

Integrated vegetation management within electrical transmission landscapes promotes floral resource and flower-visiting insect diversity

Chase B. Kimmel^{1*}, Ivone de Bem Oliveira¹, Joshua W. Campbell^{1,2}, Emily Khazan¹, Jonathan S. Bremer^{1,3}, Kristin Rossetti¹, Matthew Standridge¹, Tyler J. Shaw¹, Samm Epstein¹, Alexandra Tsalickis^{1,4}, and Jaret C. Daniels^{1,5}

¹ McGuire Center for Lepidoptera and Biodiversity, Florida Museum of Natural History, University of Florida, Gainesville, Florida, United States of America

² United States Department of Agriculture Agricultural Research Service Northern Plains Agricultural Research Laboratory, Sidney, Montana, United States of America

³ Florida Department of Agriculture and Consumer Services, Division of Plant Industry, Entomology Section, Gainesville, Florida, United States of America

⁴ Department of Geosciences, Auburn University, Auburn, Alabama, United States of America

⁵ Department of Entomology and Nematology, University of Florida, Gainesville, Florida, United States of America

* Corresponding author
E-mail: cbkimmel@ufl.edu (CBK)

S1 Table. Blooming plant inventory and phenology. Detailed overview for plant inventory (S = Spring, ES = Early-Summer, LS = Late-Summer, and F = Fall) over the duration of the project. Duration and growth habit were determined using the USDA plant database [61]. Native and endemic status data was collected from the Atlas of Florida (AFP) plant database [28]. Potential new county records were determined using AFP. If the given species did not have a voucher listed for the county in which it was found, it was indicated as a potential new voucher record. In some situations, a given plant was unable to be identified to species. In these instances, each species within the respective genus was investigated to determine native, endemic, and potential new county record status. If the designation was consistent across all species, a designation was determined. However, if there were differences between different species within the genus, an NA was used to denote that no determination could be found. An asterisk indicates multiple varieties of this species are listed on AFP and specific county records could not be ascertained.

Scientific Name	Family	Duration	Growth Habit	Native	Florida Endemic	New County Record	Bloom Phenology			
							S	ES	LS	F
<i>Agalinis fasciculata</i>	Orobanchaceae	Annual	Forb/herb	Y	N					X
<i>Asclepias tuberosa</i>	Apocynaceae	Perennial	Forb/herb	Y	N				X	
<i>Asemeia violacea</i>	Polygalaceae	Annual	Forb/herb	Y	N				X	X
<i>Asimina angustifolia</i>	Annonaceae	Perennial	Shrub	Y	N		X			
<i>Baccharis halimifolia</i>	Asteraceae	Perennial	Shrub/Tree	Y	N					X
<i>Balduina angustifolia</i>	Asteraceae	Annual/Biennial/Perennial	Forb/herb	Y	N					X
<i>Baptisia lecontei</i>	Fabaceae	Perennial	Forb/herb	Y	N			X		
<i>Berlandiera subacaulis</i>	Asteraceae	Perennial	Forb/herb	Y	Y		X	X	X	
<i>Bidens alba</i>	Asteraceae	Annual/Perennial	Forb/herb	Y	N			X	X	X
<i>Boerhavia diffusa</i>	Nyctaginaceae	Annual/Perennial	Forb/herb	Y	N				X	
<i>Callicarpa americana</i>	Lamiaceae	Perennial	Shrub	Y	N			X	X	
<i>Cantinoa mutabilis</i>	Lamiaceae	Perennial	Forb/herb	N	N	Gilchrist		X	X	X
<i>Carphephorus</i> sp.	Asteraceae	Perennial	Forb/herb	Y	NA	NA				X
<i>Carphephorus corymbosus</i>	Asteraceae	Perennial	Forb/herb	Y	N					X

<i>Carphephorus paniculatus</i>	Asteraceae	Perennial	Forb/herb	Y	N					X
<i>Centella asiatica</i>	Apiaceae	Perennial	Forb/herb/Subshrub	Y	N			X		
<i>Chaerophyllum tainturieri</i>	Apiaceae	Annual	Forb/herb	Y	N			X	X	
<i>Chamaecrista fasciculata</i>	Fabaceae	Annual	Forb/herb	Y	N					X X
<i>Chrysopsis mariana</i>	Asteraceae	Perennial	Forb/herb	Y	N					X X
<i>Chrysopsis scabrella</i>	Asteraceae	Annual	Forb/herb	Y	N	Gilchrist, Suwannee				X
<i>Chrysopsis subulata</i>	Asteraceae	Perennial	Forb/herb	Y	Y	Gilchrist				X
<i>Clitoria mariana</i>	Fabaceae	Perennial	Forb/herb/Vine	Y	N			X	X	
<i>Cnidioscolus stimulosus</i>	Euphorbiaceae	Perennial	Forb/herb	Y	N			X	X	X X
<i>Commelina erecta</i>	Commelinaceae	Perennial	Forb/herb	Y	N			X	X	X
<i>Condea verticillata</i>	Lamiaceae	Perennial	Forb/herb/Subshrub	N	N	Gilchrist				X
<i>Conyza canadensis</i>	Asteraceae	Annual/Biennial	Forb/herb	Y	N					X X
<i>Coreopsis basalis</i>	Asteraceae	Annual	Forb/herb	N	N			X	X	
<i>Coreopsis lanceolata</i>	Asteraceae	Perennial	Forb/herb	Y	N	Columbia, Gilchrist		X		X
<i>Coreopsis leavenworthii</i>	Asteraceae	Perennial	Forb/herb	Y	N			X	X	X
<i>Corydalis micrantha</i>	Papaveraceae	Annual	Forb/herb	Y	N			X		
<i>Crataegus</i> sp.	Rosaceae	Perennial	Shrub/Tree	Y	N	NA		X		
<i>Crocanthemum corymbosum</i>	Cistaceae	Perennial	Forb/herb/Subshrub	Y	N			X	X	X
<i>Crocanthemum georgianum</i>	Cistaceae	Perennial	Forb/herb/Subshrub	Y	N			X		
<i>Croptilon divaricatum</i>	Asteraceae	Annual	Forb/herb	Y	N					X
<i>Crotalaria lanceolata</i>	Fabaceae	Annual	Forb/herb	N	N					X
<i>Crotalaria pallida</i>	Fabaceae	Perennial	Forb/herb/Subshrub	N	N	Gilchrist				X
<i>Crotalaria rotundifolia</i>	Fabaceae	Perennial	Forb/herb	Y	N			X		
<i>Crotalaria spectabilis</i>	Fabaceae	Annual	Forb/herb	N	N					X

<i>Croton argyranthemus</i>	Euphorbiaceae	Perennial	Forb/herb/Subshrub	Y	N		X	X	
<i>Croton glandulosus</i>	Euphorbiaceae	Annual	Forb/herb/Subshrub	Y	N		X	X	X
<i>Croton michauxii</i>	Euphorbiaceae	Annual	Forb/herb	Y	N		X	X	X
<i>Cyclospermum leptophyllum</i>	Apiaceae	Annual	Forb/herb	N	N	Gilchrist	X		
<i>Descurainia pinnata</i>	Brassicaceae	Annual/Biennial/Perennial	Forb/herb	Y	N		X		
<i>Desmodium strictum</i>	Fabaceae	Perennial	Forb/herb	Y	N	Gilchrist			X
<i>Desmodium triflorum</i>	Fabaceae	Perennial	Forb/herb	N	N				X
<i>Diodia virginiana</i>	Rubiaceae	Annual/Perennial	Forb/herb/Subshrub	Y	N		X	X	X
<i>Distimake dissectus</i>	Convolvulaceae	Perennial	Forb/herb/Vine	Y	N	Gilchrist	X	X	X
<i>Drosera capillaris</i>	Droseraceae	Perennial	Forb/herb	Y	N		X		
<i>Edrastima uniflora</i>	Rubiaceae	Annual	Forb/herb/Subshrub	Y	N			X	X
<i>Elephantopus elatus</i>	Asteraceae	Perennial	Forb/herb	Y	N				X
<i>Erechtites hieraciifolius</i>	Asteraceae	Annual	Forb/herb	Y	N			X	
<i>Erigeron quercifolius</i>	Asteraceae	Annual	Forb/herb	Y	N		X		
<i>Erigeron strigosus</i>	Asteraceae	Annual/Biennial/Perennial	Forb/herb	Y	N		X	X	X
<i>Eriogonum tomentosum</i>	Polygonaceae	Perennial	Forb/herb	Y	N			X	
<i>Eryngium aquaticum</i>	Apiaceae	Biennial	Forb/herb	Y	N	Gilchrist	X		
<i>Eryngium aromaticum</i>	Apiaceae	Perennial	Forb/herb	Y	N			X	
<i>Eryngium baldwinii</i>	Apiaceae	Biennial/Perennial	Forb/herb	Y	N		X		
<i>Euphorbia cyathophora</i>	Euphorbiaceae	Annual/Perennial	Forb/herb	Y	N	Gilchrist	X	X	X
<i>Euphorbia heterophylla</i>	Euphorbiaceae	Annual/Perennial	Forb/herb	Y	N	Gilchrist		X	X
<i>Euthamia caroliniana</i>	Asteraceae	Perennial	Forb/herb	Y	N				X
<i>Froelichia floridana</i>	Amaranthaceae	Annual	Forb/herb	Y	N		X	X	X
<i>Galactia mollis</i>	Fabaceae	Perennial	Forb/herb/Vine	Y	N			X	

<i>Galactia</i> sp.	Fabaceae	Perennial	Forb/herb/Vine	Y	NA	NA		X	X	
<i>Galium aparine</i>	Rubiaceae	Annual	Forb/herb/Vine	Y	N		X			X
<i>Galium tinctorium</i>	Rubiaceae	Perennial	Forb/herb	Y	N	Gilchrist		X		X
<i>Gelsemium sempervirens</i>	Gelsemiaceae	Perennial	Shrub/Vine	Y	N		X			
<i>Geobalanus oblongifolius</i>	Chrysobalanaceae	Perennial	Shrub/Subshrub	Y	N			X		
<i>Geranium carolinianum</i>	Geraniaceae	Annual/Biennial	Forb/herb	Y	N		X	X		
<i>Glandularia aristigera</i>	Verbenaceae	Annual/Perennial	Forb/herb/Subshrub	N	N		X	X	X	
<i>Helianthus angustifolius</i>	Asteraceae	Perennial	Forb/herb	Y	N	Gilchrist				X
<i>Heterotheca subaxillaris</i>	Asteraceae	Annual	Forb/herb	Y	N					X
<i>Hexasepalum teres</i>	Rubiaceae	Annual/Perennial	Forb/herb	Y	N				X	X
<i>Hieracium gronovii</i>	Asteraceae	Perennial	Forb/herb	Y	N				X	
<i>Hieracium megacephalon</i>	Asteraceae	Perennial	Forb/herb	Y	N	Gilchrist	X	X		
<i>Houstonia procumbens</i>	Rubiaceae	Perennial	Forb/herb	Y	N		X			
<i>Hydrocotyle umbellata</i>	Araliaceae	Perennial	Forb/herb	Y	N			X	X	X
<i>Hymenopappus scabiosaeus</i>	Asteraceae	Biennial	Forb/herb	Y	N			X		
<i>Hypericum gentianoides</i>	Clusiaceae	Annual	Forb/herb	Y	N				X	X
<i>Hypericum hypericoides</i>	Clusiaceae	Perennial	Shrub/Subshrub	Y	N				X	X
<i>Hypericum myrtifolium</i>	Clusiaceae	Perennial	Shrub/Subshrub	Y	N		X			X
<i>Hypericum tetrapetalum</i>	Clusiaceae	Perennial	Shrub/Subshrub	Y	N		X	X	X	
<i>Ilex glabra</i>	Aquifoliaceae	Perennial	Shrub	Y	N		X			
<i>Indigofera hirsuta</i>	Fabaceae	Annual	Forb/herb/Subshrub	N	N					X
<i>Indigofera spicata</i>	Fabaceae	Annual/Perennial	Forb/herb	N	N					X
<i>Ipomoea hederacea</i>	Convolvulaceae	Annual	Forb/herb/Vine	N	N	Gilchrist				X
<i>Ipomoea hederifolia</i>	Convolvulaceae	Annual	Forb/herb/Vine	Y	N				X	X

<i>Ipomopsis rubra</i>	Polemoniaceae	Biennial	Forb/herb	Y	N				X
<i>Juncus marginatus</i>	Juncaceae	Perennial	Graminoid	Y	N				X
<i>Kalmia hirsuta</i>	Ericaceae	Perennial	Shrub	Y	N				X
<i>Krigia cespitosa</i>	Asteraceae	Annual	Forb/herb	Y	N				X
<i>Lachnanthes caroliana</i>	Haemodoraceae	Perennial	Forb/herb	Y	N				X
<i>Lachnocaulon beyrichianum</i>	Eriocaulaceae	Perennial	Forb/herb	Y	N	Gilchrist	X	X	X
<i>Lactuca graminifolia</i>	Asteraceae	Biennial/Perennial	Forb/herb	Y	N		X	X	
<i>Lechea deckertii</i>	Cistaceae	Perennial	Forb/herb/Subshrub	Y	N	Gilchrist, Suwannee			X
<i>Lepidium virginicum</i>	Brassicaceae	Annual/Biennial/Perennial	Forb/herb	Y	N		X	X	X
<i>Liatris gracilis</i>	Asteraceae	Perennial	Forb/herb	Y	N				X
<i>Liatris sp.</i>	Asteraceae	Perennial	Forb/herb	Y	NA	NA			X
<i>Liatris tenuifolia</i>	Asteraceae	Perennial	Forb/herb	Y	N	Columbia			X
<i>Linum floridanum</i>	Linaceae	Perennial	Forb/herb	Y	N	Gilchrist, Suwannee			X X
<i>Lonicera sempervirens</i>	Caprifoliaceae	Perennial	Vine	Y	N	Gilchrist	X	X	
<i>Lythrum alatum</i>	Lythraceae	Perennial	Forb/herb/Subshrub	Y	N	Gilchrist			X
<i>Mecardonia procumbens</i>	Plantaginaceae	Annual/Perennial	Forb/herb	Y	N	Levy			X
<i>Medicago lupulina</i>	Fabaceae	Annual/Perennial	Forb/herb	N	N		X	X	
<i>Melothria pendula</i>	Cucurbitaceae	Perennial	Forb/herb/Vine	Y	N				X X
<i>Mimosa quadrivalvis</i>	Fabaceae	Perennial	Forb/herb/Vine	Y	N	*		X	
<i>Mimosa strigillosa</i>	Fabaceae	Perennial	Forb/herb/Subshrub	Y	N			X	
<i>Mollugo verticillata</i>	Molluginaceae	Annual	Forb/herb	N	N	Gilchrist			X
<i>Monarda punctata</i>	Lamiaceae	Annual/Biennial/Perennial	Forb/herb/Subshrub	Y	N	Suwannee			X
<i>Oenothera biennis</i>	Onagraceae	Biennial	Forb/herb	Y	N	Suwannee			X
<i>Oenothera laciniata</i>	Onagraceae	Annual/Perennial	Forb/herb	Y	N		X	X	

<i>Oenothera simulans</i>	Onagraceae	Annual	Forb/herb	Y	N			X	X	X
<i>Oenothera speciosa</i>	Onagraceae	Perennial	Forb/herb/Subshrub	N	N	Gilchrist			X	
<i>Opuntia austrina</i>	Cactaceae	Perennial	Shrub	Y	N	Columbia		X		
<i>Oxalis corniculata</i>	Oxalidaceae	Annual/Perennial	Forb/herb	Y	N		X	X	X	X
<i>Packera glabella</i>	Asteraceae	Annual	Forb/herb	Y	N		X			
<i>Palafoxia integrifolia</i>	Asteraceae	Annual	Forb/herb	Y	N					X
<i>Paronychia patula</i>	Caryophyllaceae	Annual	Forb/herb	Y	N					X
<i>Paronychia rugelii</i>	Caryophyllaceae	Annual	Forb/herb	Y	N	Columbia			X	X
<i>Passiflora incarnata</i>	Passifloraceae	Perennial	Forb/herb/Vine	Y	N				X	
<i>Pectis prostrata</i>	Asteraceae	Annual	Forb/herb	Y	N	Gilchrist		X		
<i>Penstemon multiflorus</i>	Plantaginaceae	Perennial	Forb/herb	Y	N			X	X	
<i>Pentodon pentandrus</i>	Rubiaceae	Annual	Forb/herb	Y	N	Gilchrist				X
<i>Phlox drummondii</i>	Polemoniaceae	Annual	Forb/herb	N	N		X	X	X	
<i>Phlox floridana</i>	Polemoniaceae	Perennial	Forb/herb	Y	N			X		
<i>Phyla nodiflora</i>	Verbenaceae	Perennial	Forb/herb	Y	N			X	X	
<i>Physalis arenicola</i>	Solanaceae	Perennial	Forb/herb	Y	N	Gilchrist	X	X		
<i>Pinguicula pumila</i>	Lentibulariaceae	Annual/Perennial	Forb/herb	Y	N		X			
<i>Piriqueta cistoides</i>	Turneraceae	Annual/Perennial	Forb/herb/Subshrub	Y	N		X	X	X	X
<i>Pityopsis graminifolia</i>	Asteraceae	Perennial	Forb/herb	Y	N					X
<i>Plantago virginica</i>	Plantaginaceae	Annual/Biennial	Forb/herb	Y	N		X			
<i>Polygala incarnata</i>	Polygalaceae	Annual	Forb/herb	Y	N	Gilchrist			X	
<i>Polygala nana</i>	Polygalaceae	Annual	Forb/herb	Y	N		X	X	X	X
<i>Polygonum nesomii</i>	Polygonaceae	Perennial	Subshrub	Y	Y	Columbia				X
<i>Polygonum pinicola</i>	Polygonaceae	Annual	Forb/herb/Subshrub	Y	N	Columbia				X

<i>Polypremum procumbens</i>	Tetrachondraceae	Annual/Perennial	Forb/herb	Y	N			X	X
<i>Prunus serotina</i>	Rosaceae	Perennial	Shrub/Tree	Y	N		X		
<i>Prunus umbellata</i>	Rosaceae	Perennial	Shrub/Tree	Y	N		X		
<i>Pseudognaphalium</i>	Asteraceae	Annual/Biennial	Forb/herb	Y	N				X
<i>Pterocaulon pycnostachyum</i>	Asteraceae	Perennial	Forb/herb/Subshrub	Y	N			X	X
<i>Ptilimnium capillaceum</i>	Apiaceae	Annual	Forb/herb	Y	N	Gilchrist	X	X	
<i>Rhexia mariana</i>	Melastomataceae	Perennial	Forb/herb	Y	N				X
<i>Rhus copallinum</i>	Anacardiaceae	Perennial	Shrub/Tree	Y	N				X
<i>Rhynchosia difformis</i>	Fabaceae	Perennial	Forb/herb/Vine	Y	N				X
<i>Rhynchosia michauxii</i>	Fabaceae	Perennial	Vine	Y	N				X
<i>Rhynchosia minima</i>	Fabaceae	Perennial	Forb/herb/Subshrub/Vine	Y	N	Gilchrist, Suwannee			X
<i>Richardia brasiliensis</i>	Rubiaceae	Annual/Perennial	Forb/herb	N	N	Gilchrist, Levy		X	X
<i>Rubus cuneifolius</i>	Rosaceae	Perennial	Subshrub	Y	N		X	X	
<i>Rubus trivialis</i>	Rosaceae	Perennial	Subshrub/Vine	Y	N		X		
<i>Rudbeckia hirta</i>	Asteraceae	Annual/Biennial/Perennial	Forb/herb	Y	N				X
<i>Rumex hastatulus</i>	Polygonaceae	Perennial	Forb/herb	Y	N		X	X	
<i>Sagittaria graminea</i>	Alismataceae	Perennial	Forb/herb	Y	N	*			X
<i>Sagittaria kurziana</i>	Alismataceae	Perennial	Forb/herb	Y	N			X	X
<i>Salvia lyrata</i>	Lamiaceae	Perennial	Forb/herb	Y	N				X
<i>Scoparia dulcis</i>	Plantaginaceae	Annual/Perennial	Forb/herb/Subshrub	Y	N				X
<i>Scutellaria integrifolia</i>	Lamiaceae	Perennial	Forb/herb	Y	N				X
<i>Serenoa repens</i>	Arecaceae	Perennial	Shrub/Tree	Y	N			X	
<i>Sericocarpus tortifolius</i>	Asteraceae	Perennial	Forb/herb	Y	N				X
<i>Sida rhombifolia</i>	Malvaceae	Annual/Perennial	Forb/herb/Subshrub	Y	N	Gilchrist		X	X

<i>Sida ulmifolia</i>	Malvaceae	Perennial	Forb/herb/Subshrub	Y	N			X	X
<i>Smilax smallii</i>	Smilacaceae	Perennial	Shrub/Vine	Y	N			X	
<i>Solanum chenopodioides</i>	Solanaceae	Perennial	Forb/herb	Y	N	Gilchrist		X	X
<i>Solidago canadensis</i>	Asteraceae	Perennial	Forb/herb	Y	N	Gilchrist, Suwannee			X
<i>Sonchus asper</i>	Asteraceae	Annual	Forb/herb	N	N			X	
<i>Sophronanthe hispida</i>	Plantaginaceae	Perennial	Forb/herb	Y	N			X	X X
<i>Spermacoce remota</i>	Rubiaceae	Annual/Perennial	Forb/herb/Subshrub	Y	N	Gilchrist			X
<i>Spermacoce verticillata</i>	Rubiaceae	Perennial	Subshrub	N	N	Gilchrist		X	X
<i>Stachys floridana</i>	Lamiaceae	Perennial	Forb/herb	Y	N			X	X
<i>Stillingia sylvatica</i>	Euphorbiaceae	Perennial	Forb/herb	Y	N			X	
<i>Stylisma patens</i>	Convolvulaceae	Perennial	Forb/herb/Vine	Y	N	*		X	X
<i>Symphotrichum walteri</i>	Asteraceae	Perennial	Forb/herb	Y	N	Gilchrist			X
<i>Tephrosia chrysophylla</i>	Fabaceae	Perennial	Forb/herb	Y	N				X
<i>Tephrosia spicata</i>	Fabaceae	Perennial	Forb/herb	Y	N	Gilchrist			X
<i>Thlaspi arvense</i>	Brassicaceae	Annual	Forb/herb	N	N	Gilchrist		X	
<i>Trichostema dichotomum</i>	Lamiaceae	Annual	Forb/herb	Y	N				X
<i>Trichostema setaceum</i>	Lamiaceae	Annual	Forb/herb	Y	N	Suwannee			X
<i>Utricularia subulata</i>	Lentibulariaceae	Annual/Perennial	Forb/herb	Y	N	Gilchrist		X	X
<i>Vaccinium arboreum</i>	Ericaceae	Perennial	Shrub/Tree	Y	N			X	
<i>Verbena brasiliensis</i>	Verbenaceae	Annual	Forb/herb/Subshrub	N	N			X	X X
<i>Verbena halei</i>	Verbenaceae	Perennial	Forb/herb/Subshrub	Y	N	Gilchrist		X	X X
<i>Vernonia gigantea</i>	Asteraceae	Perennial	Forb/herb	Y	N				X X
<i>Veronica arvensis</i>	Plantaginaceae	Annual	Forb/herb	N	N			X	
<i>Veronica peregrina</i>	Plantaginaceae	Annual	Forb/herb	Y	N	Gilchrist			X

<i>Vicia sativa</i>	Fabaceae	Annual	Forb/herb/Vine	N	N	Gilchrist	X		
<i>Vitis cinerea</i>	Vitaceae	Perennial	Vine	Y	N	Gilchrist		X	
<i>Vitis rotundifolia</i>	Vitaceae	Perennial	Vine	Y	N	Gilchrist		X	
<i>Wahlenbergia marginata</i>	Campanulaceae	Perennial	Forb/herb	N	N	Gilchrist	X	X	
<i>Xyris fimbriata</i>	Xyridaceae	Perennial	Forb/herb	Y	N	Levy	X	X	X
Unknown.G5.1	NA	NA	NA	NA	NA	NA			X
