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# FLORA AND NOTES FOR A ROADSIDE PRAIRIE SCRAP IN NORTHWEST LOUISIANA

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## ABSTRACT

More research is required to understand the distribution and composition of natural grasslands and prairies in the West Gulf Coastal Plain. Roadside, degraded, and privately owned remnants have rarely been the focus of botanical description. Here we document 250 species from 64 families and 172 genera in a 0.6 hectare roadside prairie remnant in Webster Parish, northwestern Louisiana. Three species are state-tracked, 7 others are of unique conservation concern, and 19 represent parish records. Based on physiography and flora, the site is most similar to Morse clay prairie, although it occurs on a slightly acid, loamy soil series.

During the past four decades, botanists have contributed invaluable work on the nature of grasslands in the West Gulf Coastal Plain (Allen et al. 2004; Brown et al. 2002; MacRoberts and MacRoberts 1995, 1996; MacRoberts et al. 2009, 2011; Reid et al. 2010; Reid and Javed 2012, Smith et al. 1989). Still, Louisiana's grassland systems remain understudied, especially smaller, privately-owned, and roadside examples, despite their potential as refugia (Holcomb et al. 2015). Study sites have typically been selected on the basis of ecological integrity, homogeneity, and ease of access, but remnants of all types have the potential to enrich understanding of grassland biodiversity and provide a more nuanced description of the presettlement flora. State-record discoveries of two boring beetles (Buprestidae) in the Morse Clay prairies on Barksdale Air Force Base (Carlton et al 2018), the discovery of *Symphyotrichum ericoides* in a privately owned prairie in Bossier Parish (Kelley 2022), and the discovery of *Rudbeckia grandiflora* in the calcareous woodlands of the northwestern parishes (Kelley 2020) are examples of overlooked elements of diversity in these habitats. Prior investigations suggest that mowed rights-of-way and semi-natural grasslands can support diverse and habitat specific suites of species (Estes et al. 2016; Hopwood 2008; Jakobsson et al 2009; Sheridan et al. 1999).

After recognizing prairie assemblages along roadsides in Webster Parish, we had the opportunity to study a privately owned, roadside grassland and expand the known distribution of prairies in the state (Holcomb et al. 2015). This paper provides a floristic checklist and ecological notes on the Carter Road Prairie (hereafter the CRP) and its surroundings.

## Site description

We selected the CRP for study because of the occurrence of remnant grassland vegetation and the cooperative nature of the landowners. The varied management regime, especially past mowing and herbicide usage, distinguishes this site from others studied in Louisiana. It is situated on a Pleistocene terrace northeast of the intersection of Prairie Bayou and Carter Road near Koran, Louisiana (Daigle et al. 2006; Kilpatrick et al. 1998). The topography of the area is rolling, with pine-oak forests on the level terraces and ridges and mixed hardwood forests along the bayous. Today 0.6 hectares of open, degraded prairie remains at the CRP with about 60% regularly mowed; much of this mown area was affected by past soil disturbances. Summer mowing has made wildflowers conspicuous along the road

in late spring, with species such as *Parthenium hispidum*, *Silphium radula*, and *Delphinium carolinianum*. The prairie parallels the road for approximately 270 meters, slopes toward Prairie Bayou from 44-51 meters above sea level, and averages 22 meters wide (Figures 1 and 2).

The site has a history of grazing, as evidenced by fences in aerial photographs and recounted to us by adjacent landowners, but it has not been grazed in at least three decades. There is no evidence of recent fire and the landowner did not permit burning as a part of this study. It is bordered to the north by 3 hectares of dense, young forest with *Pinus*, *Quercus*, *Fraxinus*, *Ulmus*, and *Cercis* dominating, with scattered grassland herbs that grew after the site was cut for timber in 2012. Parts of the prairie have been modified by various disturbances, including road construction (slope of road bank and shallow ditches), herbicide application by powerline maintenance crews, use as a logging set, dumping of trash and gravel, and the right-of-way has been mowed repeatedly during the growing season for decades. The site ranges from relatively intact to obviously degraded.

Although the General Land Office records examined from the 1800's (https://www.earthpoint.us/) do not confirm historic prairie cover in this exact locale, broad terraces underlain by calcareous clay occur to the northwest along Prairie Bayou (the name suggesting historical prairie cover). Grassland obligate herbs punctuate 400 hectares of intensively grazed pasture on these terraces less than 1 kilometer northwest of the study site. The slopes flanking small floodplains in the area often show calcareous influences, and prairie flora is mostly restricted to more open areas in these landscape positions. We discovered three other prairie remnants and sporadic occurrences of prairie obligates within 5 kilometers, which further contextualizes the CRP and the calcareous stream slope expression. These remnants occur on a predictable complex of soils, but the individual soil series often appear in an unaccountable, fine-grain mosaic (i.e. Gore, Forbing, Morse, and other soils interdigitating at scales below the minimum acreage threshold for soil surveys of roughly 5 acres).

The red-soil calcareous prairies, which are located sparsely throughout the late Pleistocene terraces along the Red River in Arkansas, Louisiana, Oklahoma and Texas, show unique combinations of vegetation and soils (MacRoberts et al. 2009; Natureserve 2023; Reid and Javed 2012). The primary soil series that underlies these communities is Morse, thus the name "Morse Clay Prairie" has been applied in their classification by the Louisiana Department of Wildlife and Fisheries (Holcomb et al. 2015). Soil series that occur along the fringes of the prairies are Gore, Forbing, and McKamie. Slopes are usually gently sloping but range up to 20 percent. The soils at the CRP have been mapped as the Gore and Forbing series, with the former upslope and each representing about half of the opening (Kilpatrick et al. 1998).

**Methods**

All plant species encountered in the open area and the immediate wooded edge were recorded on more than 40 trips from March 2020 through April 2024. Species within the regularly mowed roadside, within a small, wet depression at the base of the slope, and all species growing less than 1 meter into the young forest were included. *Baccharis*-dominated areas of the prairie were cleared by hand and spot treated with Triclopyr in 2021, which revealed grassland species. Brief floristic surveys were also made of the adjacent properties, and prairie species found there are discussed in the text.

Voucher specimens were collected for most species and are stored at Kelley Botanical Library (KBL), with access online through the North American Network of Small Herbaria portal. Small, unstable populations and an irregular pattern of roadside mowing (Figures 1 and 2) were the main impediments to collection. Unvouchered iNaturalist posts were a secondary means of documentation. Taxonomy and nativity follow Weakley (2023) or synonymy therein. All species were checked against distribution maps, rare species tracking lists, and prior literature to determine significance (Kartesz 2014; USDA NRCS 2023; Natureserve 2023; Weakley 2023). For analysis, species were classed as annual-biennial or perennial-woody based on online resources and personal observations. Subjective

judgments and variable life histories made the results of this analysis inexact (USDA, NRCS 2023). Coefficients of conservatism were also analyzed using a recent Arkansas checklist and the methods therein (Witsell et al. 2024).


Figure 1. Aerial image showing the CRP. Prairie is outlined in white. Vegetation zones descend in elevation from the right to left toward Prairie Bayou, each zone occupying roughly 90 meters along the slope. Centered at 32.45491, -93.40940.

To identify key soil features, a soil pit was dug in a relatively undisturbed section about mid-slope and deepened by a bucket auger, while a push-probe and La Motte wide-range pH indicator were employed across the site to better understand of the range of edaphic characteristics. Soil texture, color, and the density of calcareous concretions and off-site gravel were also noted. Soil samples taken from top 15 cm in the upper, middle, and lower portions of the slope were analyzed by the Louisiana State University Soil Laboratory in Baton Rouge.

**Results and discussion**

An impressive number of taxa are present within the CRP bounds. We found 250 species from 64 families and 172 genera in the 0.6 hectare area (Appendix 1). Included are 25 exotics (10% of the total), most of which are low in cover and only abundant near the pavement. For the natives alone, the annual-biennial/perennial-woody ratio is 24% annual-biennial/76% perennial-woody; that of the Coastal prairie is roughly the same at 28% annual-biennial/72% perennial-woody (derived from Allain et al. 2004). The mean C-value is 4.15 (4.55 native) and the FQI is 62.75 (68.78 native) (Witsell et al. 2024). Table 3 lists the taxonomic groups most well-represented for native species. Three species are state tracked, we consider at least 7 others to be of conservation concern, and 19 represent parish records (Kartesz 2014; Natureserve 2023; USDA, NRCS 2023) (cf. Appendix 1 annotation and selected species discussions). The majority of these parish records are grassland obligates.

Figure 2. CRP pictured from the middle of the study site facing upslope after mowing on 30 May 2022.

Results of the soil analysis and a description of the soil pit are presented in Table 1 and Table 2, respectively. Figure 3 depicts the natural vegetation along the soil catena in this area based on our observations at the CRP and nearby remnants. The pit and soil samples tested suggest that the CRP soils are best classified as the McKamie series but may warrant a taxadjunct in light of pH values outside the given range for the control section (Nettleton et al. 1991); the Mckamie interpretations apply. The soil, to a depth of 8 inches, is dark reddish brown silty clay loam in the upper part and reddish brown silty clay in the lower part. The next layer, to a depth of 64 inches, is reddish brown silty clay in the upper part and yellowish red clay in the lower part. The layer beneath, to a depth of 80 inches, is pale brown and light brown silty clay loam and silty clay. Calcium carbonate concretions 2-5 mm in diameter are distributed throughout the lowest horizon. Reaction ranges from strongly acidic to slightly acidic (pH 5.1-6.5) in the upper horizons and slightly alkaline (pH 7.5) to moderately alkaline (pH 8.0) in the underlying material. Local areas may have significantly higher calcium or sodium levels which contrast with this analysis; we observed surface pH values over 7.0 in the upper and lower zones. Still, chemical values from the CRP approximate or are intermediate between the prairies and woodlands sampled by MacRoberts et al. (2009) (Table 1).

Should calcareous clay prairies be expected on soils that are slightly acid clay loams at the surface but have a higher pH in the subsoil? Vegetationally, yes, in our experience. The edaphic controls may not be as extreme on loamier or woody-invaded sites (Bekele & Downer 2006), but when they are held open by fire or mowing their flora is certainly most similar to, and is often indistinguishable from, the flora of the adjacent prairie openings on nominate soils (pers. obs.). This is evident in the remnants of the historic Pendarvis prairie near Tullos, Louisiana. Hollywood and Vaiden soils there support the same vegetation as the Keiffer soils which are unmapped but present; the field-tested pH values for those series range from 5.8 to >8.0 (pers. obs.). These observations, along with the intense fragmentation in recent decades, illustrate the difficulty in distinguishing between the

historic phases of grassland mosaics from the scraps surviving today. Closer to the CRP, many of the "Morse Clay" prairies around Barksdale Air Force Base are on polygons now mapped as McKamie (pers. obs.).

Figures 4-11 are photos of the various conditions of the CRP and surrounding remnants.

Table 1. Results of the soil analysis compared to the previous values from prairies and adjacent woodland in Morse clay prairies (MacRoberts et al. 2009).

| Attribute | Prairie | Woodland | CRP |
|---|---|---|---|
| **Avg. pH** | 7.7 | 5.7 | 6.2 |
| **Avg. Ca (ppm)** | 6073 | 1991 | 3941 |
| **Avg Mg (ppm)** | 909 | 526 | 1059 |

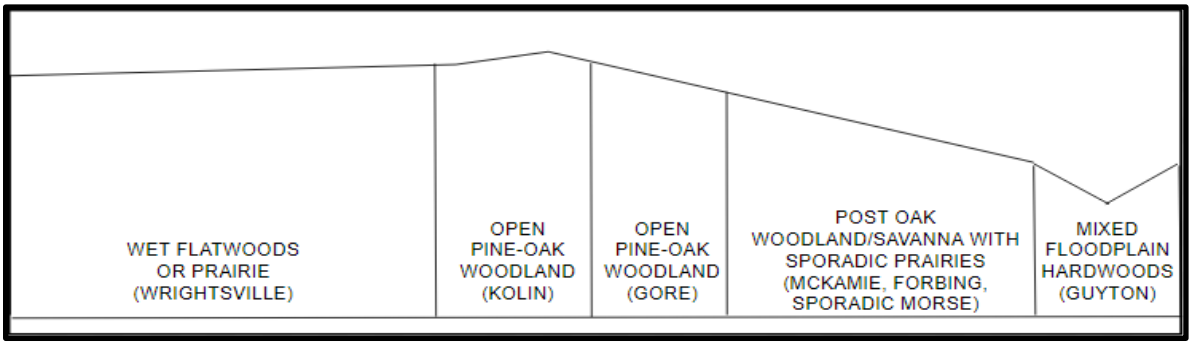


Figure 3. The estimated natural vegetation along a topographic (top line of boxes) cross-section of various soils which co-occur on the pleistocene terraces of Bossier, Caddo, and Webster parishes in northwest Louisiana (based on the authors' observations, and including undescribed plant communities). Most soils illustrated have a relatively higher pH than others in the region.

Figure 4. An autumn view of the upper portion of the CRP with *Euphorbia bicolor* blooming.

Table 2. Description from soil pit and bucket auger mid-slope.

**Site ID:** CRP, **Soil Series:** McKamie, **Coord:** 32.454241N, -93.408418; **Slope:** 0.5%

**Ap**—0 to 3 cm; slightly acid (pH 6.4-6.5); dark reddish brown (5YR 3/2) silty clay loam; weak medium granular structure; firm; many fine roots; many fine pores; 2 percent reddish brown (5YR 4/4) redoximorphic concentrations throughout matrix; gradual wavy boundary.

**BA**—3 to 8 cm; slightly acid (pH 6.4-6.5); reddish brown (5YR 4/3) silty clay; moderate medium subangular blocky structure; firm; common very fine roots; common very fine pores; 2 percent fine reddish brown (5YR 4/4)
redoximorphic concentrations throughout matrix; 1 percent dark gray (5YR 4/1) masses of reduced iron
with diffused boundaries in matrix; 1 percent black (10YR 2/1) manganese nodules, 2 to 5 mm in diameter in matrix; gradual wavy boundary.

**Bt1**—8 to 13 cm; moderately acid (pH 6.0); reddish brown (5YR 4/3) silty clay; moderate medium subangular blocky structure; very firm; common very fine roots; common very fine pores; 10 percent distinct clay films along ped faces; 5 percent yellowish red (5YR 4/6) masses of oxidized iron in matrix; clear smooth boundary.

**Bt2**—13 to 30 cm; slightly acid (pH 6.4-6.5); reddish brown (5YR 4/4) clay; moderate coarse subangular blocky structure; very firm; sticky and plastic; common very fine roots; many very fine pores; 25 percent distinct clay films along ped faces; 5 percent yellowish red (5YR 4/6) masses of oxidized iron in matrix; few dark reddish brown (5YR 3/3) worm cast; 2 percent black charcoal fragments about 2 mm in diameter; clear smooth boundary.

**Bt3**—30 to 43 cm; moderately acid (pH 6.0); reddish brown (5YR 4/4) silty clay; moderate coarse subangular blocky structure; very firm; sticky and plastic; few very fine roots; few very fine pores; 25 percent distinct clay films along ped faces; 5 percent red (2.5YR 4/6) masses of oxidized iron in matrix; 2 percent pinkish gray (7.5YR 6/2) masses of reduced iron in matrix; 1 percent dark reddish brown (5YR 3/3) worm cast throughout matrix; clear smooth boundary

**Bt4**—43 to 64 cm; moderately acid (pH 6.0); yellowish red (5YR 4/6) clay; moderate coarse subangular blocky structure; very firm; common pressure faces; 25 percent distinct clay films along ped faces; gradual wavy boundary.

**BC**—64 to 79 cm; neutral to moderately alkaline (pH 7.2-8.0); pale brown (10YR 6/3) stratified silty clay loam and silty clay; moderate medium subangular blocky structure; 10 percent dark reddish brown (5YR 3/4) masses of oxidized iron in matrix; 5 percent yellowish red (5YR 4/6) masses of oxidized iron in matrix; 5 percent light gray (10YR 7/2) masses of reduced iron throughout; strong effervescence throughout matrix; few fine calcium carbonate concretions.

Table 3. Families and genera with the most native species listed in descending order.

| **Family** | **Genus** |
|---|---|
| Asteraceae-46 | *Dichanthelium*-6 |
| Poaceae-32 | *Symphyotrichum*-6 |
| Fabaceae-20 | *Carex*-6 |

Cyperaceae-14 *Euphorbia*-5

Euphorbiaceae-9

Literature is available on enough sites to compare our results with other studies on grasslands in Louisiana and the surrounding states. To collate published checklists quantitatively, and to support comparisons to existing literature, we employed Sorensen's similarity index to derive a coefficient of similarity (SI) between documented floras and the flora of the CRP (MacRoberts and MacRoberts 2009; Oosting 1956). While strict interpretation of these SI values is not warranted, we have made the following notes on their application.

an SI above 75 is rarely attained, even when plots are only meters apart in habitats which appear homogeneous (pers. obs.).

an SI of 50 or greater suggests that two communities are more alike than they are different, and might be considered the breaking point for equivalent communities.

SI values less than 35 indicate little similarity and are typically attained from communities with obviously differing dynamics (ie. soil, climate, hydrology, disturbance).

To control for the differential introduction of exotics since settlement, we consider only the native species in this comparison. The greatest hindrance to the use of this metric is the difference in sampling intensity and study area size. The SI values and percentages of shared flora are also approximate because subjective judgments were required in the acceptance or refutation of taxa as equivalents when authors followed different species concepts and taxonomic references.

Three checklists developed for prairies in the West Gulf Coastal Plain each shared 100-115 species and an SI of 47-57 with CRP, suggesting they represent the same broad community (MacRoberts et al. 2009; Reid and Javed 2012; Brown et al. 2002). Two of these represent Morse Clay sites, but the third is the unexpectedly similar Windham Prairie in southeastern Texas, which is much further away than the Morse Clay sites and is underlain by different geology. The Keiffer and Winn prairies of Kisatchie National Forest and the Anacoco Prairies of Fort Polk shared fewer species, but still bordered on being the same community, with 62-76 species shared and SI values of 39-44 (MacRoberts and MacRoberts 1995, 1996; Allen 2004). Lastly, the barren saline and blackland prairies of the region were the least similar to the present study, sharing 42-74 species and SI values of 28-35 (MacRoberts and MacRoberts 2011; Keith and Audas 2021, Reid et al. 2010). Only about 5% of the species on our list are unaccounted for in our referenced sources and fewer still are unaccounted for by unpublished collections from prairie habitats statewide.

The following three zones of vegetation found at the CRP might be considered as potential communities, bearing in mind that the original assemblage is distorted by past anthropogenic influences:

**The Upper Prairie** is dominated by ruderal species with conservative flora in scattered clumps. This area has been used as a logging set, may have had cattle shelters or other structures erected on it historically, and has certainly received the most recent soil disturbance. This soil disturbance obscures the soil series present, which is more clayey and bears more calcium concretions than the other zones. Vegetative cover is thinner here. There is no significant slope from the pavement, and the vegetation is essentially homogeneous from the woodland to the roadside, except that exotic grasses are better established in the mowed right of way. Conspicuous species in this zone include *Euphorbia bicolor, Solidago altissima, Setaria parviflora, Croton monanthogynus, Lespedeza cuneata, Nasella leucotricha, Rubus flagellaris, Symphyotrichum dumosum, Aristida purpurascens, Carex cherokeensis, and Baccharis halimifolia* with scattered trees invading throughout. Less abundant species include *Agave*

*virginica, Penstemon digitalis, Neptunia lutea, Crataegus berberifolia, Symphyotrichum praealtum,* and *Arnoglossum plantagineum*. This vegetation is fairly typical of disturbed interior prairies in the Morse Clay system. Similar associations found near Red Chute, Louisiana, are home to *Prosopis glandulosa*. More sites of this nature are found south of Blanchard, Louisiana, many of which were apparently subjected to long periods of grazing.

**The Middle Prairie** is dominated by native forbs and has a few exotic grasses near the roadside. This midslope area has apparently received the least soil disturbance, and even the right-of-way slope is dominated by conservative prairie species. Important taxa include *Parthenium hispidum, Ruellia humilis, Delphinium carolinianum, Silphium radula, Liatris aspera, Dichanthelium aciculare, Carex meadii, Neptunia lutea, Dalea purpurea, Dalea candida, Helianthus hirsutus, Symphyotrichum oolentangiense, Mimosa Nuttallii, Acaciella hirta, Desmanthus illinoensis, Asclepias viridis,* and *Paspalum plicatulum*. Less abundant are *Sabatia campestris, Echinacea sanguinea, Asclepias tuberosa, Andropogon gerardii, Polygala verticillata, Sisyrinchium angustifolium, Vernonia texana, Dichanthelium depauperatum,* and *Baptisia leucophaea*. This vegetation is typical of dry woodland borders and interior prairies in the Morse Clay system. Soils such as Wrightsville on mounded, loamy terraces sometimes feature a mosaic of sites like this, with a calcareous feel, alternated with flatwoods vegetation (pers. obs.). Such sites have a mixture of calciphiles and more acidophilic plants like *Liatris pycnostachya, Rudbeckia alismifolia, Solidago nitida, Saccharum giganteum, Baptisia nuttalliana,* and *Baptisia alba*.

**The Lower Prairie** is the most peculiar zone of vegetation. The roadbank increases in height as the prairie surface slopes toward the bayou, and this area is less frequently mowed because of the dangerous grade. The focal point of this zone is a small, wet depression with moist-soil species dominating and emanating upslope. The vegetation is conspicuously heliophytic and somewhat calciphilic, but the exact dynamics and past disturbance of this zone are ambiguous. What is clear is the presence of sodium, with a tested SAR of only 1.4 but a neutral pH and negligible calcium. The depression may have been created as, and was almost certainly utilized as, a stock pond. Important taxa in this zone include *Tripsacum dactyloides, Steinchisma hians, Andropogon tenuispatheus, Schizachyrium scoparium, Rudbeckia maxima, Conoclinium coelestinum, Dichanthelium scoparium, Silphium radula, Rhynchospora colorata, Desmodium ciliare, Cirsium horridulum* and *Baccharis halimifolia.* Less abundant components include *Spiranthes vernalis, Helenium autumnale, Carex flaccosperma, Scutellaria australis, Vernonia missurica, Helianthus angustifolius, Agalinis tenuifolia, Agalinis heterophylla, Mitreola petiolata, Trepocarpus aethusae, Mimosa strigillosa, Zizia aurea* and *Gonolobus suberosus.* This microsite is unique (cf. note on *Rhynchospora colorata*) and its unclear history precludes classification, but many of the species are typical of moist woodland borders in sodic and Morse clay prairies.

**Noteworthy species occurrences**

Some of the species documented on CRP warrant further discussion:

*Euphorbia bicolor*-S2- A common component of prairies in central Texas, this species is rare in Louisiana. It is usually found in disturbed prairie soils and is most common in the Anacoco prairies of Vernon Parish. It is very abundant in the upper portion of the CRP.

*Nassella leucotricha*-SNR- This species is an obligate calciphile (JMK, pers. obs.). In Louisiana, we have only encountered it in Morse Clay sites. It can be abundant, as in the case of the prairies on Bodcau WMA, but it deserves tracking. It is abundant mid-slope at the CRP.

*Helenium autumnale*-SNR- This species has been collected repeatedly in the Keiffer prairies, but this occurrence is a northwestern extension in the state. A spring season collection of *Helenium*

*flexuosum* from Bossier Parish (*Lewis 3537* at LSU) has been inaccurately attributed to this species. It is found only around the wet depression on the CRP, where it is associated with *Conoclinium coelestinum, Rhynchospora colorata,* and *Teucrium canadense.* It may deserve tracking in the state.

*Pyrrhopappus pauciflorus*-SNR- The first author has reviewed all digitized specimens and most iNaturalist posts of *Pyrrhopappus* in Louisiana; in brief, *Pyrrhopappus pauciflorus* (Syn: *P. geiseri, P. multicaulis*), is an uncommon calciphile in Louisiana (Kelley in prep). Bona fide material has been collected from prairies and roadsides in 12 parishes (half the number reported by previous works). It prefers bare soil in disturbed openings but persists sporadically in dry prairies. It blooms with a suite of ephemeral taxa and fades by June while *P. carolinianus* continues to bloom through the summer. This species probably deserves tracking. It is frequent but not abundant in drier portions of the CRP.

*Acaciella hirta*-SNR- The Forest Service and Fort Polk Conservation Branch track this entity, though it has apparently faded from state tracking lists. We have found it to be uncommon and conservative; it probably deserves tracking. It is associated at CRP, and in other sites, with *Echinacea* spp., *Parthenium hispidum,* and *Carex meadii.*

*Carex bushii*-SNR- This species is known from roadsides, mounded interior prairies, sodic prairies, and a few calcareous prairies. Few collections, mid-range conservatism, and limited habitats suggest that this species may deserve tracking. The first author has rarely found it to be abundant. In the CRP we found it in the mesic lower section of the prairie.

*Rhynchospora colorata*-SNR- Starrush is common in some longleaf pine flatwoods and coastal prairie habitats, but it is virtually unknown from north Louisiana and calcareous prairies. This species is tracked in Arkansas. At the CRP it is the most dominant species in the depression at the base of the slope. In Desoto Parish this species was collected by Barbara and Michael MacRoberts in a depression similar to the one at the CRP along Hwy I-49, but this area has been badly degraded since. It was collected with rare and conservative taxa including *Rudbeckia grandiflora, Silphium radula, Carex meadii, Marshallia caespitosa, Lithospermum bejariense,* and *Ratibida pinnata*.

*Rudbeckia maxima*-SNR- A difficult *Rudbeckia* to associate with a plant community, this species is abundant around the depression and roadside in the lowest part of the CRP. It is relatively frequent in the pastures extending north along Prairie bayou and densely covers more than a hectare in one area. It seems to tolerate light shade, to be associated with wetter and mounded sites, and to persist despite grazing. We have noticed that rural roads on Pleistocene terraces in Harrison Co., Texas, host an association of this species with *Tripsacum dactyloides* and *Silphium radula*. We regard it as a component of the flatwoods-prairie interface, a habitat nearly erased by intensive land use and fire exclusion. It may deserve tracking in the future and perhaps a quantitative study of habitat preference.

Among calcareous prairies in the West Gulf Coastal Plain, the similarity between the various systems is impressive — the Keiffer, Winn, Pendarvis, Copenhagen, Anacoco, Morse and other systems differ little in their dominant species and dynamics. MacRoberts et al. (2009) also made this observation. Each system possesses distinctive taxa, or taxa in distinctive relative abundance, but the majority of species are shared (e.g. Morse clay prairies are more similar to Keiffer prairies than they are different, so that a study of one predicts the prevailing flora of the other). In the CRP checklist and those from other sites that are not only degraded but sampled edge to edge, the source of their "offsite" species richness is obscured. A study that includes taxa from bordering associations, such as adjacent woodlands, helps in the arrangement of checklists into series along environmental gradients. Coefficients of conservatism and study of habitat preference of species across their ranges can be helpful in understanding the relationships of prairie and prairie-adjacent species.

The CRP is probably the most degraded prairie yet studied in our area. Surrounding properties, fragmented and highly altered, still possess prairie taxa not present within the bounds of our study. *Salvia azurea*, *Ambrosia bidentata*, and *Zizia aurea* are found directly across the street while *Symphyotrichum ericoides, S. patens, S. attenuatum, Monarda fistulosa, Minuartia muscorum, Baptisia nuttalliana*, *Silphium laciniatum*, *Callirhoe papaver*, *Lithospermum bejariense*, *Sorghastrum nutans*, *Hypoxis hirsuta*, *Eryngium yuccifolium*, *Nemastylis geminiflora*, *Tradescantia ohiensis*, *Rudbeckia grandiflora*, *Rudbeckia alismifolia*, *Crataegus brachyacantha*, *Phlox pilosa*, and others inhabit grassland scraps within 5 kilometers of the CRP. Individual openings possess different combinations of taxa without apparent cause. We suspect that these prairies were once more connected and more homogenous.

Roadside grassland remnants are not frequently discussed in literature and even anecdotes can greatly improve our understanding of worsening threats they face. Bolin (1989) found that nearly half of the road sites in a Minnesota grassland survey experienced a decline in quality in the succeeding 11 years. MacRoberts and MacRoberts (1998) reported that 90% of the natural areas in Louisiana they revisited after 20 years experienced declines in quality or outright destruction. Nearly half of the Coastal Prairie remnants found in the 1980s and 1990s, and resurveyed in 2008, had been damaged by threats other than fire suppression — soil compaction from vehicles, surface scraping, direct and indirect herbicide application, road expansion, and construction projects (Vidrine 2010).

Ecologically inconsiderate right-of-way maintenance is probably the greatest threat to the CRP and other sites like it. Since 2020, we have observed damage to one or more roadside populations of such rare genera as *Onosmodium*, *Camassia*, *Acaciella*, *Nemastylis*, *Polytaenia*, *Acmispon*, *Ribes*, and *Silene* in Caddo and Bossier parishes. Some of these were entirely extirpated while others were decimated. The majority of these fell to newly established herbicide regimes along parish roads. The practice of spraying 3-10 m swaths along local roads, which has not yet arrived in Webster Parish, has erased much grassland flora and seriously marred the aesthetics of our local roads. Powerline and gas line rights-of-way are also sprayed to control woody vegetation, and at the CRP they are coterminous with the roadbank, so that the site is doubly endangered. On one occasion in the fall of 2020, we arrived at the site just moments after it had been sprayed to control woody vegetation beneath the powerlines. This treatment was carried out by two individuals with backpack sprayers making large arcs to apply foliar applications to trees and shrubs 2-4 meters tall; no regard for overspray was expressed. Most of the site was not directly sprayed and grew back in the spring, but a few patches of 1-200 $m^2$ were denuded until the fall. A year later they were still sparsely vegetated. Three years later they are mostly green, but they are far less rich and early successional species are more abundant than elsewhere. Ironically, a patch of *Liatris aspera*, previously unnoticed, was freed from the shade of *Baccharis* in one area and became locally abundant.

We paid comparatively little attention to the fauna at the CRP, but the following species were observed within the prairie: white tailed deer (*Odocoileus virginianus*), cottontail rabbits (*Sylvilagus*), deer mice (*Peromyscus*), a buttermilk racer (*Coluber constrictor anthicus*), prairie warblers (*Setophaga discolor*), indigo buntings (*Passerina cyanea*) Juniper hairstreaks (*Callophrys gryneus*), and southern dogface butterflies (*Zerene cesonia*). Frosted elfin butterflies (*Callophrys irus*) are abundant in one of the remnants studied nearby, but they are absent from CRP and most sites which lack *Baptisia nuttalliana*.

**Conclusions**

Roadsides, rights-of-way, pastures, and large tracts of relatively undisturbed land deserve special scrutiny in the search for native grassland remnants. Prairie woodlands are virtually undescribed, many of our uncommon or habitat-specific taxa are not tracked, and few efforts have been made to preserve private parcels.

The owners of the CRP are not interested in management at this time but the site should be revisited in the future and compared to our notes. Managers and researchers might consider using this study to justify the preservation of even the smallest grassland remnants. The CRP, though it is most nearly aligned with Morse clay prairie remnants in our current taxonomy, is not on the namesake soil, is not on a preserve or even public land, and has not seen deliberately supportive management for decades, but it continues to provide a refuge for obligate taxa. This study shows some of the issues in the study of dwindling plant communities, and we hope that it may help to control biases in conservation.

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Figure 5. *Rhynchospora colorata* in the wet depression of the Lower Prairie.

Figure 6. Typical herb richness and physiognomy in the Middle Prairie at the CRP.

Figure 9. Soil from a relatively high pH area of the CRP with concretions evident in the right inset.

Figure 7. The floral show of early summer from the roadside in the Lower Prairie, with *Rudbeckia maxima* and *Silphium radula* dominant.

Figure 8. The highest point in the prairie with the lone patch of *Andropogon gerardii*.


Figure 9. A grassland remnant on Kolin soil near the CRP; *Paspalum* spp., *Rudbeckia alismifolia, Tephrosia onobrychoides, Baptisia nuttalliana,* and *Pycnanthemum tenuifolium* dominant. Much sandier than the CRP.

Figure 10. A grassland remnant on Gore and Wrightsville soils near the CRP. *Mimosa nuttallii, Carex* spp., *Baptisia* spp., *Minuartia muscorum,* and *Parthenium hispidum* are locally dominant. Much loamier than the CRP.

Appendix 1. Species identified in the CRP. Species marked with a dagger (†) are state-tracked, those with a double dagger (‡) are parish records, those with a square (■) were found outside of the survey area (close nearby), and those with an asterisk (*) are exotics.

ACANTHACEAE- *Justicia lanceolata* (Chapm.) Small, *Ruellia humilis* Nutt..

ALTINGIACEAE- *Liquidambar styraciflua* L..

AMARYLLIDACEAE- *Allium canadense* L., *A. mutabile* Michx., *Nothoscordum bivalve* (L.) Britt..

ANACARDIACEAE- *Rhus copallinum* L., *Toxicodendron radicans* (L.) Kuntze.

APIACEAE- *Chaerophyllum tainturieri* Hooke, *Ptilimnium Nuttallii* (D.C.) Britt., *Trepocarpus aethusae* Nutt. ex D.C., *Zizia aurea* (L.) Koch ‡■.

APOCYNACEAE- *Gonolobus suberosus* (L.) R. Brown

AQUIFOLIACEAE- *Ilex decidua* Walter, *I. vomitoria* Ait.

ASCLEPIADACEAE- *Asclepias tuberosa* L., *A. viridiflora* Raf. ‡, *A. viridis* Walt.

ASPARAGACEAE- *Agave virginica* L.

ASTERACEAE- *Ambrosia artemisiifolia* L., *Ambrosia bidentata* Michx. ‡■, *A. psilostachya* D.C., *A. trifida* L., *Arnoglossum plantagineum* Raf., L, *Baccharis halimifolia* L., *Boltonia diffusa* Elliott, *Cirsium horridulum* Michx., *Conoclinium coelestinum* (L.) D.C., *Coreopsis lanceolata* L., *C. tinctoria* Nutt., *Echinacea sanguinea* Nutt., *Erechtites hieraciifolius* (L.) Raf. ex D.C., *Erigeron canadensis* L., *E. philadelphicus* L., *E. strigosus* Muhl. ex Willd., *Eupatorium capillifolium* (Lam.) Small, *E. serotinum* Michx., *Euthamia leptocephala* (Torr. & A. Gray) Greene, *Gamochaeta purpurea* (L.) Cabrera, *Helenium amarum* (Raf.) H. Rock, *H. autumnale* L.‡, *Helianthus angustifolius* L., *H. hirsutus* Raf., *Iva angustifolia* Nutt. ex D.C. ‡, *I. annua* L., *Krigia cespitosa* (Raf.) Chambers, *K. dandelion* (L.) Nutt., *Liatris aspera* Michx., *Mikania scandens* (L.) Willd., *Packera tomentosa* (Michx.) C. Jeffrey, *Parthenium hispidum* Raf., *Pityopsis graminifolia* (Michx.) Nutt., *Pyrrhopappus carolinianus* (Walt.) D.C., *P. pauciflorus* (D. Don) D.C. ‡, *Rudbeckia hirta* L., *R. maxima* Nutt., *Silphium radula* Nutt., *Solidago altissima* L., *Symphyotrichum divaricatum* (Nutt.) Nesom, *S. dumosum* (L.) Nesom , *S. lateriflorum* (L.) Á. Löve & D. Löve, *S. oolentangiense* (Riddell) Nesom ‡, *S. pilosum* (Willd.) Nesom, *S. praealtum* (Poiret) Nesom, *Vernonia missurica* Raf., *V. texana* (A. Gray) Small.

BIGNONIACEAE- *Bignonia capreolata* L., *Campsis radicans* (L.) Seemann ex Bureau.

BRASSICACEAE- *Cardamine bulbosa* (Schreber ex Muhl.) Britt., Sterns, & Poggenburg

CAMPANULACEAE- *Lobelia appendiculata* D.C., *Triodanis lamprosperma* McVaugh.

CANNABACEAE- *Celtis laevigata* Willd..

CAPRIFOLIACEAE- *Lonicera sempervirens* L., *L. japonica* Thunb. *, *Valerianella radiata* (L.) Dufresne.

CARYOPHYLLACEAE- *Stellaria media* (L.) Villars*.

CISTACEAE- *Lechea tenuifolia* Mich.

CONVOLVULACEAE- *Dichondra carolinensis* Michx., *Ipomoea cordatotriloba* Dennstedt.

CUCURBITACEAE- *Melothria pendula* L.‡.

CUPRESSACEAE- *Juniperus virginiana* L..

CYPERACAEAE- *Scleria oligantha* Michx., *Carex bushii* Mackenzie ‡, *C. cherokeensis* Schweinitz ‡, *C. festucacea* Schkuhr ex Willd., *C. flaccosperma* Dewey, *C. aureolensis* Steudel, *C. meadii* Dewey †‡, *Cyperus echinatus* (L.) A.W. Wood, *C. strigosus* L., *Eleocharis verrucosa* (Svenson) L.J. Harms, *Fimbristylis autumnalis* (L.) Roemer & J.A. Schultes, *Rhynchospora caduca* Elliott, *R. colorata* (L.) H. Pfeiffer, *R. harveyi* W. Boott ‡.

EBENACEAE- *Diospyros virginiana* L.

EUPHORBIACEAE- *Acalypha gracilens* A. Gray, *Croton lindheimeri* (Engelm. & A. Gray) Alph. Wood, *C. monanthogynus* Michx., *Euphorbia bicolor* Engelm. & A. Gray †‡, *E. corollata* L., *E. maculata* L., *E. nutans* Lag. & Segura, *E. spathulata* Lam., *Tragia urticifolia* Michx., *Triadica sebifera* (L.) Small *.

FABACEAE- *Acaciella hirta* (Nutt.) Britt. & Rose, *Baptisia leucophaea* Nutt., *Centrosema virginianum* (L.) Bentham, *Cercis canadensis* L., *Chamaecrista fasciculata* (Michx.) Greene, *Dalea candida* Michx. ex Willd., *D. purpurea* Ventenat, *Desmanthus illinoensis* (Michx.) MacMillan ex B.L. Robinson & Fernald, *Desmodium ciliare* (Muhl. ex Willd.) D.C., *D. paniculatum* (L.) D.C., *Galactia volubilis* (L.) Britt., *Gleditsia triacanthos* L., *Lespedeza cuneata* (Dumont de Courset) G. Don *, *L. repens* (L.) W.P.C. Barton, *L. virginica* (L.) Britt., *Mimosa Nuttallii* (D.C.) B.L. *M. strigillosa* Torr. & A. Gray, Turner, *Neptunia lutea* (Leavenw.) Bentham, *Strophostyles leiosperma* (Torr. & A. Gray) Piper, *Stylosanthes biflora* (L.) Britt., Sterns, & Poggenburg, *Trifolium dubium* Sibthorp *, *T. resupinatum* L. *, *Vicia minutiflora* D. Dietrich, *V. sativa* ssp. *nigra* (L.) Erhart *‡.

FAGACEAE- *Quercus hemisphaerica* Bartram ex Willd., *Q. pagoda* Raf., *Q. stellata* Wang.

GELSEMIACEAE- *Gelsemium sempervirens* (L.) J. Saint-Hilaire

GENTIANACEAE- *Sabatia campestris* Nutt.

GERANIACEAE- *Geranium carolinianum* L., *G. dissectum* L. *

HYPERICACEAE- *Hypericum drummondii* (Greville & Hooker) Torr. & A. Gray, *H. hypericoides* (L.) Crantz.

IRIDACEAE- *Sisyrinchium angustifolium* P. Miller, *S. langloisii* Greene ‡, *S. rosulatum* E.P. Bicknell.

JUNCACEAE- *Juncus brachycarpus* Engelm., *J. coriaceus* Mackenzie, J. biflorus Elliott, J. validus Coville.

LAMIACEAE- *Callicarpa americana* L., *Hedeoma hispida* Pursh, *Lamium amplexicaule* L.*, *Prunella vulgaris* L., *Salvia azurea* Michx. Ex Lam. ■, *S. lyrata* L., *Scutellaria australis* (Fassett) Epling, L, *Teucrium canadense* L..

LINACEAE- *Linum curtissii* Small

LOGANIACEAE- *Mitreola petiolata* (J.F. Gmelin) Torr. & A. Gray.

LYTHRACEAE- *Lythrum lanceolatum* Ell.

MENISPERMACEAE- *Nephroia carolina* (L.) Lian Lian & Wei Wang

MONTIACEAE- *Claytonia virginica* L.

OLEACEAE- *Fraxinus pennsylvanica* Marsh., *Ligustrum sinense* Loureiro.

ONAGRACEAE- *Ludwigia decurrens* Walt., *Oenothera linifolia* Nutt., *O. speciosa* Nutt.

ORCHIDACEAE- *Spiranthes vernalis* Engelm. & A. Gray

OROBANCHACEAE- *Agalinis heterophylla* (Nutt.) Small, *A. tenuifolia* (Vahl) Raf..

OXALIDACEAE- *Oxalis stricta* L.

PASSIFLORACEAE- *Passiflora incarnata* L., *P. lutea* L..

PINACEAE- *Pinus taeda* L.

PLANTAGINACEAE- *Mecardonia acuminata* (Walt.) Small, *Penstemon digitalis* Nutt. ex Sims, *Plantago aristata* Michx., *P. lanceolata* L. *, *P. virginica* L., *Veronica arvensis* L.*

POACEAE- *Agrostis hyemalis* (Walt.) Britt. Sterns, & Poggenburg, *Aira elegans* Willd. ex Roemer & J.A. Schultes *, *Andropogon gerardii* Vitman, *A. tenuispatheus* (Nash) Nash , *A. virginicus* L., *Anthoxanthum odoratum* L. *‡, *Aristida purpurascens* Poiret, *A. oligantha* Michx., *Axonopus fissifolius* (Raddi) Kuhlmann, *Briza minor* L. *, *Bromus catharticus* Vahl *, *Chasmanthium sessiliflorum* (Poir.) Yates, *Coleataenia anceps* (Michx.) Soreng , *Dichanthelium aciculare* (Desvaux ex Poiret) Gould & Clark, *D. longiligulatum* (Nash) Freckmann, *D. depauperatum* (Muhl.) Gould , *D. laxiflorum* (Lam.) Gould, *D. oligosanthes* (J.A. Schultes) Gould var. *scribnerianum* (Nash) Gould ‡, *D. scoparium* (Lam.) Gould, *Elymus glabriflorus* (Vasey) Scribn. & C.R. Ball, *Eragrostis lugens* Nees., *E.s spectabilis* (Pursh) Steudel, *Hordeum pusillum* Nutt., *Lolium arundinaceum* (Schreber) Darbyshire *, *L. perenne* L. *, *Melica mutica* Walt., *Nassella leucotricha* (Trinius & Ruprecht) Pohl ‡, *Paspalum floridanum* Michx., *P. laeve* Michx., *P. notatum* Flüggé *, *P. plicatulum* Michx., *P. setaceum* Michx., *P. urvillei* Steudel *, *Phalaris caroliniana* Walt., *Schizachyrium scoparium* (Michx.) Nash, *Setaria parviflora* (Poir.) Kerguélen, *Sorghum halepense* (L.) Persoon *, *Sphenopholis obtusata* (Michx.) Scribn., *Sporobolus compositus* (Poiret) Merrill, *Steinchisma hians* (Elliott) Nash, *Tridens flavus* (L.) A.S. Hitchcock, *T.strictus* (Nutt.) Nash, *Tripsacum dactyloides* (L.) L..

POLYGALACEAE- *Polygala verticillata* L. ‡

POLYGONACEAE- *Brunnichia ovata* (Walt.) Shinners, *Rumex crispus* L. *.

RANUNCULACEAE- *Anemone berlandieri* Pritzel †‡, *A.caroliniana* Walt., *Clematis virginiana* L., *Delphinium carolinianum* Walt. ‡

RHAMNACEAE- *Berchemia scandens* (Hill) K. Koch

ROSACEAE- *Crataegus berberifolia* Torr. & A. Gray, *C. brachyacantha* Sarg. & Engelm., *Prunus mexicana* S. Watson, *Pyrus calleryana* Decaisne *, *Rubus flagellaris* Willd., *R. trivialis* Michx...

RUBIACEAE- *Diodia virginiana* L., *Galium sherardia* E.H.L. Krause *, *G. tinctorium* L., *Hexasepalum teres* (Walt.) J.H. Kirkbride, *Houstonia micrantha* (Shinners) Terrell.

RUTACEAE- *Zanthoxylum clava-herculis* L.

SAPOTACEAE- *Sideroxylon lanuginosum* Michx.

SAURURACEAE- *Saururus cernuus* L.

SMILACACEAE- *Smilax bona-nox* L.

SOLANACEAE- *Physalis heterophylla* Nees, *Solanum carolinense* L..

ULMACEAE- *Ulmus alata* Michx.

VERBENACEAE- *Phyla lanceolata* (Michx.) Greene, *Verbena halei* Small, *V. montevidensis* Sprengel *

VIOLACEAE- *Viola sororia* Willd.

VITACEAE- *Nekemias arborea* (L.) J. Wen & Boggan, *Parthenocissus quinquefolia (*L.*)* Planchon, *Vitis cinerea* (Engelm.) Engelm. ex Millardet