margin of exsiccated maiden cane pond, 31°26.60'N 84°17.25'W, plants locally common, 07 Aug 2007, *R. Carter 17907 and W.W. Baker* (VSC). **Seminole County:** Balfour-Seminole Tract, ca. 5.8 airmiles N of Reynoldsville, 30°56.881'N 84°46.826'W, shallow depression surrounded by longleaf pine / wiregrass community, depression with *Quercus virginiana*, *Q. laurifolia*, *Q. nigra*, *Nyssa sylvatica*, *Diospyros virginiana* and *Viburnum obovatum*, 01 Aug 2007, *R. Carter 17878 and W.W. Baker* (VSC).

Additional unvouchered record:

31 July 2007

Georgia. Decatur County: Seminole State Park

Plants locally common along pond margin, UTM 16 703250E 3409966N (NAD27)

***Ctenium floridanum* (Hitchc.) Hitchc. (Poaceae) – S(S1)**

U.S.A. GEORGIA. Charlton County: 2.86 mi S Moniac jct. Hwys. GA 185 and GA 94, 30°28.799'N 82°11.933'W, recently burned, cut-over pine-wiregrass community along W side Hwy. GA 185, with *Pinus elliotii*, *Aristida stricta*, *Quercus incana*, *Q. laevis*, *Q. margaretta*, *Q. nigra*, *Q. pumila*, *Q. minima*, *Serenoa repens*, *Palafoxia integrifolia*, *Serenoa repens*, *Pteridium aquilinum*, plants local, 21 Sep 2006, *R. Carter 17228 and W.W. Baker* (VSC).

***Eleocharis melanocarpa* Torrey (Cyperaceae) – W(S3)**

U.S.A. GEORGIA. Brooks County: Piñon Point Plantation, ca. 0.25 airmile S Piscola, N Thompson Rd., 30° 41.184'N 83°40.657'W, 06 Jul 2007, *R. Carter 17658 and W.W. Baker* (VSC). **Early County:** Shackelford-Williams TNC Preserve, ca. 3.0 airmiles WNW Cedar Springs, 31° 11.835'N 85° 04.710'W, 19 Jul 2007, *R. Carter 17793, R. Kral and W.W. Baker* (VSC).

***Habenaria quinqueseta* (Michaux) Eaton (Orchidaceae) – S1?, T**

U.S.A. GEORGIA. Worth County: Arrowhead Farms, Jimmy Jeter property, 31.36627N 83.80259W, recently burned longleaf pine / wiregrass community, open sandy upland, near ridge crest, plant rare and local, one individual observed, 12 Sep Sep 2008, *R. Carter and W.W. Baker* (photo only, no voucher taken).

***Hartwrightia floridana* A. Gray ex S. Watson (Asteraceae) – S1, T**

U.S.A. GEORGIA. Charlton County: 2.86 airmiles S Moniac jct. Hwy. GA 185 and Hwy. GA 94, W side Hwy. GA 185, between hwy. and St. Marys River, ca. 150 m W of 30° 28.944'N 082° 11.941' W, seepage slope along W side of upland oak-pine woods, with *Magnolia virginiana*, *Nyssa biflora*, *Persea palustris*, *Cyrilla racemiflora*, *Cliftonia monophylla*, *Gordonia lasianthus*, *Taxodium ascendens*, *Ilex coriacea*, *Lyonia lucida*, *Toxicodendron vernix*, *Myrica cerifera*, *Serenoa repens*, *Hypericum fasciculatum*, *Smilax laurifolia*, *Sarracenia minor*, *Polygala* spp., *Rhynchospora* spp., *Xyris* spp., plants local and rare, 12 Oct 2006, R. Carter 17283 and W.W. Baker (VSC)

***Lophiola aurea* Ker Gawl. (Nartheciaceae) – S1?**

U.S.A. GEORGIA. Turner County: along N side Rebecca-Waterloo Rd., ca. 1.8 mi SE jct. Hwy. GA 107 and Rebecca-Waterloo Rd., 31.69918N 83.49691W, seepage slope along drain, with *Pinus palustris*, *P. elliotii*, *Magnolia virginiana*, *Pteridium aquilinum*, *Sarracenia flava*, *Polygala lutea*, *Paspalum floridanum*, *Ctenium aromaticum*, *Rhexia alifanus*, *R. virginica*, *Ilex glabra*, *Nyssa biflora*, *Balduina uniflora*, *Rhynchospora glomerata*, *Erianthus* sp., *Sagittaria* sp., *Taxodium ascendens*, *Xyris caroliniana*, *Fuirena breviseta*, *Scleria reticularis*, *Oxypolis filiformis*, *Pycnanthemum nudum*, *Eupatorium rotundifolium*, *Sabatia macrophylla*, plants locally abundant, especially at upper reaches of bog, R. Carter 18468 and W.W. Baker (VSC).

***Macranthera flammea* (Bartram) Pennell (Scrophulariaceae) – S1?, T**

U.S.A. GEORGIA. Worth County: Oakridge Farms, Cody Laird property, ca. 5.75 airmiles ESE Anderson City, E of Sumner Rd., 31°20.964'N 83°45.844'W, shrubby edge along N side of drain, tributary of Warrior Creek, recent post-winter burn, with *Nyssa biflora*, *Magnolia virginiana*, *Acer rubrum*, *Pinus elliotii*, *Cyrilla racemiflora*, *Ilex glabra*, *Clethra alnifolia*, *Pinckneya bracteata*, *Vaccinium corymbosum*, *Aster reticulatus*, *Osmunda cinnamomea*, *Woodwardia virginica*, *Eupatorium rotundifolium*, *E. semiserratum*, plants local, 27 Sep 2007, R. Carter 18163 and W.W. Baker (VSC). **Worth County:** Jeffords Tract, 4.35 airmiles NNW Anderson City, W of Old Hwy. 33, 31.434561N 83.868287W, edge of drain within recently burned longleaf pine / wiregrass *stricta* community, plants local, 11 Sep 2008, R. Carter 18531 and W.W. Baker (VSC).

***Portulaca biloba* Urban (Portulacaceae) – S1**

U.S.A. GEORGIA. Coffee County: Broxton Rocks Nature Preserve, 4.7 mi ENE Pridgen, 0.28 mi W Rock Falls, 31°43.936'N 82°51.496'W, open flat rocky expanse with pockets of thin soil, locally abundant in full sun, R. Carter 18168, F. Snow and W.W. Baker (VSC). **Colquitt County:** Victor Beadles property (Huber Tract), ca. 3.75 airmiles NNW of Norman Park, off Moye Rd., 31°19.012'N 83°42.495'W, rock outcrop in longleaf pine / wiregrass savanna, with *Pinus palustris*, *Quercus virginiana*, *Q. marilandica*, *Schizachyrium tenerum*, *Bigelovia nuttallii*, *Selaginella* sp., plants local in thin soil over rock, petals magenta, bifid, 11 Sep 2008, R. Carter 18550 and W.W. Baker (VSC). **Jeff Davis County:** Flat Rock WMA, N side Hwy. GA 107, near Coffee / Jeff Davis county line, 31°46.557'N 82°50.132'W, plowline along edge of rock outcrop, plants locally common, 12 Oct 2007, R. Carter 18177, F. Snow and W.W. Baker (VSC).

***Pteroglossaspis ecristata* (Fernald) Rolfe (Orchidaceae) – T, S(S1)**

U.S.A. GEORGIA. Worth County: Arrowhead Farms, Jimmy Jeter property, 1.2 mi W jct. Sumner Rd. and Phillip Causey Rd. by Phillip Causey Rd., elev. ~320 ft., 31°21.804'N 83°47.219'W, open woods with *Pinus palustris*, *P. taeda*, *Quercus falcata*, *Rhus copallinus*, *Myrica cerifera*, *Ilex glabra*, *Yucca flaccida*, *Aristida stricta*, *Pteridium aquilinum*, *Baptisia lanceolata*, *Tephrosia virginiana*, *Salvia azurea*, *Agalinis* spp., *Aster adnatus*, *A. tortifolius*,

Aster walteri, *Sorghastrum secundum*, *Indigofera caroliniana*, *Anthraenantia villosa*, *Coreopsis major*, *Polgala incarnata*, plants local, seven individuals counted, 27 Sep 2007, R. Carter 18147 and W.W. Baker (VSC).

***Rhynchospora globularis* (Chapm.) Small var. *saxicola* (Small) Kükenth. (Cyperaceae)**

U.S.A. GEORGIA. Colquitt County: Victor Beadles property (Huber Tract), ca. 3.75 airmiles NNW of Norman Park, off Moye Rd., 31°19.012'N 83°42.495'W, rock outcrop in longleaf pine / wiregrass savanna, with *Pinus palustris*, *Quercus virginiana*, *Q. marilandica*, *Schizachyrium tenerum*, *Bigelovia nuttallii*, *Portulaca bifida*, *Selaginella* sp., plants local in thin soil over rock, petals magenta, bifid, 11 Sep 2008, R. Carter 17690 and W.W. Baker (VSC).

***Sarracenia flava* L. (Sarraceniaceae) – U, S3S4**

U.S.A. GEORGIA. Worth County: Quail Ridge Plantation, John Norman property, ~4.3 airmiles NW of Norman Park, seepage slope along NE bank of bay creek tributary of Warrior Creek, 31°19.282'N 83°43.425'W, pitcher plant bog with *Sarracenia flava*, *S. minor*, *S. psittacina*, *Melianthum virginicum*, *Tofieldia racemosa*, *Aletris aurea*, *Xyris* spp., *Balduina uniflora*, *B. atropurpurea*, *Sabatia macrophylla*, *Asclepias lanceolata*, *Hibiscus aculeatus*, *Cyrilla racemiflora* and *Magnolia virginiana*, locally common, 11 Jul 2007, R. Carter 17675 and W.W. Baker (VSC).

***Sarracenia psittacina* Michaux – T, S2S3**

U.S.A. GEORGIA. Worth County: Quail Ridge Plantation, John Norman property, ~4.3 airmiles NW of Norman Park, seepage slope along NE bank of bay creek tributary of Warrior Creek, 31°19.282'N 83°43.425'W, pitcher plant bog with *Sarracenia flava*, *S. minor*, *S. psittacina*, *Melianthum virginicum*, *Tofieldia racemosa*, *Aletris aurea*, *Xyris* spp., *Balduina uniflora*, *B. atropurpurea*, *Sabatia macrophylla*, *Asclepias lanceolata*, *Hibiscus aculeatus*, *Cyrilla racemiflora* and *Magnolia virginiana*, locally common, 11 Jul 2007, R. Carter 17675 and W.W. Baker (VSC).

***Sporobolus teretifolius* Harper (Poaceae) – S2?**

U.S.A. GEORGIA. Colquitt County: Merle Baker property, 0.65 mi S jct. Hwy. GA 37 and Tillman Rd., E side of Tillman Rd., seepage slope along S side of tributary of Little River, 31° 09.088'N 83°35.185'W, with *Sarracenia flava*, *S. minor*, *Anthraenantia rufa*, *Eriocaulon decangulare*, *Ilex glabra*, *I. myrtifolia*, *Pinus elliotii*, *Rhexia alifanus*, *R. lutea*, *R. virginica*, *R. mariana*, *Xyris* spp., *Smilax laurifolia*, *Bigelovia*, *Panicum verrucosum*, *Ctenium aromaticum*, *Myrica cerifera*, *Nyssa biflora*, *Magnolia virginiana*, *Chaptalia tomentosa*, *Balduina uniflora*, *Aristida palustris*, 27 Sep 2007, R. Carter 18166 and W.W. Baker (VSC); Ashburn Hill Plantation, 0.7 mi W of jct. Tree Farm Rd. and Paul Murphy Rd., by S side of Paul Murphy Rd., 31.14148N 83.84662W, seepage slope with *Pinus elliotii*, *Magnolia virginiana*, *Nyssa biflora*, *Acer rubrum*, *Cyrilla racemiflora*, *Ilex glabra*, *Arundinaria gigantea*, *Pycnanthemum nudum*, *Lobelia glandulosa*, *Marshallia graminifolia*, *Andropogon glomeratum*, *Eupatorium pilosum*, *Anthraenantia rufa*, *Helianthus angustifolius*, *Osmunda cinnamomea*, *Eryngium integrifolium*, *Sarracenia flava*, *S. minor*, *Scleria reticularis*, *Rhynchospora cephalantha*, *Woodwardia areolata*, *Arnoglossum ovatum*, *Balduina atropurpurea*, *Sphagnum* sp., 11 Sep 2008, R. Carter 18552 and W.W. Baker (VSC).

Additional unvouchered record:

11 July 2007

Georgia. Colquitt County: Victor Beadles property (Page Tract), along south side Moye Road, vic. Norman Park and Crosland, 31.2855833N 83.6919000W, ~0.69 airmile NW Norman Park jct. Hwy. US 319 and Hwy. GA 256, seepage slope in powerline right-of-way, with *Magnolia virginiana*, *Pycnanthemum nudum*, *Sarracenia flava*, *S. minor*, *Rhexia alifanus*, *R. virginica*, *Ctenium aromaticum*, *Aletris aurea*, *Eupatorium rotundifolium*, *Arnoglossum ovatum*, *Tofieldia*

racemosa, *Polygala ramosa*, *Eriocaulon* sp., *Oxypolis filiformis*, *Chaptalea tomentosa*, *Centella asiatica*, *Sabatia macrophylla*, *Balduina uniflora*, *Sphagnum* sp., *Scleria verticillata*, *Stokesia laevis*, *Balduina atropurpurea*

***Stokesia laevis* (Hill) Greene (Asteraceae) – S(S1)**

U.S.A. GEORGIA. Colquitt County: Victor Beadles property (Page Tract), ~1.25 airmiles NNW of Norman Park, 31.2860333N 83.6902667W, E side powerline, seepage slope along drain, in partial shade under *Pinus elliottii*, *Nyssa biflora*, *Magnolia virginiana*, *Arundinaria gigantea*, *Balduina uniflora*, *Ilex glabra*, locally common, 11 Jul 2007, R. Carter 17697 and W.W. Baker (VSC). **Colquitt County:** Victor Beadles property (Huber Tract), ca. 75 m N of Moye Rd., 31.31719N 83.72173W, drain with *Pinus palustris*, *P. elliottii*, *Nyssa biflora*, *Magnolia virginiana*, *Ilex glabra*, *Sarracenia flava*, *S. minor*, *Asclepias cinerea*, *Ctenium aromaticum*, *Balduina uniflora*, *Rudbeckia hirta*, *Coreopsis delphinifolia*, *Xyris caroliniana* and *Rhexia alifanus*, 09 Jul 2008, R. Carter 18448 and W.W. Baker (VSC). **Worth County:** Quail Ridge Plantation, John Norman property, ~4.3 airmiles NW of Norman Park, seepage slope along NE bank of bay creek tributary of Warrior Creek, 31°19.282'N 83°43.425'W, pitcher plant bog with *Sarracenia flava*, *S. minor*, *S. psittacina*, *Melanthium virginicum*, *Tofieldia racemosa*, *Aletris aurea*, *Xyris* spp., *Balduina uniflora*, *B. atropurpurea*, *Sabatia macrophylla*, *Asclepias lanceolata*, *Hibiscus aculeatus*, *Cyrilla racemiflora* and *Magnolia virginiana*, locally common, 11 Jul 2007, R. Carter 17675 and W.W. Baker (VSC).

Additional unvouchered records:

11 July 2007

Georgia. Colquitt County: Victor Beadles property (Page Tract), along south side Moye Road, vic. Norman Park and Crosland, much of site recently burned

31.2830333N 83.6909333W, ca, 1.0 airmile NNW Norman Park, open flat with *Pinus elliottii* *Stokesia laevis* locally common and scattered throughout general area

31.2855833N 83.6919000W, ~0.69 airmile NW Norman Park jct. Hwy. US 319 and Hwy. GA 256, seepage slope in powerline right-of-way, with *Magnolia virginiana*, *Pycnanthemum nudum*, *Sarracenia flava*, *S. minor*, *Rhexia alifanus*, *R. virginica*, *Ctenium aromaticum*, *Aletris aurea*, *Eupatorium rotundifolium*, *Arnoglossum ovatum*, *Tofieldia racemosa*, *Polygala ramosa*, *Eriocaulon* sp., *Oxypolis filiformis*, *Chaptalea tomentosa*, *Centella asiatica*, *Sabatia macrophylla*, *Balduina uniflora*, *Sphagnum* sp., *Scleria verticillata*, *Balduina atropurpurea*, *Sporobolus teretifolius*

Population of ca. 350 plants observed

31.2878333N 83.7004167W, edge of drain

Population of 18 plants

31.2902000N 83.7031333W, edge of drain

Population of 20 plants

31.2895000N 83.7163667W, seepage bog along drain with *Sarracenia flava*, *Ctenium aromaticum*, *Rhexia alifanus*

Population of 125 plants

09 Jul 2008

U.S.A. Georgia. Colquitt County: Victor Beadles property ca. 4.25 airmiles NE of Norman Park, along south side of Moye Rd., recently burned flatwoods along west side of drain, with *Pinus elliotii*, 31.31646N 83.73449W

Population of ca. 500 plants

***Stylisma aquatica* (Walter) Rafinesque (Convolvulaceae) – W(S3?)**

U.S.A. GEORGIA. Irwin County: Lentile Tract, S of Hwy. US 319, E of Alapaha River, 31.50977°N 83.35280°W, Grady pond, with *Pinus taeda*, *Diospyros virginiana*, *Quercus virginiana*, *Q. laurifolia*, *Acer rubrum*, *Myrica cerifera*, 21 Aug 2008, *R. Carter 18491* with *W.W. Baker* and *G. Nelson* (VSC). **Miller County:** Mayhaw Wildlife Management Area, 6.7 airmiles NW of Colquitt town center, ca. 1.5 mi N of Griggs-Lucile Rd. by Womble Rd., then NE of Womble Rd. by unmarked trail, 31.22266N 84.83015W, margin of small sinkhole with *Taxodium ascendens*, *Crataegus aestivalis*, *Quercus laurifolia*, plants forming locally dominant ground cover along exsiccated pond margin, 19 Sep 2008, *R. Carter 18572* (VSC). **Mitchell County:** Pinewood Plantation, ca. 0.55 airmile ENE Pleasant Grove Baptist Church, ca. 3.25 airmiles NW Bridgeboro, 31°25.582'N 84°01.207'W, ecotone along drain in longleaf pine-wiregrass savanna, local, 17 Jul 2007, *R. Carter 17723* and *W.W. Baker* (VSC).

***Verbesina aristata* (Elliott) A. Heller (Asteraceae) – S3?**

U.S.A. GEORGIA. Dougherty County: Nilo Plantation, W side of Hwy. GA 91, 1.83 airmiles NNW of headquarters, undulating upland, recently burned, with *Pinus echinata*, *Prunus serotina*, *Carya tomentosa*, *Toxicodendron pubescens*, *Tephrosia virginiana*, *Quercus hemisphaerica*, *Rhus copallinus*, *Diospyros virginiana*, *Rhynchosia tomentosa*, 31°28.882'N 84°16.366'W, plants local, 07 Aug 2007, *R. Carter 17951* and *W.W. Baker* (VSC).

***Verbesina heterophylla* (Chapm.) A. Gray (Asteraceae) – STATE RECORD**

U.S.A. GEORGIA. Charlton County: Williams Tract, 3.2 mi S Moniac, W side Hwy. GA 185, 30°28.891'N 82°11.945'W, upland flat converted into slash pine, native ground cover mostly intact, with *Pinus elliotii*, *Aristida stricta*, *Quercus incana*, *Q. laevis*, *Q. margaretta*, *Q. nigra*, *Q. pumila*, *Q. minima*, *Serenoa repens*, *Palafoxia integrifolia*, *Serenoa repens*, *Pteridium aquilinum*, recently burned, plants local, 09 Aug 2007, *R. Carter 17961* and *W.W. Baker* (VSC).—Formerly thought to be endemic to Florida.

Appendix F. Maps showing locations and approximate boundaries of sites surveyed for the presence of *Schwalbea americana*. Unless otherwise indicated latitude/longitude coordinates are given as decimal degrees.

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Kinderlou Plantation, Lowndes County	Figure F29
Leabo Tract, Thomas County	Figure F30
Lentile Tract, Irwin County	Figure F31
Mayhaw WMA, Miller County	Figure F32
Milestone Plantation, Thomas County	Figure F33
Myrtlewood Plantation, Thomas County	Figure F34
Nickleville Tract, Grady County	Figure F35
Nilo Plantation, Dougherty County	Figure F36
Oakridge Farms, Worth County	Figure F37
Page Tract, Colquitt County	Figure F6

Pineland Plantation, Baker County	Figure F38
Pinewood Plantation, Mitchell County	Figure F39
Piñon Point, Brooks County	Figure F40
Quail Ridge, Worth County	Figure F41
Reddick Track, Colquitt County	Figure F42
Riverbend Plantation, Brooks County	Figure F43
Rivercreek WMA, Thomas County	Figure F44
Ross Lake Tract, Turner County	Figure F45
Salter Mountain, Upson County	Figure F46
Samara Plantation, Worth County	Figure F47
Seminole State Park, Seminole County	Figure F48
Shackleford-Williams TNC Preserve, Early County	Figure F49
Smith Tract, Decatur County	Figure F16
Sprewell Bluff State Park, Upson County	Figure F50
Sylvester ROW, Worth County	Figure F51
Tift Farm, Tift County	Figure F52
Union Church Tract, Miller County	Figure F53
Waterloo Tract, Turner / Irwin County	Figure F54
Weatherby Place, Dougherty County	Figure F55
Williams Tract, Charlton County	Figure F56



Figure F1. Arcadia Plantation, along west side of Metcalf Road, south of Thomasville, showing locations of *S. americana* EOs, Thomas County, Georgia. Survey area within white boundary.

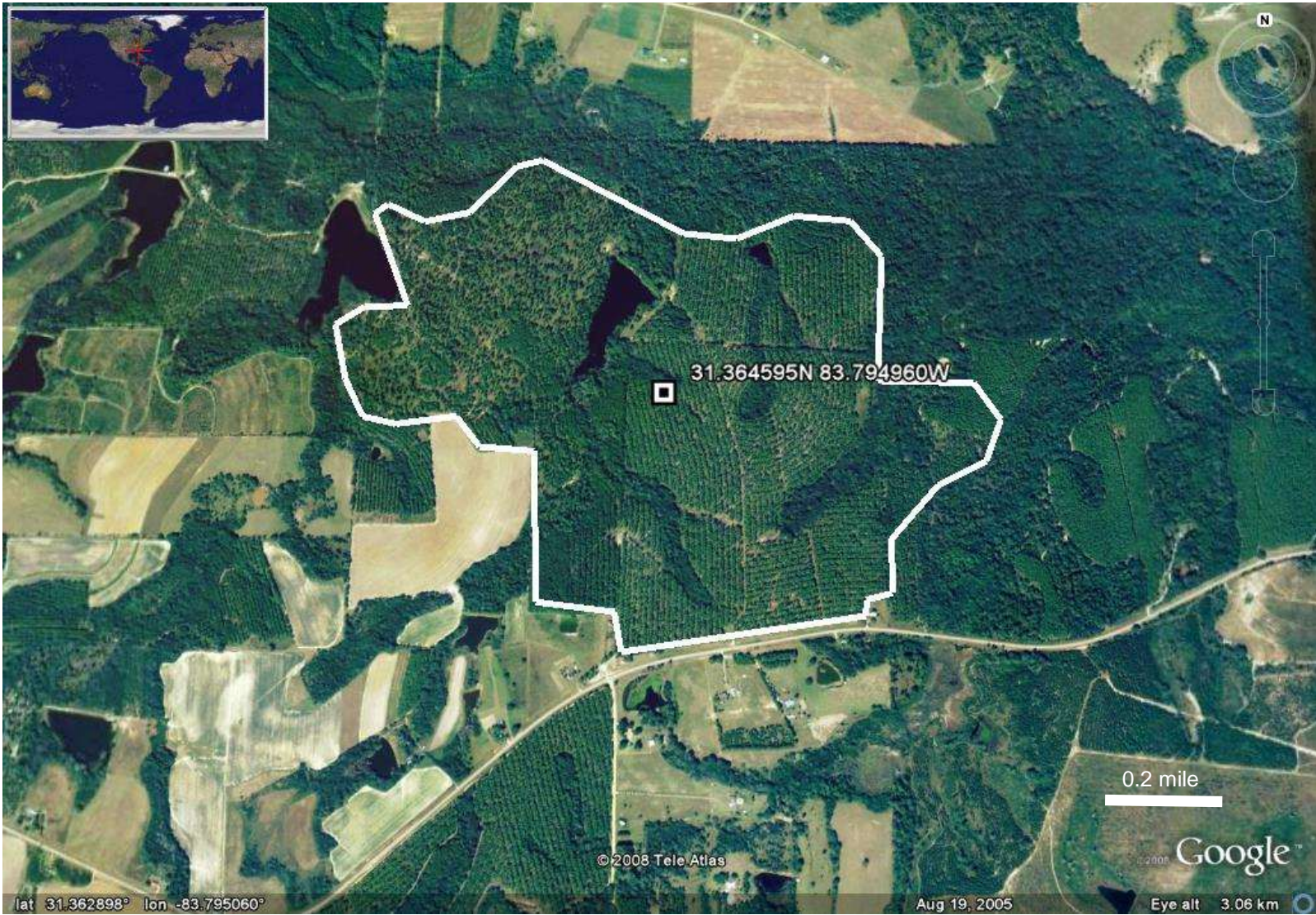


Figure F2. Arrowhead Farms, 1.2 miles west of jct. Sumner Road and Phillip Causey Road, vic. Minton, Worth County, Georgia. Survey area within white boundary.



Figure F3. Ashburn Hill Plantation, along south side of Paul Murphy Road, west side of Tree Farm Road, west of Moultrie, Colquitt County, Georgia. Survey area within white boundary.

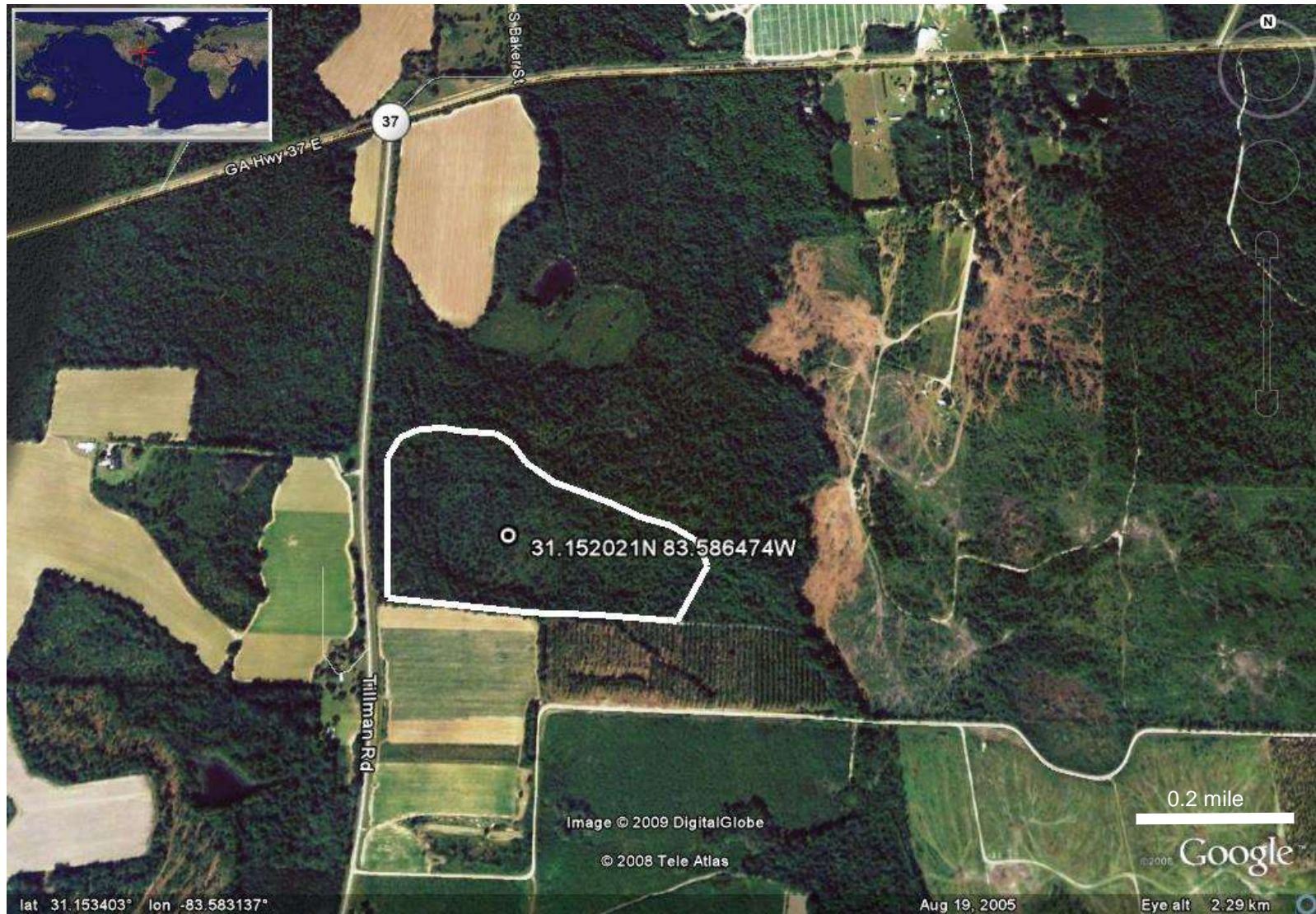


Figure F4. Baker Tract, along east side of Tillman Road, south of Hwy. GA 37, west of Adel, Cook County, Georgia. Survey area within white boundary.



Figure F5. Balfour-Seminole Tract, south-southwest of Brinson, Seminole County, Georgia. Survey area within white boundary.

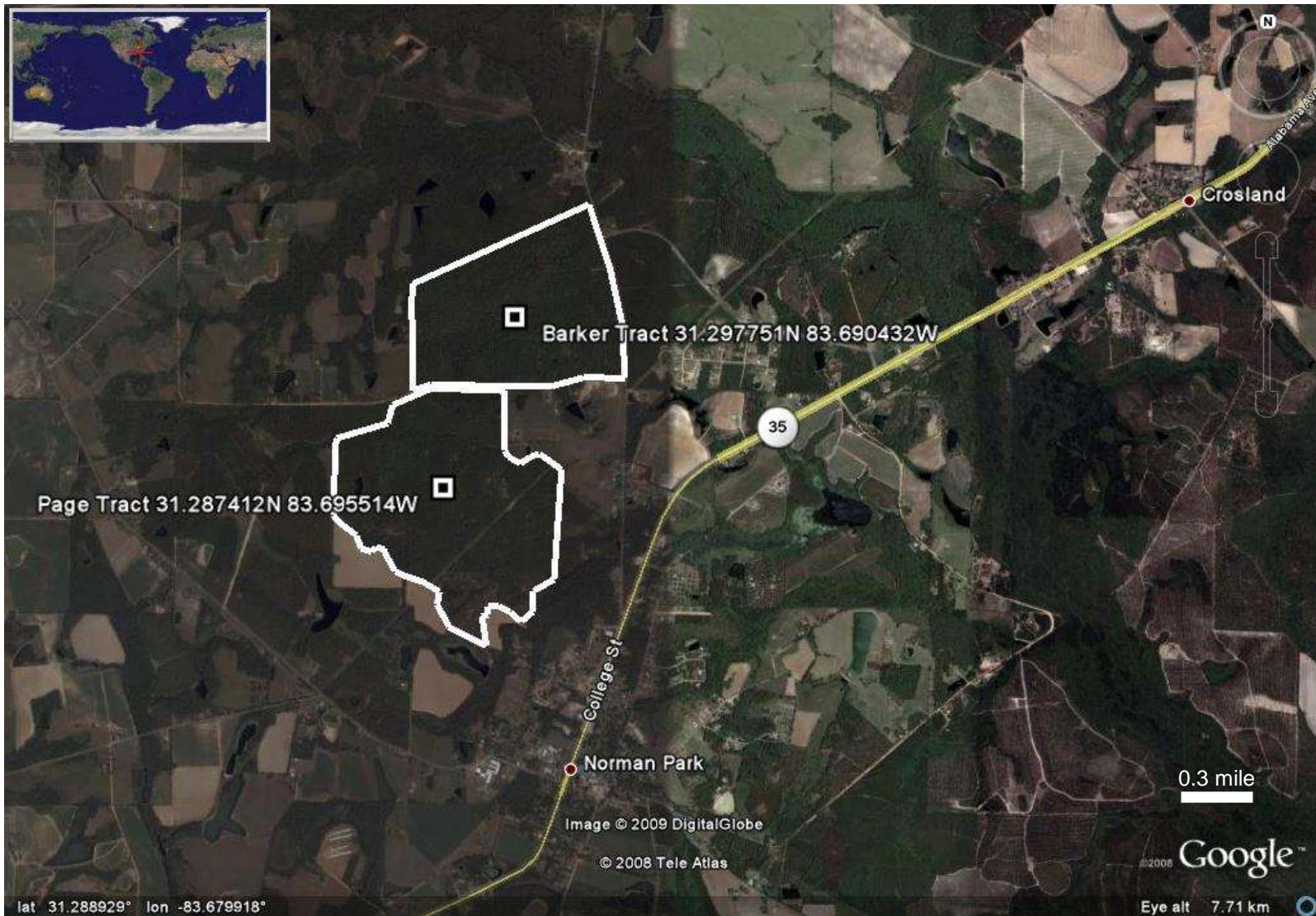


Figure F6. Barker Tract (north of Moye Road) and Page Tract (south of Moye Road), northwest of Norman Park and southeast of Crosland, Colquitt County, Georgia. Survey areas within white boundaries.



Figure F7. Broxton Rocks TNC Preserve, ca. 8 miles NNE of Broxton, Coffee County, Georgia. Survey areas within white boundaries.

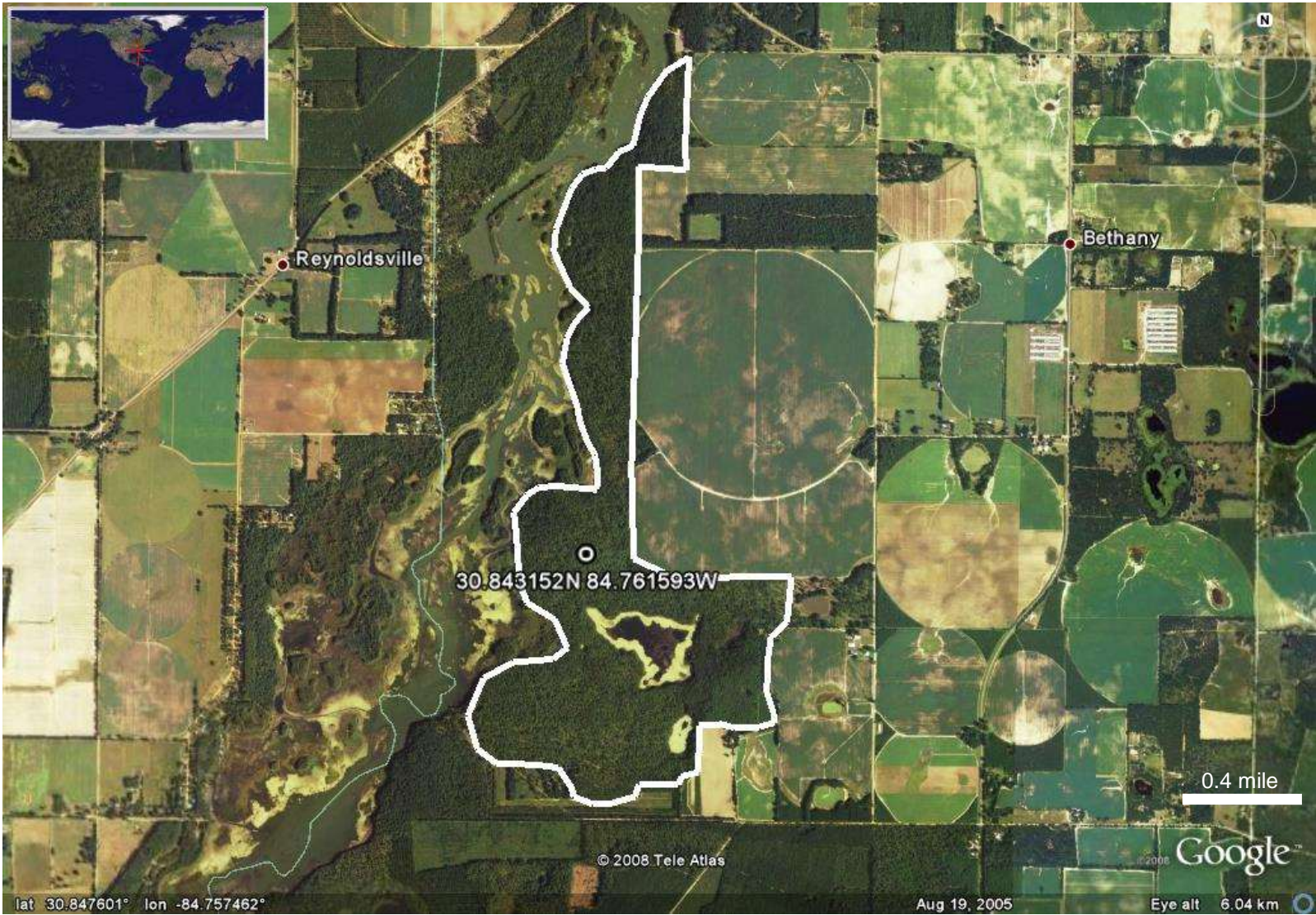


Figure F8. Buffalo Pond Wildlife Management Area, between Reynoldsville and Bethany, Decatur County, Georgia. Survey area within white boundary.



Figure F9. Cabin Bluff, vic. Ceylon, Camden County, Georgia. Survey areas within white boundaries.



Figure F10. Camp Thunder, off Hwy. GA 74 (Crest Hwy.), northwestern Upson County, Georgia. Survey area within white boundary.

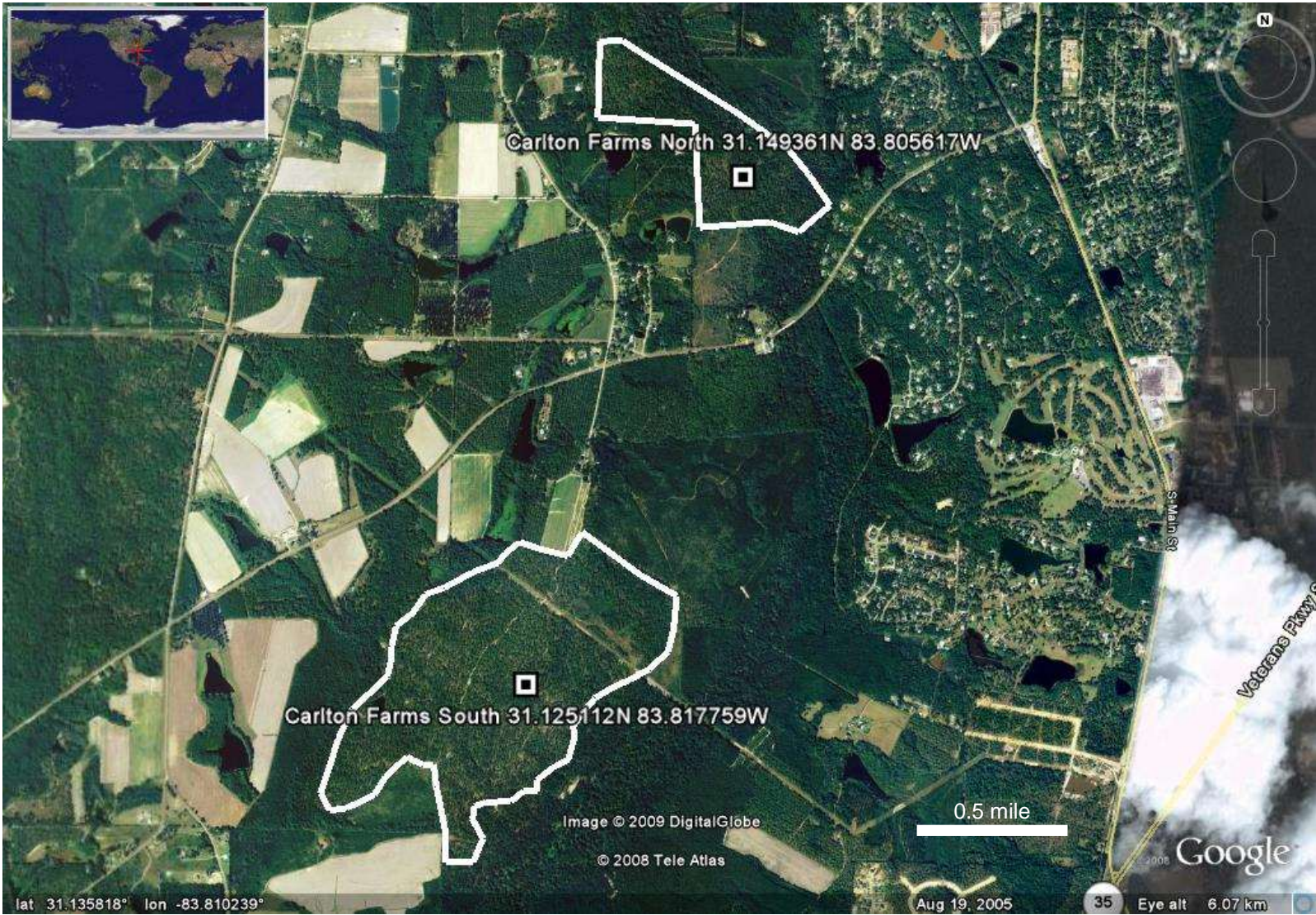


Figure F11. Carlton Farms, west of Moultrie, off Lower Meigs Road, Colquitt County, Georgia. Survey areas within white boundaries.

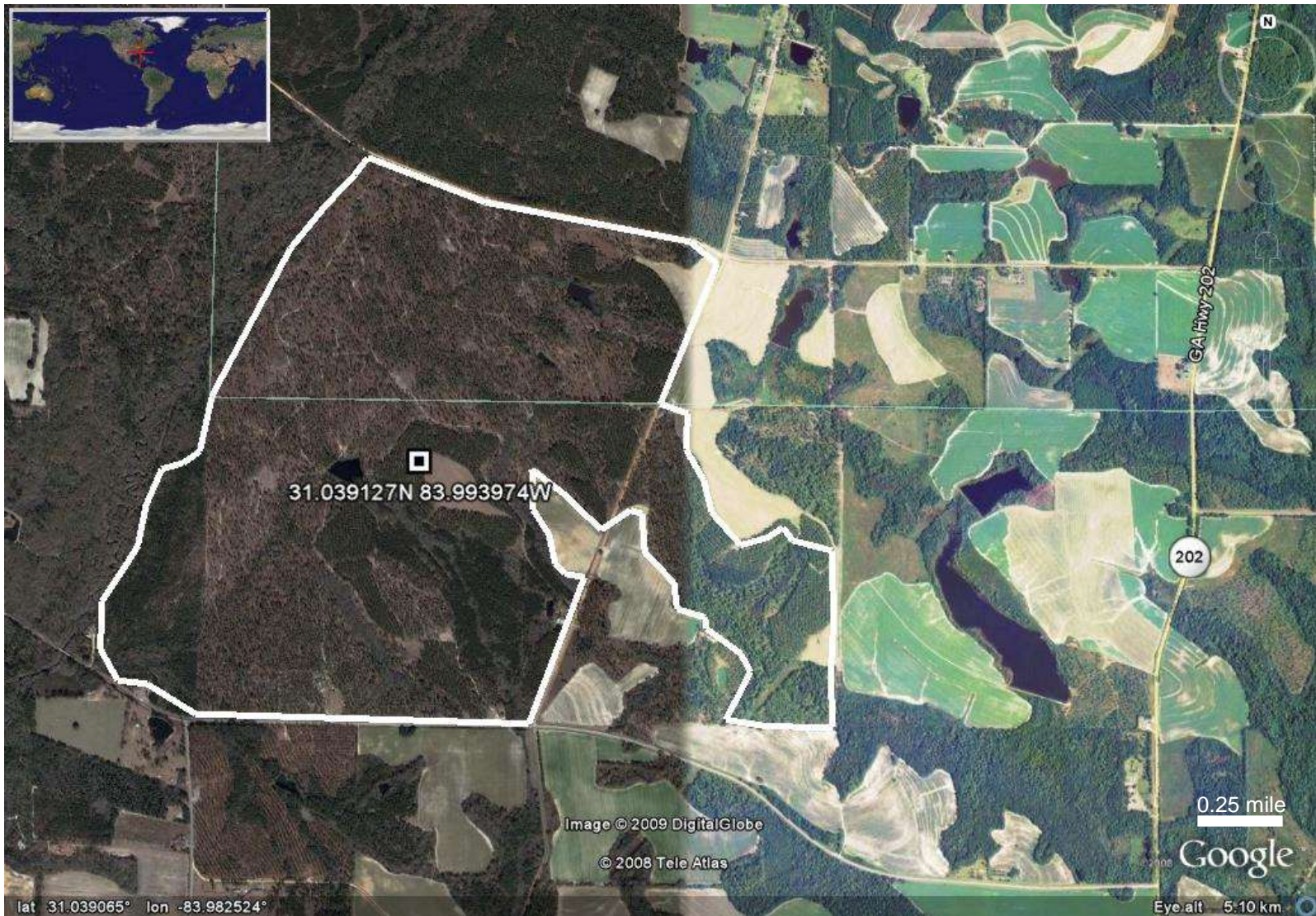


Figure F12. Cassique Plantation, off Hwy.GA 202, northwestern Thomas County and southwestern Colquitt County, Georgia. Survey area within white boundary.



Figure F13. Cecil Bog, ca. 2¼ miles east of Cecil, along east side of Hutchinson Pond Road, Cook County, Georgia. Survey area within white boundary.



Figure F14. Clarks Bluff, Camden County, Georgia. Survey areas within white boundaries.

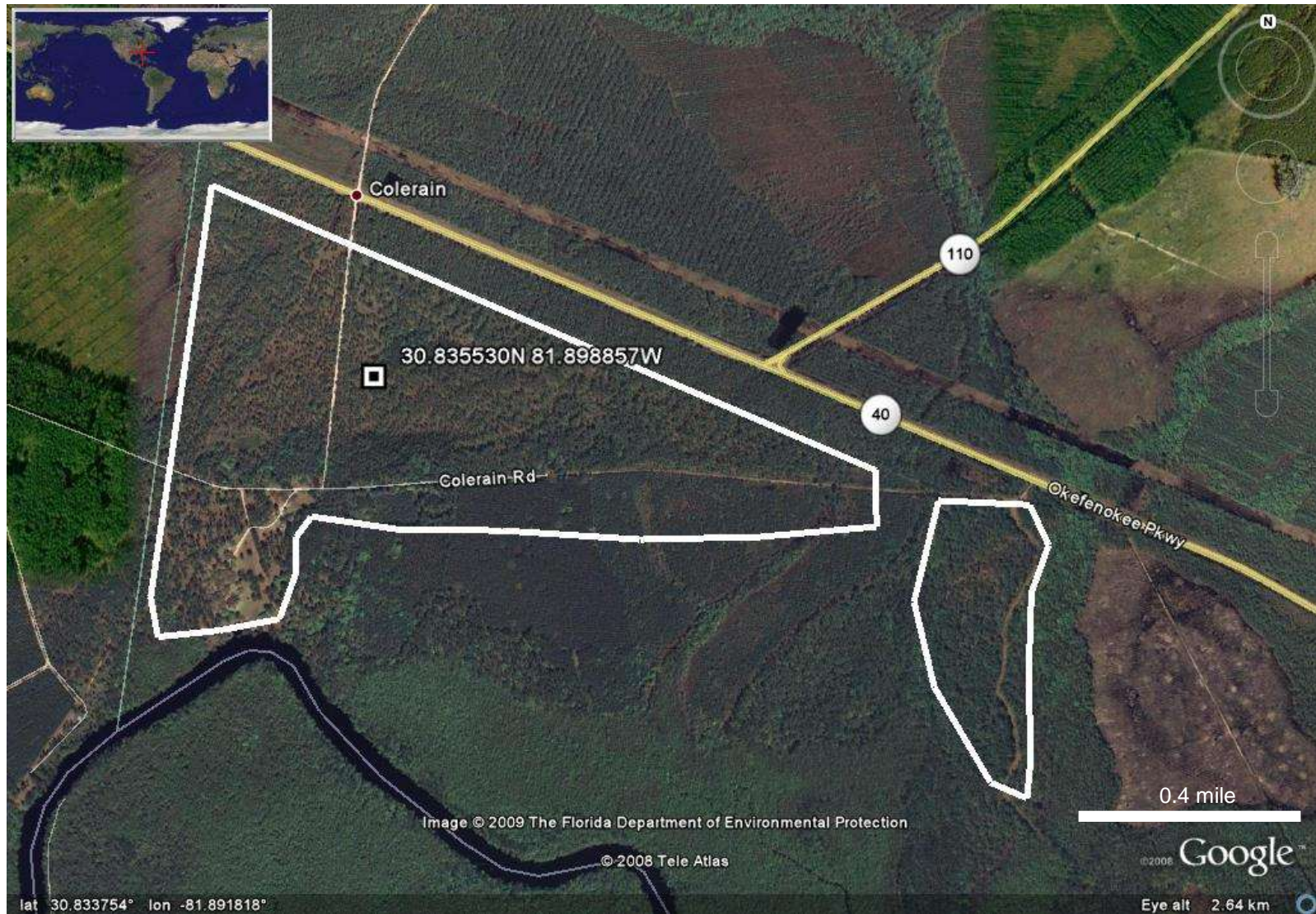


Figure F15. Colerain, along south side Hwy. GA 40, just east of Charlton-Camden County line, Camden County, Georgia. Survey areas within white boundaries.

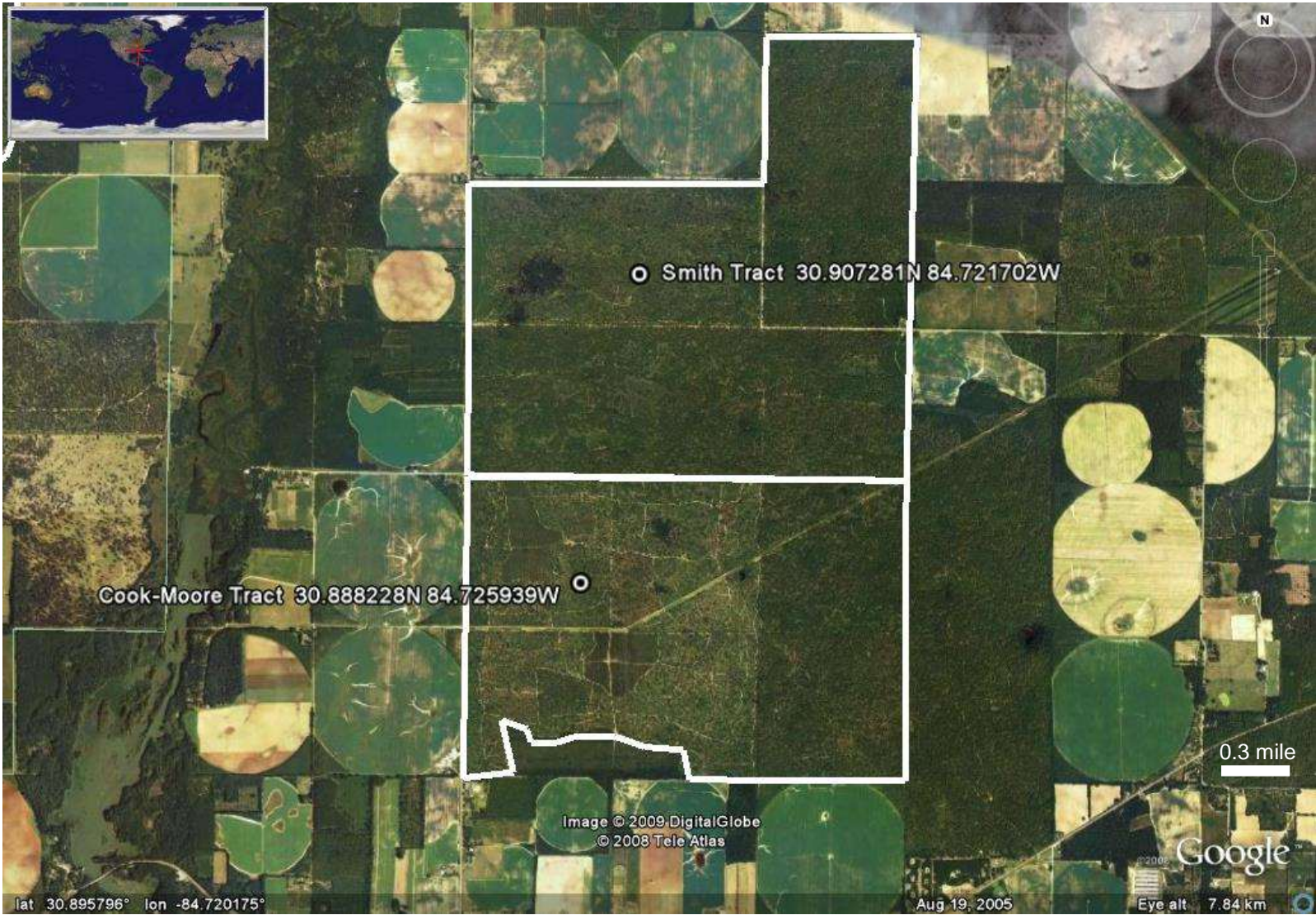


Figure F16. Cook-Moore Tract and Smith Tract, south of Hwy. US 84 (Dothan Road), west of Bainbridge, Decatur County, Georgia. Survey areas within white boundaries.



Figure F17. Cork Ferry Road, off Hwy. GA 300, along east side of Lake Blackshear by Cork Ferry Road, 1.3 miles west of jct. Cork Ferry Road and Coney Road, Crisp County, Georgia. Survey area within white boundary.



Figure F18. Doerun Pitcherplant Bog Natural Area, along east side of Hwy. GA 133, south of Doerun, showing locations of *S. americana* EOs, Colquitt County, Georgia. Survey area within white boundary.

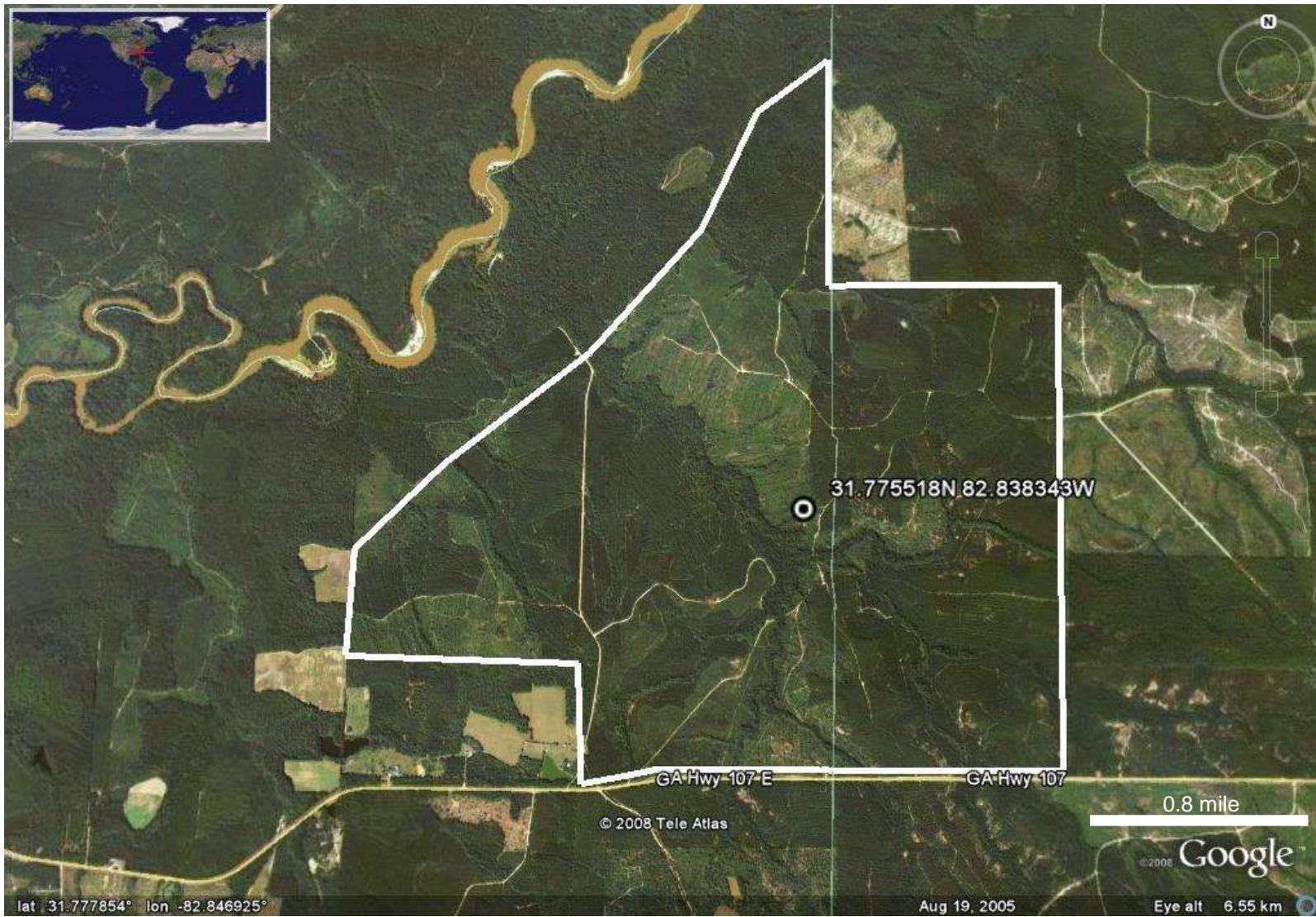


Figure F19. Flat Tub Wildlife Management Area, along Hwy. GA 107, Coffee and Jeff Davis counties, Georgia. Survey area within white boundary.

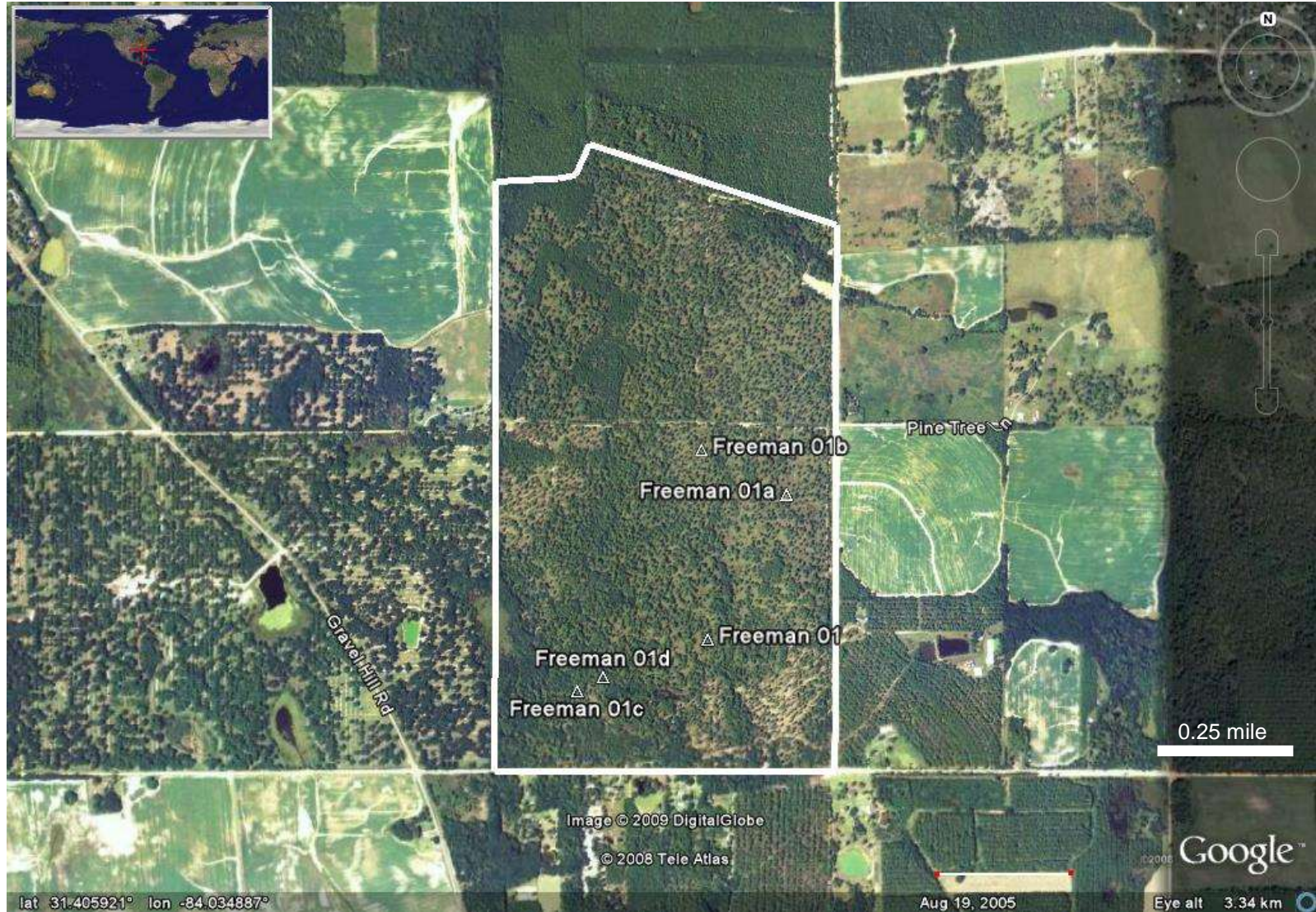


Figure F20. Freeman Place, along north side of Hatcher Hill Road and along west side of Briarwood Road, 1.5 miles south of Pleasant Grove Church Road, showing locations of *S. americana* EOs, Mitchell County, Georgia. Survey area within white boundary.

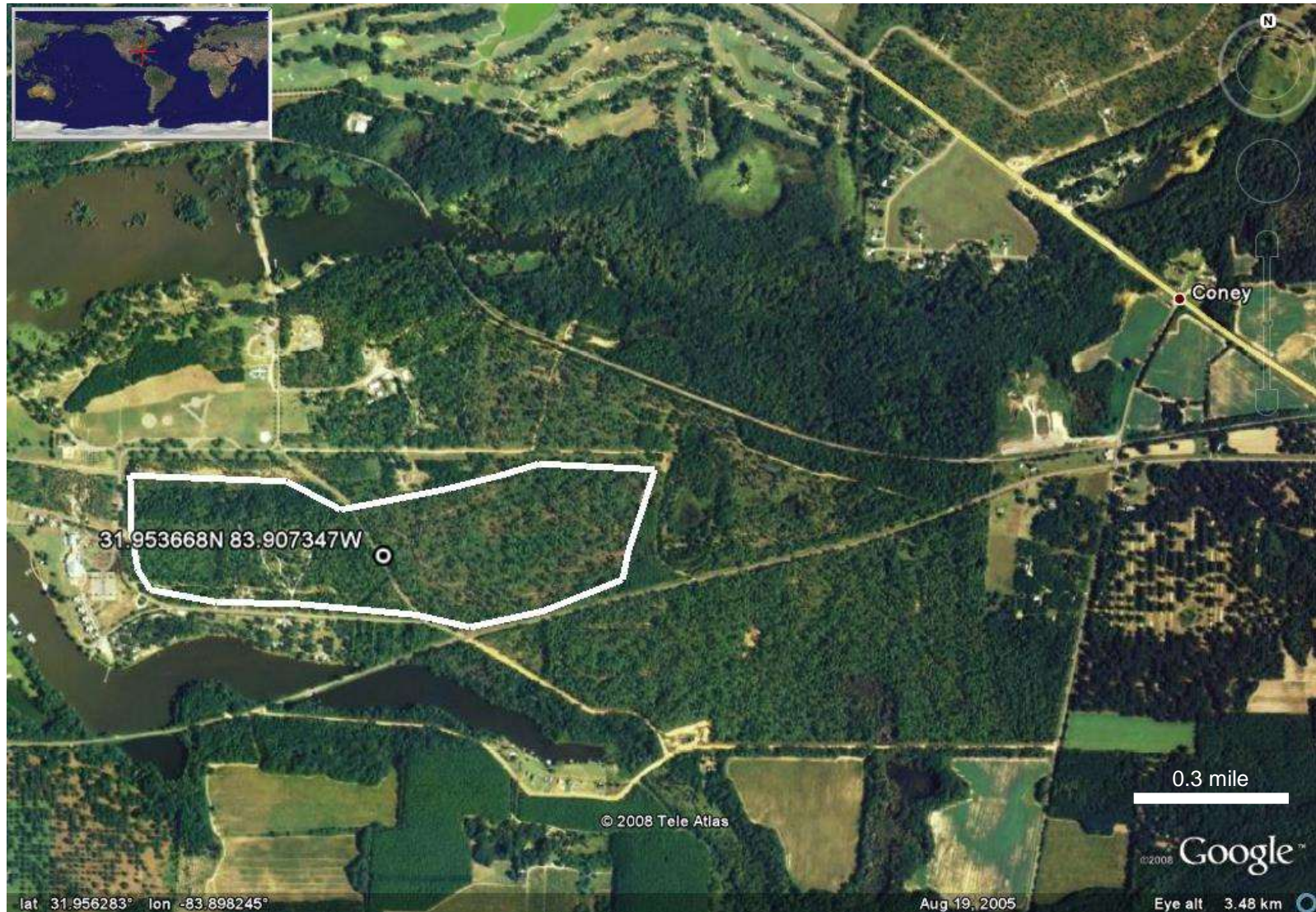


Figure F21. Georgia Veterans State Park, off Hwy. GA 30, along west side of Lake Blackshear, vic. Coney, Crisp County, Georgia. Survey area within white boundary.



Figure F22. Hand Tract, off Hwy. US 84, west of Climax, Decatur County, Georgia. Survey area within white boundary.

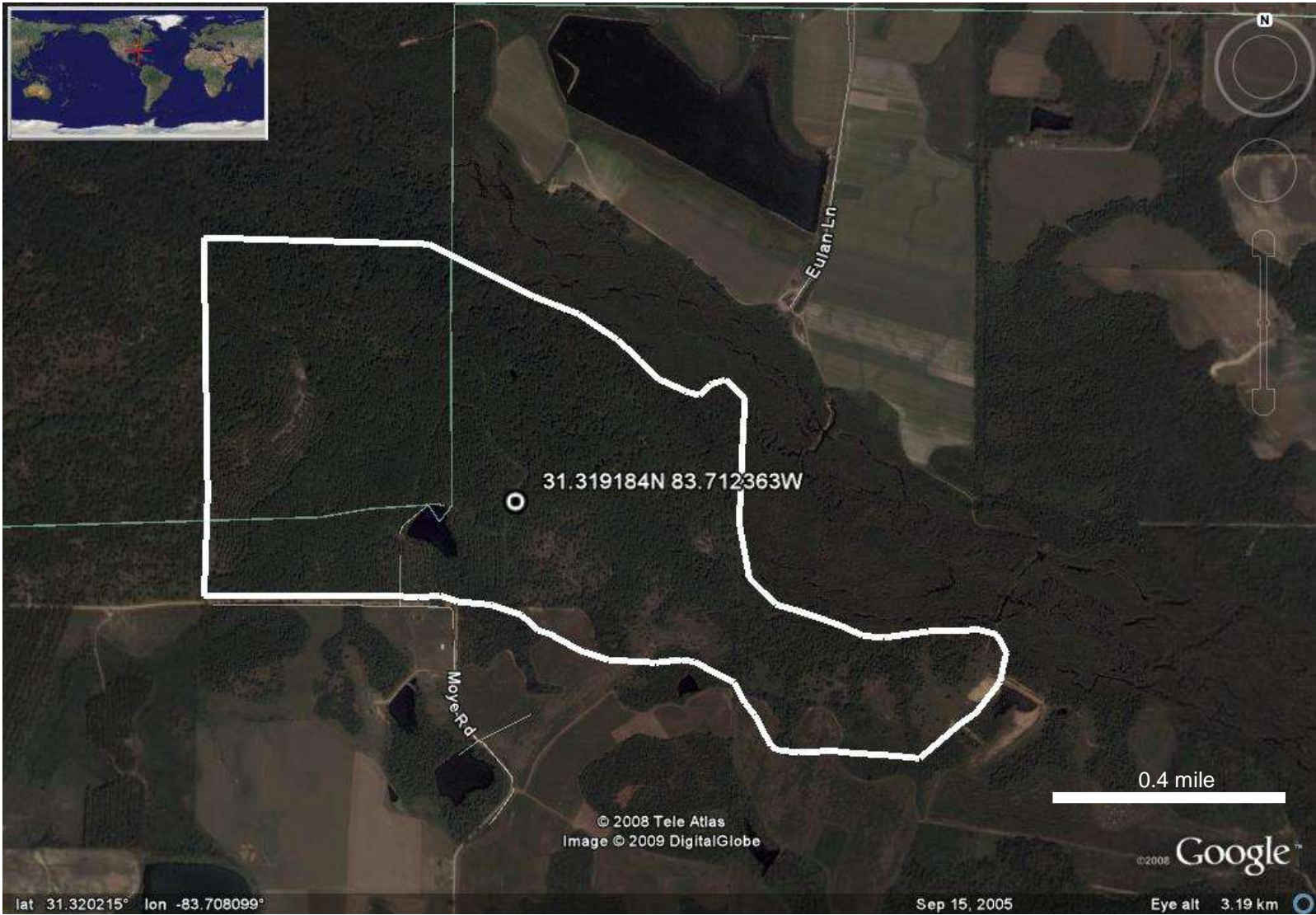


Figure F23. Huber Tract, along north side of Moye Road, west of Norman Park, Colquitt and Worth counties, Georgia. Survey area within white boundary.

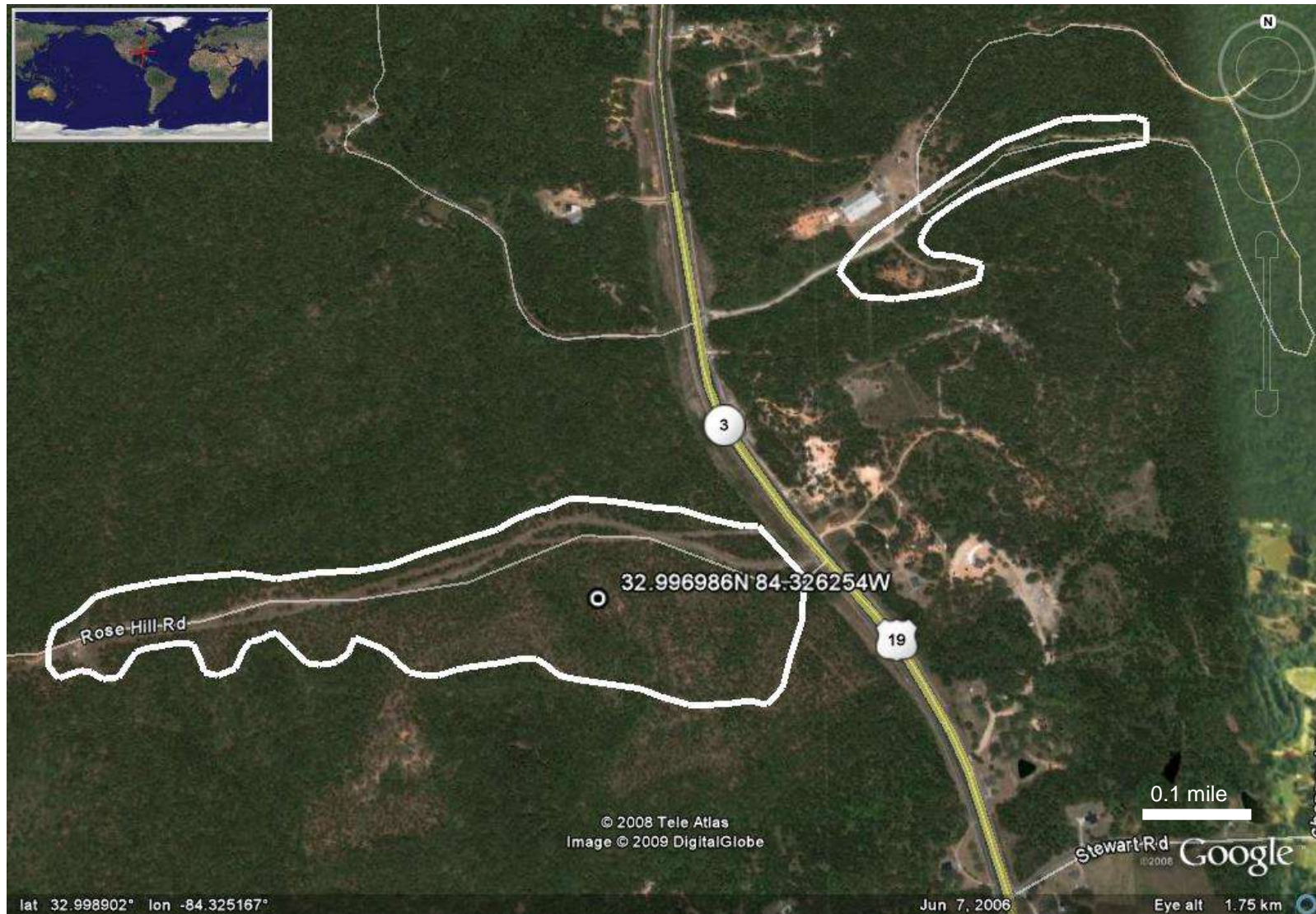


Figure F24. Indian Grave Mountain, ca. 2.5 miles SSE of Rose Hill, along east and west sides of Hwy. US 19, Pike County, Georgia. Survey areas within white boundaries.

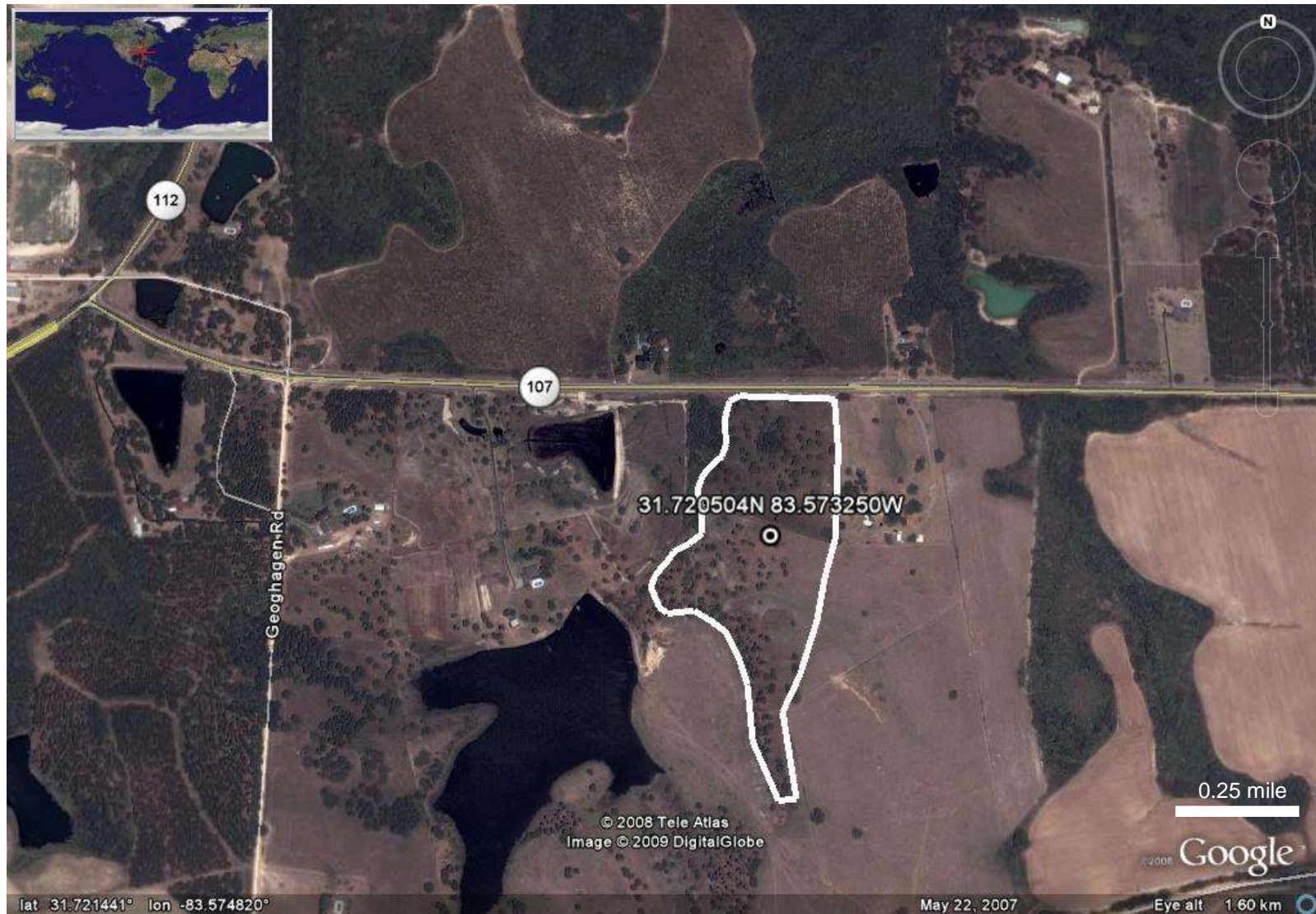


Figure F25. Ivie Tract, east of Ashburn, near junction Hwy. GA 112 and Hwy. GA 107, along south side of Hwy. GA 107, Turner County, Georgia. Survey area within white boundary.

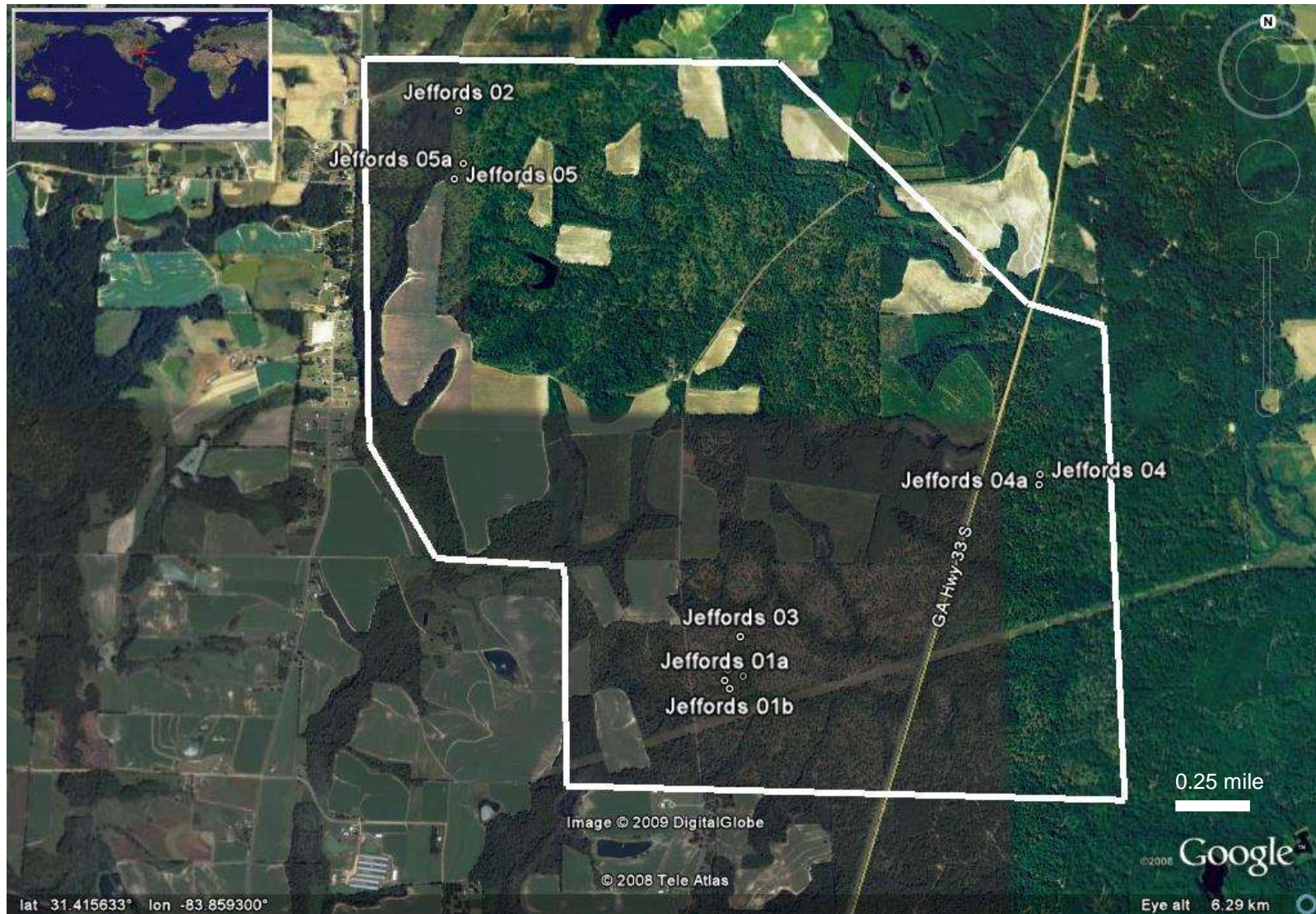


Figure F26. Jeffords Tract, along Hwy. GA 33, north of Anderson City, showing locations of *S. americana* EOs, Worth County, Georgia. Survey area within white boundary.

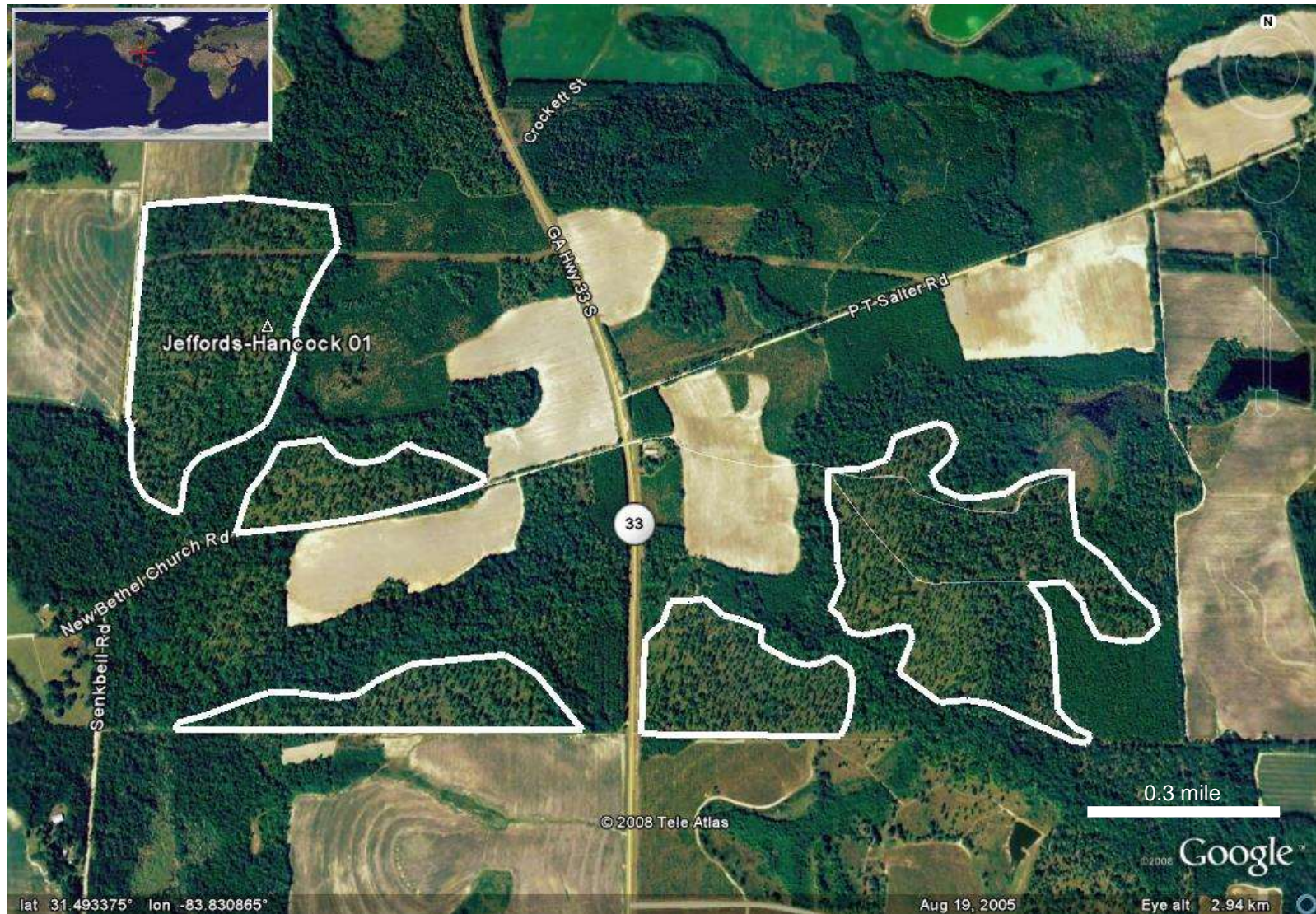


Figure F27. Jeffords-Hancock Place and other Jeffords properties south of Sylvester, showing location of *S. americana* EO, Worth County, Georgia. Survey areas within white boundaries.

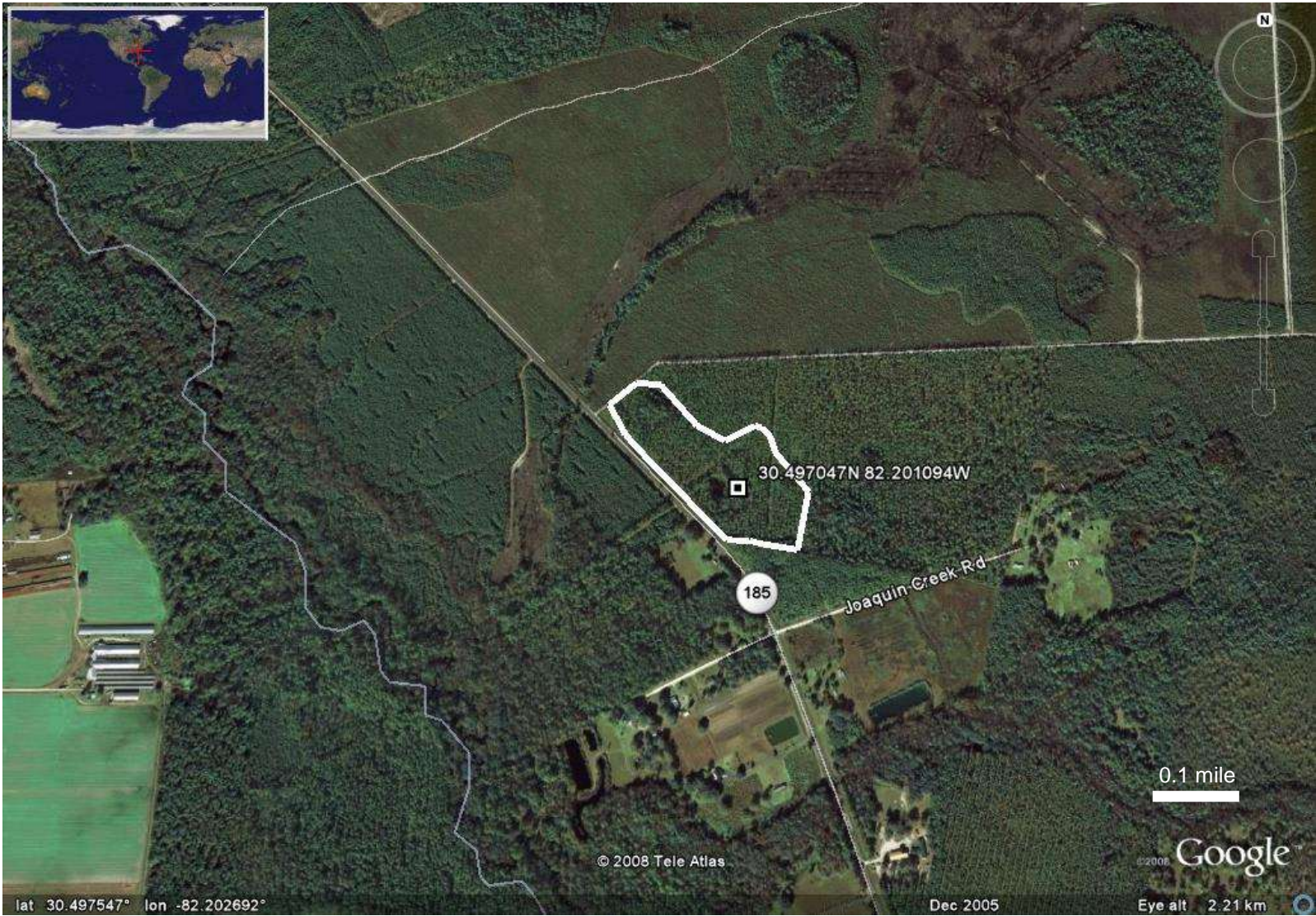


Figure F28. Joaquin Creek, along northeast side Hwy. GA 185, south of Moniac, Charlton County, Georgia. Survey area within white boundary.



Figure F29. Kinderlou Plantation, south of Hwy. US 84, west of Valdosta, vic. Kinderlou, Lowndes County, Georgia. Survey areas within white boundaries.



Figure F30. Leabo Tract, west of Thomasville, along south side of Hwy. US 319 bypass, Thomas County, Georgia. Survey area within white boundary.

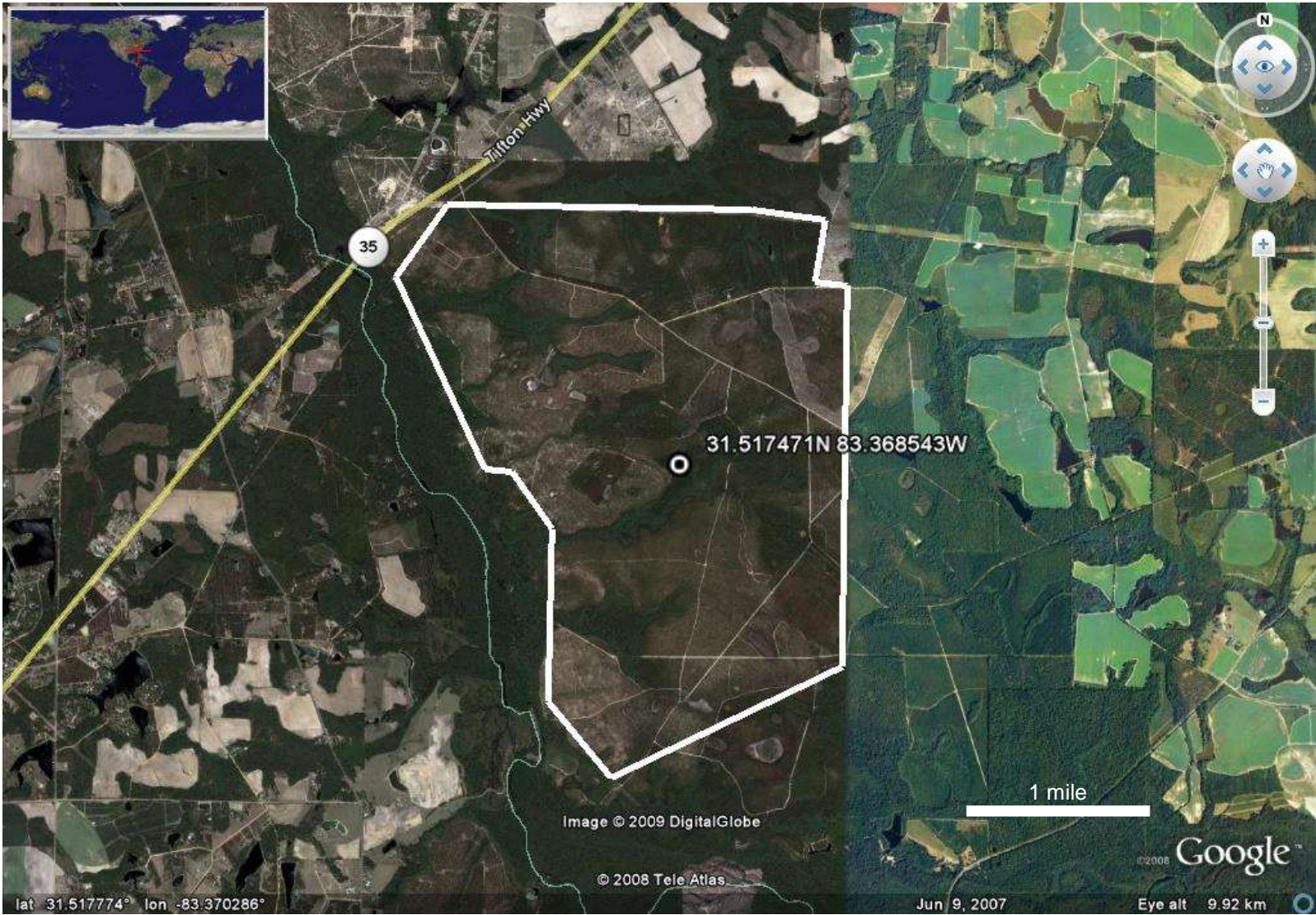


Figure F31. Lentile Tract, along south side of Hwy. GA 35, along east bank of Alapaha River, Irwin County, Georgia. Survey area within white boundary.

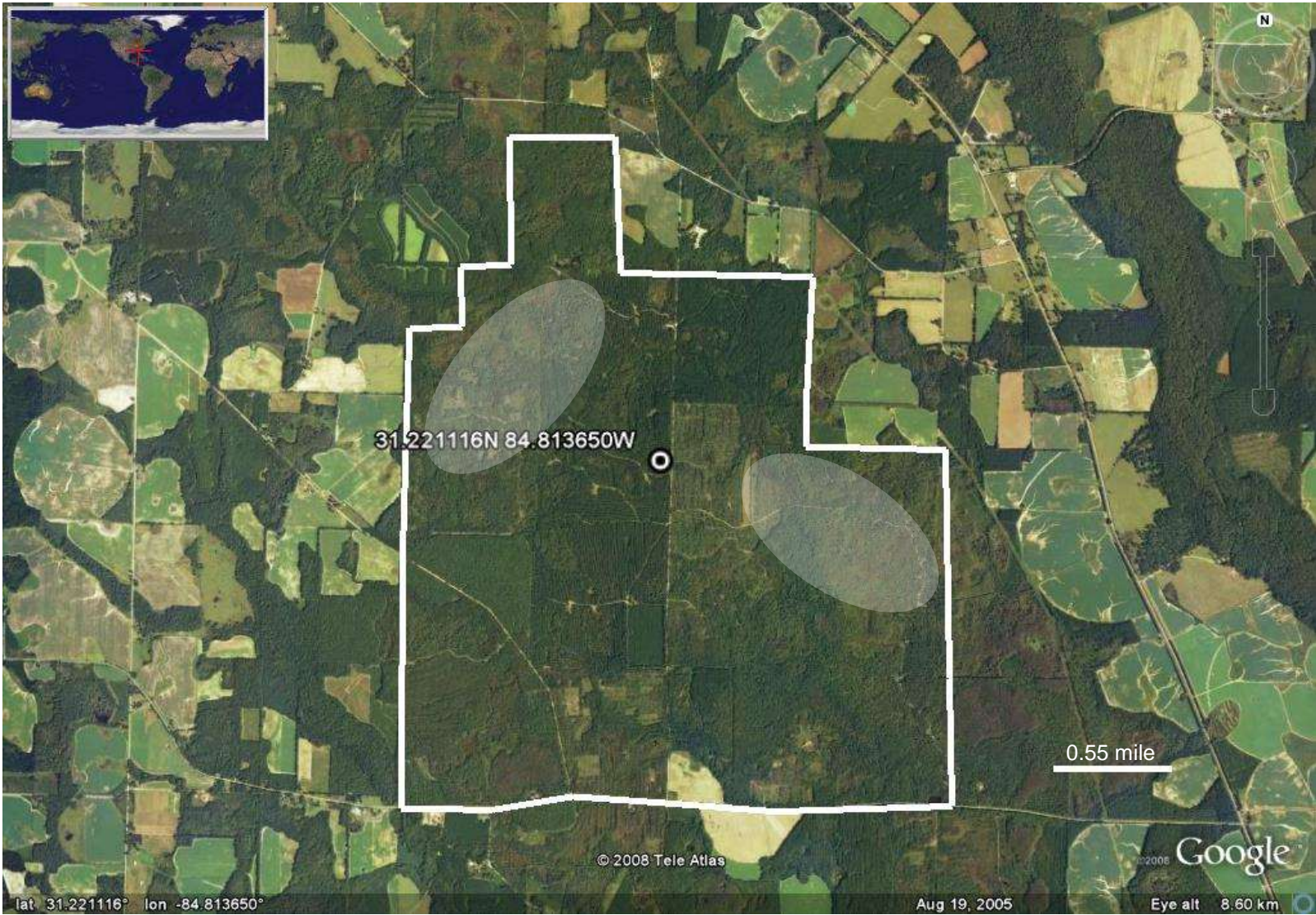


Figure F32. Mayhaw Wildlife Management Area, Miller County, Georgia. Survey area within white boundary; major upland areas shaded.

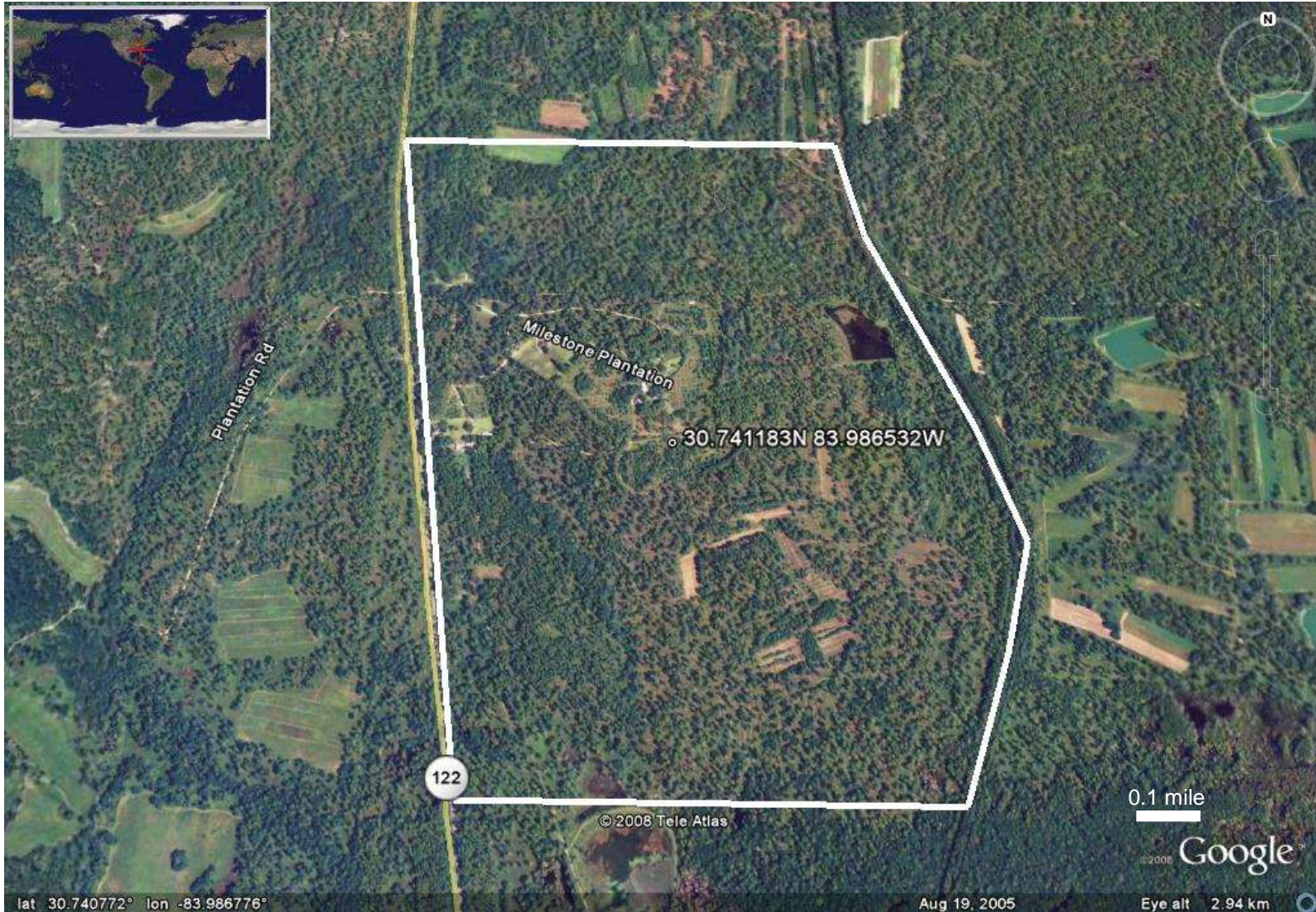


Figure F33. Milestone Plantation, south of Thomasville, east of Hwy. US 319, along east side of Metcalf Road, Thomas County, Georgia. Survey area within white boundary.

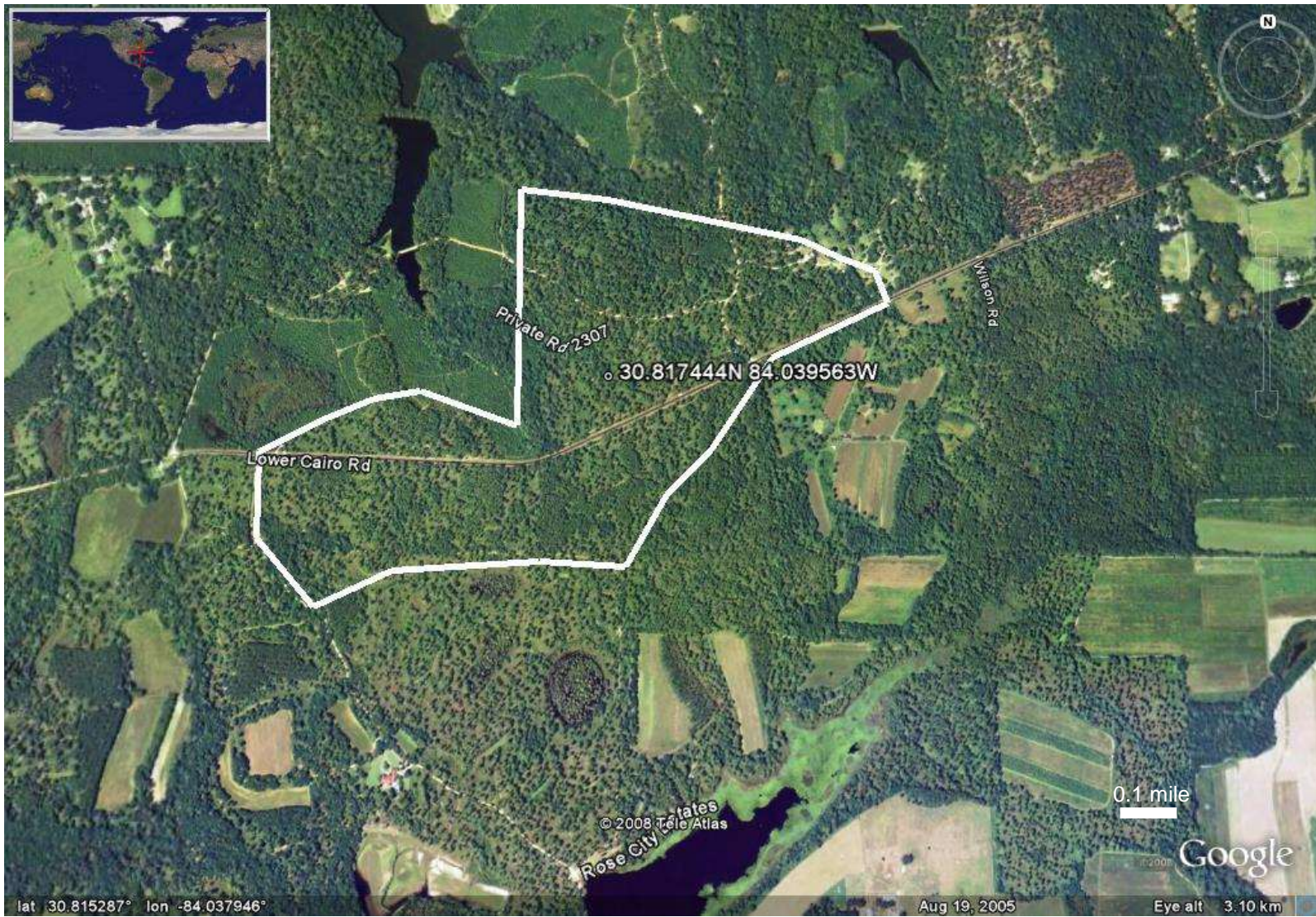


Figure F34. Myrtlewood Plantation, southwest of Thomasville, along Lower Cairo Road, Thomas County, Georgia. Survey area within white boundary.

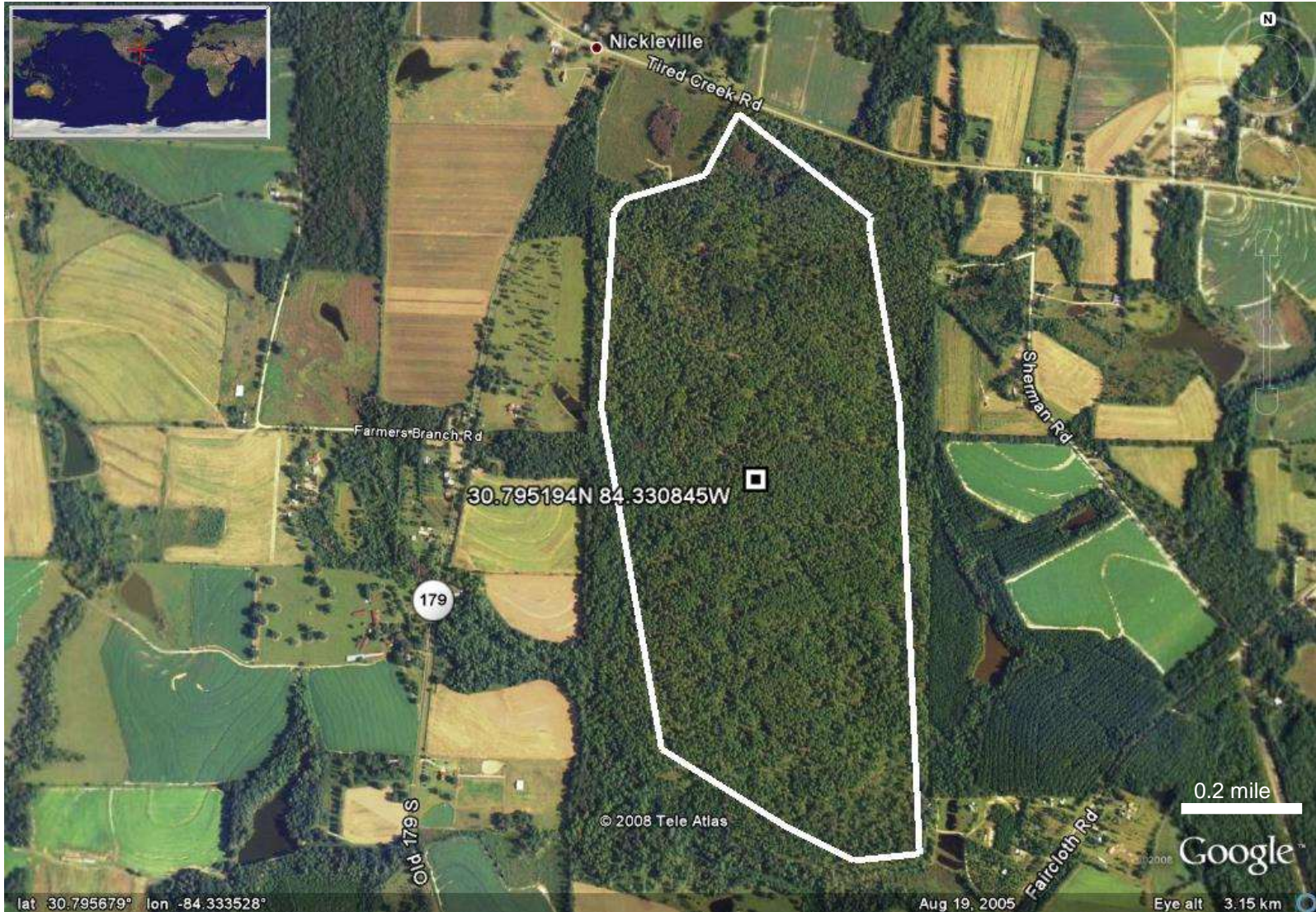


Figure F35. Nickleville Tract, east of Old Hwy. GA 170, south of Tired Creek Road, just south of jct. with Old Hwy. 170, vic. Nickleville, Grady County, Georgia. Survey area within white boundary.



Figure F36. Nilo Plantation, west side of Hwy. GA 91, showing locations of *S. americana* EOs, Dougherty County, Georgia. Survey area within white boundary.



Figure F37. Oakridge Farms, east of Sumner Road and south of Wrights Chapel Road, Worth County, Georgia. Survey area within white boundary.



Figure F38. Pineland Plantation, Baker County, Georgia. Survey area within white boundary.



Figure F39. Pinewood Plantation, along north side of Pleasant Grove Church Road, showing locations of *S. americana* EOs, Mitchell County, Georgia. Survey area within white boundary.



Figure F40. Piñon Point, southeast of Quitman, Brooks County, Georgia. Survey area within white boundary.

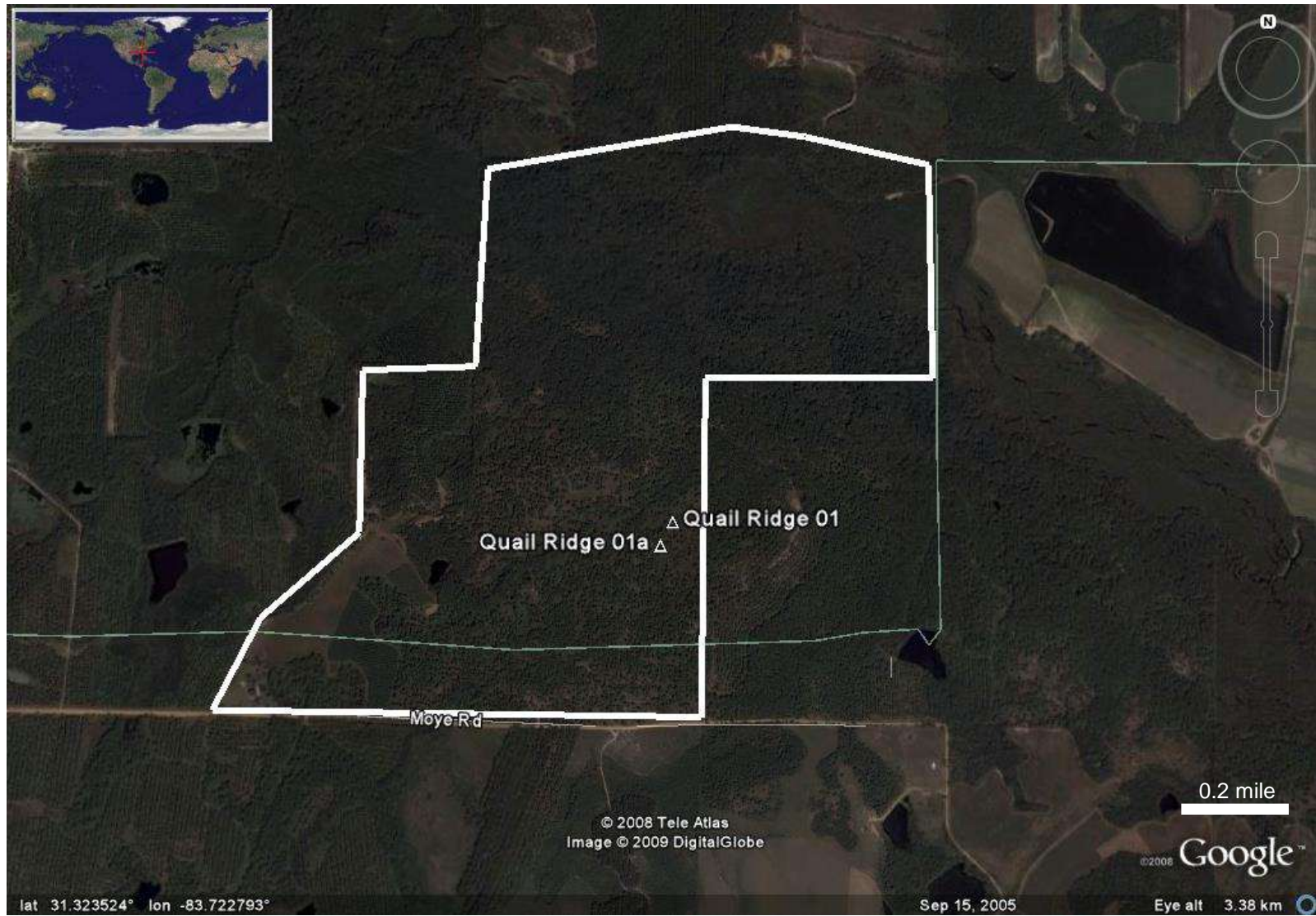


Figure F41. Quail Ridge, ca. 4.41 airmiles NW of Norman Park, along north side of Moye Road, showing locations of *S. americana* EOs, Worth County, Georgia. Survey area within white boundary.

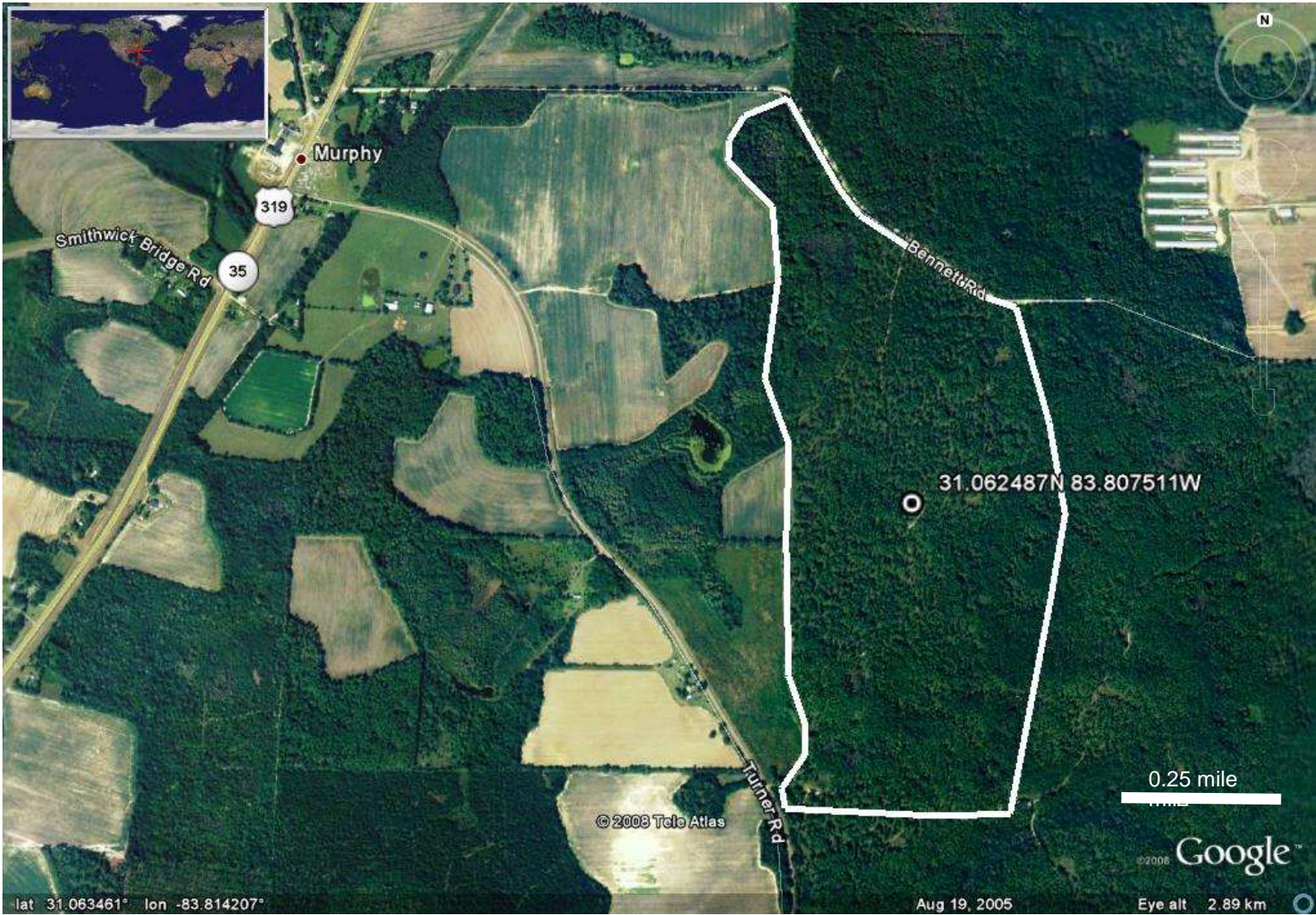


Figure F42. Reddick Track, east of Hwy. US 319 at Murphy, Colquitt County, Georgia. Survey area within white boundary.



Figure F43. Riverbend Plantation, off Clyattville-Nankin Road, vic. Nankin, Brooks County, Georgia. Survey area within white boundary.



Figure F44. Rivercreek Wildlife Management Area, south of Hwy. US 84, west of Thomasville, Thomas County, Georgia. Survey area within white boundary.

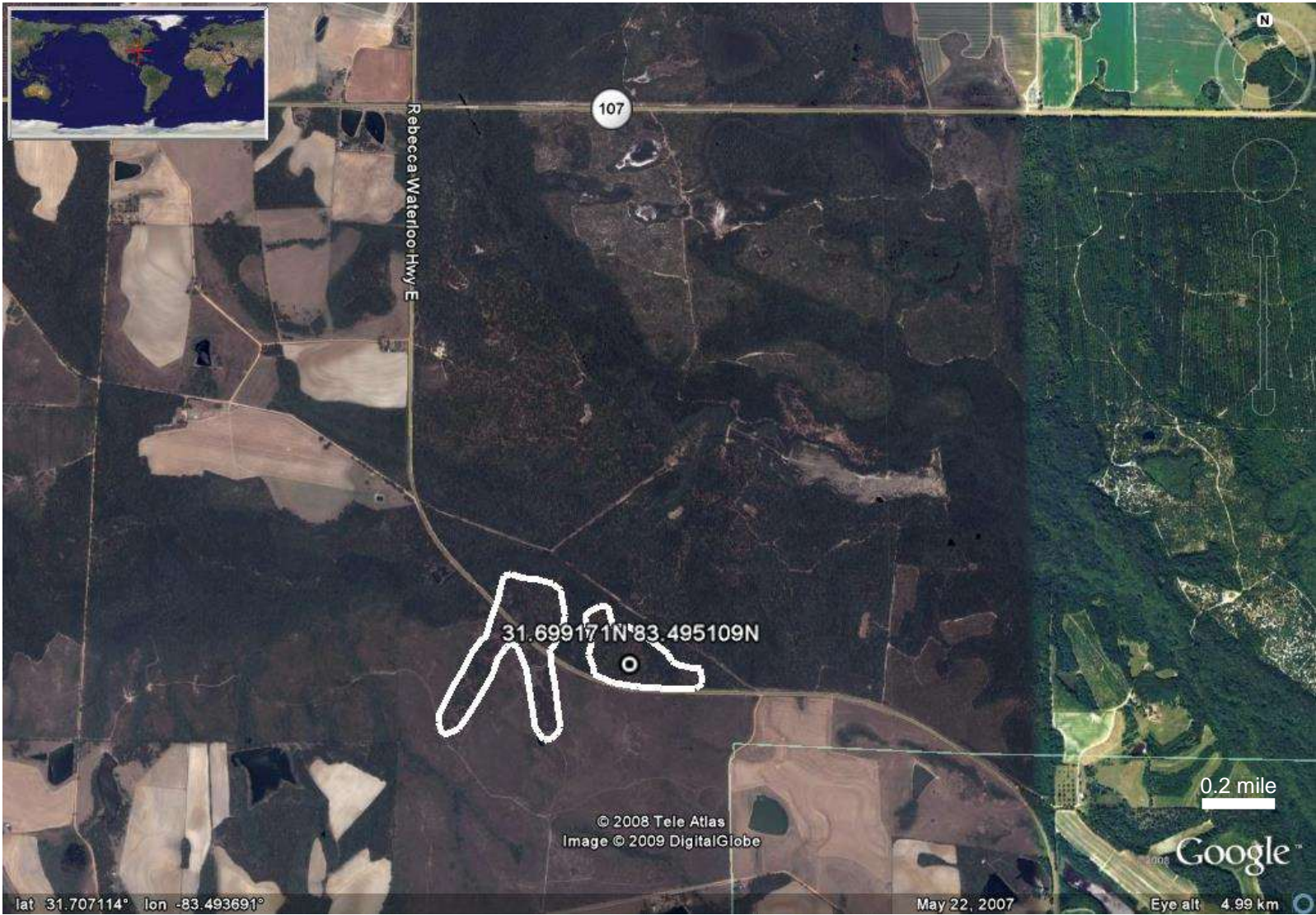


Figure F45. Ross Lake Tract, along Rebecca-Waterloo Rd, ca. 1.8 miles southeast of jct. Rebecca-Waterloo Road and Hwy. GA 107, Turner County, Georgia. Survey areas within white boundaries.

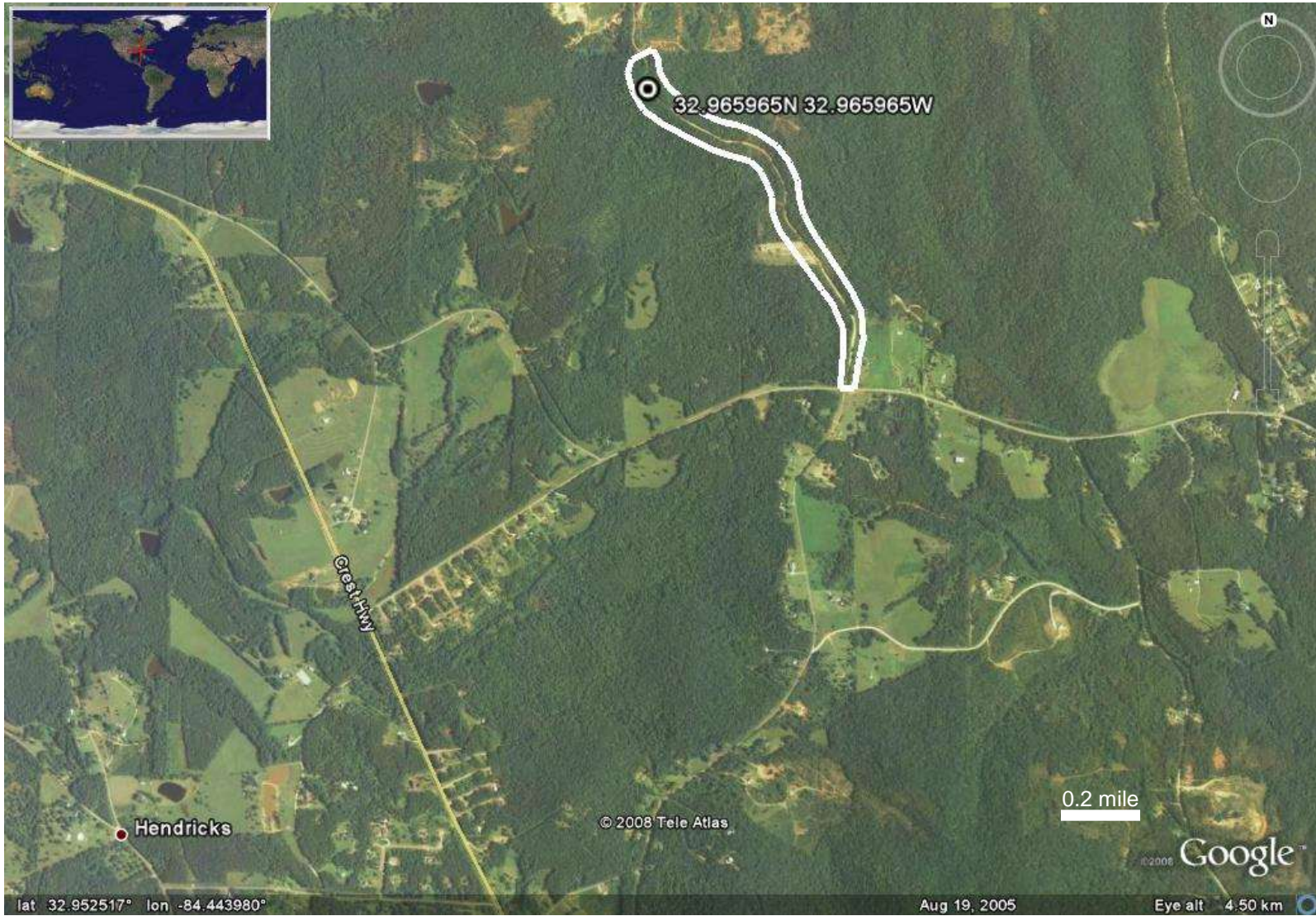


Figure F46. Salter Mountain, along Fire Tower Road, off Hwy. GA 74 and Jeff Davis Road, north of Crest, Upson County, Georgia. Survey area within white boundary.

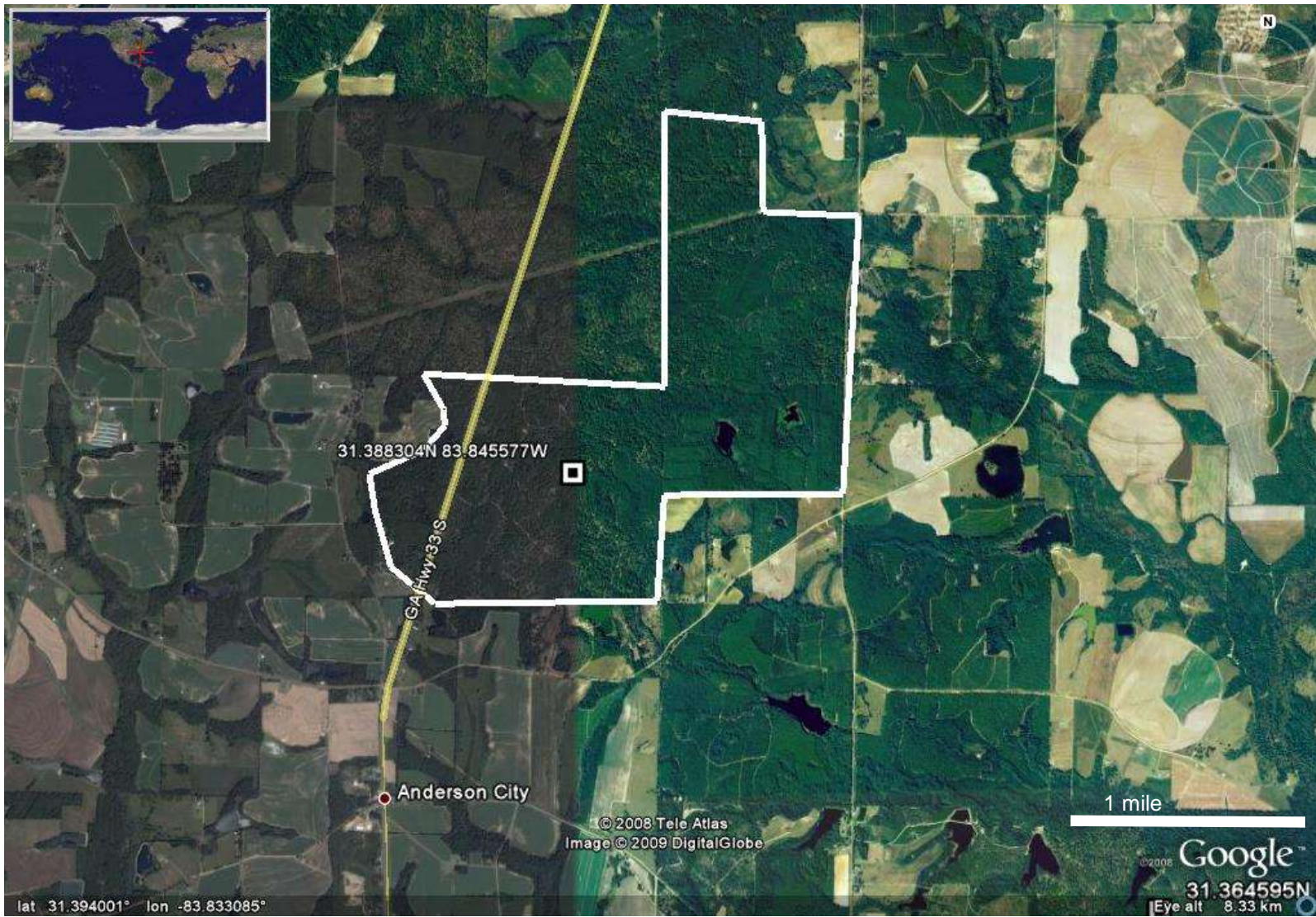


Figure F47. Samara Plantation, along Hwy. GA 33, north of Anderson City, Worth County, Georgia. Survey area within white boundary.



Figure F48. Seminole State Park, along south side of Hwy. GA 253, Seminole County, Georgia. Survey area within white boundary.

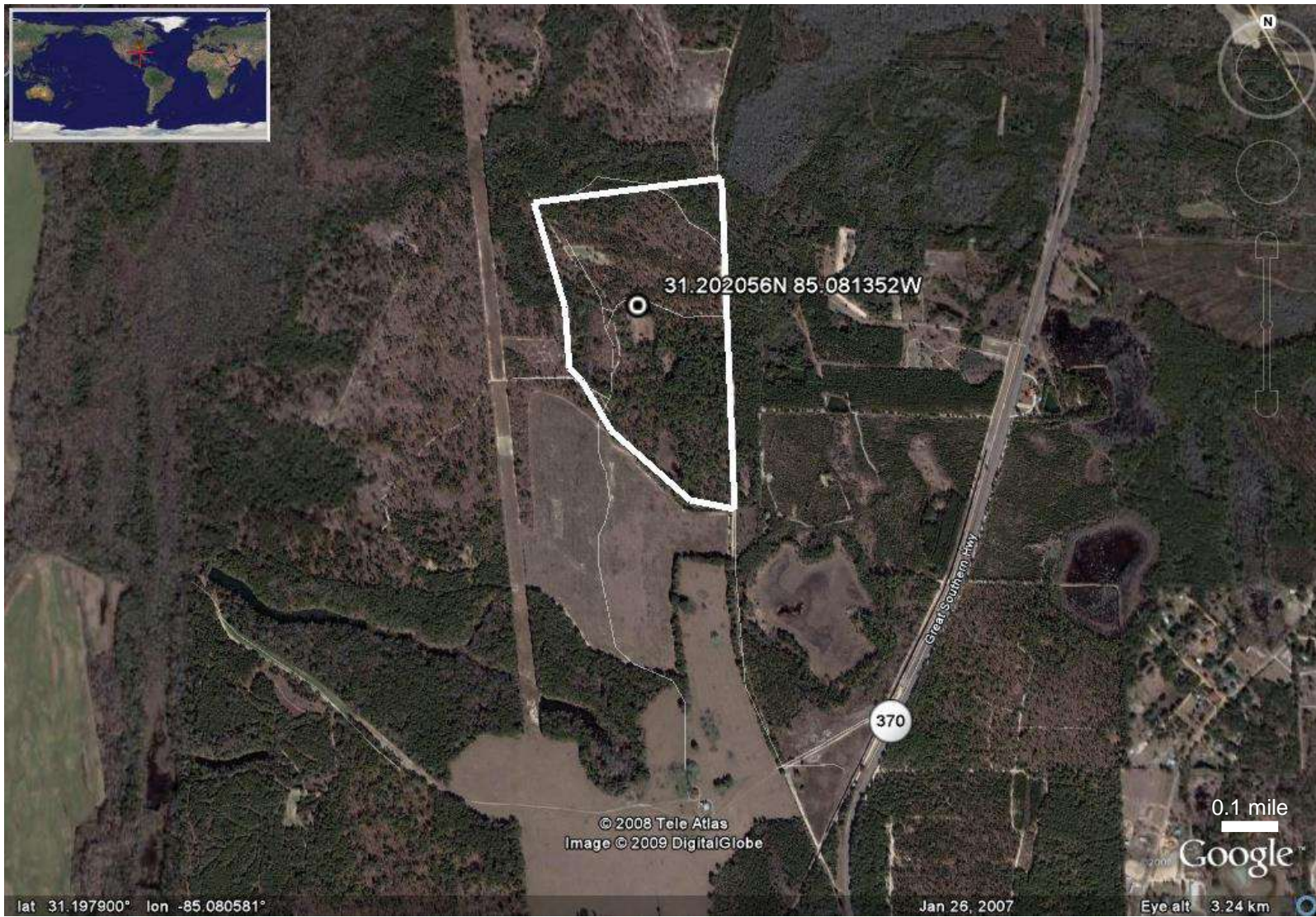


Figure F49. Shackleford-Williams TNC Preserve, 2.9 airmiles WNW of Cedar Springs, Early County, Georgia. Survey area within white boundary.

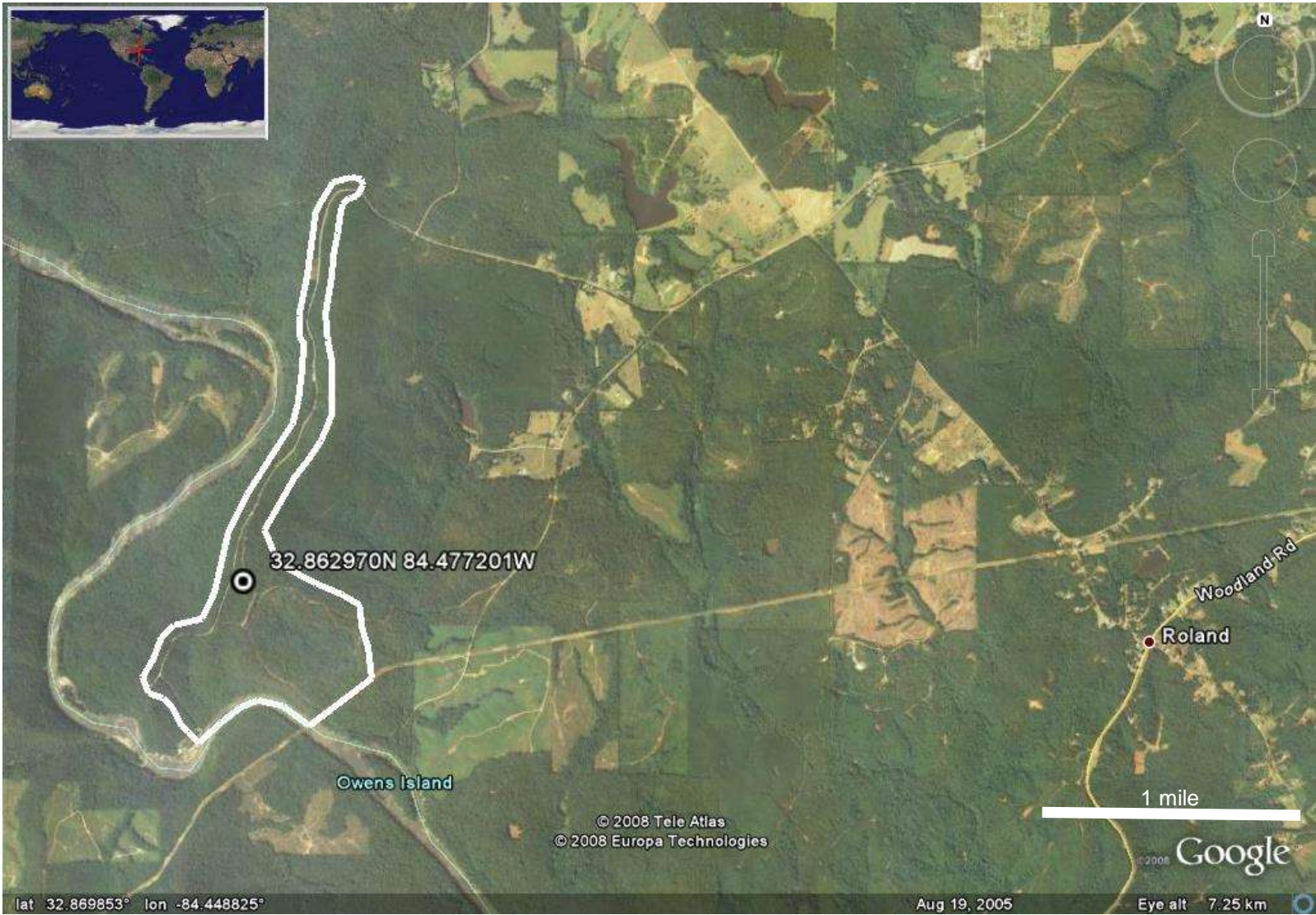


Figure F50. Sprewell Bluff State Park, along the Flint River, ca. 10 miles west of Thomaston, Upson County, Georgia. Survey area within white boundary.

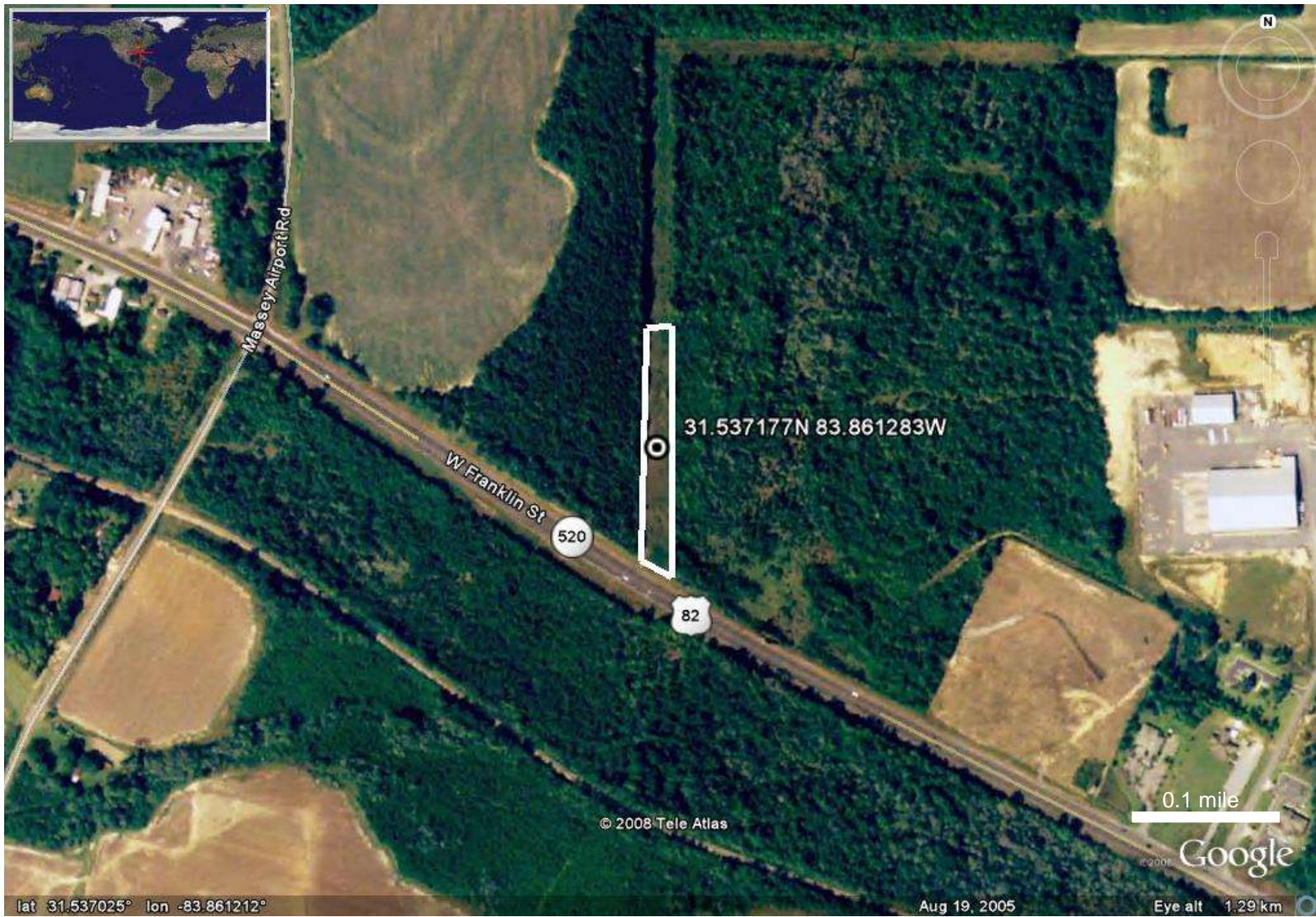


Figure F51. Sylvester ROW, along north side of Hwy. US 84, west of Sylvester, Worth County, Georgia. Survey area within white boundary.



Figure F52. Tift Farms, along north side of Wiley Branch Road at junction of Wiley Branch Road and Branch Road, Tift County, Georgia. Survey area within white boundary.



Figure F53. Union Church Tract, along east side Hwy. GA 91, southeast of Union Church, south of Enterprise, Miller County, Georgia. Survey area within white boundary.



Figure F54. Waterloo Tract, southwest of the junction of Hwy. GA 32 and Waterloo-Rebecca Hwy., Turner and Irwin counties, Georgia. Survey area within white boundary.

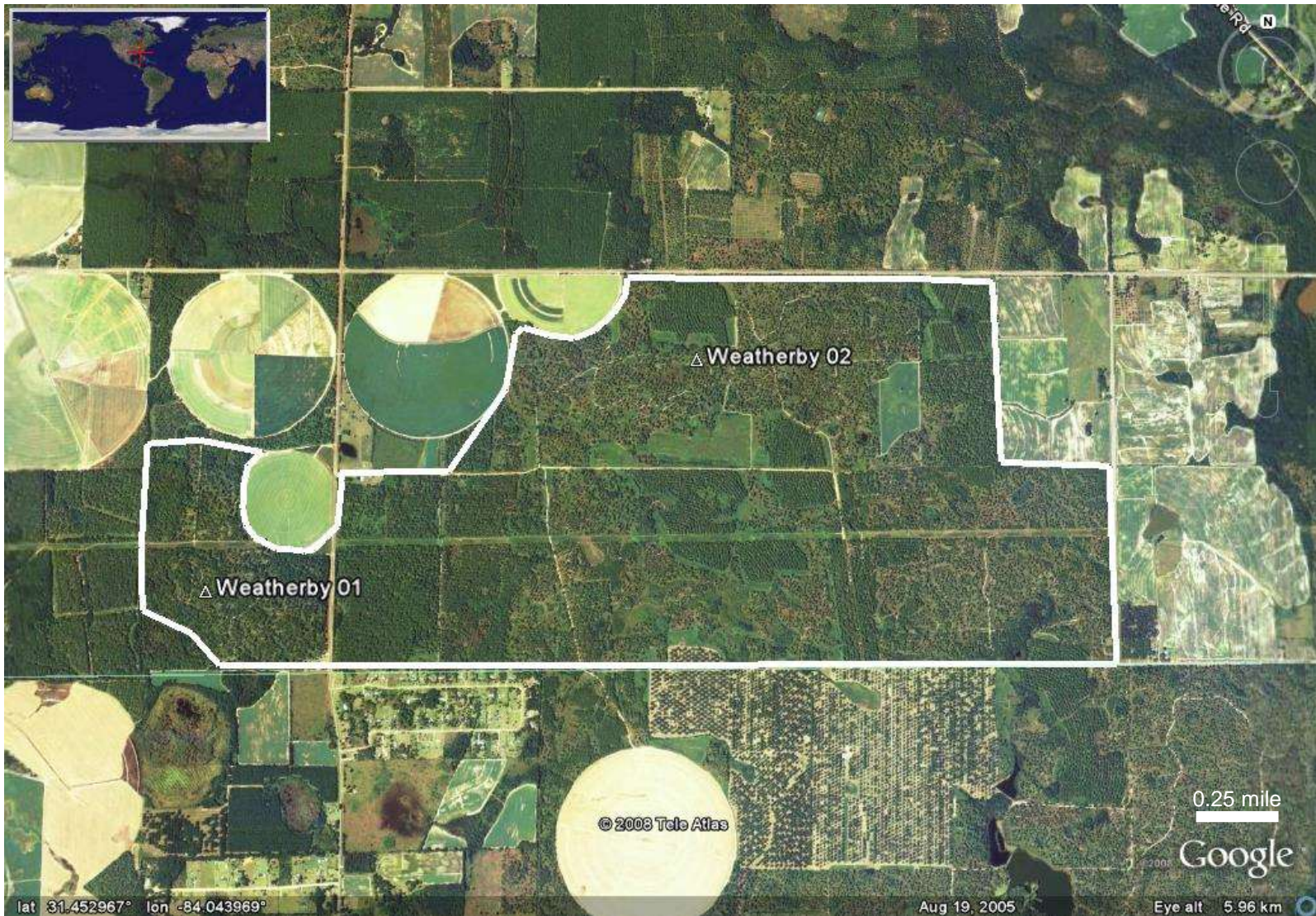


Figure F55. Weatherby Place, along Gravel Hill Road and Nelms Road, showing locations of *S. americana* EOs, Dougherty County, Georgia. Survey area within white boundary.

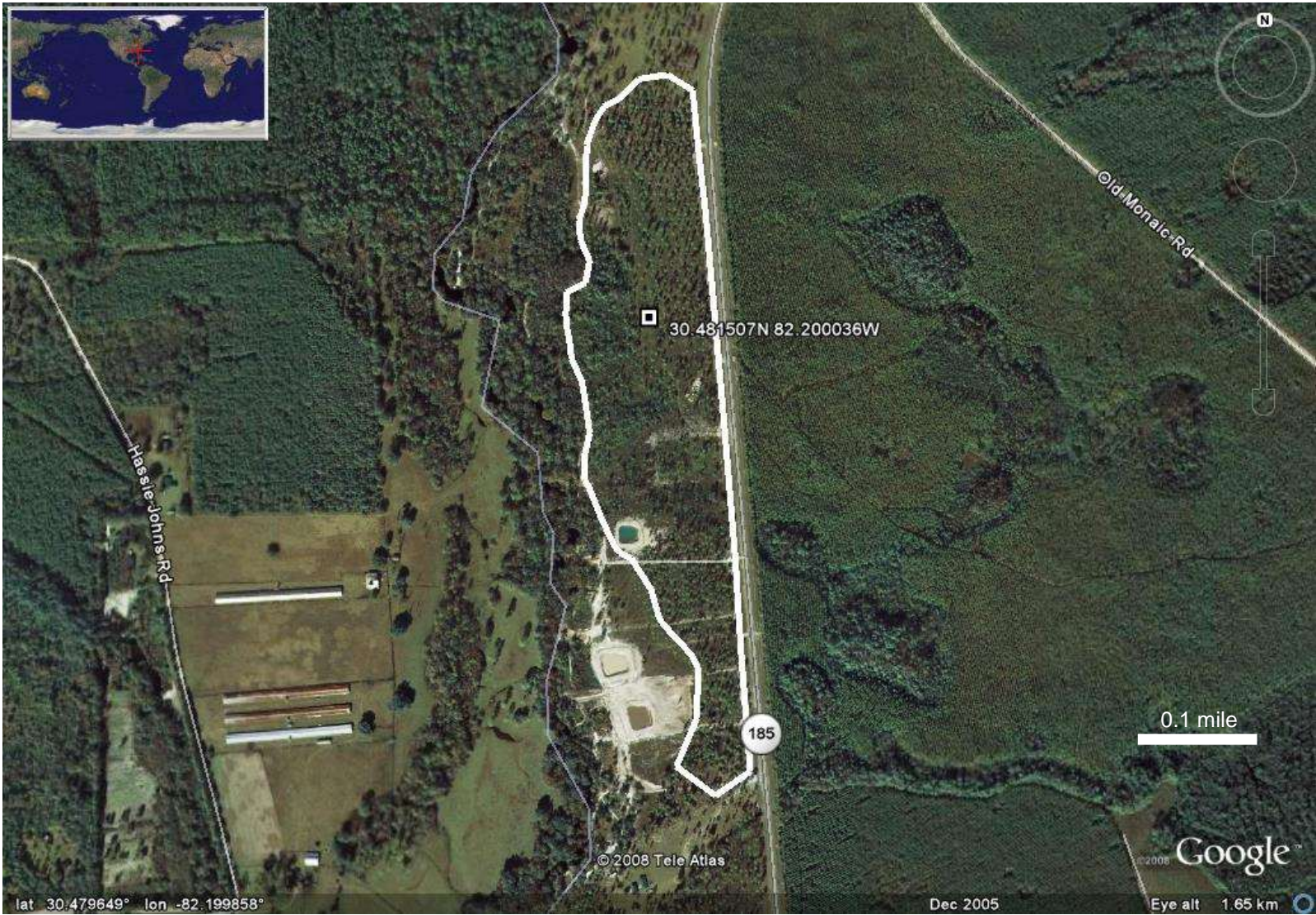


Figure F56. Williams Tract, along west side of GA Hwy. 185, south of Moniac, Charlton County, Georgia. Survey area within white boundary.

Appendix G. Negative results of *Schwalbea americana* survey

06 July 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Brooks County: Piñon Point Plantation, SE Grooverville, SW Piscola; Fig. F40

Owner: Mike Shea

Survey parameters/results: fresh burn, good survey conditions, most potential habitat surveyed; no *Schwalbea* observed

GPS point taken within search area: 30.6834000N 83.6909833W

10 July 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Worth County: Samara Plantation, just N Anderson City, adjacent to Jeffords Tract; Fig. F47

Owner: Victor Beadles

Survey parameters/results: fresh burn, good survey conditions, most potential habitat surveyed; surprised no *Schwalbea* found, since populations were observed nearby on Jeffords property in same habitat

GPS points taken within search area:

31.3852667N 83.8504500W

31.3856667N 83.8505833W

11 July 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Worth and Colquitt counties: Huber Tract, adjacent to Quail Ridge; Fig. F23

Owner: Victor Beadles

Survey parameters/results: quick survey, less than ideal conditions, i.e., raining and one-year rough; most potential habitat surveyed; no *Schwalbea* observed

GPS point taken within search area: 31.3168667N 83.7082500W

11 July 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Colquitt County: Barker Tract, along north side of Moye Road, vic. Crosland and Norman Park; Fig. F6

Owner: Victor Beadles

Unlikely habitat, mostly old field pineland

Survey parameters/results: fresh burn, no *Schwalbea* observed

11 July 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Colquitt County: Page Tract, along south side Moye Road, vic. Norman Park and Crosland; Fig. F6

Owner: Victor Beadles

Survey parameters/results: fresh burn, some likely habitat, no *Schwalbea* observed

Other specialties observed:

Balduina atropurpurea

Sporobolus teretifolius

Stokesia laevis

12 July 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Colquitt County: Carlton Farms, SW Moultrie, off north side Lower Meigs Road
 Owner: John Carlton; Fig. F11
 Survey parameters/results: likely habitat, but one-year rough; no *Schwalbea* observed
 One point taken within search area: 31.1487167N 83.8066667W
 Recommendations: should be surveyed after fresh burn

12 July 2007

Surveyors: W. Wilson Baker and Richard Carter
 Georgia. Colquitt County: Ashburn Hill Plantation, along south side Paul Murphy Road; Fig. F3
 Owner: Mr. Pidcock
 Survey parameters/results: only surveyed parts with fresh burn; no *Schwalbea* observed
 Two points taken within search area:
 31.1389333N 83.8483333W
 31.1390833N 83.8495000W
 Recommendations: other areas should be surveyed after fresh burn

18 July 2007

Surveyors: R. Carter and W.W. Baker
 Georgia. Turner County: Ivie Tract, east of Ashburn; Fig. F25
 Owner: Stephen Ivie
 Survey parameters/results: recently burned; no *Schwalbea* found

18 July 2007

Surveyors: W. Wilson Baker and Richard Carter
 Georgia. Turner County: Little River Plantation (Davis-Ward Property), including Ross Lake
 (under different ownership as of 2007); Fig. F 45
 Owner: Michael Ward
 Survey parameters/results: on-site request for access denied
 Recommendations: extensive areas with longleaf pine/native ground cover should be surveyed
 after fresh burn

19 July 2007

Surveyors: W. Wilson Baker and Richard Carter
 Georgia. Early County: Shackelford-Williams TNC Preserve; Fig. F49
 GPS points taken within search area:
 31°12.090'N 85°04.871'W
 31°11.871'N 85°04.824'W
 31°11.835'N 85°04.710'W
 31°11.691'N 85°04.686'W
 Survey parameters/results: upland areas recently burned, no *Schwalbea* observed, occurrence
 unlikely

25 July 2007

Surveyors: W. Wilson Baker and Richard Carter
 Georgia. Colquitt and Thomas counties: Cassique Plantation; Fig. F12
 Owner: Charles Griffin
 Survey parameters/results: fairly thorough survey under ideal conditions, i.e., fresh burn; no
Schwalbea observed
 GPS points taken within search area:
 31.0464667N 83.9931167W
 31.0486500N 83.9931833W

31.0298167N 84.0037667W

31.0378167N 84.0005167W

Other specialties observed: *Callirhoe papaver*

Recommendations: additional survey probably not warranted

31 July 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Decatur County: Hand Tract (240 acres), south side Hwy. US 84, just west of Climax, both sides of Harrell Mill Road, east of Hidden Springs Subdivision; longleaf pine / wiregrass savanna; high site with clay base and *Quercus marilandica*; Fig. F22

Owner: Balfour

Survey parameters/results: good conditions, mostly burned in 2007, some portions too woody; no *Schwalbea* found

General point: UTM 16 742914E 3418890N (NAD27)

31 July 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Decatur County: Smith Tract, along John Rich Road, east of Route 310; Fig. F16

Owner: Balfour

Survey parameters/results: conditions not good, mostly one-year rough; no *Schwalbea* found and not very likely

General point: UTM 16 718613E 3420768N (NAD27)

31 July 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Decatur County: Buffalo Pond Wildlife Management Area; Fig. F8

Owner: U.S. Army Corps of Engineers, managed by Georgia Department of Natural Resources

Survey parameters/results: a few small patches with some potential for *Schwalbea*, mostly too woody because of previous absence of fire; no *Schwalbea* found

GPS point taken within search area: 31.8475500N 84.7600667W

31 July 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Decatur County: Silver Lake Tract and Hog Farm Tract

Owner: International Paper Company; Georgia Department of Natural Resources as of late 2007

Survey parameters/results: not surveyed because of permit issues and sale negotiations underway

Recommendations: extensive areas with longleaf pine/native ground cover should be surveyed in future after fresh burn

31 July 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Decatur County: Seminole State Park; Fig. F48

Owner: Georgia Department of Natural Resources

Survey parameters/results: quick check, one-year rough; *Schwalbea* neither found nor very likely

Other specialties observed:

Croton elliotii

01 August 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Decatur County: Cook-Moore Tract, 1.84 airmiles north of Hwy. GA 253, along east side Hwy. GA 310 (Yates Springs Road); north boundary borders Smith Tract (Balfour); Fig. F16

Owner: Joe Livingston (managing forester)

Survey parameters/results: ideal survey conditions, i.e., fresh burn; no *Schwalbea* found; *Pteridium aquilinum* and *Tephrosia virginiana* infrequent, perhaps too sandy/xeric for *Schwalbea*

GPS points taken within search area:

30.8879000N 84.7154833W

30.8912833N 84.7238000W

Other specialties observed:

Gopherus and *Geomys* common

01 August 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Seminole County: Balfour-Seminole Tract; ca. 5.8 airmiles N of Reynoldsville; Fig. F5

Owner: Mr. Balfour

Survey parameters/results: sub-optimal survey conditions, one-year rough; no *Schwalbea* found

GPS point taken within search area: 30.9480167N 84.7804333W

Other specialties observed:

Croton elliotii

Recommendations: extensive areas with longleaf pine/native ground cover should be surveyed in future after fresh burn

02 August 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Irwin and Turner counties: Waterloo Tract; west side of Rebecca-Waterloo Road, south of Hwy. GA 32; Fig. F54

Owner: Wayne Hightower (Ashburn, GA)

Survey parameters/results: optimal survey conditions, fresh burn; habitat appears favorable for *Schwalbea*, but none found

General point: UTM 17 264088E 3501435N (NAD83/WGS84)

02 August 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Tift County: Tift Farms, north side Wiley Branch Road; Fig. F52

Owner: Brumby; managing forester Ronald Halstead

Survey parameters/results: conditions sub-optimal, mostly one-year rough; *Schwalbea* neither seen nor likely

GPS point taken within search area: 31.5367833N 83.4637333W

02 August 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Colquitt County: Reddick Tract; 1.0 mile east of Hwy. US 319 at Murphy, south side Bennett Road; Fig. F42

Owner: Victor Beadles

Survey parameters/results: quick check, conditions optimal, fresh burn; site generally low flatwoods with little topographic relief; *Schwalbea* neither seen nor likely

GPS point taken within search area: 31.0635000N 83.8075167W

09 August 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Joaquin Creek Tract, south of Moniac, along east side Hwy. GA 185; Fig. F28

Owner: unknown

Survey parameters/results: small area, mostly converted to slash pine, but with some native ground cover still intact; fresh burn; no *Schwalbea* seen, unlikely

09 August 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Charlton County: Williams Tract, 3.2 miles south of Moniac, along west side Hwy. GA 185; Fig. F56

Owner: Williams family

Survey parameters/results: conditions optimal, fresh burn; no *Schwalbea* seen; previous visits during 2006 were also negative

GPS point taken within search area: 30.4815167N 82.1990833W

Other specialties observed:

Ctenium floridanum

Hartwrightia floridana

Verbesina heterophylla (state record)

14 August 2007

Surveyor: W. Wilson Baker

Georgia. Baker County: Pineland Plantation, north of Newton; Fig. F38

Owner: Mellon family

Survey parameters/results: original site struck by tornado 2007; because of tornado and subsequent salvage logging area greatly disturbed; no *Schwalbea* seen

Recommendations: survey original *Schwalbea* site after fresh burn; however, family seems reluctant to have additional survey work

16 August 2007

Surveyor: Richard Carter

Georgia. Miller County: Union Church Tract, north of Donaldsonville, vic. Union Baptist Church; ca. 0.25 mile east jct. Hwy. GA 91 and Lane Road, along south side Lane Road; 50-100 acre tract with longleaf pine/native ground cover; Fig. F53

Owner: unknown

Survey parameters/results: conditions optimal, fresh burn; no *Schwalbea* seen; portions of site with substantial soil disturbance

GPS point taken within search area: 31.1145333N 84.8324667W

26 Aug 2007

Surveyors: R. Carter and W.W. Baker

Georgia. Worth County: Sylvester Right-of-Way, 1.6 mi W Sylvester jct. Hwys. US 82 and GA 33, right-of-way extending north from Hwy. US 82; Fig. F51

Owner: unknown

Survey parameters/results: open boggy slope; no *Schwalbea* found, unlikely

GPS point taken within search area: 31°32.157'N 83°51.690'W

06 September 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Lowndes County: Kinderlou Plantation, west of Valdosta, south of Hwy. US 84; Fig. F29

Owner: Langdale family

Survey parameters/results: conditions sub-optimal, 1-to-2-year rough; no *Schwalbea* seen

GPS points taken within search area:

30.7898833N 83.3929000W

30.7805833N 83.3831500W

30.7757167N 83.4009500W

30.7802333N 83.3664500W

Other specialties observed:

Agalinis georgiana

Recommendations: continue to survey in future after fresh burn

08 September 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Pike County: Indian Grave Mountain; ca. 2.5 miles SSE of Rose Hill; east of Hwy. US 19, vic. Church at Grace Hill; elev. ~1000 ft; Fig. F24

Owner: unknown

Survey parameters/results: no *Schwalbea* seen

GPS point taken within search area: 33.0037667N 84.3181167W

Other specialties observed:

Calamintha georgiana? (R. Carter and W.W. Baker 18017, VSC)

Recommendations: search longleaf pine sites after fresh burn

08 September 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Pike County: Indian Grave Mountain; ca. 2.5 miles SSE of Rose Hill; west of Hwy. US 19 at pass; along road to radio tower; crest and upper slope of ridge; elev. ~1136; Fig. F24

Owner: unknown

Survey parameters/results: no *Schwalbea* seen

GPS point taken within search area: 32.9977167N 84.3274500W

Other specialties observed:

Calamintha georgiana? (no voucher made)

Recommendations: search longleaf pine sites after fresh burn

08 September 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Upson County: Camp Thunder, Boy Scout Reservation, northwestern portion of Upson County, off Hwy. GA 74 (Crest Hwy.) and Thundering Springs Road; Fig. F10

Owner: Boy Scouts of America

Survey parameters/results: briefly searched recently burned crest and upper slopes; herbaceous flora generally depauperate; no *Schwalbea* seen, and unlikely

GPS point taken within search area: 32.8563833N 84.4762167W

08 September 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Upson County: Salter Mountain; along Fire Tower Road, 1.2 miles NNW of jct. Fire Tower Road and Jeff Davis Road; off Hwy. GA 74 (Crest Hwy.); elev. ~1160 ft; ridge crest and upper slopes with *Pinus palustris* (including old growth), *P. taeda*, *Quercus marilandica*, *Q. prinus*, *Q. stellata*, *Carya pallida*, *Prunus alabamensis*, *Diospyros virginiana*, *Vaccinium arboreum*, *Tephrosia virginiana*; Fig. F46

Owner: unknown

Survey parameters/results: no *Schwalbea* seen
 GPS point taken within search area: 32.9677833N 84.4453333W
 Other specialties observed:
Calamintha georgiana? (no voucher made)
 Recommendations: search longleaf pine sites after fresh burn

09 September 2007

Surveyors: W. Wilson Baker and Richard Carter
 Georgia. Upson County: Sprewell Bluff State Park; crest and upper slopes downstream from picnic and river access area; Fig. F50
 Owner: Georgia Department of Natural Resources
 Survey parameters/results: searched recently burned crest and upper slopes; herbaceous flora generally depauperate; no *Schwalbea* seen
 GPS point taken within search area: 32.8563833N 84.4762167W
 Recommendations: discussions with Nathan Clause (GA DNR) indicate possible *Schwalbea* habitat in pine dominated woods on west side Flint River, DNR land opposite Sprewell Bluff State Park; this area should be surveyed after fresh burn

14 September 2007

Surveyors: W. Wilson Baker and Richard Carter
 Georgia. Camden County: Clarks Bluff (former Guggenheim property); west end of Clarks Bluff Road, bordering St. Marys River; one of few remaining areas with longleaf/native ground cover in Camden County; Fig. F14
 Owner: Walter Merck
 Survey parameters/results: good survey conditions in longleaf/native ground cover area on fresh burn (southern part of tract); no *Schwalbea* found
 GPS points taken within search area:
 30.7765500N 81.7791000W
 30.7745667N 81.7830000W
 30.7726000N 81.7761500W
 30.7724833N 81.7762500W
 Other specialties observed:
Anthaenantia villosa – local; 30.7726000N 81.7761500W
Ctenium floridanum – rare and local; 30.7724833N 81.7762500W
Asimina pygmaea – rare and local; 30.7724833N 81.7762500W
Asclepias connivens – found in area, earlier trip
Platanthera nivea – found in area, earlier trip
 Recommendations: encourage owner to continue burning and re-initiate fire in longleaf pine/native ground cover areas not recently subject to burning

15 September 2007

Surveyors: W. Wilson Baker et al.
 Georgia. Thomas County: River Creek Wildlife Management Area; west of Thomasville; Fig. F44
 Owner: Georgia Department of Natural Resources
 Survey parameters/results: most pineland of lower flatwoods forest type, unlikely habitat for *Schwalbea*; no *Schwalbea* seen during surveys by W.W. Baker, R. Carter, G. Nelson and P. Spivey, T. Patrick, R. Kral during 2006-2007
 General point: UTM 16 781051E 3416958N (NAD27)
 Recommendations: continue to monitor appropriate habitat after fresh burn

15 October 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Camden County: Colerain, area east of Charlton County line and south of Hwy. GA 40; Fig. F15

Owner: Varn family

Survey parameters/results: property also surveyed during 2006, prior to formal initiation of *Schwalbea* project; potential longleaf pine/native ground cover, but most not burned for many years; no *Schwalbea* found

GPS point taken within search area: 30°50.295'N 81°53.973'W

Recommendations: continue burning and gradually re-initiate fire in areas not recently burned; survey after fresh burn

27 September 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Worth County: Arrowhead Farms; 1.2 miles west of jct. Sumner Road and Phillip Causey Road; elev. ~320 ft; Fig. F2

Owner: Jimmy Jeter

Survey parameters/results: optimal conditions, fresh burn; habitat appears to have high potential, but no *Schwalbea* found

GPS points taken within search area:

31.3634000N 83.7869833W

31.3688833N 83.7961000W

31.3652833N 83.7977500W

Other specialties observed:

Balduina atropurpurea

Pteroglossapsis ecristata

Recommendations: continue regular burning

27 September 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Worth County: Oakridge Farms; Fig. F37

Owner: Cody Laird

Survey parameters/results: optimal conditions, fresh burn; habitat appears to have high potential, but no *Schwalbea* found

GPS point taken within search area: 31.3494000N 83.7640667W

Other specialties observed:

Macranthera

Recommendations: continue regular burning

27 September 2007

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Colquitt County: Baker Tract, 0.65 mile south jct. Hwy. GA 37 and Tillman Road, along east side of Tillman Road; seepage slope along south side of tributary of Little River; Fig. F4

Owner: Merle Baker

Survey parameters/results: habitat not burned in years, resurvey for *Schwalbea* after burning

GPS point taken within search area: 31.1514667N 83.5864167W

Other specialties observed:

Sarracenia flava

S. minor

Recommendations: establish fire management program

12 October 2007

Surveyors: W. Wilson Baker, Richard Carter and Frankie Snow

Georgia. Coffee County: Broxton Rocks TNC Preserve; Fig. F7

Owner: The Nature Conservancy

Survey parameters/results: sizable areas of longleaf pine/native ground cover burned regularly in recent years; naturalist Frankie Snow has conducted intensive general surveys over many years; additionally, numerous botanists have visited this site through the years; habitat appears to have moderate potential, but no *Schwalbea* found

GPS points taken within search area:

31°43.936'N 82°51.496'W

31°44.623'N 82°51.628'W

Other specialties observed:

Portulaca biloba

Recommendations: continue regular burning; continue survey for *Schwalbea* and other special interest flora

12 October 2007

Surveyors: W. Wilson Baker, Richard Carter and Frankie Snow

Georgia. Coffee / Jeff Davis County: Flat Tub Wildlife Management Area; along north side of Hwy. GA 107, vic. county line; Fig. F19

Owner: Georgia Department of Natural Resources

Survey parameters/results: areas of longleaf pine/native ground cover burned regularly in recent years; naturalist Frankie Snow has conducted intensive general surveys over many years; habitat appears to have moderate potential, but no *Schwalbea* found

GPS point taken within search area: 31°46.557'N 82°50.132'W

Other specialties observed:

Portulaca biloba

Recommendations: continue regular burning; continue survey for *Schwalbea* and other special interest flora

07 June 2008

Surveyor: Richard Carter

Georgia. Brooks County: Riverbend Plantation, vic. Nankin; Fig. F43

Owner:

Survey parameters/results: habitat promising – longleaf pine / wiregrass managed with fire; whereas we were unsuccessful gaining access; survey restricted to roads and other publically accessible areas; habitat appears to have high potential, but no *Schwalbea* seen

GPS point taken within search area: 30.67007N 83.40188W

Recommendations: continue to pursue access permission for thorough survey in future

07 June 2008

Surveyor: Richard Carter

Georgia. Cook County: Cecil Bog, west of Cecil, along east side Hutchinson Pond Road; Fig. F13

Owner: Mr. Bennett, lives nearby

Survey parameters/results: small site, pitcherplant bog and adjacent upland, mostly degraded now and overgrown after conversion to slash pine plantation; RC has visited this site numerous times over the past five years; no *Schwalbea* found and not likely

12 June 2008

Surveyors: R. Carter and W.W. Baker

Georgia. Thomas County: Milestone Plantation; Fig. F33

Owner:

Survey parameters/results: recently burned upland areas with longleaf pine / wiregrass searched; no *Schwalbea* found

19 June 2008

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Grady County: Nickleville Tract; east of Old Hwy. GA 170, south of Tired Creek Road, just south of jct. with Old Hwy. 170, vic. of Nickleville; Fig. F35

Owner: Balfour

Survey parameters/results: frequently burned longleaf pine / wiregrass community with native ground cover; 1-year rough; habitat appears to have high potential, but no *Schwalbea* found

GPS point taken within search area: 30.79133N 84.33247W

Recommendations: continue regular burning; continue survey for *Schwalbea* and other special interest flora

19 June 2008

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Seminole County: Balfour-Seminole Tract; ca. 5.8 airmiles N of Reynoldsville; Fig. F5

Owner: Mr. Balfour

Survey parameters/results: extensive areas with longleaf pine / native ground cover; optimal survey conditions, site recently burned; habitat appears to have high potential, but no *Schwalbea* found

GPS point taken within search area: 30.9480167N 84.7804333W

Recommendations: continue to survey for *Schwalbea* and other specialties

09 July 2008

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Worth and Colquitt counties: Huber Tract, along north side of Moye Road, adjacent to Quail Ridge; Fig. F23

Owner: Victor Beadles

Survey parameters/results: some areas with longleaf pine / wiregrass; site recently burned, optimal survey conditions; habitat with longleaf pine / native ground cover appears to have high potential, but no *Schwalbea* found

GPS point taken within search area: 31.31719N 83.72173W

Other specialties observed:

Sarracenia flava

S. minor

Stokesia laevis

Recommendations: continue to survey for *Schwalbea* and other specialties

10 July 2008

Surveyors: R. Carter and W.W. Baker

Georgia. Thomas County: Myrtlewood Plantation; Fig. F34

Owner: Mr. Balfour

Survey parameters/results: recently burned upland areas with longleaf pine / wiregrass searched; no *Schwalbea* found

30 July 2008

Surveyors: W. Wilson Baker and Richard Carter

Georgia. Turner County: Little River Plantation, including Ross Lake (formerly Davis-Ward Property, recently purchase by Tolleson Land Company); Fig. F45

Owner: Tolleson Land Company

Survey parameters/results: attempts to reach Tolleson Land Company via telephone [1(800)694-9754] unsuccessful; longleaf pine / wiregrass areas recently burned along Rebecca-Waterloo Rd, ca. 1.8 miles southeast of jct. Rebecca-Waterloo Road and Hwy. GA 107; quick check of burned areas immediately adjacent to Rebecca-Waterloo Road; no *Schwalbea* seen
GPS point taken within search area: 31.69918N 83.49691W

Other specialties observed:

Lophiola aurea

Sarracenia flava

Recommendations: continue to pursue access permission for thorough survey in future

21 August 2008

Surveyors: R. Carter, W.Wilson Baker and G. Nelson

Georgia. Irwin County: Lentile Tract, south of Hwy. US 319, east of Alapaha River; Fig. F31

Owner: Mr. Lentile, Lentile Farms, Chester GA; (478) 358-4143, (478) 278-4819 (Mr. Lentile)

Survey parameters/results: combined with survey for *Litsea aestivalis* and *Lindera melissifolia*; much of the upland is degraded sandridge planted in *Pinus elliottii*; no *Schwalbea* observed, unlikely to be found

GPS point taken within search area: 31.51117N 83.36599W

Recommendations: no further survey work recommended

02 September 2008

Surveyor: R. Carter

Georgia. Crisp County: Georgia Veterans Memorial Park, off Hwy. GA 30; Fig. F21

Owner: State of Georgia

Survey parameters/results: upland areas with pine were surveyed; site heavily degraded, native ground cover lacking or very poor quality; no *Schwalbea* seen, none expected

Recommendations: no further survey work recommended

02 September 2008

Surveyor: R. Carter

Georgia. Crisp County: Cork Ferry Road, off Hwy. GA 300, along east side of Lake Blackshear by Cork Ferry Road, 1.3 miles west of jct. Cork Ferry Road and Coney Road; Fig. F17

Owner: unknown

Survey parameters/results: remnant upland with *Pinus palustris*, *Quercus laevis*, *Q. margaretta*, *Q. hemisphaerica*, *Q. falcata*, *Q. nigra*, *Carya glabra*, *Toxicodendron pubescens*, *Diospyros virginiana*, *Osmanthus americanus*, *Rhus copallinus*, *Aristida stricta*, *A. tuberculosa*, *Eriogonum tomentosum*, *Amsonia ciliata*, *Carex tenax*, *Commelina erecta*, *Tephrosia virginiana*, *Pteridium aquilinum*, *Centrosema virginiana*, *Chrysopsis mariana*, *Eupatorium compositifolium*, *Aster tortifolius*, *Croton argyranthemum*, *Indigofera caroliniana*, *Lygodesmia*, *Cyperus hystricinus*, *Piriqueta cistoides caroliniana*, *Hypericum gentianoides*, *Smilax auriculata*, *Opuntia compressa*, *Seymeria pectinata*, *Froelichia floridana*, *Paronychia* sp., *Licania michauxii*, *Pityopsis graminifolia*; area not recently burned; no *Schwalbea* seen, unlikely to be found

GPS point taken within search area: 31.88681N 83.92101W

Recommendations: no further survey work recommended

14&15 September 2008

Surveyors: R. Carter and W.W. Baker

Georgia. Thomas County: Leabo Tract; Fig. F30

Owner: Karen and Phil Leabo

Survey parameters/results: recently burned upland areas with longleaf pine / wiregrass searched; no *Schwalbea* found

19 September 2008

Surveyors: R. Carter

Georgia. Miller County: Union Church Tract; Fig. F53

Owner: unknown

Survey parameters/results: site small, some soil disturbance, but generally good longleaf pine / wiregrass with native ground cover; no *Schwalbea* found, but site with moderate potential

19 September 2008

Surveyor: R. Carter

Georgia. Miller County: Mayhaw Wildlife Management Area; Fig. F32

Owner: Georgia Department of Natural Resources

Survey parameters/results: combined with search for *Litsea aestivalis* and *Lindera melissifolia*; recently burned upland areas searched for *Schwalbea*, none found

Recommendations: continue burning, continue survey for *Schwalbea* and other specialties

26 September 2008

Surveyors: R. Carter and W.W. Baker

Georgia. Miller County: Mayhaw WMA; Fig. F32

Survey parameters/results: combined with search for *Litsea aestivalis* and *Lindera melissifolia*; recently burned upland areas searched for *Schwalbea*, none found

Recommendations: continue burning, continue survey for *Schwalbea* and other specialties

30 September 2008

Surveyors: R. Carter and W.W. Baker

Georgia. Lowndes County: Kinderlou Plantation; Fig. F29

Owner: Langdale family; Mr. Wayne Warren (manager)

Survey parameters/results: recently burned upland areas searched; no *Schwalbea* found

Cabin Bluff

Georgia. Camden County: Cabin Bluff, ca. 1.5 mi SE Ceylon, USGS Woodbine quad.; Fig. 9

Owner: Bill Jones III, CEO, Sea Island Company

Survey parameters/results: W.W. Baker and R. Carter surveyed site on 07 Apr 2006, prior to initiation of *Schwalbea* project; longleaf pine / wiregrass savanna, with largely intact native ground cover appeared to have high potential for *Schwalbea*, especially if subjected to warm season burn; attempts during 2007-2008 to secure permission for access were unsuccessful
GPS point taken within search area: 30° 56.898'N 81° 37.914'W

Other specialties observed:

Ctenium aromaticum

Recommendation: site should be re-surveyed after burn

Errata

Page 3, paragraph 1, line 10 –and in ~~a~~ other counties....

Page 11, line 2 – size (numbers of individual plants).

Page 28 – Replace Table 15 with the following.

Table 15. The five most important species in herb plots for each site ranked by order of relative importance (1=highest relative importance).

	Arcadia 01	Arcadia 04	Jeffords 01	Quail Ridge 01
<i>Aristida stricta</i>		1	1	1
<i>Dyschoriste oblongifolia</i>	3	5		5
<i>Galactia erecta</i>	4			
<i>Gaylussacia dumosa</i>		4		4
<i>Helianthus radula</i>				2
<i>Pityopsis graminifolia</i>	1			
<i>Pteridium aquilinum</i>	2	3	3	
<i>Schrankia microphylla</i>			5	
<i>Sporobolus curtissii</i>			2	
<i>Tephrosia virginiana</i>		2	4	3
<i>Tragia urens</i>	5			

Page 118, *Portulaca biloba* – Omit the Colquitt County record: *R. Carter 18550 and W.W. Baker.*