Taxonomic Status and Identification of Potential, Occupied, and Unsuitable Habitat for Rough-Stemmed Aster (*Aster puniceus* var. *scabricaulis*)

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ABSTRACT

Rough stemmed-aster (*Aster puniceus* L. var. *scabricaulis* (Shinners) A. G. Jones) is a rare taxon known from springs, seeps, marshes, drainages, small impoundments, and their disturbed remnants in northeastern Texas, with reports from northwestern Louisiana and central Mississippi. The taxon was originally described as a full species, but was moved to varietal status by Dr. Almut Jones. Due to the questionable taxonomic status of rough-stemmed aster, including whether the plant was a valid taxonomic entity, Dr. Guy Nesom studied the taxon and other related species, and resolved the these uncertainties. His conclusion was to keep *scabricaulis* as a variety of the species *puniceus*.

At the beginning of this study, rough-stemmed aster was reported from 16 sites in four counties in northeastern Texas. Only six of these sites were known to be extant. However upon reviewing topographic maps, much additional suitable habitat appeared to be available. An assumption was made that sites within the known habitat range could be selected from topographic maps and soil surveys. A representative number could then be visited, and the amount of potential occupied, unoccupied, and destroyed habitat could be estimated. Such estimates would be helpful in listing decisions. Sites were selected from topographic maps based on presence of marshes, springs, streams, intermittent drainages, and small lakes or impoundments. Only two counties within the known range had published soil surveys. Thus use of soils for remote habitat identification was not possible. Selected sites were surveyed in late October and early November of 1995. Out of 467 visited sites, nine new sites were found, including one new county record. However the extremely large number of potential sites (a rough estimate would be tens of thousands) made it impossible to calculate the acreage or linear miles of potential habitat for the time and money allotted to this project. Also the number of sites which could be visited was extremely limited compared to the vast number of sites available. Additionally two of the new sites were discovered in dry drainages; thus not matching the topographic profile. Until a better method can be found to remotely identify rough-stemmed aster habitat, or more time for surveying becomes available, the amount of potential occupiable, unoccupiable, and destroyed habitat cannot be calculated with any certainty.

INTRODUCTION

Rough-stemmed aster (*Aster puniceus* var. *scabricaulis*) is a rare, purplish-flowered member of the Sunflower Family. The tall, sprawling perennial grows in northeastern Texas in saturated soils in full sun to partial shade. These conditions are usually found in or along springheads, seeps, bogs, marshes, small impoundments, drainages, or the degraded remnants of these wetlands. Rough-stemmed aster is found almost exclusively on the Queen City Sand formation with a few sites on Sparta Sand or recent alluvium (Bureau of Economic Geology 1964 and 1967), and on loam or sandy loam soils that are frequently flooded (Coffee 1975; Hatherly 1993). At the beginning of the study, rough-stemmed aster was known from four counties: Anderson, Smith, Van Zandt, and Wood. Many of these sites have been highly disturbed by events such as roadway construction, logging, conversion to tame pasture, drainage, or damming.

The taxon was first described as a species by Shinners (1953). Later Jones (1984) reduced it to a variety of the subspecies *elliottii* within the species *puniceus*, citing its similarity to both taxa. Nesom (1994) transferred the entire species to the genus *Symphyotrichum*, making the combination, *S. puniceum* (L.) Löve & Löve var. *scabricaule* (Shinners) Nesom. However Nesom (in prep.) does not agree with Jones, and views *elliotti* as a distinct species with no close relationship to either *puniceus* or *scabricaulis*. Due to the unfamiliarity of most people with the genus *Symphyotrichum*, the name *Aster puniceus* var. *scabricaulis* will be used in this report. A draft copy of Nesom's paper is attached at the end of the report.

Rough-stemmed aster has been of conservation concern for over twenty years. The species was listed as threatened on the original endangered and threatened species list for the United States (U.S. Fish and Wildlife Service 1975; Ayensu and Defilipps 1978). The U.S. Fish and Wildlife Service placed the species in Category 2 in 1980 (USFWS 1980), moving it to Category 3C in 1985 (USFWS 1985). This decision was probably based on a viewpoint expressed by Dr. Bill Mahler (1995) that he did not recommend any federal status if the taxon was recognized as a variety. In a review of numerous plant taxa formerly under consideration by U.S. Fish and Wildlife Service, Dr. Charlie McDonald elevated the taxon to Category 1 in 1990 (USFWS 1990). In 1996 U.S. Fish and Wildlife Service made broad changes to their list of candidate species, tracking only those taxa considered Category 1 (USFWS 1996). Rough-stemmed aster was not included in Category 1 because, on the basis of taxonomic uncertainty, it might not meet the Endangered Species Act's definition of species. Although rough-stemmed aster was deleted from the list, it is considered a Species of Concern by the U. S. Fish and Wildlife Service Austin office (K. Kennedy, pers. comm., 1996).

METHODS

The 16 pre-1995 collection sites of *Aster puniceus* var. *scabricaulis* were reviewed for topographic characteristics (see Appendix 1). Due to the lack of published soil surveys (only Anderson and Smith counties) and with only four localities precise enough to pinpoint soil types, soils were dropped as part of the site selection process. Although some of the sites (5) either could not be relocated or had extremely vague directions, the other 11 could be placed with a fair degree of certainty at small lakes or impoundments (4 sites), streams (3 sites), marshes (2 sites), and intermittent drainages (2 sites). A search area for rough-stemmed aster was selected on the basis of the previous collections. A 60-mile radius which centered on Tyler was inclusive of all previous collection locations (Figure 1). All U.S. Geologic Survey (USGS) 7.5′ minute topographic quadrangles within the 60-mile radius (Figure 2) were searched for the selected topographic features. Publicly accessible features were then surveyed over a seven day period. Visited sites were evaluated according to the presence/absence of rough-stemmed aster, and the quality (i.e., amount and type of disturbance, water quality/quantity, associated plant community) of the site.

RESULTS

Tens of thousands of potential sites for rough-stemmed aster could have been identified from the 211 topographic maps within the 60-mile search area. However time only allowed for the identification of several thousand. Again due to time constraints, only a very small percentage (roughly 10%) of these sites could be searched. Of the 467 sites visited, nine new locations (1.9% of sites surveyed), including a new county record (Henderson County), were discovered. At present there are 16 sites with rough-stemmed aster (3.4% of total sites). A reported site from Kaufman County turned out to be in error due to a mix-up of label data. Only 15% of the surveyed sites appeared to be potential habitat for rough-stemmed aster. Nine historical sites (1.9%) could not be relocated either due to imprecise directions or habitat destruction. Almost 80% of the sites surveyed were either not rough-stemmed aster habitat (70.9%) or altered beyond support capability (8.8%). Appendix 2 lists the sites surveyed, and the results of the survey for each site. Although additional precisely located sites are too numerous and time-consuming to list, Appendix 3 provides the names of the USGS 7.5′ topographic quadrangles by county which have unsurveyed potential, suitable habitat for the rough-stemmed aster. During the course of Dr. Nesom's taxonomic study, three herbarium specimens from northwestern Louisiana and central Mississippi were annotated to rough-stemmed aster. Appendix 4 lists all collections of rough-stemmed aster, both historic and extant.

DISCUSSION

The nine new locations for rough-stemmed aster were similar in habitat to previously known sites. As before rough-stemmed aster was found almost exclusively on the Queen City Sand formation, with an additional location on Sparta Sand and one on recent alluvium. The Queen City Sand is an Eocene formation of fine grained quartz sand with interbeds of clay, a few glauconitic lentils, and ironstone beds and concretions. The Sparta Sand is also an Eocene formation of fine to medium grained quartz sand in a silt and clay matrix. Because these formations are quite common over much of East Texas, the geology would be of little help in future site identification.

Only one additional soil type was identified even with the increase in the number of sites and counties. With the new county record, three soil surveys (Anderson, Henderson, and Smith Counties) were available. Because over half of the rough-stemmed aster populations are in Wood and Van Zandt Counties, and only eight of the other 11 sites can be located precisely enough to determine soil type, the use of soil surveys for site selection purposes is limited. The soil types identified from the eight sites are Keechi loam, Thenas fine sandy loam, Redsprings very gravelly sandy loam, and Nahatche loam or Nahatche and Wehadkee loam complex (Coffee 1975; Hatherly 1993; Hatherly and Mays 1979). Keechi loam is a poorly drained, strongly acid, dark brown soil that is frequently flooded. The water table is at or near the surface during winter and spring, and within four feet the remainder of the year. Thenas fine sandy loam is a moderately well drained, slightly acid, dark brown fine sandy soil that is annually flooded. Nahatche loam is a poorly drained, moderately to strongly acid, brownish soil that is flooded once or twice a year. Wehadkee soils are poorly drained, strongly acid, grayish-brown loams that can be flooded for three or four months during spring of most years. Redsprings very gravelly sandy loam is a well drained, moderately acid, dark reddish brown soil underlain at 5 to 49 inches by a firm, strongly acid, red clay. The Redsprings rough-stemmed aster site is along a drainage ditch on highway right-of-way adjacent to I-10. Construction may have severely altered the edaphic conditions at this site, and thus the soil type is probably not representative of rough-stemmed aster habitat.

Lists of associated species have been compiled for 15 sites and from reports by Nesom (in prep.) and Mahler (1984) (see Appendix 5 for a list of species by site/report, and number of individuals of rough-stemmed aster per site). The most common species among the sites were sweetgum (*Liquidamber styraciflua*), wax myrtle (*Myrica cerifera*), water smartweed (*Polygonum punctatum*), tearthumb (*Polygonum sagittatum*), goldenrod (*Solidago* spp.), climbing hempweed (*Mikania scandens*), smooth beggar's ticks (*Bidens laevis*), seedbox (*Ludwigia* spp.), sensitive fern (*Onoclea sensibilis*), rush (*Juncus* sp.), water-pennywort (*Hydrocotyle*

spp.), eupatorium (*Eupatorium* sp.), and plumegrass (*Erianthus* spp.).

After the field work for this study was completed in fall 1995, three additional rough-stemmed aster locations were reported from Smith, Franklin, and Hopkins Counties. The Smith County site was visited by the author in the fall of 1996, and contained a small population of rough-stemmed aster along a drainage ditch on highway right-of-way. The Franklin and Hopkins County sites have not been verified by the author. However the geologic formation (Wilcox Formation) is different from that of all other rough-stemmed aster sites, and the topography appears dissimilar also. Because of the confusion with the reported record from Kaufman County, the Franklin and Hopkins County sites should be revisited to confirm the presence of rough-stemmed aster.

The proposed method for remotely identifying the habitat of rough-stemmed aster turned out to be too inclusive and thus time-consuming. The amount of potential habitat identified by the methods described above, was much too vast to be calculated as to amount, much less surveyed, in the time available for this study. Thus no estimates could be made as to the amount of habitat available, nor its quality. While the majority of the rough-stemmed aster sites were along topographically identifiable features (intermittent drainages - 6 sites, streams - 3 sites, marshes - 3 sites, small lakes or impoundments - 6 sites), two sites (the most pristine site, EOR #25, and the most disturbed site, EOR #19) were shown on the topographic maps as dry drainages on slight to moderate slopes. Thus 10% of the identified habitat does not fit the selection criteria, and if it were added, would add two to three times as many potential sites. Additionally over 70% of the remotely identified habitat turned out not to be suitable habitat based upon ground-truthing. Until a better way can be found to remotely identify rough-stemmed aster habitat or more time for surveying becomes available, the amount of potential occupiable, unoccupiable, and destroyed habitat cannot be calculated with any certainty.

ACKNOWLEDGEMENTS

I would like to thank Jason Singhurst for taking an interest in this project. Jason also searched for and collected rough-stemmed aster at several sites, including the new record from Henderson County. I would also like to thank Dr. Guy Nesom for tackling the taxonomic study. Working on a tight time frame and for little money, Guy completed the taxonomic evaluations before the field work began. This assured that the long days spent in the field were in search of a valid taxonomic entity.

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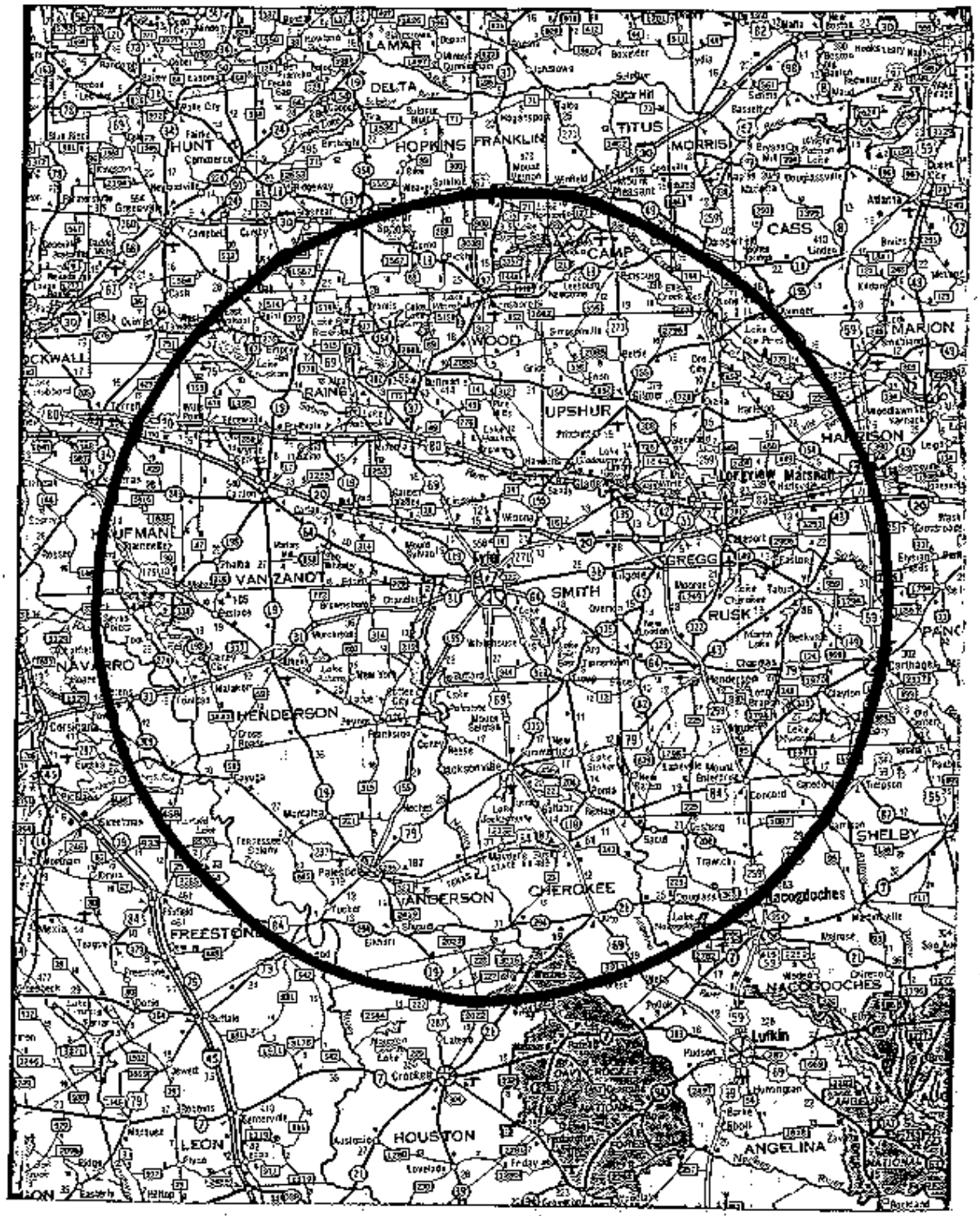

Figure 1. Search area for rough-stemmed aster (60 mile radius of Tyler

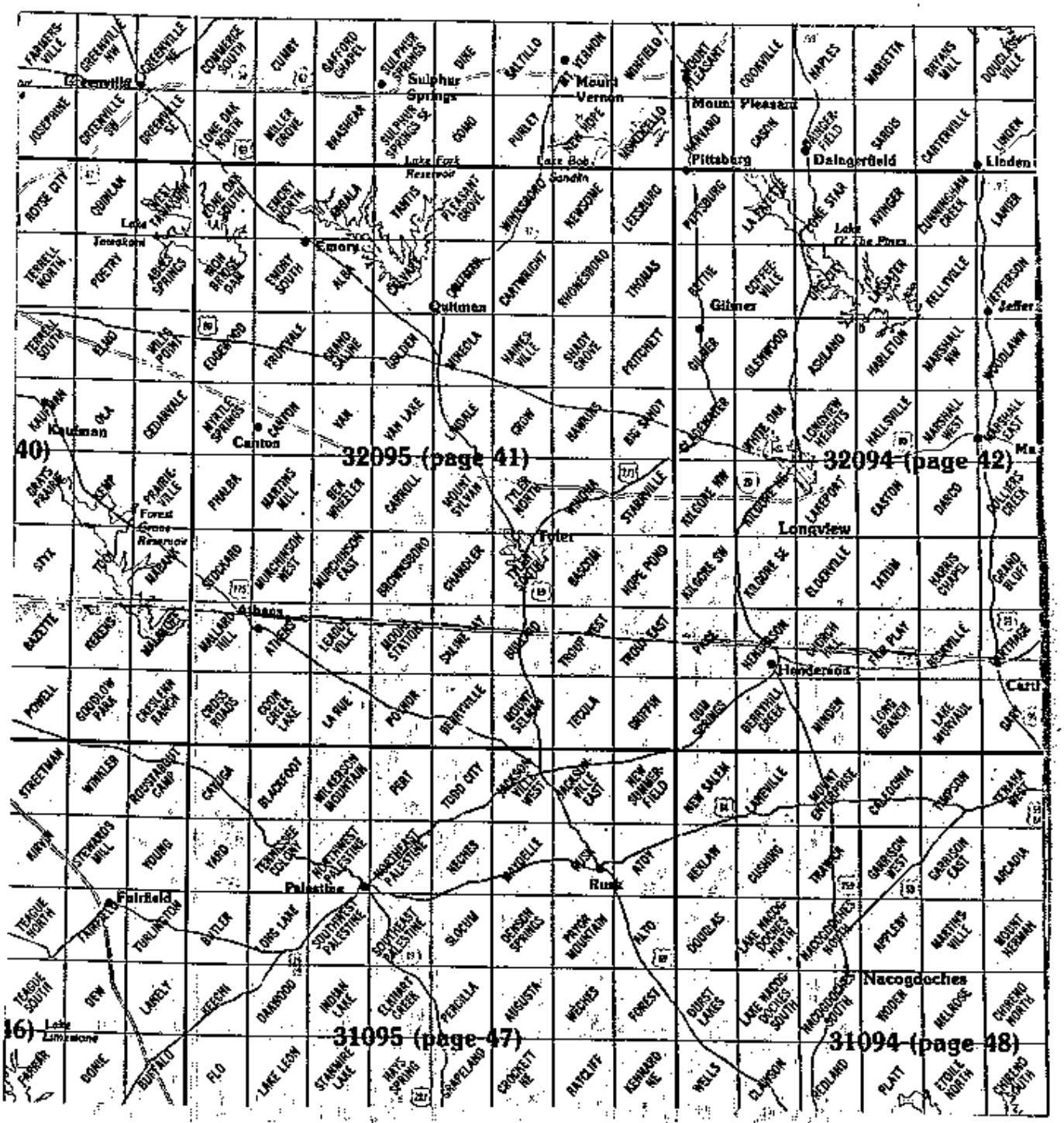

Figure 2. USGS 7.5′ topographic quadrangles surveyed for rough-stemmed aster

Appendix 1. Topographic characteristics of the pre-1995 rough-stemmed aster sites.

TxNHP EOR # / USGS 7.5′ Topographic Quadrangle	Location; Last Observation	Topographic Characteristics
001 - NW Palestine	Anderson Co.: 3.2-3.3 mi N of jct of FM 3390 & FM 315; 1995	Stream
002 - Slocum	Anderson Co.: ca. 1 mi E of Slocum, Hwy 294; 1983	Locality vague; although there are impoundments, intermittent drainages, streams, and marshes in the area, an intensive search along the highway turned up nothing
003 - NE Palestine NW Palestine	Anderson Co.: 2 mi N of jct of FM 3309 & FM 315, E side of FM 315; 1986	Marsh
004 - Tyler North	Smith Co.: ca. 0.4 mi SE of jct of hwys 110 & 2016 on 110, NW of Tyler; 1983	Stream
005 - Ben Wheeler	Van Zandt Co.: 3.5 mi SE of jct of hwys 279 & 858 in Ben Wheeler; 1995	Impoundment
006 - SE Palestine	Anderson Co.: TX St. Railroad Park, between mileposts 22 & 23, & 21 & 22; 1995	Marsh
007 - Mount Sylvan Carroll	Smith Co.: 16 mi NW of Tyler; 1947	Locality vague, but springs, streams, and impoundments in the area

Appendix 1. Topographic characteristics of the pre-1995 rough-stemmed aster sites.

TxNHP EOR # USGS 7.5′ Topographic Quadrangle	Location; Last Observation	Topographic Characteristics
008 - Ben Wheeler	Van Zandt Co.: 2.5 mi SE of Ben Wheeler; 1955	Locality could not be relocated. No wetland of any type could be found at this mileage. Perhaps the site has been totally destroyed or the directions are inaccurate. Impoundments, streams, and intermittent drainages are in the nearby area.
009 - Quitman	Wood Co.: 0.3 mi E of jct of Hwy 154 & Lake Lydia Road (FM 3230); 1995	Impoundments
010 - Hainesville	Wood Co.: 1.6 mi E of jct of Hwy 778 & Co. Road 3860, E of Red Branch; 1995	Stream
011 - Quitman	Wood Co.: ca. 4.7 mi W of jct of hwys 14 and 154 on 154; 1984	Locality could not be relocated. No wetland of any type could be found at this mileage. Perhaps the site has been totally destroyed or the directions are inaccurate. Impoundments and intermittent drainages are in the nearby area.
012 - Quitman	Wood Co.: near Co. Rd. 3235 & its jct with E end of Lake Lydia; 1984	Impoundment
013 - Quitman	Wood Co.: 0.1 mi N of Co. rd. 3245, 0.5 mi E of Co. rd. 3235, ca. 0.4 mi upstream from end of SE arm of Lake Lydia; 1988	Intermittent drainage

Appendix 1. Topographic characteristics of the pre-1995 rough-stemmed aster sites.

TxNHP EOR # USGS 7.5′ Topographic Quadrangle	Location; Last Observation	Topographic Characteristics
014 - Quitman	Wood Co.: ca. 0.6 mi W of jct of Lake Lydia Road (FM 3230) & Hwy 154; 1984	Locality could not be relocated. No wetland of any type could be found at this mileage. Perhaps the site has been totally destroyed or the directions are inaccurate. Intermittent drainage and impoundments are in the nearby area.
015 - Mineola	Wood Co.: 2.2 mi N of jct of hwys 80 & 69 in Mineola, E side of Hwy 69, W end of Lake Brenda; 1996	Impoundment
016 - Winona	Smith Co.: Camp Fannin, 8 mi NE of Tyler; 1943	Intermittent drainage

Appendix 2. Sites visited (arranged by USGS 7.5′ topographic quadrangle; bolded entries indicate presence of rough-stemmed aster, strike-outs indicate historic sites where rough-stemmed aster could not be relocated)

Athens (3209527) - Henderson Co.: Ca. 1.6 mi NE of jct of Hwys 31 & 317, N side of Hwy 31; Athens Fish & Game Club Lake; no rough-stemmed aster present; 11/01/95

Henderson Co.: Ca. 1.6 mi NE of Hwys 31 & 317, SE side of NE bound Hwy 31; seep draining into Athens Fish & Game Club Lake; rough-stemmed aster present; 11/01/95

Henderson Co.: Ca. 0.5 mi NE of Hwys 31 & 317; small ponds; no rough-stemmed aster habitat present; 11/01/95

Ben Wheeler (3209546)- **Van Zandt Co.: Ca. 3.5 mi SE of jct of Hwys 279 & 858, drainage & impoundment; rough-stemmed aster present; 10/27/95**

~~Van Zandt Co.: 2.5 mi SE of Ben Wheeler; rough-stemmed aster present in 1955; not relocated in 1991 or 1995 along hwy right-of-way although several sites in the vicinity searched; 10/27/95~~

Van Zandt Co.: Ca. 0.2 mi N of jct of Co. Road 4608 & Hwy 279; impoundment & drainage to Murchinson Creek; manicured; 11/02/95

Van Zandt Co.: Ca. 0.3 mi SE of jct of Hwy 279 & Co. Road 4704; small impoundment & drainage to Murchinson Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.2 mi NE of jct of Co. Road 4614 & Hwy 279; small impoundment & intermittent drainage to Horsley Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.2 mi E of jct of Co. Roads 4614 & 4602; Stanger Springs Church; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.1 mi SW of jct of Co. Road 4614 & Hwy 64; intermittent drainage to Horsley Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.2 mi NW of jct of Hwy 64 & Co. Road 4614; small impoundment & intermittent drainage to Horsley Creek; no rough-stemmed aster present; 11/02/95

Van Zandt Co.: Ca. 0.5 mi NW of jct of Hwy 64 & Co. Road 4614; drainage to Horsley Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.9 mi SE of jct of Hwy 64 & Co. Road 4601; drainage to Horsley Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.8 mi SE of jct of Hwy 64 & Co. Road 4601; small impoundment & drainage to Horsley Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.6 mi SE of jct of Hwy 64 & Co. Road 4601; intermittent drainage to Horsley Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.1 mi W of jct of Hwy 858 & Co. Road 4601; small impoundment (Mitchell Lake) & drainage to Turkey Creek; no rough-stemmed aster present; 11/02/95

Van Zandt Co.: Ca. 0.1 mi N of jct of Co. Road 4505 & Hwy 858; drainage from small impoundment (Mitchell Lake) to Turkey Creek; no rough-stemmed aster present; 11/02/95

Van Zandt Co.: Ca. 0.5 mi N of jct of Co. Road 4505 & Hwy 858; small impoundment; manicured; 11/02/95

Van Zandt Co.: Ca. 0.6 mi N of jct of Co. Road 4505 & Hwy 858; small impoundments & drainage to Turkey Creek; no rough-stemmed aster present; 11/02/95

Van Zandt Co.: Ca. 1.1 mi N of jct of Co. Road 4505 & Hwy 858; small impoundment & drainage to Browning Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.3 mi SW of jct of Co. Roads 4505 & 4506; small impoundment & drainage to Browning Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.5 mi N & W of jct of Co. Roads 4505 (?) & 4506; very small impoundment along Browning Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 1.8 mi N of jct of Co. Road 4505 (?) & Hwy 64; Browning Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 1.1 mi N of jct of Co. Road 4505 (?) & Hwy 64; Turkey Creek; dry; 11/02/95

Van Zandt Co.: Ca. 0.3 mi N of jct of Co. Road 4505 (?) & Hwy 64; small impoundment & intermittent drainage to Turkey Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.1 mi N of jct of Co. Road 4505 (?) & Hwy 64; small impoundment at head of intermittent drainage to Turkey Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.1 mi S of jct of Co. Road 4701 & Hwy 858; Carter Spring & small impoundment; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.4 mi N of jct of Hwy 773 & Co. Road 4701; head of drainage to Prairie Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.2 mi S of jct of Hwy 773 & Co. Road 4701; small impoundment & drainage to Prairie Creek; dry; 11/02/95

Van Zandt Co.: Ca. 0.4 mi S of jct of Hwy 773 & Co. Road 4701; marshy drainage to Prairie Creek; no rough-stemmed aster present; 11/02/95

Van Zandt Co.: Ca. 0.7 mi N of jct of Hwy 773 & Co. Road 4310; intermittent drainage to Prairie Creek; cleared & rock-lined; 11/02/95

Van Zandt Co.: Ca. 0.4 mi N of jct of Hwy 773 & Co. Road 4310; impoundment along drainage to Prairie Creek; manicured; 11/02/95

Van Zandt Co.: Ca. 0.9 mi E of jct of Co. Road 4310 (?) & Hwy 773; very small impoundment; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.1 mi E of jct of Co. Roads 4310 (?) & 4708; Slater Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.4 mi W of jct of Co. Roads 4310 (?) & 4714; very small impoundments; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 2.0 mi S of jct of Co. Roads 4714 & Hwy 279; small impoundment; dry; 11/02/95

Van Zandt Co.: Ca. 1.6 mi S of jct of Co. Roads 4714 & Hwy 279; small impoundment & drainage to Murchinson Creek; dry; 11/02/95

Van Zandt Co.: Ca. 1.2 mi S of jct of Co. Roads 4714 & Hwy 279; very small impoundment; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.9 mi S of jct of Co. Roads 4714 & Hwy 279; intermittent drainage; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.6 mi NW of jct of Hwy 279 & Co. Road 4714; small impoundment & intermittent drainage to Horsley Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.5 mi NW of jct of Hwy 279 & Co. Road 4601; drainage between small impoundments at head of drainage to Horsley Creek; no rough-stemmed aster present; 11/02/95

Van Zandt Co.: Ca. 0.1 mi S of jct of Hwys 279 & 858; intermittent drainage to Turkey Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.2 mi NW of jct of Hwy 279 & Co. Road 4408; very small pond on drainage to Turkey Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Jct of Hwys 279 & 64; very small pond & drainage to Browning Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Jct of Hwy 64 & Co. Road 4412; drainage to Browning Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.3 mi NW of jct of Hwy 64 & Co. Road 4410; head of drainage to Cream Level Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.2 mi NW of jct of Hwy 64 & Co. Road 4411 (north end); small impoundment & drainage to Cream Level Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.5 mi NW of jct of Hwy 64 & Co. Road 4411 (north end); impoundment & drainage to Cream Level Creek; no rough-stemmed aster present; 11/02/95

Berryville (3209514) - Henderson Co.: Ca. 2.7 mi NNW of jct of Hwys 155 & 175; intermittent drainage of Dunn Creek; dry; 10/30/95

Henderson Co.: Ca. 3.1 mi NNW of jct of Hwys 155 & 175; Dunn Creek; no rough-stemmed aster habitat present; 10/30/95

Brownsboro (3209535) - Henderson Co.: Hwy 31 & Lake Palestine, a large impoundment on Kickapoo Creek; extremely disturbed; 11/01/95

Henderson Co.: Ca. 0.1 mi S of jct of FM 3204 & Hwy 31, intermittent drainage of Kickapoo Creek; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 0.6 mi W of jct of FM 3204 & Hwy 31, small impoundment on intermittent drainage to Kickapoo Creek; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 0.9 mi W of jct of FM 3204 & Hwy 31, intermittent drainage to Horn Branch; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 0.8 mi W of jct of FM 3204 & Hwy 31, then ca. 0.1 mi S on county road, small impoundment and drainage to Horn Branch; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 0.8 mi W of jct of FM 3204 & Hwy 31, then ca. 1.5 mi S and 0.2 mi E on county roads, drainage between small impoundments on drainage of Cottonwood Creek; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 0.8 mi W of jct of FM 3204 & Hwy 31, then ca. 1.5 mi S, 0.2 mi E, and 0.3 mi S on county roads, Cottonwood Creek; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 0.8 mi W of jct of FM 3204 & Hwy 31, then ca. 1.5 mi S, 0.2 mi E, and 0.5 mi S on county roads, small impoundment on drainage to Cottonwood Creek; highly manicured; 11/01/95

Henderson Co.: Ca. 0.3 mi NE of jct of FM 3079 & Co. Road 3408; intermittent drainage to Martin Spring Branch; dry; 11/01/95

Henderson Co.: Ca. 0.5 mi NE of jct of FM 3079 & Co. Road 3408; small impoundment & drainage to Martin Spring Branch; dry; 11/01/95

Henderson Co.: Ca. 1.0 mi NE of jct of FM 3079 & Co. Road 3408; Martin Spring Branch; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 0.3 mi SE of jct of Co. Road 3408 & FM 3079; Martin Springs; spring impounded, exotic game ranch, heavily disturbed; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 1.3 mi NE of jct of FM 3079 & Hwy 314; intermittent drainage to Boggy Creek; dry; 11/01/95

Henderson Co.: Ca. 1.1 mi NE of jct of FM 3079 & Hwy 314; small impoundment & intermittent drainage to Boggy Creek; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 0.7 mi NE of jct of FM 3079 & Hwy 314; small impoundment & intermittent drainage to Boggy Creek; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 0.4 mi NE of jct of FM 3079 & Hwy 314; Boggy Creek; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 3.8 mi S of jct of Hwys 314 & 31; small impoundment along drainage to Prairie Branch; dry; 11/01/95

Henderson Co.: Ca. 3.1 mi S of jct of Hwys 314 & 31; small impoundment along drainage to Prairie Branch; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 2.8 mi S of jct of Hwys 314 & 31; small impoundment along drainage to Prairie Branch; dry; 11/01/95

Henderson Co.: Ca. 2.6 mi S of jct of Hwys 314 & 31; drainage to Prairie Branch; dry; 11/01/95

Henderson Co.: Ca. 0.8 mi S of jct of Hwys 314 & 31; intermittent drainage to Prairie Branch; dry; 11/01/95

Buffalo (3109641) - Leon Co.: Ca. 3.3 mi SW of jct of Hwy 79 & I-45, Tape Creek & Hwy 79; no rough-stemmed aster; 10/30/95
Leon Co.: Ca. 2.8 mi SW of jct of Hwy 79 & I-45, drainage to Tape Creek & Hwy 79; dry; 10/30/95
Leon Co.: Ca. 1.5 mi SW of jct of Hwy 79 & I-45, drainage to Cane Branch & Hwy 79; site too shaded, banks too steep; 10/30/95
Leon Co.: Ca. 1.3 mi SW of jct of Hwy 79 & I-45, impoundment draining to Cane Branch & Hwy 79; banks too steep; 10/30/95
Leon Co.: Ca. 0.8 mi SW of jct of Hwy 79 & I-45, roadside park & impounded drainage; site too shaded, banks too steep; 10/30/95
Leon Co.: Ca. 1.5 mi NE of jct of Hwys 79 & 75, drainage impoundment; highly manicured; 10/30/95
Leon Co.: Ca. 2.3 mi NE of jct of Hwys 79 & 75, intermittent drainage from impoundment to Buffalo Creek; dry; 10/30/95
Leon Co.: Ca. 2.7 mi NE of jct of Hwys 79 & 75, pond; dry; 10/30/95
Leon Co.: Ca. 3.0 mi NE of jct of Hwys 79 & 75, pond; dry; 10/30/95
Leon Co.: Ca. 3.5 mi NE of jct of Hwys 79 & 75, pond; dry; 10/30/95
Leon Co.: Ca. 3.9 mi NE of jct of Hwys 79 & 75, Buffalo Creek crossing; wrong plant community; 10/26/95

Bullard (3209523) - Smith Co.: Ca. 1.3 mi SSW of jct of Hwys 69 & 2813; small impoundment on drainage to West Mud Creek; highly manicured; 10/31/95
Smith Co.: Ca. 1.5 mi SSW of jct of Hwys 69 & 2813; small impoundment on drainage to West Mud Creek; highly manicured; 10/31/95
Smith Co.: Ca. 0.6 mi NNE of jct of Hwys 69 & 346; West Mud Creek; steep banks, no rough-stemmed aster habitat present; 10/31/95
Smith Co.: Ca. 0.1 mi S and ca. 0.1 mi W of jct of Hwys 69 & 346; Henshaw Creek; steep banks, some areas herbicided or burned, no rough-stemmed aster present; 10/31/95

Canton (3209557) - Van Zandt Co.: Ca. 0.2 mi W of jct of Co. Road 4203 & FM 2909; impoundment along drainage to Kickapoo Creek; no rough-stemmed aster present; 11/02/95
Van Zandt Co.: Ca. 0.1 mi SE of jct of Co. Roads 4203 & 4219; impoundments along intermittent drainage to Mill Creek; no rough-stemmed aster present; 11/02/95
Van Zandt Co.: Ca. 0.4 mi SE of jct of Co. Road 4203 & Hwy 19; intermittent drainage to Mill Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.1 mi S of jct of Hwy 19 & Co. Road 4203; impoundment & drainage to Beaver Dam Branch; manicured; 11/02/95

Van Zandt Co.: Ca. 0.2 mi W of jct of Co. Road 2205 & Hwy 19; confluence of Beaver Dam and Chinquapin Branches; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.2 mi N of jct of Hwy 19 & Co. Road 2205; Mill Creek; channelized; 11/02/95

Van Zandt Co.: Ca. 0.3 mi S of jct of Hwy 19 & FM 2909; intermittent drainage to Mill Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.4 mi S of jct of Hwys 19 & 243; intermittent drainage to Mill Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.1 mi S of jct of Hwys 19 & 243; small impoundment & intermittent drainage to Mill Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.4 mi N of jct of Hwy 19 & I-20; Caney Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.7 mi N of jct of Hwy 19 & I-20; intermittent drainage to Caney Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 1.3 mi N of jct of Hwy 19 & I-20; Sandy Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 1.1 mi NW of jct of Co. Road 3103 & Hwy 19; Willow Branch; no rough-stemmed aster habitat present; 11/02/95

Carroll (3209545) - Smith Co.: Ca. 1.0 mi E of jct of Hwy 110 & FM 1995; Clark Spring & drainage; part of drainage stabilized with riprap; manicured; no rough-stemmed aster present; 11/02/95

~~Smith Co.: 16 mi NW of Tyler; rough-stemmed aster present in 1947; the vagueness of the locality makes it impossible to relocate, however Clark Springs is in this general vicinity; much habitat within this general area was searched in 1995, without success; 11/02/95~~

Smith Co.: Ca. 0.6 mi SE of jct of Hwy 110 & FM 1995; Allen Branch & roadside drainage to SW; no rough-stemmed aster present; 11/02/95

Smith Co.: Ca. 0.5 mi S of jct of Co. Road 420 & Hwy 110; small impoundments along drainage to Neches River; no rough-stemmed aster present; 11/02/95

Smith Co.: Ca. 0.2 mi E of jct of Co. Roads 49 & 420; Allen Branch; no rough-stemmed aster habitat present; 11/02/95
Smith Co.: Ca. 0.5 mi E of jct of Co. Roads 49 & 420; small impoundment and drainage to Allen Branch; heavily forested; 11/02/95
Smith Co.: Ca. 1.0 mi E of jct of Co. Roads 49 & 420; small impoundment and drainage to Neches River; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Ca. 0.4 mi E of jct of Hwy 64 & Co. Road 4914; wrong soil; 11/02/95
Van Zandt Co.: Ca. 0.2 mi NW of jct of Hwy 64 & Co. Road 4929; small impoundment; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Ca. 0.3 mi NW of jct of Hwy 64 & Co. Road 487; intermittent drainage to Pile Creek; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Ca. 1.5 mi S of jct of Hwys 314 & 64; small impoundments and intermittent drainages to Murchinson Creek; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Ca. 0.3-0.7 mi NW of jct of Hwy 279 & FM 2339; intermittent drainage to Murchison Creek; no rough-stemmed aster present; 11/02/95

Cartwright (3209573) - **Wood Co.: 1.0 mi SSE of jct of Hwys 14 & 154, Buck Creek marsh; rough-stemmed aster present; 10/27/95**
Wood Co.: 0.3 mi E of jct of Hwys 154 & 14, tributary of Buck Creek; rough-stemmed present; 10/27/95
Wood Co.: 0.3 mi W of jct of Hwys 154 & 14, tributary of Buck Creek; no rough-stemmed aster; 10/27/95
Wood Co.: 0.6 mi W of jct of Hwys 154 & 14, tributary of Buck Creek; no rough-stemmed aster; 10/27/95

Chandler (3209534) - Smith Co.: Ca. 0.8 mi N of jct of Spur 164 (?) & Hwy 64; marshy tributary of Black Fork Creek; no rough-stemmed aster habitat present; 11/01/95
Smith Co.: Ca. 0.1 mi E of jct of Hwy 31 & Spur 164; impoundment along an intermittent tributary of Indian Creek; dry; 11/01/95
Smith Co.: Ca. 0.9 mi S of jct of Spur 164 & Hwy 31; fish hatchery by intermittent tributary of Indian Creek; no rough-stemmed aster habitat present; 11/01/95

Smith Co.: Ca. 0.5 mi SSW of jct of Spurs 164 & 364; intermittent tributary of Indian Creek; no rough-stemmed aster habitat present; 11/01/95
Smith Co.: Ca. 0.8 mi S of jct of Spur 164 & Co. Road 1140; intermittent tributary of Butler Creek; no rough-stemmed aster habitat present; 11/01/95
Smith Co.: Ca. 0.1 mi N of jct of Spur 164 & Co. Road 1113; intermittent tributary of Butler Creek; no rough-stemmed aster habitat present; 11/01/95
Smith Co.: Ca. 0.2 mi E of jct of Co. Road 1113 & Spur 164; intermittent tributary of Butler Creek; dry; 11/01/95
Smith Co.: Ca. 0.4 mi E of jct of Co. Road 1113 & Spur 164; small impoundment on intermittent tributary of Butler Creek; dry; 11/01/95
Smith Co.: Ca. 0.6-0.9 mi SW of jct of Co. Road 1113 & Spur 164; impoundment (Lake Placid) on intermittent tributaries of Butler Creek; heavily disturbed; no rough-stemmed aster habitat present; 11/01/95
Smith Co.: Ca. 0.5 mi N of jct of Co. Roads 1141 & 1113; Butler Creek marsh; no rough-stemmed aster habitat present; 11/01/95
Smith Co.: Ca. 0.4 mi W of jct of Co. Roads 1130 & 1141; impoundment (Club 13 Lake) along intermittent drainage to Butler Creek; disturbed; no rough-stemmed aster habitat present; 11/01/95
Smith Co.: Ca. 0.3 mi NE of jct of Co. Roads 1130 & 1141; intermittent drainage to Butler Creek; dry; 11/01/95
Smith Co.: Ca. 0.7 mi N of jct of the eastern Co. Road that crosses Indian Creek & Co. Road 1140; Indian Creek marsh; no rough-stemmed aster habitat present; 11/01/95

Crow (3209553) - Smith Co.: Ca. 0.3 mi S of jct of Co. Road 498 & Hwy 16; drainage between impoundment (Lake Lorraine) & North Prairie Creek; no rough-stemmed aster habitat present; 11/03/95
Smith Co.: Ca. 0.1 mi S of jct of Co. Road 498 & Hwy 16; drainage to North Prairie Creek; no rough-stemmed aster habitat present; 11/03/95
Smith Co.: Ca. 0.5 mi E of jct of Hwy 16 & Co. Road 498; drainage between impoundment & North Prairie Creek; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.9 mi NE of jct of Hwy 16 & Co. Road 498; drainage to North Prairie Creek; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 1.0 mi NE of jct of Hwy 16 & Co. Road 498; intermittent drainage to North Prairie Creek; heavily wooded; 11/03/95

Smith Co.: Ca. 0.9 mi W of jct of Hwy 16 & Co. Road 31; Saline Creek marsh; no rough-stemmed aster present; 11/03/95

Smith Co.: Ca. 0.3 mi W of jct of Hwy 16 & Co. Road 31; drainage to Saline Creek marsh; dry; 11/03/95

Smith Co.: Ca. 0.1-0.2 mi W of jct of Hwy 16 & Co. Road 32; Jones Creek marsh; no rough-stemmed aster present; 11/03/95

Smith Co.: Ca. 0.4 mi E of jct of Hwy 16 & Co. Road 32; impoundment along intermittent drainage to Jones Creek marsh; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.9 mi E of jct of Hwy 16 & Co. Road 32; Red Springs Branch; herbicided; 11/03/95

Smith Co.: Ca. 0.2 mi W of jct of FM 2710 & Hwy 14; Red Springs; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 1.2 mi WNW of jct of FM 2710 & Hwy 14; Red Springs Branch marsh; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.8-1.2 mi E of jct of FM 2710 & Co. Road 4104; Saline Creek and its impoundments, drainages, & marsh; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.5-0.6 mi E of jct of FM 2710 & Co. Road 4104; small impoundment & intermittent drainage to Saline Creek; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.5 mi W of jct of FM 2710 & Co. Road 4104; North Prairie Creek; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.8 mi WNW of jct of FM 2710 & Co. Road 4104; impoundment on intermittent drainage to North Prairie Creek; manicured; 11/03/95

Smith Co.: Ca. 0.1 mi E of jct of FM 2710 & Co. Road 498; intermittent drainage to North Prairie Creek; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.1 mi S of jct of Co. Road 498 & FM 2710; intermittent drainage to North Prairie Creek; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.5 mi S of jct of Co. Road 498 & FM 2710; intermittent drainage to North Prairie Creek; no rough-stemmed aster habitat present; 11/03/95
Smith Co.: Ca. 0.7 mi S of jct of Co. Road 498 & FM 2710; drainage from impoundment (American Legion Lake) to North Prairie Creek; no rough-stemmed aster habitat present; 11/03/95
Smith Co.: Ca. 0.9 mi S of jct of Co. Road 498 & FM 2710; intermittent drainage to North Prairie Creek; no rough-stemmed aster habitat present; 11/03/95
Smith Co.: Ca. 0.1 mi W of jct of Hwy 16 & Co. Road 498; intermittent drainage to North Prairie Creek; no rough-stemmed aster habitat present; 11/03/95

Edgewood (3209568) - Van Zandt Co.: Ca. 0.2 mi NW of jct of Hwy 64 & Co. Road 3403; intermittent drainage to Flat Creek; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Jct of Co. Roads 3104 & 3103; intermittent drainage to Buffalo Creek; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Ca. 0.1 mi SW of jct of Co. Road 3204 & Hwy 859; impoundment at head of tributary to Rock Branch; manicured; 11/02/95
Van Zandt Co.: Ca. 0.5 mi NW of jct of Hwy 64 & Co. Road 3403; Flat Creek; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Ca. 0.1 mi SE of jct of Hwy 64 & Co. Road 3412; small ponds along intermittent drainage to Andy Branch; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Ca. 0.9 mi NW of jct of Hwy 64 & Co. Road 3418; intermittent drainage to Allen Creek; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Ca. 1.2 mi NW of jct of Hwy 64 & Co. Road 3418; impoundment; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Ca. 1.6 mi NW of jct of Hwy 64 & Co. Road 3418; intermittent drainage to Allen Creek; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Ca. 0.2 mi NW of jct of Hwy 64 & Co. Road 3417; small impoundments along intermittent drainage to Allen Creek; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Ca. 0.2 mi W of jct of Hwy 80 & Co. Road 3424; intermittent drainage to Giladon Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.9 mi W of jct of Hwy 80 & FM 1504; Giladon Creek; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Ca. 0.5 mi W of jct of Hwy 80 & FM 1504; ponds; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Ca. 0.4 mi W of jct of Hwy 80 & FM 1504; intermittent drainage to Giladon Creek; no rough-stemmed aster habitat present; 11/02/95

Fruitvale (3209567) - Van Zandt Co.: Ca. 0.2 mi NE of jct of Co. Roads 3104 & 3103; intermittent drainage to Buffalo Creek; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Ca. 1.4 mi W of jct of Hwys 80 & 19; ponds along intermittent drainage to Crooked Creek; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Ca. 1.0 mi W of jct of Hwys 80 & 19; marsh & impoundment along intermittent drainage to Crooked Creek; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Ca. 0.3 mi W of jct of Hwys 80 & 19; Crooked Creek; almost dry, puddles; herbicided; 11/02/95
Van Zandt Co.: Ca. 0.4 mi E of jct of Hwy 80 & 19; Mill Creek; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Ca. 0.8 mi W of jct of Hwy 80 & FM 1818; Caney Creek; no rough-stemmed aster habitat present; 11/02/95

Golden (3209565) - Wood Co.: Ca. 0.2 mi N of jct of Loop 564 & Hwy 80; intermittent drainage to Smith Creek; no rough-stemmed aster habitat present; 11/02/95
Wood Co.: Ca. 0.2 mi SE of jct of Hwy 69 & Co. Road 2333; impoundment (Sand Springs Lake) on drainage to Lake Holbrook (impoundment along Keys Creek); no rough-stemmed aster present; 11/02/95

Grand Saline (3209566) - Van Zandt Co.: Ca. 0.3 mi S of jct of Hwys 110 & 17; marsh along tributary of Grand Saline Creek; filled with *Baccharis*; 11/02/95
Van Zandt Co.: Ca. 0.5-0.8 mi SSE of jct of Hwys 857 & 80; marsh along tributary of Grand Saline Creek; no rough-stemmed aster habitat present; 11/02/95

Hainesville (3209563) - Wood Co.: Ca. 0.3 mi W of jct of Hwys 49 & 778; Stewart Branch marsh; no rough-stemmed aster habitat present; 11/03/95
Wood Co.: Ca. 0.3 mi SSE of jct of Hwys 778 & 49; small marsh; no rough-stemmed aster habitat present; 11/03/95
Wood Co.: Ca. 0.6 mi SE of jct of Hwys 778 & 49; small marsh & Patton Creek; herbicided and oiled; 11/03/95

Wood Co.: Ca. 0.7-0.8 mi SE of jct of Hwy 778 & Co. Road 2678; small marsh & Mill Race Creek; no rough-stemmed aster habitat present; 11/03/95

Wood Co.: Ca. 0.4 mi NW of jct of Hwy 778 & Co. Road 3860; intermittent drainage to Lacey Branch; no rough-stemmed aster habitat present; 11/03/95

Wood Co.: Ca. 0.2 mi NW of jct of Hwy 778 & Co. Road 3860; intermittent drainage between impoundments along Lacey Branch; no rough-stemmed aster habitat present; 11/03/95

Wood Co.: Ca. 1.6 mi E of jct of Co. Road 3860 & Hwy 778; impoundment along Red Branch; rough-stemmed aster present; 11/03/95

Wood Co.: Ca. 0.8 mi E of jct of Co. Road 3860 & Hwy 778; intermittent drainage to Norman Branch; no rough-stemmed aster habitat present; 11/03/95

Wood Co.: Ca. 2.1 mi E & N of jct of Co. Road 3860 & Hwy 778; marshy drainage along Little Sandy Creek; no rough-stemmed aster present; 11/03/95

Wood Co.: Ca. 1.3 mi SW of jct of Co. Road 3860 & Hwy 14; impoundment along intermittent drainage to Little Sandy Creek; no rough-stemmed aster habitat present; 11/03/95

Wood Co.: Ca. 1.2 mi SE of jct of Hwy 14 & Co. Road 3860; Bull Creek; no rough-stemmed aster habitat present; 11/03/95

Wood Co.: Ca. 0.5 mi NW of jct of Hwys 14 & 49; Mansell Creek; no rough-stemmed aster habitat present; 11/03/95

Keechi (3109558) - Leon Co.: Ca. 0.1 mi SW of jct of Hwys 79 & 832, drainage; dry; 10/26/95

Leon Co.: Ca. 0.3 mi NE of jct of Hwys 79 & 832, drainage; dry; 10/26/95

Leon Co.: Ca. 1.2 mi NE of jct of Hwys 79 & 832, Alligator Creek & Hwy 79; no rough-stemmed aster; 10/30/95

Leon Co.: Ca. 2.9 mi NE of jct of Hwys 79 & 832, drainage; dry; 10/30/95

Leon Co.: Ca. 3.7 mi NE of jct of Hwys 79 & 832, drainage; dry; 10/30/95

Leon Co.: Ca. 5.2 mi NE of jct of Hwys 79 & 832, Upper Keechi Creek; banks too steep; 10/30/95

Leon Co.: Ca. 5.4 mi NE of jct of Hwys 79 & 832, drainage; no rough-stemmed aster; 10/30/95

Lanely (3109651) - Leon Co.: Ca. 4.7-5.1 mi NE of jct of Hwys 79 & 75, Mustang Creek marsh along Hwy 79; wrong plant community; 10/26/95

Lindale (3209554) - Smith Co.: Ca. 0.5 mi S of jct of Co. Road 4100 & Hwy 16; impoundment (Lake Lorraine) along North Prairie Creek; no rough-stemmed aster present; 11/03/95

Smith Co.: Ca. 0.4 mi W of Hwy 16 & Co. Road 431; intermittent drainage to Stevenson Branch; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.8 mi W of Hwy 16 & Co. Road 431; small impoundment along intermittent drainage to Stevenson Branch; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 1.0 mi ESE of Hwy 16 & Co. Road 479; impoundment (Hide-a-Way Lake No. 2) along Hubbard Branch; no rough-stemmed aster present; 11/03/95

Smith Co.: Ca. 0.7 mi ESE of Hwy 16 & Co. Road 479; Luckeible Branch; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.4 mi E of Hwy 16 & Co. Road 479; intermittent drainage to Luckeible Branch; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.9 mi N of Co. Road 479 & Hwy 16; intermittent drainage to Duck Creek marsh; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 1.1 mi N of Co. Road 479 & Hwy 16; intermittent drainage to Duck Creek marsh; dry; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.2 mi N to 0.5 mi S of jct of Co. Roads 479 & 477; drainage and marsh along Duck Creek; dry enough to mow; soils appear unsuitable; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.2 mi S of jct of Co. Roads 479 & 482; intermittent drainage to Duck Creek marsh; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 1.0 mi SE of jct of Co. Roads 849 & 4119; Duck Creek marsh; steep-banked creek, surrounding area mowed, manicured pasture; 11/03/95

Smith Co.: Ca. 1.6 mi SE of jct of Co. Roads 849 & 4119; intermittent drainage to Stevenson Branch; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Jct of Co. Roads 849 & 4118; impoundment along Stevenson Branch; no rough-stemmed aster present; 11/03/95

Smith Co.: Ca. 0.5 mi S of jct of Co. Roads 849 & 4118; drainage between impoundments (Stewart & Tomlin Lakes) along Stevenson Branch; rough-stemmed aster present; 11/03/95

Smith Co.: Ca. 1.5 mi NNW of jct of Hwy 69 & FM 1804; intermittent drainage between impoundments on drainage to Macs Creek; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.1 mi SE of jct of Hwy 69 & Co. Road 452; Duck Creek marsh; steep-banked creek, no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.3 mi NW of jct of Hwy 69 & Co. Road 452; drainage between impoundments on drainage to Duck Creek; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.9 mi NW of jct of Hwy 69 & Co. Road 452; small pond along intermittent drainage to Bowdoin Branch; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 1.4 mi NW of jct of Hwy 69 & Co. Road 452; Bowdoin Branch & drainage; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.5 mi SE of jct of Hwy 69 & Co. Road 431; Winding Branch; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.2 mi S of jct of Co. Roads 431 & 484; impoundment; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.5 mi S of jct of Co. Roads 431 & 484; impoundment along intermittent drainage; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.9 mi S of jct of Co. Roads 431 & 484; Winding Branch; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.2 mi W of jct of Co. Roads 452 & 431; intermittent drainage to Winding Branch; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.4 mi W of jct of Co. Roads 452 & 431; impoundment along drainage to Winding Creek; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.5 mi SE of jct of Co. Roads 452 & 445; intermittent drainage to Winding Creek; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Jct of Co. Roads 452 & 445; marsh and small impoundments along intermittent drainage to Rock Creek; no rough-stemmed aster present; 11/03/95

Smith Co.: Ca. 0.3 mi NE of jct of Co. Roads 445 & 452; marsh and small impoundments along intermittent drainage to Rock Creek; no rough-stemmed aster present; 11/03/95

Long Lake (3109567) - Freestone Co.: Ca. 1.8 mi SW of jct of Hwys 79 & 84, drainage; dry; 10/30/95

Freestone Co.: Ca. 0.8 mi SW of jct of Hwys 79 & 84, drainage; dry; 10/30/95

Freestone/Anderson Cos.: Trinity River crossing of Hwys 79/84; bottomland hardwoods or cropland; 10/30/95

Anderson Co.: Ca. 0.4 mi E of Trinity River crossing of Hwys 79 & 84, drainage; dry; 10/30/95

Anderson Co.: Ca. 0.8 mi NE of jct of Hwys 79/84 & 294, drainage; dry; 10/30/95

Martins Mill (3209547) - Van Zandt Co.: Ca. 0.1 mi S of jct of FM 1653 & Co. Road 4116; very small pond; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.4 mi S of jct of FM 1653 & Co. Road 4116; very small pond; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.1 mi S of jct of FM 1653 & Co. Road 4106; impoundment & intermittent drainage to Diffy Creek; no rough-stemmed aster present; 11/02/95

Van Zandt Co.: Ca. 0.1 mi S of jct of FM 1653 & Co. Road 4404; small impoundment; no rough-stemmed aster present; 11/02/95

Van Zandt Co.: Ca. 0.3 mi N of jct of FM 1653 & Co. Road 4403; impoundment on tributary of Diffy Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.1 mi S of jct of FM 1653 & Co. Road 4403; Diffy Creek; dry; 11/02/95

Van Zandt Co.: Jct of FM 1653 & Co. Road 4118; very small pond; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.1 mi S of jct of FM 1653 & Co. Road 4118; very small pond; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.2 mi N of jct of FM 1653 & Co. Road 4401; drainage to Heifer Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.2 mi W of jct of FMs 1653 & 1861; impoundment & drainage to Heifer Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.4 mi N of jct of FM 2909 & Hwy 858; impoundment & drainage to Kickapoo Creek; manicured; 11/02/95

Van Zandt Co.: Ca. 0.8 mi N of jct of FM 2909 & Co. Road 4209; drainage with marshes; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.9 mi N of jct of FM 2909 & Co. Road 4209; small impoundment; manicured; 11/02/95

Van Zandt Co.: Ca. 0.5 mi N of jct of FM 2909 & Co. Road 4209; marshy drainage to Sand Branch; no rough-stemmed aster present; 11/02/95

Van Zandt Co.: Ca. 0.3 mi S of jct of FM 2909 & Co. Road 4113; impoundment; manicured; 11/02/95

Van Zandt Co.: Ca. 0.5 mi NW of jct of FM 2909 & Co. Road 4113; intermittent drainage to Kickapoo Creek; no rough-stemmed aster present; 11/02/95

Van Zandt Co.: Ca. 0.1 mi NW of jct of FM 2909 & Co. Road 4112; Kickapoo Creek; herbicided; 11/02/95

Van Zandt Co.: Ca. 0.7 mi NW of jct of FM 2909 & Co. Road 4112; small impoundment; dry; 11/02/95

Van Zandt Co.: Ca. 0.5-0.6 mi NW of jct of FM 2909 & Co. Road 4205; small impoundment & intermittent drainage to Kickapoo Creek; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.8 mi NW of jct of FM 2909 & Co. Road 4205; intermittent drainage to Kickapoo Creek; no rough-stemmed aster habitat present; 11/02/95

Mineola (3209564) - **Wood Co.: Just N of jct of Loop 564 & Hwy 69; drainage to Lake Atkins (Mineola Club Lake on map); rough-stemmed aster present; 11/02/95**

Wood Co.: Jct of Hwy 69 & Co. Road 2720; intermittent drainage to Sabine River; rough-stemmed aster and hybrids present; 11/03/95

Wood Co.: Intersection of University & Sycamore Streets in Mineola; marsh along intermittent drainage from Lake Atkins to Smith Creek; no rough-stemmed aster present; 11/03/95

Wood Co.: Ca. 0.5 mi NW of jct of Hwys 69 & 37; impoundment along intermittent drainage to Smith Creek; no rough-stemmed aster present; 11/03/95

Wood Co.: Ca. 2.2 mi N of jct of Hwys 37 & 69; intermittent drainage to impoundment (Lake Brenda) along Twomile Branch; rough-stemmed aster present; 11/03/95

Wood Co.: Ca. 0.4 mi E of jct of Co. Road 2460 & Hwy 37; unmarked drainage at head of tributary to Fourmile Branch; rough-stemmed aster present; 11/03/95

Wood Co.: Ca. 0.6 mi E & N of jct of Co. Road 2460 & Hwy 37; impoundments along Fourmile Branch; heavily disturbed, area being bulldozed; 11/03/95

Wood Co.: Ca. 0.4 mi E of jct of Co. Road 2465 & Hwy 37; small impoundment along intermittent drainage to Fourmile Branch; no rough-stemmed aster present; 11/03/95

Wood Co.: Ca. 0.2 mi E of jct of Co. Road 2465 & Hwy 37; small impoundment along intermittent drainage to Fourmile Branch; no rough-stemmed aster habitat present; 11/03/95

Wood Co.: Ca. 0.3 mi S of jct of Hwy 37 & Co. Road 2465; drainage between impoundments (Lakes Garner & Long) along Fourmile Branch; no rough-stemmed aster present; 11/03/95

Wood Co.: Ca. 0.7 mi W of jct of Co. Road 2465 (?) & FM 1254; intermittent drainage to Lewellyn Creek marsh; no rough-stemmed aster habitat present; 11/03/95

Wood Co.: Ca. 0.4 mi W of jct of Co. Road 2465 (?) & FM 1254; intermittent drainage to Lewellyn Creek; no rough-stemmed aster habitat present; 11/03/95

Wood Co.: Ca. 0.2 mi W of jct of Co. Road 2465 (?) & FM 1254; intermittent drainage to Lewellyn Creek; no rough-stemmed aster present; 11/03/95

Wood Co.: Ca. 0.1 mi W of jct of Co. Road 2465 (?) & FM 1254; intermittent drainage to Lewellyn Creek; no rough-stemmed aster habitat present; 11/03/95

Wood Co.: Ca. 0.1 mi S of jct of FM 1254 & Co. Road 2465 (?); intermittent drainage to Lewellyn Creek; dry; 11/03/95

Wood Co.: Ca. 0.3 mi S of jct of FM 1254 & Co. Road 2465 (?); Lewellyn Creek; no rough-stemmed aster habitat present; 11/03/95

Wood Co.: Ca. 0.7 mi SSW of jct of FM 1254 & Co. Road 2465 (?); Lewellyn Creek marsh; no rough-stemmed aster present; 11/03/95

Wood Co.: Ca. 1.1 mi SSW of jct of FM 1254 & Co. Road 2465 (?); drainage from small pond to Lewellyn Creek marsh; no rough-stemmed aster habitat present; 11/03/95

Wood Co.: Ca. 1.9 mi SSW of jct of FM 1254 & Co. Road 2465 (?); intermittent marshy drainage to Lewellyn Creek; no rough-stemmed aster present; 11/03/95

Wood Co.: Ca. 1.5 mi W of jct of FM 1801 & Co. Road 2460; impoundment along intermittent drainage to Sabine River; no rough-stemmed aster habitat present; 11/03/95

Wood Co.: Ca. 0.7 mi W of jct of FM 1801 & Co. Road 2460; intermittent drainage to Sabine River; no rough-stemmed aster habitat present; 11/03/95

Wood Co.: Ca. 0.5 mi N of jct of Co. Road 2650 & FM 1801; Palmer Spring, intermittent drainage, and marsh of Rock Falls Creek; no rough-stemmed aster present; 11/03/95

Wood Co.: Ca. 0.2 mi S of jct of Co. Road 2650 (?) & Hwy 49; impoundment (Beckham Lake) and intermittent drainage to Lake Fork Creek; no rough-stemmed aster habitat present; 11/03/95

Wood Co.: Ca. 1.0 mi NE of jct of Hwy 49 & Co. Road 2650 (?); intermittent drainage to Lake Fork Creek; no rough-stemmed aster habitat present; 11/03/95

Wood Co.: Ca. 1.3 mi NE of jct of Hwy 49 & Co. Road 2650 (?); Lake Fork Creek; no rough-stemmed aster habitat present; 11/03/95

Wood Co.: Ca. 1.4 mi NE of jct of Hwy 49 & Co. Road 2650 (?); small ponds; no rough-stemmed aster habitat present; 11/03/95

Wood Co.: Ca. 2.1 mi NE of jct of Hwy 49 & Co. Road 2650 (?); intermittent drainage to Lake Fork Creek; no rough-stemmed aster habitat present; 11/03/95

Wood Co.: Ca. 2.7 mi NE of jct of Hwy 49 & Co. Road 2650 (?); impoundment along intermittent drainage to Lake Fork Creek; no rough-stemmed aster habitat present; 11/03/95

Wood Co.: Ca. 3.3 mi NE of jct of Hwy 49 & Co. Road 2650 (?); drainage to Lake Fork Creek; no rough-stemmed aster habitat present; 11/03/95

Mount Sylvan (3209544) - Smith Co.: Ca. 0.4 mi S of jct of Hwy 110 & Co. Road 433; Chinquapin Creek and tributary; steep-sided creek; no rough-stemmed aster habitat present; 11/01/95

Smith Co.: Ca. 1.2 mi E of jct of Swan Lake Road (?) & Hwy 110; drainage between impoundments (Swan Lake, an impoundment along a drainage to Chinquapin Creek); heavily forested; 11/01/95

Smith Co.: Ca. 0.5 mi W of jct of Hwy 110 & Co. Road 433; Prairie Creek marsh; steep-sided creek and marsh; no rough-stemmed aster habitat present; 11/01/95

Smith Co.: Ca. 0.3 & 0.4 mi N of jct of Co. Road 433 & Hwy 110; drainages to Prairie Creek; no rough-stemmed aster habitat present; 11/01/95

Smith Co.: Ca. 1.0 mi N of jct of Co. Road 433 & Hwy 110; drainage to Prairie Creek; dry; 11/01/95

Smith Co.: Ca. 0.3 mi W of jct of Co. Roads 471 & 433; Prairie Creek marsh; S side drained; no rough-stemmed aster present on N side; 11/01/95

Smith Co.: Ca. 0.9 mi W of jct of Co. Roads 471 & 433; Long Branch Creek; adjacent pasture and powerlines cleared; no rough-stemmed aster present; 11/01/95

Smith Co.: Ca. 0.3 mi N of jct of Co. Roads 471(?) & 46; Prairie Creek; no rough-stemmed aster habitat present; 11/01/95

Smith Co.: Ca. 0.2 mi NW of jct of Co. Roads 46 & 45; Prairie Creek; no rough-stemmed aster habitat present; 11/01/95

Smith Co.: Ca. 0.7 mi S of jct of Co. Roads 1150 & 46; Black Fork Creek marsh; major road construction; 11/01/95

Smith Co.: Ca. 0.1 mi N of jct of Co. Roads 46 & 1148; Black Fork Creek; no rough-stemmed aster habitat present; 11/01/95

Smith Co.: Ca. 0.3 mi SW of jct of Co. Roads 1148 & 46; tributary of Black Fork Creek; no rough-stemmed aster habitat present; 11/01/95

Smith Co.: Ca. 0.7 mi SW of jct of Co. Roads 1148 & 46; intermittent tributary of Black Fork Creek; dry; 11/01/95

Smith Co.: Ca. 0.8 mi E of jct of Co. Roads 1148 & 46; intermittent tributary of Black Fork Creek; dry; 11/01/95

Smith Co.: Ca. 0.2 mi E of jct of Co. Roads 1148 & 46; intermittent tributary of Prairie Creek; no rough-stemmed aster habitat present; 11/01/95

Smith Co.: Ca. 0.2 mi NW of jct of Hwy 724 & Co. Roads 1148; intermittent tributary of Prairie Creek; no rough-stemmed aster habitat present; 11/01/95

Smith Co.: Ca. 0.5 mi S of jct of Hwy 724 & Co. Roads 46; intermittent tributary of Prairie Creek; no rough-stemmed aster habitat present; 11/01/95

Smith Co.: Ca. 1.2 mi S of jct of Hwy 724 & Co. Roads 46; intermittent tributary between impoundments on intermittent tributaries of Prairie Creek; impoundments fairly well-manicured, no rough-stemmed aster present; 11/01/95

Smith Co.: Ca. 0.9 mi S of jct of Co. Road 413 & Hwy 724; intermittent tributary of Prairie Creek; dry; 11/01/95

Smith Co.: Ca. 0.5 mi NW of jct of Hwy 724 & Co. Road 42; intermittent tributary of Prairie Creek; no rough-stemmed aster habitat present; 11/01/95

Smith Co.: Ca. 1.1 mi S of jct of Hwy 724 & Co. Road 49; pond; manicured; 11/01/95

Smith Co.: Ca. 0.7 mi S of jct of Hwy 724 & Co. Road 49; drainage; heavily wooded; 11/01/95

Smith Co.: Ca. 0.3 mi S of jct of Hwy 724 & Co. Road 49; impoundment; no rough-stemmed aster habitat present; 11/01/95

Smith Co.: Ca. 0.8 mi NW of jct of Hwy 110 & 724; intermittent drainage to Caney Creek; dry; 11/02/95

Smith Co.: Ca. 1.3 mi NW of jct of Hwy 110 & 724; small impoundments along intermittent drainage to the Nueces River; no rough-stemmed aster present; 11/02/95

Smith Co.: Ca. 0.1 mi N of jct of Co. Road 438 & Hwy 110; small impoundment at head of intermittent drainage to the Nueces River; no rough-stemmed aster present; 11/02/95

Smith Co.: Ca. 1.3 mi SW of jct of Co. Road 49 & Hwy 724; intermittent drainage to the Nueces River; no rough-stemmed aster present; 11/02/95

Murchison E (3209536) - Henderson Co.: Ca. 0.2 mi W of jct of Co. Road 3516 & Hwy 31, then 0.1-0.2 mi N on Co. Road 472(?); impoundment; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 0.2 mi W of jct of Co. Road 3516 & Hwy 31, then ca. 0.6-0.7 mi N on Co. Road 472(?); impoundment on drainage to Kickapoo Creek; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 0.2 mi W of jct of Co. Road 3516 & Hwy 31, then ca. 1.0 mi N on Co. Road 472(?); small impoundments along drainages to Kickapoo Creek; dry; 11/01/95

Henderson Co.: Ca. 0.2 mi W of jct of Co. Road 3516 & Hwy 31, then ca. 1.0 mi N & 0.1 mi W on Co. Road 472(?); small impoundment and drainage to Kickapoo Creek; highly manicured; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 0.2 mi W of jct of Co. Road 3516 & Hwy 31, then ca. 1.0 mi N & 0.5 mi W on Co. Road 472(?); small impoundment and drainage to Kickapoo Creek; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 0.2 mi W of jct of Co. Road 3516 & Hwy 31, then ca. 1.0 mi N & 0.8 mi W on Co. Road 472(?); small impoundments and drainage to Kickapoo Creek; manicured; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 0.2 mi W of jct of Co. Road 3516 & Hwy 31, then ca. 1.0 mi N & 2.4 mi W on Co. Road 472(?); intermittent drainage to Kickapoo Creek; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 0.2 mi W of jct of Co. Road 3516 & Hwy 31, then ca. 1.0 mi N & 2.6 mi W on Co. Road 472(?); Price Creek; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 0.2 mi W of jct of Co. Road 3516 & Hwy 31, then ca. 1.0 mi N & 3.1 mi W on Co. Road 472(?); small impoundments and drainage along tributary to Kickapoo Creek; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 0.2 mi W of jct of Co. Road 3516 & Hwy 31, then ca. 1.0 mi N & 3.2 mi W on Co. Road 472(?); small impoundment and intermittent drainage along tributary to Kickapoo Creek; dry; 11/01/95

Henderson Co.: Ca. 0.2 mi W of jct of Co. Road 3516 & Hwy 31, then ca. 1.0 mi N & 3.3 mi W on Co. Road 472(?); small impoundment and drainage along tributary to Kickapoo Creek; dry; 11/01/95

Henderson Co.: Ca. 0.2 mi W of jct of Co. Road 3516 & Hwy 31, then ca. 1.0 mi N, then 3.4 mi W and 0.2 mi N on Co. Road 472(?); small impoundments and drainages along tributary to Kickapoo Creek; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 0.3 mi S of jct of Co. Road 472 & FM 2339; drainage to Slater Creek; no rough-stemmed aster habitat present; 11/01/95

Van Zandt Co.: Ca. 0.3 mi SW of jct of FM 2339 & Co. Road 472; small impoundment on drainage to Slater Creek; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 0.9 mi WSW of jct of FM 2339 & Co. Road 472; intermittent drainage to Slater Creek; no rough-stemmed aster habitat present; 11/01/95

Henderson Co.: Ca. 1.5 mi WSW of jct of FM 2339 & Co. Road 472; large impoundment (Callender Lake) along Slater Creek; no rough-stemmed aster habitat present; 11/01/95
Van Zandt Co.: Ca. 2.2 mi WSW of jct of FM 2339 & Co. Road 472; small impoundment and drainage to Callender Lake; no rough-stemmed aster habitat present; 11/01/95
Van Zandt Co.: Ca. 0.2 mi E of jct of FM 2339 & Co. Road 4711; intermittent drainage to Callender Lake; no rough-stemmed aster habitat present; 11/01/95
Van Zandt Co.: Jct of FM 2339 & Hwy 773; intermittent drainage to Prairie Creek; dry; 11/01/95
Henderson Co.: Ca. 0.3 mi S of jct of Hwy 773 & FM 2339; drainage to Prairie Creek; no rough-stemmed aster habitat present; 11/01/95
Henderson Co.: Ca. 0.4 mi SE of jct of FM 1803 & Hwy 773; Killingsowrth Branch; dry; 11/01/95
Henderson Co.: Ca. 1.4 mi SE of jct of FM 1803 & Hwy 773; intermittent drainage to Killingsowrth Branch; no rough-stemmed aster habitat present; 11/01/95
Henderson Co.: Ca. 1.7 mi N of jct of FM 1803 (North) & Hwy 31; Kickapoo Creek; steep-banked creek; 11/01/95
Henderson Co.: Ca. 0.4 mi W of jct of Hwy 31 & FM 1803 (North); intermittent drainage to Bailey Branch; no rough-stemmed aster present; 11/01/95
Henderson Co.: Ca. 0.6 mi W of jct of Hwy 31 & FM 1803 (South); intermittent drainage to Big Duncan Branch; no rough-stemmed aster present; 11/01/95
Henderson Co.: Ca. 1.0 mi W of jct of Hwy 31 & FM 1803 (South); Big Duncan Branch; no rough-stemmed aster habitat present; 11/01/95

Murchinson W (3209537) - Henderson Co.: Ca. 1.2 mi SW of jct of Hwys 31 & 773; drainage to Jackson Lake; no rough-stemmed aster habitat present; 11/01/95
Henderson Co.: 1.3 mi SW of jct of Hwys 31 & 773; drainage to Jackson Lake; no rough-stemmed aster habitat present; 11/01/95
Henderson Co.: 2.3 mi SW of jct of Hwys 31 & 773; intermittent drainage to Athens Fish & Game Club Lake; no rough-stemmed aster habitat present; 11/01/95
Henderson Co.: 2.6 mi SW of jct of Hwys 31 & 773; small impoundments and drainage to Athens Fish & Game Club Lake; no rough-stemmed aster habitat present; 11/01/95

Myrtle Springs (3209558) - Van Zandt Co.: Ca. 0.1 mi SW of jct of Co. Roads 3204 & 3206; pond; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 0.5 mi SE of jct of Co. Roads 3204 & 3219; intermittent drainage to Caney Creek; dry; 11/02/95

Van Zandt Co.: Ca. 0.6 mi E of jct of Co. Road 3204 & Hwy 64; intermittent drainage to Rats Branch; no rough-stemmed aster habitat present; 11/02/95

Van Zandt Co.: Ca. 1.1 mi NW of jct of Hwy 64 & FM 1504; pond; no rough-stemmed aster habitat present; 11/02/95

NE Palestine (3109575) - Anderson Co.: Ca. 0.1 mi NNE of jct of Hwys 155 & 256; Howard Creek; heavily disturbed by exotic plant invasions; 10/30/95

Anderson Co.: Ca. 0.2 mi NNE of jct of Hwys 155 & 315; drainage; dry; 10/30/95

Anderson Co.: Ca. 0.8 mi SW of jct of Hwy 155 & Co. road 359; drainage between impoundments on drainage of Smith Creek; closely mowed, soil surface dry, but many associates present; 10/30/95

Anderson Co.: Ca. 0.4 mi SW of jct of Hwy 155 & Co. road 359; Smith Creek; no rough-stemmed aster present; private land on W side appears to have potential 10/30/95

Anderson Co.: Ca. 0.9 mi NE of jct of Hwy 155 & Co. road 359; Mound Prairie Creek; some steep banks, some herbicided spots, potential habitat on NW side S of bridge but no rough-stemmed aster present; 10/30/95

Anderson Co.: Ca. 1.1 mi NE of jct of Hwy 155 & Co. road 359; small pond; dry; 10/30/95

Anderson Co.: Ca. 1.2 mi NE of jct of Hwy 155 & Co. road 359; intermittent drainage of Mound Prairie Creek; dry; 10/30/95

Anderson Co.: Ca. 0.4 mi NNE of jct of Hwy 155 & Co. road 349; intermittent drainage; sandy creek, no rough-stemmed aster present; 10/30/95

~~**Anderson Co.: Ca. 2.0 mi N of jct of FMs 315 & 3309; marshy drainage; rough-stemmed aster present in 1986, not observed in 1991 or 1995; habitat highly manicured; 10/27/95**~~

Anderson Co.: Ca. 0.4 mi SE of jct of Loop 256 & Hwy 79, then ca. 0.1 mi SW of Loop 256 on road to Memorial Cemetery; marshy drainage to Howard Creek; no rough-stemmed aster habitat present; 10/31/95

NW Palestine (3109576) - **Anderson Co.: 3.2-3.2 mi N of jct of FMs 315 & 3309; impoundment; rough-stemmed aster present; 10/27/95**

Oakwood (3109557) - Leon Co.: Ca. 0.2 mi SW of jct of Hwys 79 & 542, drainage; dry; 10/30/95
Freestone Co.: Ca. 1.8 mi NE of jct of Hwys 79 & 542, drainage; almost dry; 10/30/95
Freestone Co.: Ca. 3.0 mi NE of jct of Hwys 79 & 542, Caney Creek; steep banks, heavily wooded; 10/30/95

Pert (3109585) - Anderson Co.: Ca. 1.3 mi S of jct of Hwys 155 & 2267; Walnut Creek; no rough-stemmed aster present; 10/30/95
Anderson Co.: Ca. 0.5 mi N of jct of Hwy 155 & Co. road 436; Brushy Creek marsh; adjacent bottomland hardwood clearcut, no rough-stemmed aster present; 10/30/95

Poyner (3209515) - Anderson Co.: Ca. 1.2 mi N of jct of Hwy 155 & Co. Road 318; Caney Branch; sandy creek; no rough-stemmed aster present; 10/30/95
Anderson Co.: Ca. 0.4-0.7 mi SW of jct of Hwys 155 & 19; Caddo Creek marsh; no rough-stemmed aster present; 10/30/95

Quitman (3209574) - **Wood Co.: Ca. 0.3 mi E of jct of Hwy 154 & FM 3230, impoundments of Chinquapin Branch; rough-stemmed aster present; 10/27/95**
~~Wood Co.: Ca. 0.6 mi E of jct of Hwy 154 & FM 3230, vicinity of Shiloh Branch; rough-stemmed aster present in 1984, not relocated in 1991 or 1995 (hwy right-of-way well-mowed, adjacent private land converted into manicured pasture); 10/27/95~~
~~Wood Co.: Ca. 4.7 mi W of jct of Hwys 154 & 14, no wetland features in this vicinity; rough-stemmed aster present in 1984, not relocated in 1991 or 1995; no wetlands at this mileage, within Quitman city limits; 10/27/95~~
Wood Co.: 0.1 mi N of Co. Road 3245, at a point 0.5 mi E of Co. Road 3235; SE arm of Lake Lydia; rough-stemmed aster present in 1988, not rechecked in 1991 or 1995, on private land
~~Wood Co.: near Co. Road 3235 & its jct with E end of Lake Lydia; rough-stemmed aster present in 1984, not relocated in 1991, not rechecked in 1995; in 1991 the E edge of the lake was primarily well-manicured single-family residential homes~~

Saline Bay (3209524) - Smith Co.: Ca. 0.3 mi NE of jct of Hwys 344 & 2661; Rose Branch; steep banks, herbicided on E side; 10/30/95
Smith Co.: Ca. 0.5 mi SSW of jct of Hwy 155 & 2868; Copperas Creek; no rough-stemmed aster habitat present; 10/30/95
Smith Co.: Ca. 0.1 mi SSW of jct of Hwy 155 & 2868; small impoundment on drainage to Copperas Creek; manicured pasture; 10/30/95

Slocum (3109564) - Anderson Co.: Ca. 1.6 mi SE of jct of Hwys 323 & 1817; Alder Branch; flat sandy creek, clearcut north of hwy; no rough-stemmed aster present; 10/31/95

Anderson Co.: Ca. 2.6 mi SE of jct of Hwys 323 & 1817; drainage to Alder Branch; dry; 10/31/95

Anderson Co.: Ca. 1.1 mi NW of jct of Hwy 323 & Co. Road 1244; Turkey Creek; highly manicured pasture; 10/31/95

Anderson Co.: Ca. 0.4 mi NW of jct of Hwy 323 & Co. Road 1244; drainage to Squirrel Creek; no rough-stemmed aster habitat; 10/31/95

Anderson Co.: Ca. 0.5 mi SE of jct of Hwy 323 & Co. Road 1244; pond and drainage to Squirrel Creek; pond; highly manicured; drainage dry; 10/31/95

Anderson Co.: Ca. 1.1 mi N of jct of Hwys 323 & 294; Squirrel Creek; no rough-stemmed aster present; 10/31/95

Anderson Co.: Ca. 0.9 mi E of jct of Hwys 294 & 323; Ioni Creek; mowed to fenceline and creek; no rough-stemmed aster habitat present; 10/31/95

Anderson Co.: Ca. 0.2 mi W of jct of Hwys 294 & 323; small impoundment on drainage of Squirrel Creek; no rough-stemmed aster habitat present; 10/31/95

Anderson Co.: Ca. 0.5 mi W of jct of Hwys 294 & 323; drainage of Squirrel Creek; no rough-stemmed aster habitat present; 10/31/95

Anderson Co.: Ca. 0.7 mi W of jct of Hwys 294 & 323; drainage to Squirrel Creek; highly manicured; 10/31/95

Anderson Co.: S of jct of Hwy 294 & Co. Road 1205; small impoundment on drainage to Ioni Creek; no rough-stemmed aster habitat present; 10/31/95

Anderson Co.: Ca. 0.3 mi W of jct of Hwy 294 & Co. Road 1205; very small impoundments on drainage to Squirrel Creek; no rough-stemmed aster present; 10/31/95

~~Anderson Co.: Ca. 1 mi E of Slocum on Hwy 294; rough-stemmed aster present in 1993, not relocated in 1991 or 1995, most of this area is highly manicured pasture; 10/31/95~~

Anderson Co.: Ca. 0.5 mi W of jct of Hwy 294 & Co. Road 1204; drainage from very small impoundment; dry; 10/31/95

Anderson Co.: Ca. 0.8 mi W of jct of Hwy 294 & Co. Road 1204; intermittent drainage from small impoundment; no rough-stemmed aster habitat present; 10/31/95

Anderson Co.: Ca. 1.5 mi SE of jct of Co. Road 1204 & FM 1817; Squirrel Creek marsh; road recently resurfaced with oil-sand; no rough-stemmed aster habitat present; 10/31/95

Anderson Co.: Ca. 0.2 mi NE of jct of Co. Roads 1204A & 1204; Boggy Creek marsh; no rough-stemmed aster habitat present; 10/31/95

Anderson Co.: Ca. 1.0 mi SE of jct of Co. Road 1204 & FM 1817; Boggy Creek marsh; no rough-stemmed aster present; 10/31/95

Anderson Co.: Ca. 0.6 mi NE of jct of FM 1817 & Co. Road 1204; drainage and small impoundment on tributary of Boggy Creek; no rough-stemmed aster present; 10/31/95

Anderson Co.: Ca. 0.4 mi NE of jct of FM 1817 & Co. Road 1204; intermittent tributary of Boggy Creek; no rough-stemmed aster present; 10/31/95

Anderson Co.: Ca. 0.3 mi S of jct of FM 1817 & Co. Road 1204; Boggy Creek; mowed, logged, and pasturized; 10/31/95

Anderson Co.: Ca. 0.4 mi SE of jct of Co. Road 153A & FM 2022 (northern jct); intermittent drainage from small impoundment on tributary of Squirrel Creek; no rough-stemmed aster habitat present; 10/31/95

Anderson Co.: Ca. 0.8 mi SE of jct of FMs 2022 & 1817; intermittent drainage from small impoundment on tributary of Squirrel Creek; no rough-stemmed aster habitat present; 10/31/95

Anderson Co.: Ca. 1.0 mi SE of jct of FMs 2022 & 1817; Squirrel Creek marsh; no rough-stemmed aster present; 10/31/95

Anderson Co.: Ca. 0.2 mi SE of jct of Co. Road 153A & FM 2022 (middle jct); Squirrel Creek marsh; no rough-stemmed aster habitat present; 10/31/95

Anderson Co.: Ca. 0.4 mi WSW of jct of FMs 1817 & 2022; intermittent drainage to Squirrel Creek; steep banks; 10/31/95

Anderson Co.: Ca. 0.6 mi WSW of jct of FMs 1817 & 2022; intermittent drainage to Squirrel Creek; no rough-stemmed aster habitat; 10/31/95

SE Palestine (3109565) - **Anderson Co.: Ca. 1.0 mi and ca. 1.5 mi E of jct of Texas State Railroad & Co. Road 386; marshy drainage of Stills Creek; rough-stemmed aster present; 10/31/95**

Anderson Co.: Ca. 0.2 mi SE of jct of Co. Road 386 & Texas State Railroad; Stills Creek; steep banks, no rough-stemmed habitat present; 10/31/95

Anderson Co.: Ca. 1.1 mi SE of jct of Co. Road 386 & Texas State Railroad; Stills Creek drainage; no rough-stemmed habitat present; 10/31/95
Anderson Co.: Ca. 1.7 mi SE of jct of Co. Road 386 & Texas State Railroad; Stills Creek drainage; no rough-stemmed habitat present; 10/31/95
Anderson Co.: Ca. 0.3 mi SE of jct of Co. Roads 386 & 198; Snake Creek; steep banks; 10/31/95
Anderson Co.: Ca. 0.2 mi NE of jct of FM 1817 & Co. Road 163; small pond; highly manicured; 10/31/95
Anderson Co.: Ca. 0.2 mi SW of jct of FM 1817 & Co. Road 191; Delany Branch; steep banked creek; 10/31/95
Anderson Co.: Ca. 0.8 mi SW of jct of FM 1817 & Co. Road 191; intermittent drainage to Yellow Branch; no rough-stemmed aster habitat present; 10/31/95
Anderson Co.: Ca. 1.0 mi SW of jct of FM 1817 & Co. Road 191; small pond; highly manicured; 10/31/95
Anderson Co.: Ca. 0.2 mi N of jct of FMs 2419 & 1817; small pond; highly manicured; 10/31/95
Anderson Co.: Ca. 0.6 mi NW of jct of FMs 2419 & 1817; drainage to Elkhart Lake; no rough-stemmed aster habitat present; 10/31/95
Anderson Co.: Ca. 0.8 mi NW of jct of FMs 2419 & 1817; drainage to Elkhart Lake; no rough-stemmed aster habitat present; 10/31/95
Anderson Co.: Ca. 0.4 mi NW of jct of FM 2419 & Co. Road 163; Box Creek; no rough-stemmed aster habitat present; 10/31/95
Anderson Co.: Ca. 1.1 mi SE of jct of FM 2419 & Hwy 287; intermittent drainage to Frost Creek; no rough-stemmed aster habitat present; 10/31/95
Anderson Co.: Ca. 0.6 mi SE of jct of FM 2419 & Hwy 287; small impoundment at head of intermittent drainage to Frost Creek; highly manicured pond; 10/31/95

SE Palestine (3109566) - Anderson Co.: Ca. 0.1 mi NE of jct of Hwys 79/84 & 645, pond; dry; 10/30/95
Anderson Co.: Ca. 1.6 mi NE of jct of Hwys 79/84 & 645, drainage between impoundments; dry; 10/30/95
Anderson Co.: Ca. 2.4 mi NE of jct of Hwys 79/84 & 645, Gum Creek crossing; dry; 10/30/95
Anderson Co.: Ca. 3.5 mi NE of jct of Hwys 79/84 & 645, Town Creek crossing; dry; 10/30/95

Anderson Co.: Ca. 4.0 mi NE of jct of Hwys 79/84 & 645, drainage; almost dry, heavily wooded; 10/30/95

Tyler N (3209543) - Smith Co.: Ca. 0.2 mi E of jct of Morningside Drive & Loop 323, drainage; bottomland hardwood forest; 10/28/95

Smith Co.: Just W of jct of Hwys 271 & 2015, Ray Creek; creek channelized, concreted, and polluted; hwy right-of-way herbicided; small power station & numerous electric lines; 10/28/95

Smith Co.: Ca. 1.8 mi E of jct of I-20 & Hwy 14, N side of W-bound access road, drainage to marsh on Wiggins Creek; rough-stemmed present; 10/28/95

Smith Co.: Ca. 1.6 mi E of jct of I-20 & Hwy 14, N side of W-bound access road, drainage to marsh on Wiggins Creek; no rough-stemmed aster present; 10/28/95

Smith Co.: Ca. 1.1 mi E of jct of I-20 & Hwy 14, N side of W-bound access road, drainage to Wiggins Creek; no rough-stemmed aster present; 10/28/95

Smith Co.: Jct of I-20 & Co. Road 35 (Lavender Road), Hitts Creek; primarily open water with *Zizaniopsis* on edge; no rough-stemmed aster present; 10/28/95

Smith Co.: 1.8 mi W of jct of I-20 & Co. Road 35 (Lavender Road), Little Saline Creek; no rough-stemmed aster present; 10/28/95

Smith Co.: Ca. 0.4 mi SSE of jct of Hwy 69 & FM 2016; Black Fork Creek marsh; steep-banked, sandy creek with surrounding marsh; no rough-stemmed aster present; 11/01/95

Smith Co.: Ca. 0.5 mi W of jct of FM 2016 & Hwy 69; impoundment along drainage to Black Fork Creek; no rough-stemmed aster habitat present; 11/01/95

Smith Co.: Ca. 0.2 mi S of jct of Lake Park Drive & FM 2016; intermittent drainage to Black Fork Creek; dry; 11/01/95

Smith Co.: Ca. 0.4 mi S of jct of Lake Park Drive & FM 2016; Black Fork Creek; steep-banked, sandy creek; 11/01/95

Smith Co.: Ca. 0.6 mi N of jct of Lake Park Drive & Hwy 110; drainage to Lake Park; rough-stemmed aster present; 11/01/95

~~**Smith Co.: Ca. 0.4 mi SE of jct of Hwy 110 & FM 2016; Black Fork Creek marsh; wide, steep-banked creek with oily water; recently mowed, powerline right-of-way herbicided, pipeline recently dug up, bridge replaced in 1990 or 1991; rough-stemmed aster present in 1983, not relocated in 1991 or 1995; 11/01/95**~~

Smith Co.: Ca. 0.2 mi SE of jct of Hwy 110 & FM 2016; pond on drainage to Black Fork Creek; herbicided, only cattails left; 11/01/95

Smith Co.: Ca. 0.2 mi NNE of jct of Hwy 110 & FM 2016; drainage to Black Fork Creek; dry and heavily forested; 11/01/95

Smith Co.: Ca. 0.7-0.9 mi NNE of jct of Loop 323 & Hwy 69; Black Fork Creek & tributaries; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.8 mi N of jct of Jones Valley Church Co. Road & Loop 323; impoundment along drainage to Black Fork Creek; no rough-stemmed aster present; 11/03/95

Smith Co.: Ca. 1.1 mi N of jct of Jones Valley Church Co. Road & Loop 323; impoundment (Federal Lake) along drainage to Black Fork Creek; no rough-stemmed aster present; 11/03/95

Smith Co.: Ca. 0.2 mi S of jct of Hwys 35 & 492; drainage to Hitts Creek; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.5 mi S of jct of Hwys 35 & 492; drainage to Hitts Creek; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.9 mi S of jct of Hwy 35 & I-20; drainage to Hitts Creek; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.5 mi S of jct of Hwy 35 & I-20; drainage to Hitts Creek; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.1 mi SE of jct of Tyler State Park north entrance road & Hwy 313; drainage to Hitts Creek; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.2 mi SW of jct of Tyler State Park south road & north entrance road; drainage from lake to Hitts Creek; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Beauchamp Springs, Tyler State Park; spring; dry; 11/03/95

Smith Co.: Ca. 0.3 mi W of jct of Hwys 313 & 14; drainage to East Mill Creek; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.9 mi W of jct of Hwys 313 & 14; impoundment on drainage to Hitts Creek; manicured; 11/03/95

Smith Co.: Ca. 0.4 mi W of jct of Hwys 313 & 35; drainage to Littel Saline Creek; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.9 mi W of jct of Hwys 313 & 35; Little Saline Creek; no rough-stemmed aster present; 11/03/95

Smith Co.: Ca. 0.5 mi N of jct of Co. Road 496 & Hwy 313; Cooks Creek; no rough-stemmed aster habitat present; 11/03/95

Smith Co.: Ca. 0.2 mi W of jct of Co. Roads 497 & 496; drainage from impoundment to Cooks Creek; no rough-stemmed aster habitat present; 11/03/95
Smith Co.: Ca. 0.6 mi W of jct of Co. Roads 497 & 496; drainage to Cooks Creek; no rough-stemmed aster habitat present; 11/03/95
Smith Co.: Ca. 0.9 mi W of jct of Co. Roads 497 & 496; small impoundment along drainage to Cooks Creek; no rough-stemmed aster habitat present; 11/03/95
Smith Co.: Ca. 0.4 mi W of jct of Co. Roads 497 & 4102; impoundment along drainage to Cooks Creek; no rough-stemmed aster habitat present; 11/03/95
Smith Co.: Ca. 0.2 mi N of jct of Co. Roads 498 & 497; drainage to Cooks Creek; no rough-stemmed aster habitat present; 11/03/95

Tyler S (3209533) - Smith Co.: Ca. 0.1 mi S of jct of Loop 323 & Hwy 64, impoundment drainage; drained & converted into parking lot; 10/28/95
Smith Co.: Ca. 1.5 mi N of jct of Loop 323 & Hwy 64, impoundment drainage; manicured, channelized, and polluted; 10/28/95
Smith Co.: Ca. 0.5 mi W of jct of Hwy 110 & Loop 323; impoundment and channelized tributary; Lake Park; a highly disturbed area (powerlines herbicided, sewer overflow, open water impoundment, channelization) with little habitat except along lake edge; no rough-stemmed aster present; 11/01/95

Wills Point (3209561) - Van Zandt Co.: Ca. 0.5 mi W of jct of Hwy 80 & FM 2965; intermittent drainage to Blackberry Creek; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Ca. 0.7 mi W of jct of Hwy 80 & FM 2965; intermittent drainage to Blackberry Creek; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Ca. 1.1 mi W of jct of Hwy 80 & FM 2965; impoundment; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Ca. 1.5 mi W of jct of Hwy 80 & FM 2965; intermittent drainage to Wolf Creek; no rough-stemmed aster habitat present; 11/02/95
Van Zandt Co.: Ca. 1.7 mi W of jct of Hwy 80 & FM 2965; intermittent drainage to Wolf Creek; no rough-stemmed aster habitat present; 11/02/95
Kaufman Co.: Ca. 3.7 mi W of jct of Hwy 80 & FM 2965; Rocky Cedar Creek; no rough-stemmed aster habitat present; 11/02/95

Winona (3209542) - Smith Co.: Ca. 0.7 mi E of jct of Hwys 271 & 2015, west arm of Loves Branch; bottomland hardwood forest; 10/28/95

~~Smith Co.: University of Texas at Tyler Health Center (formerly East Texas Tuberculosis Hospital and before that Camp Fannin); manicured grounds or bottomland hardwood forest; rough-stemmed aster present in 1943; not relocated in 1995~~

Smith Co.: Ca. 0.4 mi SW of jct of Hwys 271 & 155, Walsh Creek drainage; area herbicided; 10/28/95

Smith Co.: Ca. 0.4 mi N of jct of Hwys 155 & 271, Ray Creek drainage; dry; 10/28/95

Smith Co.: Ca. 0.6 mi N of jct of Hwy 155 & I-20, Wiggins Creek; steep banked, heavily-forested creek; 10/28/95

Smith Co.: Ca. 1.0 mi N of jct of Hwy 155 & I-20, drainage to Wiggins Creek; heavily forested; 10/28/95

Smith Co.: Ca. 0.2 mi N of jct of Hwy 155 & Co. road 343, drainage to Wiggins Creek; heavily forested; 10/28/95

Smith Co.: Ca. 0.3 mi W of jct of Co. Roads 313 & 343, drainage to Wiggins Creek; heavily forested or manicured pasture; 10/28/95

Smith Co.: Ca. 1.2 mi W of jct of Co. Roads 313 & 343, drainage to Wiggins Creek; heavily forested or manicured pasture; 10/28/95

Smith Co.: Ca. 1.1 mi S of jct of Co. Roads 336 & 313, Wiggins Creek marsh; steep-banked, heavily forested, no marsh within sight; 10/28/95

Smith Co.: Ca. 0.6 mi E of jct of Co. Roads 313 & 336, Wiggins Creek drainage; manicured ponds, *Bidens* in ditch; 10/28/95

Smith Co.: Ca. 0.5 mi W of jct of Co. Roads 313 & 336, impoundment on Wiggins Creek drainage; heavily forested; 10/28/95

Smith Co.: Ca. 0.3 mi S of jct of FM 2015 & Co. road 313, drainage of Driscoll Lake, an impoundment on a Wiggins Creek drainage; heavily forested; 10/28/95

Smith Co.: Jct of FM 2015 & I-20, Wiggins Creek; heavily forested or closely mowed; 10/28/95

Appendix 3. USGS 7.5′ topographic quadrangles with unsurveyed, potential habitat for rough-stemmed aster

Anderson County - Augusta, Berryville, Blackfoot, Cayuga, Coon Creek Lake, Creslann Ranch, Cross Roads, Denson Springs, Elkhart, Indian Lake, La Rue, Long Lake, Neches, Northeast Palestine, Northwest Palestine, Percilla, Pert, Poyner, Roustabout Camp, Slocum, Southeast Palestine, Southwest Palestine, Tennessee Colony, Todd City, Wilkerson Mountain, Yard

Camp County - Harvard, La Fayette, Leesburg, Monticello, New Hope, Newsome, Pittsburg

Cass County - Avinger, Daingerfield, Lone Star

Cherokee County - Alto, Atoy, Berryville, Bullard, Denson Springs, Douglas, Durst Lakes, Forest, Griffin, Gum Springs, Jacksonville East, Jacksonville West, Kennard NE, Maydelle, Mount Selman, Neches, New Salem, New Summerfield, Price, Pryor Mountain, Reklaw, Rusk, Tecula, Todd City, Troup East, Troup West, Weches

Franklin County - New Hope, Newsome, Purley, Winnsboro

Freestone County - Buffalo, Butler, Keechi, Lanely, Long Lake, Oakwood, Rousabout, Stewards Mill, Turlington, Winkler, Yard, Young

Gregg County - Ashland, Gladewater, Glenwood, Kilgore NE, Kilgore NW, Kilgore SE, Kilgore SW, Lakeport, Longview Heights, White Oak

Harrison County - Ashland, Colliers Creek, Darco, Easton, Hallsville, Harleton, Lakeport, Longview Heights, Marshall W, Marshall NW, Marshall W, Woodlawn

Henderson County - Athens, Brownsboro, Chandler, Coon Creek Lake, Creslenn Ranch, Cross Roads, La Rue, Leagueville, Mabank, Malakoff, Mallard Hill, Moore Station, Murchison East, Murchison West, Poynor, Stockard, Styx, Tool

Hopkins County - Brashear, Sulphur Springs SE

Houston County - Augusta, Crockett NE, Elkhart Creek, Grapeland, Hays Spring, Indian Lake, Kennard NE, Percilla, Porter Springs, Ratcliff, Stanmire Lake, Weches

Hunt County - No potential habitat was identified in this county.

Kaufman County - Kemp

Leon County - Buffalo, Centerville, Eunice, Flo, Keechi, Lake Leon, Lanely, Leona, Oakwood

Marion County - Harleton, Kellyville, Marshall NW, Woodlawn

Morris County - Cason, Daingerfield, Lone Star

Nacogdoches County - Appleby, Cushing, Douglass, Durst Lakes, Garrison East, Garrison West, Lake Nacogdoches North, Lake Nacogdoches North, Nacogdoches South, Reklaw, Trawick

Navarro County - Malakoff, Streetman, Styx, Winkler

Panola County - Beckville, Caledonia, Fair Play, Gary, Harris Chapel, Lake Murvaul, Long Branch, Tatum, Tenaha West, Timpson

Rains County - No potential habitat was identified in this county.

Rusk County - Berryhill Creek, Caledonia, Church Hill, Cushing, Elderville, Fair Play, Garrison East, Garrison West, Gum Springs, Henderson, Kilgore, SE, Kilgore SW, Laneville, Long Branch, Minden, Mount Enterprise, New Salem, Price, Reklaw, Tatum, Timpson, Trawick

Shelby County - Caledonia, Garrison East, Tenaha West, Timpson

Smith County - Bascom, Big Sandy, Bullard, Carroll, Chandler, Crow, Golden, Hawkins, Hope Pond, Kilgore NW, Kilgore SW, Lindale, Mount Sylvan, Price, Saline Bay, Starrville, Troup East, Troup West, Tyler North, Tyler South, Van Lake, Winona

Titus County - Cason, Monticello, New Hope

Upshur County - Bettie, Big Sandy, Coffeeville, Gilmer, Gladewater, Glenwood, Hawkins, La Fayette, Leesburg, Newsome, Ore City, Pittsburg, Pritchett, Rhonesboro, Shady Grove, Thomas, White Oak

Van Zandt County - Ben Wheeler, Brownsboro, Canton, Carroll, Chandler, Golden, Martins Mill, Mount Sylvan, Murchison East, Murchison West, Myrtle Springs, Van Lake

Wood County - Cartwright, Crow, Golden, Hainesville, Hawkins, Lindale, Mineola, Newsome, Quitman, Rhonesboro, Shady Grove, Winnsboro

Appendix 4. Historic and extant collections of rough-stemmed aster

TEXAS

Anderson Co.: 3.2-3.3 miles north of FM 3309 and FM 315 junction, west side of FM 315; first collected by W. F. Mahler 9690 (ASTC, SMU) on 15 October 1983; last observed 27 October 1995 by J. Poole; EOR #001

Anderson Co.: About 1 mile east of Slocum on Highway 294; first collected by E. S. Nixon 12658 (ATSC, SHST, SMU) on 28 October 1983; not relocated in 1991 or 1995, most of this area is highly manicured pasture; EOR #002

Anderson Co.: 2 miles north of the intersection of FM 3309 and FM 315; first collected by E. R. Nixon 12662 (ATSU, SMU) on 20 October 1983; not observed in 1991 or 1995, habitat highly manicured; EOR #003

Anderson Co.: Texas State Railroad State Historical Park, between mileposts 22 and 23, and between mileposts 22 and 21; first collected by L. N. Lodwick 383 (SMU); last observed 31 October 1995 by J. Poole; EOR #006

Henderson Co.: Ca. 5.5 miles west-southwest of the junction of Highway 31 and FM 1804 on Highway 31; first collected by J. Singhurst 3903 (SHST) on 27 October 1995; last observed by J. Poole on 1 November 1995; EOR #021

Smith Co.: About 0.4 miles southeast of the junction of Highways 110 and 2016 on 110; first collected by E. S. Nixon 12659 (ATSU, SHST, SMU); wide, steep-banked creek with oily water; recently mowed, powerline right-of-way herbicided, pipeline recently dug up, bridge replaced in 1990 or 1991; not relocated in 1991 or 1995; EOR #004

Smith Co.: 16 miles northwest of Tyler; first collected by L. H. Shinners 9504 (SMU) on 19 October 1947; the vagueness of the locality makes it impossible to relocate, however Clark Springs is in this general vicinity; much habitat within this general area was searched on 2 November 1995 without success; EOR #007

Smith Co.: 8 miles northeast of Tyler, Camp Fannin (now University of Texas at Tyler Health Center); first collected by H. E. Moore, Jr. 564 (US) on 15 October 1943; manicured grounds or bottomland hardwood forest; not relocated in 1995; EOR #016

Smith Co.: 1.8 miles east of the intersection of I-20 and Highway 14, north side of west bound access road of I-20; first collected and last observed by J. Poole 4281 (SHST) on 28 October 1995; EOR #019

Smith Co.: 0.6 miles north of the intersection of Lake Park Drive and Highway 110, east side of Lake Park Drive, south of a small drainage to Lake Park, north side of Tyler; first collected by J. Poole 4282 (SHST) on 1 November 1995; last observed by J. Poole and J. Singhurst on 4 November 1996; EOR #020

Smith Co.: 0.5 miles south of the junction of FM 849 (County Road 431) and County Road 4118, north side of FM 849, just west of the drainage between Stewart Lakes and Tomlin Lake, northwest of Lindale; first collected and last observed by J. Poole 4291 (SHST) on 3 November 1995; EOR #024

Smith Co.: Ca. 1.2 miles south-southeast of the junction of Highway 31 and Spur 364, west side of Spur 364 and south of St. Louis Southwestern Railway railroad track; first observed by J. Singhurst 4924 on 22 October 1996; last observed by J. Poole and J. Singhurst on 5 November 1996; EOR #026

Van Zandt Co.: 3.5 miles southeast of the junction of Highways 279 and 858 in Ben Wheeler, north end of lake, both sides of road; first collected by H. E. Daly 157 (SMU); last observed 27 October 1995 by J. Poole; EOR #005

Van Zandt Co.: 2.5 miles southeast of Ben Wheeler; first cited by R. Kral in 1955; not relocated in 1991 or 1995 along highway right-of-way although several sites in the vicinity searched; EOR #008

Wood Co.: 0.3 miles east of the junction of Highway 154 and FM 3230 (Lake Lydia road), 3.5 miles east of the intersection of Highways 154 and 37; first collected by E. S. Nixon 14006 (ATSU, SMU) on 13 October 1984; last observed by J. Poole on 27 October 1995; EOR #009

Wood Co.: 1.6 miles east of the junction of Highway 778 and County Road 3860 on CR 3860 just east of Red Branch, north side of road near east edge of pond; first collected by E. S. Nixon 14029 (ATSC, SMU) on 19 October 1984; last observed by J. Poole on 3 November 1995; EOR #010

Wood Co.: Ca. 4.7 miles west of the junction of Highways 14 and 154, on 154; first collected by E. S. Nixon 14022 (ATSU) on 16 October 1984; not relocated in 1991 or 1995; no wetlands at this mileage, within Quitman city limits; EOR #011

Wood Co.: Near County Road 3235 and its junction with the east end of Lake Lydia; first collected by E. S. Nixon 14028 (ATSU, SMU) on 27 October 1984; not relocated in 1991; last observed by G. L. Nesom on 16 October 1995; EOR #012

Wood Co.: 0.1 mile north of County Road 3245, at a point 0.5 miles east of County Road 3235, ca. 0.4 miles upstream from end of southeast arm of Lake Lydia; first collected by E. S. Nixon 14038 (ATSU, SMU) on 27 October 1984; not rechecked in 1991 or 1995, on private land; EOR #013

Wood Co.: Ca. 0.6 miles west of the junction of County Road 3230 (Lake Lydia road) and Highway 154; first collected by E. S. Nixon 14005 (ATSU, SMU) on 13 October 1984; not relocated in 1991 or 1995; highway right-of-way well-mowed, adjacent private land converted into manicured pasture; EOR #014

Wood Co.: 2.2 miles north of the junction of Highways 37 and 69 in Mineola, est side of Highway 69, just west of Lake Brenda; first observed by J. Poole on October 1993; last observed by J. Poole and J. Singhurst on 4 November 1996; EOR #015

Wood Co.: 0.7 miles north-northwest of the intersection of Highway 14 and County Road 3260, and 1.0 mile south-southeast of the intersection of Highways 14 and 154, east side of Highway 14, south of Buck Creek; first collected and last observed by J. Poole 4279 (SHST) and J. Singhurst on 27 October 1995; EOR #017

Wood Co.: 0.3 miles east of the intersection of Highways 14 and 154; first collected and last observed by J. Poole 4280 (SHST) and J. Singhurst on 27 October 1995; EOR #018

Wood Co.: Ca. 5 meters northeast of the junction of Loop 564 and Highway 69 at Mineola; first collected by J. Singhurst 4379 (SHST) on 1 November 1995; last observed by J. Poole on 2 November 1995; EOR #022

Wood Co.: between Highway 69 and County Road 2720, just south of their intersection, 1.0 mile south of the intersection of Highways 80 and 69 in Mineola; first and last observed by J. Poole on 3 November 1995; EOR #024

Wood Co.: 0.4 miles east of the junction of County Road 2460 and Highway 37, south side of County Road 2460, 2.4 miles north of Mineola; first observed by J. Poole on 3 November 1995; last observed by J. Poole and J. Singhurst on 4 November 1996; EOR #025

The following Texas localities should be rechecked to confirm the presence of rough-stemmed aster and/or to verify the location.

Franklin Co.: Ca. 2.1 miles east of the junction of FM 115 and Highway 21 on south side of Highway 21; J. Singhurst 4926; 9 November 1996

Hopkins Co.: Ca. 5.8 miles south of the junction of FM 3105 and FM 3109, west side of FM 3109; J. Singhurst 4925; 9 November 1996

Wood Co.: Ca. 0.8 miles north of the junction of Highway 49 and County Road 3270, on CR 3270; 3 November 1984; E. S. Nixon 14030 (ATSC, SMU)

LOUISIANA

Natchitoches Parish: Natchitoches; October [1910]; R. S. Cocks s.n. (NO)

MISSISSIPPI

Grenada Co.: ca. 2.5 miles north-northwest of Gore Springs, T22N R6E w1/2 Sec. 12; 7 October 1986; Morris 2679 (NLU, SWSL, VDB)

Grenada Co.: ca. 4 miles southeast of Gore Springs, T21N R7E S4 NE4; 9 October 1987; Morris 3061 (IBE)

Lauderdale Co.: Highway 11, 5 miles north of Clarke County line, ca. 1 mile north of Savoy; 14 October 1978; S. McDaniel 22172 (IBE)

Appendix 5. Associated species of rough-stemmed aster by site

Species Counties & Sites	A1	A2	H1	S1	S2	S3	V1	W1	W2	W3	W4	W5	W6	W7	W8	MR	NR
Acer rubrum			x		x	x	x		x						x		x
Aletris farinacea												x					
Alnus serrulata						x			x								x
Ambrosia trifida			x				x										
Ampelopsis arborea		x	x	x				x									
Andropogon glomeratus	x	x	x	x			x	x					x			x	
Aster lateriflorus	x		x	x		x		x	x		x						x
Aster scabricaulis	191	50	300	13	100	508	227	292	27	50	3	125	10	50	?	na	na
Aster umbellatus															x		
Baccharis halimifolia	x			x				x								x	x
Betula nigra						x					x						x
Bidens laevis	x	x	x				x	x	x	x	x	x				x	x
Boehmeria cylindrica	x		x				x	x						x		x	x
Burmannia capitata												x					
Callicarpa americana								x									
Carex frankii								x									
Carex sp.					x	x			x					x			
Cephalanthus occidentalis		x															x
Cirsium horridulum																	x
Commelina communis																	x
Cornus florida							x										
Cyperus haspan																	x
Cyperus strigosus																	x
Cyperus sp.		x	x										x			x	
Dichanthelium dichotomum																	x
Doellingeria sp.																	
Drosera capillaris															x		
Drosera sp.												x					
Erianthus giganteus																	x
Erianthus sp.	x	x			x		x	x	x			x	x			x	
Eriocaulon decangulare												x			x		
Eryngium integrifolium															x		
Eupatorium coelestinum			x	x	x			x	x				x			x	x
Eupatorium perfoliatum							x	x								x	x
Eupatorium sp.	x	x	x			x	x	x		x							
Fuirena pumila																	x

Appendix 5. Associated species of rough-stemmed aster by site

Species Counties & Sites	A1	A2	H1	S1	S2	S3	V1	W1	W2	W3	W4	W5	W6	W7	W8	MR	NR
Fuirena squarrosa															x		
Fuirena sp.											x						
Galium sp.								x			x						
Helianthus angustifolius			x			x		x	x								x
Hibiscus moscheutos												x					
Hydrocotyle verticillata																x	x
Hydrocotyle ranunculoides											x	x					
Hydrocotyle sp.	x	x				x	x	x		x							
Hypericum mutilum											x						
Ilex opaca											x	x					
Juncus sp.			x	x		x	x	x			x	x	x				
Lactuca sp.			x														
Leersia lenticularis																	x
Leersia oryzoides																x	
Limnodea arkansana										x			x				
Liquidamber styraciflua	x		x	x	x	x	x	x	x		x	x		x	x		
Lobelia cardinalis																x	
Lobelia reverchonii															x		
Lonicera japonica	x	x		x			x	x	x								
Ludwigia alternifolia																x	x
Ludwigia decurrens																x	
Ludwigia leptocarpa																x	x
Ludwigia octovalvis																	x
Ludwigia sp.	x	x	x			x		x			x	x	x				
Lycopodium carolianianum												x					
Lycopus rubellus																x	
Mayaca fluviatilis															x		
Mikania scadens	x		x	x		x	x	x			x	x	x				x
Myrica cerifera	x	x	x	x		x	x	x			x	x	x	x	x	x	x
Nyssa sylvatica														x			
Onoclea sensibilis	x			x		x	x	x	x				x	x		x	
Panicum gymnocarpon			x	x			x	x									
Panicum sp.								x									
Paspalum urvillei	x	x				x		x					x				x
Pinus taeda						x											
Platanus occidentalis												x					

Appendix 5. Associated species of rough-stemmed aster by site

Species Counties & Sites	A1	A2	H1	S1	S2	S3	V1	W1	W2	W3	W4	W5	W6	W7	W8	MR	NR
Polygonum punctatum	x	x	x	x	x	x	x	x			x	x	x			x	x
Polygonum sagittatum	x	x	x	x	x	x	x	x			x	x					x
Pteridium aquilinum					x												
Ptilimnium costatum															x		
Quercus falcata			x			x	x					x					
Quercus incana							x										
Quercus marilandica							x										
Quercus nigra			x			x											
Rhus copallina				x			x		x								
Rhynchospora chalarocephala															x		
Rhynchospora glomerata							x										
Rhynchospora gracilenta															x		
Rhynchospora macra															x		
Phynchospora oligantha															x		
Rubus sp.	x	x	x	x			x	x									
Rudbeckia sp.								x									
Sagittaria latifolia					x	x											
Salix nigra			x	x	x				x			x		x			x
Sarracenia alata															x		
Saurus cernua											x					x	
Scirpus cyperinus																	x
Scirpus sp.			x		x					x				x			
Scleria reticularis															x		
Smilax laurifolia						x								x			
Solidago rugosa																	x
Solidago sp.	x	x	x	x	x	x	x		x	x		x		x			
Sorghum jalapense								x									
Thelypteris kunthii																	x
Typha domingensis				x					x								x
Ulmus alata																	
Utricularia cornuta															x		
Vitis sp.				x													
Woodwardia areolata		x														x	x
Woodwardia virginica															x		
Xyris baldwiniana															x		
Zizaniopsis miliacea		x							x								

A1 = Anderson County: 3.2-3.3 miles north of the intersection of FM 315 and County Road 3309, west side of FM 315; EOR #001

A2 = Anderson County: Texas State Railroad State Historical Park, 1.0-1.5 miles east of the junction of the railroad and County Road 386; EOR #006

H1 = Henderson County: 1.7 miles northeast of the intersection of Hwys 31 and 317, southeast side of Hwy 31, southwest of Flat Creek (now Athens Fish and Game Club Lake); EOR #021

S1 = Smith County: 1.8 miles east of the intersection of I-20 and Hwy 14, drainage to Wiggins Creek, north of westbound I-20; EOR #019

S2 = Smith County: 0.4 miles north of the intersection of Lake Park Drive and Hwy 110, west side of Lake Park Drive; EOR #020

S3 = Smith County: 0.5 miles south and east of the intersection of FM 431 and County Road 4118, northwest of Lindale, north side of FM 431; EOR #024

V1 = Van Zandt County: 3.5 miles southeast of the intersection of Hwys 279 and 858 in Ben Wheeler, both sides of Hwy 279: EOR #005

W1 = Wood County: 3.5 miles east of the intersection of Hwys 154 and 37 on the east side of Quitman, both sides of Hwy 154; EOR #009

W2 = Wood County: 1.6 miles east of the intersection of Hwy 778 and County Road 3860, on the north side of County Road 3860 and just east of Red Branch (a dammed creek); EOR #010

W3 = Wood County: 2.2 miles north of the intersection of Hwys 80 and 69 in Mineola, east side of Hwy 69, just west of Lake Brenda; EOR #015

W4 = Wood County: 1.0 miles south-southeast of the intersection of Hwys 14 and 154, east side of Hwy 14, south of Buck Creek; EOR #017

W5 = Wood County: 0.3 miles east of the intersection of Hwys 154 and 14, on both sides of Hwy 154, along a tributary of Buck Creek; EOR #018

W6 = Wood County: Hwy 69 and Loop 564, north of the intersection and east of a drainage to Lake Atkins, north of Mineola; EOR #022

W7 = Wood County: 0.45 miles east of the intersection of County Road 2460 and Hwy 37, north of Mineola, south of County Road 2460; EOR #024

W8 = Wood County: 0.1 mile north of County Road 3245, at a point 0.5 miles east of County Road 3235, ca. 0.4 miles upstream from end of southeast arm of Lake Lydia; EOR #013

MR = Mahler, W. F. 1984. Status report on *Aster scabricaulis*. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. 10 pp.

NR = Nesom, G. L. In preparation. The status of *Aster scabricaulis* (Asteraceae - Astereae), an endemic of the Gulf Coastal Plain.

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THE STATUS OF ASTER SCABRICAULIS (ASTERACEAE - ASTEREAE), AN ENDEMIC OF THE GULF COASTAL PLAIN

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ABSTRACT

Aster scabricaulis is a rare entity of wet habitats on the Gulf Coastal Plain, now known from six counties of northeastern Texas, one of northwestern Louisiana, and two of central Mississippi. These plants were originally described at specific rank but more recently have been treated as a variety of A. puniceus. The latter view is maintained here, as A. scabricaulis is weakly but consistently differentiated in morphology and set apart in geographic distribution from the main population system of A. puniceus, which has a more northern and montane distribution. Aster elliottii and A. firmus also have been treated both as distinct species and as elements within A. puniceus. Aster elliottii is viewed as separate species in the present study; A. firmus remains equivocal in status though probably best included within A. puniceus. Specimen citations, observations on its habitat, and a distribution map are provided for var. scabricaulis. All taxa in the present discussion are more broadly regarded as members of the genus Symphyotrichum sect. Symphyotrichum, for which an overview and taxonomic review are provided.

KEY WORDS: Aster scabricaulis, Aster puniceus, Aster elliottii, Symphyotrichum, Texas, Louisiana, Mississippi

Aster scabricaulis Shinners was formally described by Shinners (1953) on the basis of collections from Smith County and Van Zandt County of northeastern Texas. In the original description, Shinners observed (p.157) that "Future revision of the A. puniceus complex may reduce [A. scabricaulis] to varietal rank, but it appears about equally related to [A. puniceus L., A. firmus Nees, and A. nebraskensis [Britt.] Wieg. (= A. praealtus Poir. sensu lato)]." Aster scabricaulis was maintained as a species by Correll and Johnston (1970) but was formally reduced in rank by Jones (1984, 1987), who treated it as a variety of A. puniceus. Its geographic range is considerably expanded with data summarized in the present report, although its rarity is hardly reduced. A review of the systematic and taxonomic status of A. scabricaulis is appropriate, as it is under consideration for listing as an endangered entity, with a current Nature Conservancy ranking of G5T2S2.

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In a review of the systematics and taxonomy of Aster sensu lato (Nesom 1994), A. scabricaulis was maintained at varietal rank within A. puniceus, but the latter was treated within the segregate genus Symphyotrichum Nees. I remain convinced that recognition of Symphyotrichum is appropriate, but the present discussion is presented primarily in terms of Aster since the system of segregate genera is unfamiliar to most. The taxonomic summary below (Table 1) provides the nomenclature in Symphyotrichum.

Jones's broadened concept of Aster puniceus (1984, 1987) not only included A. scabricaulis but also two other taxa, each of which she recognized at both varietal and subspecific rank: A. firmus (including A. lucidulus [A. Gray] Wieg.) and A. elliottii Torrey & Gray. She placed var. scabricaulis within A. puniceus subsp. elliottii. In brief justification of her taxonomic rearrangement of A. scabricaulis, Jones (1984, p. 384) noted only that its "affinities clearly lie with A. puniceus. Characteristics of the leaves, rhizomes, and capitula relate the taxon to ssp. elliottii."

A similarity between Aster puniceus and A. elliottii was also observed by Radford et al. (1968), who suggested that the two might be combined as a single species. In formally combining the two, Jones (1984, p. 384) observed that "Although the extreme forms of this taxon can be distinguished from typical A. puniceus, there is complete intergradation in regions of sympatry, e.g., in Maryland, Virginia, and Tennessee." But while hybrids may be formed in Maryland and Virginia, the habitat of A. elliottii is on the outer coastal plain and there is no other area of even potential sympatry with A. puniceus. Both taxa occupy large ranges. Aster elliottii does not occur in Tennessee. Cronquist recently maintained these two as separate species (1980; Gleason and Cronquist 1991), and my examination of both entities leads to the same conclusion. The current study proceeds on the basis that A. elliottii is morphologically and geographically distinct from A. puniceus as well as its closest relatives (see key below for a summary of differences). I cannot confirm Jones's mostly implied observation of greater similarity between A. scabricaulis and A. elliottii than between A. scabricaulis and A. puniceus.

Aster firmus has previously been treated within A. puniceus (e.g., Torrey and Gray 1841; Gray 1884; Semple et al. 1983; Jones 1989), sometimes at varietal rank. In contrast, Cronquist (1980, and in Gleason and Cronquist 1991) and Barkley (1986) have maintained A. firmus as a separate species (see key below for summary of differences). I tentatively regarded them as separate species in my taxonomic review of Aster but the more conservative view is more widely accepted in current treatments, as further considered in the discussion below.

Aster praealtus was included by Shinners among the species most closely related to A. scabricaulis, but the former is more similar to species of the Leucanthi species group (see comments below and Table 2) than to those of the Salicifolii group, including A. scabricaulis and its closest relatives.

With assistance from the Texas Parks & Wildlife Department and the U.S. Fish & Wildlife Service, I was able to study native populations of Aster puniceus in North Carolina and South Carolina and A. scabricaulis in Texas within a single week (23-28 October 1995), making direct comparisons of habitat and morphology, taking color photographs, and sampling population variability for laboratory study. In addition, I have studied specimens of both entities from over their geographic range.

DISTRIBUTION AND HABITAT OF ASTER SCABRICAULIS

The localities known for Aster scabricaulis have increased in number since its original description, and the total extent of its geographic range in Texas has been broadened to six closely associated northeastern Texas counties: Anderson, Henderson, Kaufman, Smith, Van Zandt, and Wood (Map 1; collection data in Appendix 1). Known localities were revisited and new ones discovered in 1993, 1994, and 1995 by personnel of the Texas Natural Heritage Program. Their additional observations and detailed comments on habitat and present status and abundance of these plants are on computerized records maintained by the TNHP. The species was the subject of a brief biological and taxonomic summary in a status report by Mahler (1984).

Aster scabricaulis appears to be correctly regarded as rare in Texas. At a number of the known localities, only one or a few plants exist; and even in the last 5 years, the number of individuals in all localities apparently has dropped markedly, even to the point of total extirpation in several of them. This entity is probably now extinct in Louisiana, and it apparently is rare in Mississippi (see below).

Plants of Aster scabricaulis are distinctly specialized and strongly restricted in their natural habitat -- they grow in mucky, saturated soil in open sites at the edges of seepage areas, bogs, marshes, and small lakes or in drainage channels associated with these areas. All Texas sites except one for A. scabricaulis are within an area where the regional vegetation is developed on deep, loose sand derived from deposits of the middle Eocene Claiborne group, chiefly the Carrizo, Sparta, and Queen City formations. The slightly outlying plants in Kaufman County are over the immediately adjacent and similar Wilcox deposits.

The prevailing vegetation of the Texas region that includes these sites is primarily an oak woodland with scattered pine, sweetgum, and hickory. The dominant species are Quercus falcata, Q. marilandica, Q. stellata, Q. velutina, Q. margaretta, Pinus taeda, Liquidambar styraciflua, and Carya texana, with scattered Quercus nigra and Nyssa sylvatica. Common understory species are Juniperus virginiana, Rhus copallina, Ulmus alata, Sassafras albidum, Cornus florida, and Acer rubrum. At the wet sites with A. scabricaulis, common and closely associated woody species are Cephalanthus occidentalis, Myrica cerifera, Baccharis halimifolia, Acer rubrum, Salix nigra, Alnus serrulata, and Betula nigra. Common herbaceous

species at these sites include Polygonum sagittatum, Polygonum punctatum, Boehmeria cylindrica, Hydrocotyle verticillata, Ludwigia alternifolia, Ludwigia octovalvis, Ludwigia leptocarpa, Mikania scandens, Helianthus angustifolius, Bidens laevis, Aster lateriflorus, Solidago rugosa, Eupatorium perfoliatum, Conoclinium coelestinum, Cirsium horridulum, Woodwardia areolata, Thelypteris kunthii, Paspalum urvillei, Erianthus giganteus, Leersia lenticularis, Dichanthelium dichotomum, Commelina communis, Typha domingensis, Cyperus strigosus, Cyperus haspan, Scirpus cyperinus, Fuirena pumila, and other Cyperaceae. At sites that are more bog-like, species of Eriocaulon, Xyris, Eryngium, Doellingeria, and others also may be found (see Kral 1955).

The range of Aster scabricaulis is significantly expanded by the confirmation of localities for it in Louisiana and Mississippi (see Appendix 1). The relatively early Louisiana collection by R.S. Cocks (made ca. 1910, fide A. Bradburn, the label data without a year) was originally identified as A. puniceus, annotated as Aster praealtus by R. Pavlu in 1976, as "A. cf. puniceus" by A.G. Jones in 1980, as A. puniceus by K.N. Gandhi in 1980, and included in the Asteraceae of Louisiana as A. puniceus by Gandhi and Thomas (1989). It is likely that Cocks made this collection from one of the boggy habitats well-known in the Kisatchie area of Natchitoches Parish, but such a plant has not been located in recent intensive studies of these habitats and this region in general (MacRoberts 1988, 1990, 1991, and pers. comm.). The Cocks collection is the only representative of A. scabricaulis known from Louisiana.

The first Mississippi records of Aster puniceus were collected and correctly identified by Sidney McDaniel from a low, wet area in Lauderdale County. Two other closely situated populations were recently discovered in Grenada County by Wayne Morris in springhead bogs (Morris 1988) and identified by Robert Kral.

Most of the known habitats in Texas for Aster scabricaulis apparently have been strongly to irrevocably modified by human activity. Most of these sites are along roadway right-of-ways, either in artificially created habitats or in natural sites intersected by roads, where the hydrology has been altered. Kral (1955) studied what is apparently the "Ben Wheeler site" in Van Zandt Co. (Appendix 2) and reported the existence of a large bog with dense and characteristic vegetation; this bog apparently is now converted into a small lake with almost no bog vegetation. In this region of Texas, however, habitats similar to those already known for A. scabricaulis are abundant (in drainage areas and around impoundments of small to moderate size, all or almost all of these on private property), and it is at least hopeful speculation that these plants may be situated in other such sites not yet investigated. It may be possible to persuade local land owners to begin populations of A. scabricaulis on their property, since it appears that these beautiful plants could be introduced and grown in a variety of localities in the immediate area where they now occur but are rare.

Plants of Aster scabricaulis have been grown to reproductive maturity both in pots and in normally moist gardens at the Mercer Arboretum in Humble, Texas (Greg Wieland, pers. comm.), which is surprising in view of the apparent restriction of these plants to saturated soil in their natural habitats. Plants have been grown from achenes although the germination percentage appears to be relatively low, and cuttings also are easily propagated and grown to maturity. Further study of germination characteristics and seedling ecology should facilitate the reestablishment of A. scabricaulis into habitats within its native region.

DISTRIBUTION AND HABITAT OF ASTER PUNICEUS

Aster puniceus occurs from Labrador to Newfoundland and Maine westward to Ontario, southern Manitoba, Saskatchewan, and Alberta, and to Wisconsin, Minnesota, and North Dakota. From New England, it occurs south to Virginia and westward through West Virginia, Indiana, and northern Illinois, with outlying populations in Missouri, Iowa, and Nebraska. Aster puniceus reaches the southern limit of its main range in the Appalachian region of North Carolina, South Carolina, and Tennessee, from where it extends with less abundance into the adjacent piedmont of Georgia and the Carolinas. It also is reported to occur in the mountains of Alabama (Small 1933, Gleason and Cronquist 1991). The distribution of this species is summarized in an outline map presented by Semple et al. (1983).

Localities for Aster puniceus in coastal parishes of southeastern Louisiana shown by Gandhi and Thomas (1989) are instead for A. elliottii at the western limit of its range (vouchers NLU!) but in typical habitats. The record shown by Gandhi and Thomas for A. puniceus in northwestern Louisiana is identified here as A. scabricaulis (= A. puniceus var. scabricaulis).

Aster puniceus grows in open, wet habitats: swamp margins, marshes, alluvial woods, bogs, ditches, in seepage at the base of steep banks, and on river, stream, and lake banks. In northwestern North Carolina, the species is particularly common in ditches and other drainages associated with the development of roads and agriculture. These habitats occur within various types of regional vegetation, from oak-hickory woodlands to communities characteristic of higher Appalachians.

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VARIABILITY IN ASTER PUNICEUS

Fernald (1950, p. 1428) noted that Aster puniceus is "one of our most intricately variable and wide-ranging species" and formally recognized five varieties within the range of his floristic purview. He furnished keys to varieties and forms of the species in northeastern North America (Fernald 1899, 1950). Scoggin (1979), Strausbaugh and Core (1978), Seymour (1982), and others also have formally recognized a series of varieties and forms within A. puniceus, which Scoggin referred to as an "aggregate species." The taxa that have been recognized at varietal rank within A. puniceus are listed below (with general type localities).

var. albiflorus Farwell (Michigan);

var. calderi (Boivin) Lepage (Quebec);

var. calvus Shinners (West Virginia);

var. colbyi Benke (Wisconsin);

var. compactus Fern. (Massachusetts);

var. demissus Lindley (eastern North America);

var. firmus (Nees) Torrey & Gray (eastern North America);

var. laevicaulis A. Gray (eastern North America);

var. monocephalus Farwell (Michigan);

var. oligocephalus Fern. (Labrador);

var. perlongus Fern. (Quebec);

var. puniceus (eastern North America);

var. purpureus Pursh (eastern North America);

var. rufescens Pursh (eastern North America);

var. vimineus Torr. & Gray (eastern North America).

Variable characters by which these entities have been recognized are primarily the following: cauline vestiture densely and uniformly hispid, hispid in lines, strongly reduced, or of loose, soft hairs; leaves subrhomboidal or greatly elongate; leaf surfaces hispid to glabrous, dull to shiny; leaf margins entire to serrate; capitulescence narrow or relatively broad, compact or open, with branches longer or shorter than the subtending bracteal leaves; bracteal leaves closely or widely spaced; heads numerous or few to solitary; peduncles to 6 mm long or mostly shorter; outer phyllaries 1 mm broad or up to 3 mm broad, sometimes foliaceous; disc corollas red or purple vs. yellow; and ray corollas blue, white, or reddish,

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Shinners (1943, p. 348) observed that "Some of the named varieties [of Aster puniceus] are probably to be referred to hybrids with A. foliaceus or other species, others are hardly more than forms of the species itself." A number of these varieties have been formally reduced in rank to forms (e.g. Shinners 1941, Fernald 1949), but for the most part, these entities have been accepted within the normal range of variability for A. puniceus and not accorded formal taxonomic recognition. Some may prove to be regional variants of consistent morphology and warrant varietal status, as concluded below for var. scabricaulis and as suggested for other taxa (e.g., Strausbaugh and Core 1978), but for a consistent taxonomic treatment, the species in its broadest sense needs a detailed review.

Var. firmus (= A. ~~f.~~ firmus) is among the taxonomically most persistent varieties of Aster puniceus, and only this variety was considered in cytological reviews of A. puniceus by Semple et al. (1983, 1992). Shinners (1941, p. 414) noted that "Wiegand is apparently correct in maintaining Aster lucidulus [= A. firmus] as a species distinct from A. puniceus, but it is not always very easy to distinguish the two. Characters of the internodes, leaves, pubescence, panicles, heads, and style branches are sufficiently inconstant to make it impossible to rely upon any of them." He later observed that A. firmus is "readily distinguishable from A. puniceus in the field by its habit of forming large beds from creeping rootstocks ... ; by its densely leafy stem; and by its dense inflorescence" (Shinners 1945, p. 71). The var. firmus morphotype occurs in habitats similar to those of typical A. puniceus and the two taxa overlap in geographic range over a broad area, var. firmus reported to occur from Quebec south to West Virginia and North Carolina and westward to Iowa, Minnesota, and North Dakota.

Aster puniceus and A. firmus are reported to intergrade (e.g., Barkley 1986, Mohlenbrock 1986, Jones 1989) when they are regarded as separate taxa. Jones (1980b) provided a detailed comparison of A. puniceus and A. firmus with the observation that they are strongly separated species, but she later (1984, 1987, 1989) took the view that intergradation with A. puniceus made varietal status for A. firmus more appropriate. Semple et al. (1983, p. 1434) observed that "There is a great range of variation [in A. puniceus] in stem pubescence, floret color, leaf color, and rhizome morphology. ... We could find no non-arbitrary way to separate collections on the basis of [these features]." Steyermark (1963) and Fisher (1988) reached generally the same conclusion for A. puniceus in Missouri and Ohio, respectively.

Plants of Aster puniceus in the southern Appalachians and adjacent piedmont are more uniform in morphology, with but few populations showing features of var. firmus. One example is the type of Aster conduplicatus Burgess (= A. puniceus, collected in Buncombe Co., N.C.), which has upper stem vestiture reduced to hairs in lines and a somewhat congested capitulescence suggestive of var. firmus.

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COMPARISON OF ASTER SCABRICAULIS AND ASTER PUNICEUS

Brief descriptions of Aster scabricaulis have been published by Shinners (1953) and Correll and Johnston (1970); a full technical description is furnished here in Appendix 2.

The chromosome number of Aster scabricaulis has been reported as n=8 (Smith County; Jones 1984). Chromosome numbers of n=8 (diploid) and n=16 (tetraploid) have been reported for populations of A. puniceus (Jones 1980b; Semple 1985; Semple et al. 1983 and references therein; Semple et al. 1989; Semple et al. 1992; Semple et al. 1993). As documented in the studies by Semple and colleagues, diploids occur over the entire range of A. puniceus; the tetraploids are uncommon and found only along the western margin of the range, in Illinois, Iowa, Wisconsin, Minnesota, and Manitoba. Aster firmus has been reported as diploid and tetraploid (Jones 1980b).

Shinners (1953) observed similarities in Aster scabricaulis between both A. puniceus and A. firmus. Aster scabricaulis resembles typical A. puniceus in many features, including cauline vestiture and its production of short thick rhizomes, features that have been used to distinguish the latter from the A. firmus morphotype. Plants of A. scabricaulis, like A. puniceus, are perennials producing short rhizomes, the stems arising singly or in close clusters, mostly 4-8 feet tall (A. puniceus grows up to 9 feet tall), producing numerous branches above the middle and often bearing hundreds of heads. Stems of the older plants are purple, woody, and up to 15 mm thick at the base. The stem vestiture below the inflorescence usually is hispid-villous, of relatively thick hairs 0.5-1.2 mm long, and densely and uniformly distributed around the stem. In some plants from Wood County (Nixon 13969, Nesom 00000, Poole 4280) and Smith County (Poole 4281, 4282), the upper stem vestiture is strongly reduced in density with the hairs in lines, similar to the A. firmus morphotype. Also similar to A. firmus, there is ~~also~~ a tendency in A. scabricaulis for the capitulescence to be noticeably condensed with heads on relatively short peduncles and for the leaves of the capitulescence (bracteal leaves) to be more numerous and reduced in size compared to the lower cauline leaves. In the orginal description of A. scabricaulis, Shinners was not specific about its intermediacy between A. puniceus and A. firmus, but his description of the heads of A. scabricaulis as "rather numerous and crowded" matches his characterization of A. lucidulus (A. firmus), with "short upper internodes [and] a dense and compact inflorescence."

Aster scabricaulis can be separated from A. puniceus sensu lato (including A. firmus) over all of its range by features of its cauline and bracteal leaves (see key below). The morphological features that characterize A. scabricaulis are not unique to it within A. puniceus, especially if A. firmus is included, but the combination is consistent within var. scabricaulis, and it distinctly contrasts with the morphology of var. puniceus from the southeastern United States. In the plants from Mississippi and Louisiana, the lower leaf surfaces are green but there is a slight darkening of the veiny reticulum, and the upper surfaces do not have distinctly impressed veins. The upper cauline and bracteal leaves, however, are

conspicuously reduced in size, and these plants are more like the Texas ones than those of typical var. puniceus. Plants of the coastal plain (A. scabricaulis), with warmer temperatures and a longer growing season, might also be inferred to be physiologically differentiated from those of the main range of A. puniceus. Aster scabricaulis is treated here at varietal rank as a morpho-geographic variant within A. puniceus, emphasizing their overall similarity but recognizing their segregation in geography and geological substrate and their relatively slight though consistent morphological differences. As suggested for the origin of outlying populations of A. puniceus in Missouri and Nebraska (Semple et al. 1983), the populations recognized here as var. scabricaulis may be "glacial relicts" separated from the main range of the species during Pleistocene.

The following key summarizes the main differences among the taxa of central concern in the present study.

1. Leaf bases tapered to a non-clasping base, or sometimes subclasping but never auriculate; rays usually pinkish, or mostly bluish in South Carolina southward and westward; swamp and marsh edges of the outer coastal plain, Virginia to Florida, west to southeastern Louisiana ..... A. elliottii
1. Leaf bases auriculate-clasping; rays bluish or purplish, rarely white or slightly pink; wet meadows, bogs, marshes, and low woods of inner continent (mountains, piedmont, outer coastal plain, rare on inner coastal plain) (2)

2. Stems nearly glabrous or glabrescent in the lower half, hirsute or sparsely hispidulous in lines in the upper portion; lower leaf surface glabrous or sparsely scabrous along the midrib; leaves of the inflorescence conspicuously crowded; phyllary apices short-attenuate or often acute to obtuse; rhizomes long, stoloniform ..... A. firmus morphotype
2. Stems hispidulous over the entire length, the indument usually distributed uniformly around the stem but sometimes less dense and in lines; lower leaf surface glabrous to minutely strigillose or hispidulous, the midrib hispidulous or densely hirsute to villous; leaves of the inflorescence not conspicuously crowded; phyllary apices generally long-attenuate; rhizomes short, thick and fleshy ..... A. puniceus (3)

3. Lower leaf surface distinctly lighter colored than the upper surface, with a distinct reticulum of dark colored veins; main veins of upper leaf surface not impressed; leaves of the capitulescence variable but mostly nearly equal in size to those lower on the stems ..... A. puniceus var. puniceus
3. Lower leaf surface about the same color as the upper surface, without a strongly evident reticulum of dark colored veins; main veins of upper leaf surface shallowly but distinctly impressed, imparting a slightly rugose appearance; leaves of the capitulescence usually more numerous and distinctly reduced in size compared to the lower ..... A. puniceus var. scabricaulis

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OVERVIEW OF SECT. SALICIFOLII (SECT. SYMPHYOTRICHUM)

Significant features shared by Aster puniceus and A. scabricaulis also are common to most of the species of the Salicifolii species group (= Aster sect. Salicifolii sensu stricto = Symphyotrichum sect. Symphyotrichum; see below). The section shows considerable coherence in geography, ecology, and morphology. All taxa of the section are restricted to the eastern United States and adjacent Canada (except A. subspicatus, which extends into northwestern North America) and most occur in wet habitats (marshes, bogs, low areas, or at the edge of water) although several tend to grow in drier sites (i.e., A. novi-belgii, A. subgeminatus, A. crenifolius). The leaves are chiefly cauline, lanceolate to lance-oblong, epetiolate, and auriculate-clasping; the capitulescence tends to be relatively discrete as corymbiform clusters of heads near the branch tips; and the heads are relatively large ([5-] 6-12 mm high) with involucral bracts most commonly linear, herbaceous, in 5-7 series of subequal length, with the outer often loose or divergent. The rays most commonly are blue to purplish but may be white or pinkish. In A. elliottii and A. anticostensis the leaves are barely to not at all clasping, and in A. prenanthoides the phyllaries are graduated in length, but these species are otherwise clearly placed here.

Chromosome numbers for species of the Salicifolii group are all based on x=8: A. anticostensis: n=40 (Brouillet and Labrecque 1990); A. elliottii: n=8 (Jones 1980a, Semple et al. 1992); A. longifolius: n=32, n=40 (Semple 1985; Semple et al. 1992); A. novi-belgii (incl. A. tardiflorus): n=16, n=24 (Jones 1980a, 1980b; Semple 1985; Semple et al. 1993); A. prenanthoides: n=16 (Jones 1980b; Semple 1985; Semple et al. 1989; Semple et al. 1992; Semple et al. 1993); A. puniceus: n=8, n=16 (see references above); and A. subspicatus: n=24 (Semple 1985).

The present study provides a perspective for dealing with the taxonomic evaluation at hand (Aster scabricaulis), but the systematics of Aster puniceus sensu lato need to be considered in more detail within the context of its larger natural group, the taxa comprising the Salicifolii species group (Table 1). Jones's concept of the Salicifolii (1980a, 1980b, and later discussions) includes some of the species more generally treated in the Leucanthi group (i.e., Aster praealtus, A. hesperius A. Gray) and the Foliacei group (A. eatonii [A. Gray] Howell = A. bracteolatus Nutt.), her rationale for this given in detail (1980b). Aster longifolius Lam., which I included in the Salicifolii (= sect. Symphyotrichum), may be better placed with the Leucanthi group (see comments in Jones 1980b). Aster subspicatus, which I included in the Foliacei group (sect. Occidentales), appears to better placed in sect. Salicifolii (sect. Symphyotrichum) (Jones 1980b). The listing in Table 1 reflects these modifications.

Among the species of the Salicifolii and the species groups most closely similar to it, the correspondence among taxonomic treatments by Semple and Brouillet (1980), Jones (1980), and Nesom (1994) is relatively close (Table 2). My treatment places the Salicifolii and Foliacei groups in more isolated positions (as sect. Symphyotrichum and sect. Occidentales, respectively). It also suggests that little difference is found between the species of the Divergentes and Leucanthi groups, although with further perspective, I believe that a meaningful taxonomic division between these two species groups may be drawn, more as suggested by Semple and Brouillet, although they are closely related.

Whatever proves to be the pattern of relationship among these species groups, it is clear that they are closely interrelated. Intergroup hybrids are common, and a new example (Salicifolii x Divergentes) is reported here. A hybrid involving Aster scabricaulis (Salicifolii) has been collected in Henderson County (Poole 4285). This collection is cited in Appendix 1 as A. scabricaulis because in characters of habit, capitulescence, and involucre it is most like that species, but it differs primarily in the following ways: the phyllaries are somewhat graduated in length and the apices broader; the stem pubescence is of relatively fine, crisped hairs; the basal auriculation of the leaves is not so pronounced; and the entire limb of the disc corollas is purple, sharply widened at the tube/throat junction, and the corolla lobes are about half the length of the limb. Only one other species of Aster (Symphyotrichum) is present at this locality, A. lateriflorus (L.) Britt. (Poole 4284 - SHSC). The habit and overall morphology of Poole 4285 is hardly suggestive of A. lateriflorus (Divergentes), but the distinctive disc corolla morphology strongly suggests that the modifications of Poole 4285 have resulted from a contribution of genes from this species.

To the summary diagram of the internal structure of the genus Symphyotrichum in my Aster review (1994, Fig. 2, p. 173), a connecting line needs to be placed between sect. Cordifolii (the Heterophylli group) and sect. Symphyotrichum (Salicifolii), reflecting the occurrence of hybridization between Aster ciliolatus Lindl. and several species of sect. Symphyotrichum (Jones 1980b). Further, A. subgeminatus (Pern.) Boiv. (Salicifolii) has been hypothesized to be of hybrid origin between A. ciliolatus and A. novi-belgii var. tardiflorus, and there is good evidence that A. anticostensis (Salicifolii) is an allopolyploid derivative of A. borealis (T. & G.) Prov. (Foliacei) and A. novi-belgii (Brouillet and Lebrecque 1987; Lebrecque and Brouillet 1990).

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Table 1. Taxa included in Symphyotrichum sect. Symphyotrichum (the Salicifolii species group = Aster sect. Salicifolii Torrey & Gray sensu stricto). Details of publication citations and synonymy are found in a taxonomic review (Nesom 1994), where all subgeneric and sectional groups of Symphyotrichum are formally outlined.

1. Symphyotrichum puniceum (L.) Love & Love (1983)
   Aster puniceus L. (1753)

   a. S. puniceum var. puniceum
      Symphyotrichum firmum (Nees) Nesom (1994)
      Aster firmus Nees (1818)
      Aster puniceus var. firmus (Nees) Torrey & Gray (1841)
      Aster puniceus subsp. firmus (Nees) A.G. Jones (1984)
      Aster lucidulus (A. Gray) Wieg. (1924)
      Aster puniceus var. lucidulus A. Gray (1884)
      Aster puniceus var. firmus
        forma lucidulus (A. Gray) Fern. (1949)

   b. S. puniceum var. scabricaule (Shinners) Nesom, Phytologia 77:290. 1994.
      Aster scabricaulis Shinners, Field & Lab. 21:156. 1953.
      Aster puniceus var. scabricaulis (Shinners) A.G. Jones, Phytologia 55:384. 1984.

2. Symphyotrichum prenanthoides (Muhl. ex Willd.) Nesom (1994)

3. Symphyotrichum novi-belgii (L.) Nesom (1994)
   a. S. novi-belgii var. novi-belgii

   b. S. novi-belgii var. tardiflorum (L.) Nesom (1994)

   c. S. novi-belgii var. elodes (Torrey & Gray) Nesom (1994)

   d. S. novi-belgii var. litoreum (A. Gray) Nesom (1994)

4. Symphyotrichum subgeminatum (Fern.) Nesom (1994)

5. Symphyotrichum anticostense (Fern.) Nesom (1994)

6. Symphyotrichum subspicatum (Nees) Nesom (1994)

7. Symphyotrichum crenifolium (Fern.) Nesom (1994)

8. Symphyotrichum elliottii (Torrey & Gray) Nesom (1994)

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Table 2. Comparison of recent treatments of the Salicifolii species group and closely related groups. The species groups with their generally known names are shown in CAPS.

SEMPLE & BROUILLET (1980)	JONES (1980a)	NESOM (1994)
Subsect. Dumosi	Sect. Dumosi	Sect. Dumosi
DUMOSI	DUMOSI	DUMOSI
DIVERGENTES	DIVERGENTES	DIVERGENTES (incl. LEUCANTHI)
	Sect. Porteriani	
PORTERIANI	PORTERIANI	PORTERIANI
	Sect. Salicifolii	
LEUCANTHI	LEUCANTHI	
Subsect. Foliacei		Sect. Occidentales
FOLIACEI	FOLIACEI	FOLIACEI
		Sect. Symphyotrichum
SALICIFOLII	SALICIFOLII	SALICIFOLII

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Jackie Poole provided detailed information on Aster puniceus var. scabricaulis accumulated by the Texas Natural Heritage Program (of the Texas Parks & Wildlife Department), personal observations on these plants and their habitat, vouchers for recent collections, and comments on the manuscript. Jason Singhurst (TNHP) sent duplicates of his recent collections from Henderson and Kaufman counties. Jim Massey and Linda Prince (NCU), John Nelson (USC), Sidney McDaniel (IBE), and Charles Bryson (SWSL) provided information on localities in the southeastern United States for Aster puniceus. Anne Bradburn (NO) sent information and photocopies of the Cocks collection of A. puniceus from Natchitoches Parish, Louisiana. Greg Wieland (Mercer Arboretum and Botanic Gardens, Humble, Texas) provided information on cultivation of var. scabricaulis. The staffs of ASTC, BRIT, NLU, TEX, and US helped in study at their institutions, and the U.S. Fish & Wildlife Service enabled travel to make first-hand observations on asters in Texas and the southeastern United States.

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APPENDIX 1. Specimens examined of Aster puniceus var. scabricaulis

Louisiana. [NATCHITOCHES PARISH,] "pine woods, Natchitoches, Oct [1910], R.S. Cocks s.n. (NO-photocopy NLU, photocopy SHSU).

Mississippi. GRENADA COUNTY, locally common in sphagnum bog, ["ca. 2.5 mi NNW of Gore Springs, in a boggy springhead"], T22N R6E w1/2 Sec. 12, with Cacalia lanceolata, Eryngium integrifolium, Oxypolis rigidior, Solidago patula, Habenaria clavellata, Habenaria ciliaris, Gentiana saponaria, Chelone glabra, 7 Oct 1986, Morris 2679 (NLU; others at SWSL, VDB, fide C. Bryson); ca 4 mi SE of Gore Springs, T21N, R7E, S4, NE4, North Central Plateau, in a sphagnous springhead bog, forming fairly large colonies, 9 Oct 1987, Morris 3061 (IBE-2 sheets, base and capitulescence). LAUDERDALE COUNTY: Hwy 11, 5 mi N Clarke Co. line, ca 1 mi N Savoy, NW4, S9, low open area with Salix nigra [wet area between highway and RR], locally common, 14 Oct 1978, McDaniel 22172 (IBE-2 sheets).

Texas. ANDERSON COUNTY: Texas State Railroad Historical Park, 10 mi E of Palestine [between Rusk and Palestine, off Hwy 84], between mileposts 22 and 23, closer to 22 (1.0 mi E of jct of RR and Co. Rd. 386), open marsh with dense emergent vegetation crossed by railroad, 23 Oct 1975, Lodwick 383 (SMU); ca. 1 mi E of Slocum on Texas Hwy 294, drainage area from small pond, 20 Oct 1983, Nixon and Ward 12658 (ASTC, SHSC, SMU); 3.2-3.3 mi NNW of jct Hwys 3309 and 315 on W side of Hwy 315, near jct with Co. Rd. 358, natural marsh area mostly covered with Typha: 20 Oct 1983, Nixon 12661 (ASTC, SHSC, SMU), 15 Oct 1983, Mahler 9690 (ASTC, SMU), 30 Oct 1983, Mahler 9709 (SMU), 16 Oct 1995, Nesom 0000 (SHSU); ca. 2 mi NNW of jct of Hwys 3309 and 315 on Hwy 315, natural marsh to swamp area, 20 Oct 1983, Nixon 12662 (ASTC, SMU); Palestine, sandy open swamp, 15 Sep 1918, Palmer 14584 (US). HENDERSON COUNTY: 1.6 mi NE of intersct of Hwys 31 and 317, SE side of the NB bound lane of Hwy 31, SW of the Athens Fish & Game Club Lake, NE of Athens, marshy drainage ditch (perhaps a remnant natural feature) between forest edge and hwy, 1 Nov 1995, Poole 4283 (SHSC) and 4285 (SHSC); ca. 5.5 mi WSW of jct. of Hwy 31 and FM 1804, on S side of Hwy 31, deep xeric sand hill with spring seepage, 27 Oct 1995, Singhurst 3903 (SHSC). KAUFMAN COUNTY: ca. 0.5 mi W of jct. Kaufman/Van Zandt Co. line and Hwy 80, on N side of Hwy 80 between Mo. Pac. RR and fence line, sandy loam seepy ditch, 1 Nov 1995, Singhurst 4380 (SHSC) and 4381 (SHSC). SMITH COUNTY: 8 mi NE of Tyler, Camp Fannin, wet pockets at edge of meadow below hospital, 15 Oct 1943, Moore 564 (US); ca. 0.4 mi SE of jct Hwys 110 and 2016 on Hwy 110 NW of Tyler, open seepage area along hwy above creek: 4 Nov 1983, Nixon 12659 (ASTC, SHSC, SMU) and Mahler 9710 (SMU); 1.8 mi E of intersct of I-20 and Hwy 14, N side of W-bound access road of I-20, damp, polluted drainage ditch (perhaps a remnant natural feature), 28 Oct 1995, Poole 4281 (SHSC); 0.6 mi N of intersct of Lake Park Drive and Hwy 110, E side of LP Drive, N side of Tyler, marshy drainage, 1 Nov 1995, Poole 4282 (SHSC); 0.5 mi S of jct of FM 849 (Co. Rd 431) and Co Rd 4118, N side of FM 849, just W of drainage between Stewart Lakes and Tomlin Lake, NW of Lindale, marshy drainage ditch at edge of woodland along hwy right-of-way, 3 Nov 1995, Poole 4291 (SHSC); 16 mi NW of Tyler [courthouse], 19 Oct 1947, Shinners

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9504 (Holotype: SMU). **VAN ZANDT COUNTY**: ca. 3.8 mi SSE of jct of Hwys 858 and 279 in Ben Wheeler on Hwy 279, drainage area from small lake, N end of lake, both sides of road: 26 Oct 1983, Nixon and Ward 12663 (ASTC, SHSC, SMU), 12 Oct 1952, Daly 157 (SMU); 16 Oct 1995, Nesom 0000 (SHSU). **WOOD COUNTY**: on Hwy 154 0.3 mi E of jct with Lake Lydia Road (FM 3230), 3.5 mi E of jct Hwys 154 and 37 E of Quitman, seepage area along open roadside, below earthen tank on N side of road: 13 Oct 1984, Nixon 14006 (ASTC SMU), 15 Oct 1984, Nixon 13969 (ASTC, SHSC, SMU); 16 Oct 1995, Nesom 0000 (SHSU); on Hwy 154, 0.6 mi E [W] from its jct with Lake Lydia Road (FM 3230), open seepage along hwy for ca. 100 m, 13 Oct 1984, Nixon 14005 (ASTC, SHSC, SMU); ca. 4.7 mi W of jct Hwys 14 and 154 on Hwy 154, open seepage area along road, 16 Oct 1984, Nixon 14022 (ASTC); near Co. Rd. 3235 and its jct with the E end of Lake Lydia, wet open creek bottom with ponds, 27 Oct 1984, Nixon 14028 (ASTC, SHSC, SMU); edge of marsh on SE side of Lake Lydia on Co. Rd. 3235, across rd from housing development on edge of lake, 16 Oct 1995, Nesom 0000 (SHSU); ca. 1.5 mi E of jct Hwy 778 and Co. Rd. 3860 on 3860 E of its jct with Red Branch, N side of road near E edge of pond, open seepages at margin of a woodland, 19 Oct 1984, Nixon 14029 (ASTC, SHSC, SMU); ca. 0.8 mi N of jct Hwy 49 and Co. Rd. 3270 on 3270, open seepage area along roadside near creek, 3 Nov 1984, Nixon 14030 (ASTC, SMU); ca. 0.5 mi NE of jct Co. Rd. 3235 and 3245, ca. 100 m from Co. Rd. 3245, ca. 0.4 mi upstream from end of SE arm of Lake Lydia, marshy to brushy glades with springs and seepages: 27 Oct 1984, Nixon 14038 (ASTC), Oct 1988, Orzell and Bridges 8063 (TEX); 0.7 mi NNW of intersct of Hwy 14 and Co. Rd 3260 and 1.0 mi SSE of intersct of Hwys 14 and 154, E side of Hwy 14, S of Buck Creek, marshy drainage, 27 Oct 1995, Poole 4279 (SHSC); 0.3 mi E of intersct of Hwys 14 and 154, primarily on N side of Hwy 154, drainage of spring-fed marsh, 27 Oct 1995, Poole 4280 (SHSC); ca. 5 m NE of jct. of Loop 564 and Hwy 64 at Mineola, deep xeric sand hill with spring seepage, 1 Nov 1995, Singhurst 4379 (SHSC).

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APPENDIX 2. Technical morphological description of Symphyotrichum puniceum var. scabricaule.

Perennial herbs from short, thick rhizomes. Stems arising singly or in close clusters, mostly 4-8 feet tall, producing numerous branches above the middle, those of the older plants purple, woody, and up to 15 mm thick at the base, cauline vestiture usually hispid-villous, of relatively thick hairs 0.5-1.2 mm long, densely and uniformly distributed around the stem, the upper cauline vestiture reduced and in lines in some Wood County populations. Leaves chiefly cauline, lanceolate to lance-oblong or oblanceolate, epetiolate, and auriculate-clasping, (3.5-)10-13 dm long, minutely and evenly scabrous above and beneath or the vestiture relatively reduced beneath, the margins often narrowly revolute, serrate with strongly antrorse, indurate-tipped teeth. Capitulescence relatively condensed as corymbiform clusters of heads near the branch tips, a large plant often bearing hundreds of heads, the heads on relatively short peduncles, bracteal leaves 10-25 mm long, these similar in shape and margin to those lower on the stems but distinctly more closely arranged and markedly reduced in size. Heads 6-10 mm broad; involucral bracts sparsely and minutely puberulent and ciliate to glabrous, linear, in 4-5 series of subequal length, the inner 6-8 mm long with the apical green portion ca 1/4 the length of the phyllary and extending into a linear-subulate apex, the outer slightly shorter and often loose to strongly divergent or recurving, with the apical green portion 1/2-2/3 the phyllary length; receptacles shallowly membranous-foveolate. Ray flowers 20-34, the corollas 10-12 mm long, the tube ca 2 mm long, the ligules blue, 1.0-1.6 mm wide, strongly coiling at maturity. Disc corollas yellowish, 4.0-5.5 mm long, narrowly funnelform to nearly cylindric, the tube 1.8-2.0 mm long, very slightly widened into the limb, the lobes erect to spreading, 0.6-1.1 mm long, purplish at maturity; collecting appendages of the style branches narrowly triangular, 0.3-0.5 mm long, hairy, ca 30-40% of the style branch length. Achenes 2.1-3.0 mm long, narrowly oblong-oblanceolate, flattened, 4(-5) nerved (with a nerve on each edge and 1[-2] on each face), tan or commonly purplish at maturity, glabrous to sparsely short-strigose; pappus bristles 35-48 in a single series, about as long as the disc corollas.