

2006-08-07	T15S, R4W, sec 18 NW ¼ NW ¼	38.7542°	97.8171°	Freeman
2006-08-08	T15S, R5W, sec 14 E ½	38.74882°	97.83649°	Freeman
2006-08-08	T15S, R5W, sec 16 N ½	38.74937°	97.88398°	Freeman
2006-08-08	T15S, R5W, sec 15 NE ¼	38.75138°	97.86159°	Freeman

3.3.2. Rare Vascular Plants

3.3.2.1. Federal-listed Species

The three federal-listed plant species documented in Kansas, *Asclepias meadii* (Mead's milkweed), *Platanthera praeclara* (western prairie fringed orchid), and *Trifolium stoloniferum* (running buffalo clover) are known from historic and extant populations in the central Flint Hills and areas eastward. Most populations are at sites east of the Flint Hills. No federal-listed plant species ever have been reported from Saline or McPherson counties, and with very low probability that any of these species occurs on the Smoky Hill ANGR, we elected not to carry out surveys specifically for these species.

3.3.2.2. State-rare Species

The Kansas Natural Heritage Inventory has assigned a rarity rank to each native vascular plant occurring in Kansas. Ranks estimate the rarity of each species based on the number of populations that are known in the state: S1 = critically imperiled in Kansas, 5 or fewer occurrences; S2 = imperiled in Kansas, 6—20 occurrences; S3 = rare in Kansas, 21—100 occurrences; S4 = apparently secure in Kansas, many occurrences; S5 = demonstrably secure in Kansas; SH = of historical occurrence in Kansas, not seen in >30 years; and SX = apparently extirpated in Kansas. The Kansas Natural Heritage Inventory tracks site-specific information for roughly 400 species ranked S1, S2, SH, or SX. These species are considered sufficiently rare to be tracked, although additional field work eventually will show that many S2-ranked species are indeed much more common than currently estimated.

Six of 22 state-rare (rank = S1 or S2) vascular plant species known from Saline County were documented by at least one occurrence each on or near Smoky Hill ANGR during this study (Table 3.2). Five of the six species were reported for the first time from Saline County during this study: *Eleocharis coloradoensis* (Britton) Gilly (Cyperaceae; Colorado spike-rush), *Eragrostis curtipedicillata* Buckley (Poaceae; gummy love grass), *Fimbristylis vahlii* (Lam.) Link (Cyperaceae; Vahl's fimbry), *Sagittaria ambigua* J. G. Sm. (Alismataceae; Kansas arrowhead), and *Scrophularia lanceolata* Pursh (Scrophulariaceae; lance-leaf figwort). The sixth species, *Asclepias lanuginosa* Nutt., was known from one previous report. Three state-rare species occur in wetlands or in moist to wet soil around ponds, one species occurs on upland prairies, and one species occurs in wooded riparian habitats. A brief description of each state-rare species follows.

Asclepias lanuginosa (woolly milkweed) is an inconspicuous, perennial herb that occurs from Wisconsin west to North Dakota and south to Kansas. Plants grow on sandy to loamy tallgrass, mixed-grass, and sand prairies. Kansas populations are documented in 13 counties (Figure 3.3); plants have been seen only in Morris, Republic, and Saline counties in the past 30 years. Prior to

this study, woolly milkweed had been found on the Kansas Regional Training Center Range, northeast of Smoky Hill ANGR (Winters and Charlton 2000). During this study, plants were discovered at two sites on Smoky Hill ANGR. Because of the rarity of plants at these two sites, it is not known if these occurrences represent reproductively viable populations.

VOUCHERS: Kansas. Saline Co., T15S R04W sec 31, SW ¼. 38.7021°N, 97.8082°W. Elev. 1420—1470 ft. Brookville, 4.5 mi S, 2.5 mi E. Smoky Hill ANGR. Rolling, upland, tallgrass prairie on ridge near headwaters of unnamed tributary to Ralston Creek. Sandy, soil over sandstone bedrock. Rare; 1 genet with 4 ramets, 1 with an inflorescence. Growing near top of ridge in well drained site. 20 May 2003. *C. C. Freeman & J. Elliott 19771* (KANU); Saline Co., T16S, R05W, sec 3, SE ¼, SW ¼. 38.68389°N, 97.86322°W. Elev. 1450 ft. Brookville, 6 mi S. Smoky Hill ANGR. N side of Falun Rd. 16 May 2005. *A. Powel & B. Busby s.n.* (KANU).

TABLE 3.2. State-rare Kansas plants documented in Saline County (Status = s) or on Smoky Hill ANGR (Status = r). Named hybrids are excluded from the list.

Family	Scientific Name	Common Name	Status	S-Rank	CoC
Asclepiadaceae	<i>Asclepias lanuginosa</i> Nutt.	woolly milkweed	r	S1	9
Asteraceae	<i>Plectocephalus americanus</i> (Nutt.) D. Don	American basket-flower	s	S1	3
Cyperaceae	<i>Schoenoplectus heterochaetus</i> (Chase) Soják	slender twine-bulrush	s	S1	6
Isoetaceae	<i>Isoetes melanopoda</i> J. Gay & Durieu	black-foot quillwort	s	S1	8
Poaceae	<i>Aristida desmantha</i> Trin. & Rupr.	curly threeawn	s	S1	6
Poaceae	<i>Panicum hillmanii</i> Chase	Hillman's panicum	s	S1	5
Rosaceae	<i>Rosa blanda</i> Aiton	smooth rose	s	S1	6
Rosaceae	<i>Rubus mollior</i> L.H. Bailey	soft blackberry	s	S1	4
Zygophyllaceae	<i>Kallstroemia parviflora</i> Norton	warty caltrop	s	S1	1
Alismataceae	<i>Sagittaria ambigua</i> J.G. Sm.	Kansas arrowhead	r	S2	8
Asteraceae	<i>Artemisia campestris</i> L. subsp. <i>caudata</i> (Michx.) H.M. Hall & Clem.	western sagewort	s	S2	5
Asteraceae	<i>Artemisia dracunculus</i> L.	silky wormwood	s	S2	4
Cyperaceae	<i>Eleocharis coloradoensis</i> (Britton) Gilly	Colorado spike-rush	r	S2	4
Cyperaceae	<i>Fimbristylis vahlii</i> (Lam.) Link	Vahl's fimbry	r	S2	5
Elatinaceae	<i>Bergia texana</i> (Hook.) Seub. ex Walp.	Texas bergia	s	S2	2
Lythraceae	<i>Didiplis diandra</i> (Nutt. ex DC.) A.W. Wood	common water-purslane	s	S2	7
Nyctaginaceae	<i>Mirabilis carletonii</i> (Heimerl ex Standl.) Standl.	Carleton's four-o'clock	s	S2	7
Plantaginaceae	<i>Plantago elongata</i> Pursh subsp. <i>elongata</i>	slender plantain	s	S2	3
Poaceae	<i>Eragrostis curtipedicellata</i> Buckley	gummy love grass	r	S2	3
Rosaceae	<i>Rubus hancinianus</i> L.H. Bailey	Hancin's dewberry	s	S2	4
Scrophulariaceae	<i>Gratiola neglecta</i> Torr.	common hedge-hyssop	s	S2	4
Scrophulariaceae	<i>Scrophularia lanceolata</i> Pursh	lance-leaf figwort	r	S2	5

Eleocharis coloradoensis (Colorado spike-rush) is a diminutive, rhizomatous, perennial spike-rush that occurs sporadically across the southeast, central, and western U.S. Populations occur from Manitoba west to Oregon, and south Alabama, Texas, and California. Plants usually occur at the edges of fresh or brackish lakes and ponds, in stream beds, and in tidal wetlands. Twelve Kansas populations are documented in as many counties (Figure 3.3). A single population on Smoky Hill ANGR co-occurs with *Fimbristylis vahlii* (Lam.) Link, another state-rare wetland species. This is the first report for the county. Because of its size and superficial similarity to the more common *Eleocharis acicularis* (L.) Roem. & Schult. (needle spike-rush), other Kansas populations of Colorado spike-rush likely have been overlooked.

VOUCHER: Kansas. Saline Co., T15S R04W sec 32, SE ¼. 38°41'56"N, 97°46'52"W. Elev. ca 1530 ft. Brookville, 5 mi S, 5 mi E. Smoky Hill ANGR. Along banks of pond, heavy silt, moist-marshy, not grazed. Scattered. 6 July 2003. *J. Elliott 1762* (KANU).

Eragrostis curtipedicillata (gummy love grass) is a caespitose, perennial grass of central North America, occurring from south-central Missouri west to southeast Colorado, and south to Louisiana, northern Mexico, and eastern New Mexico. Plants often are found in disturbed grasslands, along fields and roadsides, and at the margins of woods. The species is known in Kansas from 16 sites in 10 counties; most reports are from the Red Hills (Figure 3.3). A single population was discovered in 2004 on grazed prairie on private land just west the Smoky Hill ANGR, the northern-most population documented in Kansas and the first from Saline County.

VOUCHER: Kansas. Saline Co., T15S, R05W, sec 32, N ½. 38.70934°N, 97.90108°W. Elev. 457 m. Rolling Hills Ranch, west of Smoky Hill ANGR. Grazed, upland prairie. 14 October 2004. *H. Loring s.n.* (KANU).

Fimbristylis vahlii (Vahl's fimbry) is a short, annual sedge found primarily in the southeastern U.S., occurring northward to Illinois and Nebraska and with disjunct populations in Arizona and California. It also occurs in Central and South America. In Kansas it is known from 15 sites (2 of these historical) in 11 counties, mostly in the southeast sixth of the state (Figure 3.3). Plants grow mostly along moist, sandy margins of reservoirs, ponds, and lakes. A small population was discovered on Smoky Hill ANGR in 2003, the northern-most population in the state and the first from the county. It co-occurs with *Eleocharis coloradoensis* (Britton) Gilly, another state-rare wetland species.

VOUCHERS: Kansas. Saline Co., T15S R04W sec 32, SE ¼. 38°41'56"N, 97°46'52"W. Elev. ca 1530 ft. Brookville, 5 mi S, 5 mi E. Smoky Hill ANGR. Along banks of pond, heavy silt, moist-marshy, not grazed. Locally abundant. Scattered along E and N side of pond. 6 July 2003. *J. Elliott 1762* (KANU); 16 August 2003. *J. Elliott 1833* (KANU).

Sagittaria ambigua (Kansas arrowhead), a perennial, aquatic herb known only from Arkansas, Kansas, Missouri, and Oklahoma in the central U.S. Plants typically occur in natural and man-made wetlands and around edges of ponds. Eight populations in seven Kansas counties have been documented (Figure 3.3). A population discovered on Smoky Hill ANGR is the first from Saline County and is disjunct from other southeastern Kansas populations by nearly 160 km.

VOUCHERS: Kansas. Saline Co., T16S R05W sec 27, NE ¼. 38°37'43"N, 97°51'44"W. Elev. 1520—1550 ft. Brookville, 9.5 mi S, 0.5 mi E. Smoky Hill ANGR. Upland rolling prairie, grazed, shallow sandstone soil. Scattered. Single population, ca 100 plants in shallow prairie slough. 29 May 2003. *J. Elliott 1569* (KANU); 22 June 2003. *J. Elliott 1668* (KANU).

Scrophularia lanceolata (lance-leaf figwort) is a widespread perennial herb in North America, occurring from Quebec west to British Columbia, and south to South Carolina, Oklahoma, New Mexico, and California. Plants grow along streams, in thickets, and in moist sites in prairies and woodlands. The species is known in Kansas from five populations in five counties in the Smoky Hills (Figure 3.3). A small population was discovered on Smoky Hill ANGR in 2003, the first report from the county. Other populations may be expected on or near the installation.

VOUCHER: Kansas. Saline Co., T15S R04W sec 29, NW ¼, SW ¼. 38°42'48"N, 97°47'47"W. Elev. ca 1500 ft. Brookville, 3.5 mi S, 4 mi E. Smoky Hill ANGR. Common. Upland prairie and sandstone outcrop. Disturbed area on and around Soldiers Cap Mound. 21 May 2003. *J. Elliott 1519* (KANU).

3.3.3. Floristic Surveys

All taxa documented by voucher specimens at KANU as occurring in Saline County are listed in Appendix B. Taxa are arranged alphabetically by family, genus, species, subspecies, and variety, respectively. Nomenclature follows that used in the KANU CIMS. Included are data about the rarity, conservatism, wetland status, alien status, longevity, and habit (life form) of each species.

Vouchers at KANU provide evidence for 85 families, 331 genera, and 619 taxa (609 species) of vascular plants in Saline County (Appendix B). Of this number, 76 families (89%), 262 genera (79%), and 415 taxa (412 species) (67% and 68%, respectively) have been documented on Smoky Hill ANGR (Appendix B).

The 10 most species-rich families (Table 3.3) include 60% and 62% of the taxa known in the county and on the installation, respectively. Typical of grassland-dominated sites in the Great Plains, the Asteraceae, Poaceae, Fabaceae, and Cyperaceae collectively make up more than 40% of the species in the county and on the installation.

Provenance. Based on provenance data presented in Appendix B, the percentage of native taxa reported for Saline County and the installation are 82% and 84%, respectively (Table 3.4). Percentages of introduced taxa (18% and 16% for the county and installation, respectively) are in line with numbers reported for other intensively studied sites in the state (e.g., Freeman et al. 1997).