DISTRIBUTION, HABITAT, AND DEMOGRAPHIC CHARACTERISTICS OF *LYSIMACHIA FRASERI* DUBY (PRIMULACEAE) POPULATIONS IN ILLINOIS

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1. Species Information: Classification and Nomenclature

Lysimachia fraseri Duby, Fraser's loosestrife, is a member of the Primulaceae (primrose family), a family of 30 genera and 160 species (Gleason and Cronquist 1991; Watson and Dallwitz 1992). *Lysimachia* is the largest genus in the family and contains approximately 160 species. *Lysimachia fraseri* was first collected by John Fraser in South Carolina and was first described in the publication Prodromus Systematis Regni Vegetabilis (De Candolle 1844; Kartesz 1994; Bates 1998). *Lysimachia* was named for the ancient King of Thrace, Lysimachia, whose name comes from the Greek lysis, "to loose from," and mache, "strife." The King of Thrace was remembered for pacifying a charging bull by grabbing a loosestrife plant and waving it at him (Bates 1998). The specific epithet *fraseri* comes from John Fraser, an important early plant collector in the southern Appalachians, who has also been commemorated with *Cymophyllus fraseri* (Fraser's sedge) and *Magnolia fraseri* (Fraser's magnolia) (Radford et al. 1968; Bates 1998).

Lysimachia fraseri is an erect, multi-stemmed, herbaceous perennial 1-1.5 m tall from creeping underground rhizomes. The stems are terete and glandular-pubescent. The lowermost leaves are much reduced in size and are often scale-like whereas the upper leaves occur in whorls of three to five, or are opposite. Leaf shape varies from elliptic to lanceolate with the blades being from 4-15 cm long and 1.5-6 cm wide. The leaf base is cuneate and the apex is either acute or acuminate. Leaves have a short petiole from 2-10 mm long and are exstipulate. The surfaces of the leaf blades are punctate with round or elongate dark purple or black glands, which are much paler beneath than above. Blade margins are darkened and finely stipitate-glandular (Fernald 1950; Ray 1956; Radford et al. 1968; Gleason and Cronquist 1991; Bates 1998).

Lysimachia fraseri has a leafy, stipitate-glandular, panicle from 0.5-2.5 dm in length. Bracts are linear-lanceolate to subulate. Pedicels are from 5-9 mm long and are abundantly stipitate-glandular with reddish margins. Stipitate glands are also abundant on the calyx, which has five lanceolate lobes that are 3-5 mm long, acute to acuminate at the tip, and purple to maroon on the margins. The calyx tube averages 5 mm long. The rotate corolla consists of five yellow petals that are 1.5-1.6 cm across with elliptic to oblong lobes. The petals are 6-9 mm long, several times longer than the tube, with rounded apices that are occasionally notched. Petal margins are entire to erose. The filaments are glandular, unequal in length, united for ⅓ to ½ their length, and form a cup at the base. The five anthers are yellow with longitudinal dehiscence. The basal portion of both the corolla and androecium have glandular tissue that secretes sugary fluids that are collected by bees of the genus *Macropis*. The unilocular ovary is inferior. The style is slender and topped by a slightly expanded stigma. The fruit is a capsule that is globose to subglobose and 3-4 mm in diameter. Several seeds occur within each capsule, and the seeds are angular, dark brown to black, and have a finely pitted surface. Seeds average 1.6 to 2.3 mm long. Bates (1998) found the seeds to float on water and predicted that this might be one mode of seed dispersal in riparian habitats. Flowers are usually produced in June and July and capsules are mature in September and October (Fernald

1950; Ray 1956; Radford et al. 1968; Gleason and Cronquist 1991; Bates 1998).

The reproductive biology of the genus *Lysimachia* has been well-studied (Vuilleumier 1967; Simpson et al. 1983). *Lysimachia fraseri* can reproduce asexually by rhizomes or infrequent production of bulbils (Ray 1956). This is a common means of reproduction in plants that are heavily shaded. Sexual reproduction in this species is either by outcrossing or autogamy (selfing). Holartic bees of the genus *Macropis* are known to collect pollen from *Lysimachia* anthers (Malyshev 1929) whereas female *Macropis* have been observed collecting fluids secreted by glandular tissue of the corolla and androecium (Vogel 1976). The genus *Macropis* contains 5 or 6 species and is a widespread genus throughout Canada and the United States (Michener 1981). *Macropis ciliata*, *Macropis patellata*, and *Macropis steironimata* were noted by Simpson et al. (1983) as potential pollinators of *Lysimachia fraseri.*

Lysimachia fraseri is most similar to the Eurasian *Lysimachia vulgaris* L. (garden loosestrife), which is known to escape from cultivation in the eastern United States (Mohlenbrock 1986, Gleason and Cronquist 1991). *Lysimachia fraseri* has a glandular-pubescent stem on the upper half and stipitate-glandular leaf margins, while *Lysimachia vulgaris* has a viscid-pilose stem above and ciliate leaf margins. *Lysimachia punctata* (spotted loosestrife) is another Eurasian species with whorled, punctate leaves that is similar in appearance to *Lysimachia fraseri.* It differs in lacking the red-purple margin along the sepals and the margins of the corolla lobes are glandular-ciliate. *Lysimachia punctata* has primarily escaped from cultivation in the northeastern United States, whereas *Lysimachia vulgaris* may be found throughout the eastern United States (Gleason and Cronquist 1991).

2. Present Federal and State Status

Lysimachia fraseri was considered a C2 candidate (some evidence for vulnerability but not enough data to support listing proposals) for federal listing by the Federal Register in 1993 before revisions to the Endangered Species Act. *Lysimachia fraseri* is now considered a species of special concern with a G3 global rank (very rare or local throughout its range) (Federal Register 1997).

Lysimachia fraseri is state endangered in Illinois (Herkert 1991). This species is also listed in Georgia (S1, rare), Kentucky (S1, endangered), North Carolina (S2, endangered), South Carolina (S1, regional concern), and Tennessee (S2, endangered). This species is not listed in Alabama where it has a S1 rank (Bates 1998).

3. Distribution

A. Southeastern United States

Lysimachia fraseri occurs in the southeastern United States from North Carolina southwest to Alabama and northwest to southern Illinois (Figure 1) (Radford et al. 1968; Gleason and Cronquist 1991; Bates 1998). *Lysimachia fraseri* is currently known from 7 states and 21 counties. Bates (1998) confirmed

86 extant populations in 11 counties and 42 extirpated, historical, or unconfirmed populations in 18 counties.

The majority of extant populations occur in a four county region of northeast Georgia (Rabun County, 10 populations), southwest North Carolina (Jackson County, 13 populations), northwest South Carolina (Oconee County, 40 populations), and southeast Tennessee (Polk County, 10 populations) (Bates 1998). Bates (1998) noted that 86% of all extant populations occur in a contiguous six-county area of Georgia, North Carolina, and South Carolina, which is the center of this species distribution in the southern Appalachian Mountains. A second disjunct group of populations occurs in Tennessee along the Ocoee River and southward into Georgia and Alabama, and there is a third northern disjunct group of populations in three midwestern counties of Illinois (Pope), Kentucky (Marshall), and Tennessee (Stewart) (Bates 1998).

Lysimachia fraseri has been found in a variety of natural and human-disturbed habitats from rock outcrop edges, stream terraces, forested slopes, roadsides, powerlines, old logging roads, old homesites, clearcut forests, and hiking trails. Bates (1998) found that 56% of the extant populations of this species occurred in human-disturbed habitats. *Lysimachia fraseri* is referred to as a disturbance-adapted species that requires either natural or artificial disturbances for its survival.

B. Illinois

Lysimachia fraseri has been vouchered twice from Pope County along Lusk Creek. John Schwegman made a collection from Burke Branch but the location of this specimen is currently not known (personal communication). Figure 2 provides a habitat shot of the Lusk Creek site. Figures 3 and 4 provide the locations of the Lusk Creek and Burke Branch populations. The Lusk Creek population has been surveyed for over 10 years and this population once numbered at least 100 individual plants. A survey of the population in 1991 by John Schwegman recorded 100 plants: 5 were flowering and 95 were sterile. The population began to decline after 1991 and it is thought that a tree that fell into the population, along with associated changes in microclimate, was responsible for this decline. The Lusk Creek population numbered just 3 plants in 1998 when surveyed by Moni Bates, 1 plant in 1999, and no plants in 2000. It is currently thought that this species is extirpated in Illinois.

The following are brief descriptions of three voucher specimens that are deposited at the Southern Illinois University herbarium (SIU). The first two were collected by Bill Hopkins during his survey of the vascular flora of Lusk Creek Canyon (Hopkins 1968). The third voucher specimen is from western Kentucky.

1) Pope Co., IL, Near large boulder south of Indian Kitchen, adjacent to stream in sandy soil. W.E. Hopkins #280, 3 June 1966. Identified as *Lysimachia vulgaris* L.; annotated by E.F. Ulaszek on 11 August 1995.

2) Pope Co., IL, South end of canyon, sandy area next to stream, W.E. Hopkins #808, 14 August 1966. Identified as *Lysimachia vulgaris* L.; annotated by Raymond Athey on 18 February 1976.

3) Marshall Co., KY, 0.6 m. on Ky. 94E from Calloway Co. line, turn left 0.9 m. to creek terraces in ravines south of gravel road. Raymond Athey #1875, 21 June 1972. Figure 7 is a photograph of this specimen housed at SIU.

The site in western Kentucky was re-surveyed by Mark Basinger and Jody Shimp on 11 June 2000 using the herbarium specimen as a reference. The label information was found to be very accurate, but no specimens of *Lysimachia fraseri* were found along the intermittent creeks in the area. Bates (1998) did not search for this taxon during her survey and it does appear that it is extirpated from Kentucky.

4. Survey Methods and Data Collection

One population of *Lysimachia fraseri* was located and surveyed in 1999 and 2000 during three separate visits. Additional populations were searched for during 1999 and 2000 in suitable habitats in the Greater Shawnee Hills and Cretaceous Hills of Pope County. All data were analyzed using Statmost for Windows Version 3.5.

Demographic data was collected in May 1999 on number of plants, number of stems per plant, stem height, and number of leaf whorls.

Environmental data was collected in May 1999 on soil pH, aspect, percent slope, slope position, and percent canopy cover.

Habitat characteristics recorded were associated plant species and plant community using descriptions in White and Madany (1978).

5. Description of Physiographic Regions and Soils

One population of *Lysimachia fraseri* was known from the Greater Shawnee Hills Section of the Shawnee Hills Division, whereas the second population was known from the Cretaceous Hills Section of the Coastal Plain Division. The unglaciated Shawnee Hills are a forested region with soils formed primarily from loess and residual parent material (Schwegman et al. 1973).

The Greater Shawnee Hills Section is a region characterized by an east-west escarpment of Pennsylvanian-aged sandstone. This section has gentle to rugged hills with features such as sandstone escarpments, cliffs, and overhanging bluffs (Schwegman et al. 1973; Harris et al. 1977).

The Cretaceous Hills Section is an unglaciated region characterized by unconsolidated Cretaceous and Tertiary aged sands, gravels, and clays. This section has gentle rolling hills that contain upland forests similar in composition to the Shawnee Hills. The Cretaceous Hills Section also contains two unique plant communities: barrens or open areas with prairie vegetation and acid gravel seep springs (Schwegman et al. 1973; Harris et al. 1977).

The soil types where *Lysimachia fraseri* was located at Lusk Creek were Muskingum and Berks soils, 30 to 60 percent slopes (955G) and Wellston-Berks complex, 30 to 60 percent slopes (986G). Muskingum and Berks soils (typic dystrochrepts) are well-drained soils on steep slopes that are often very stony. The soils are silty and overlay sandstone bedrock. Wellston-Berks complex (ultic hapludalfs and typic dystrochrepts) are well-drained upland soils formed in loess and residual sandstone and shale. These soils are silty, overlay sandstone bedrock and have a variable degree of stoniness (Parks 1975).

The soil types where *Lysimachia fraseri* was located at Burke Branch were Burnside silt loam (427) and Wellston-Berks complex, 30 to 60 percent slopes (986G). Burnside silt loams (typic hapludults) are well-drained soils of narrow bottomlands and are usually adjacent to hilly uplands. This silt loam is often very stony (Parks 1975).

6. General Environment and Habitat Descriptions

Lysimachia fraseri was restricted in Pope County, Illinois, to sandy soil of a stream terrace in mesic upland forest. It was historically known from the Lusk Creek and Burke Branch watersheds. The following provides descriptive habitat and environmental characteristics from 1999 for the Lusk Creek population of *Lysimachia fraseri* in Illinois. A complete list of associated plant species at this site is found in Table 1.

A) Lusk Creek:

This population was visited three times during 1999 and 2000. One plant was located on 19 May 1999 but this plant was not observed during subsequent visits on 28 August 1999 and 17 May 2000. This site is located on the Shawnee National Forest. In 1999, the plant was growing adjacent to a large boulder in sandy soil of a stream terrace in mesic upland forest. The plant was 45.1 cm tall, had one stem, and had 5 whorls of leaves on the stem (3 leaves at each node) in May. The most frequent associated species were *Alnus serrulata*, *Andropogon gerardii*, *Athyrium angustum*, *Cornus obliqua*, *Dichanthelium yadkinense*, *Eupatorium fistulosum*, *Solidago caesia*, *Solidago patula*, *Viburnum dentatum*, and *Zizia aurea*. The mean soil pH was 6.3 ± 0.1 and soil depth was shallow and averaged less than 10 cm. The site was east-northeast facing and had a very open canopy (39.7% canopy coverage). The percent slope from the edge of the population to the edge of Lusk Creek averaged 14%.

7. Summary of *Lysimachia fraseri* in Illinois

Lysimachia fraseri is currently not known from any extant population in Illinois. If this species is extirpated in Illinois, it is not due to human disturbance. It appears that the extirpation of the species in Illinois is due to natural factors such as the treefall and associated microclimate changes at the historic site. The creek probably changed its flow and velocity in this area due to the treefall, which may also have been a factor in the species absence from the site now.

Bates (1998) noted that the southern Illinois population was the only one remaining in the northern disjunct group that includes western Kentucky and Tennessee.

8. Current Land Ownership Summary

Lysimachia fraseri was known from two sites on the Shawnee National Forest. The site at Lusk Creek is within a Natural Area (within a National Natural Landmark and Wilderness Area) whereas the site at Burke Branch is within a Research Natural Area within an area that has been proposed for Wilderness designation.

9. Evidence of Threats to Survival

A. Southeastern United States

The biggest threat to the survival of *Lysimachia fraseri* in the southeastern United States is proper management and communication between companies that own the right-of-way along roadsides and powerlines and state conservation and/or natural resource biologists. State departments of transportation and local electricity and/or telephone companies need to be made aware of populations of this species that are growing within their right-of-ways. These companies need to alter their mowing and spraying regimes to coincide with the flowering and fruiting of this species. Bates (1998) noted that posting no mowing and spraying signs has increased the vigor of plants along Bull Pen Road in North Carolina. Bates also noted that there is little threat to the species from commercial or horticultural interests.

Several animals were noted by Bates (1998) during her survey of Lysimachia fraseri in 1997-98. An Eurasian sawfly, *Monostegia abdominalis*, was noted on the leaves of over 40% of the extant populations of *Lysimachia fraseri* during the survey. Sawflies are generally considered to be serious plant pests, so the impact of this insect on the family Primulaceae and especially species of *Lysimachia* in North America should be monitored. White-tailed deer (*Odocoileus virginianus*) predation was noted at 13% of the extant populations. Bates (1998) did not consider deer predation to be a serious problem to this species. Fulgoroid planthoppers were noted on one population in South Carolina. These insects extract plant juices from the stem using their long proboscis, so they could cause localized wilting damage to the plants (Bates 1998).

Bates (1998) concluded that successful management agreements between multiple agencies (U.S. Fish & Wildlife Service, U.S. Forest Service, Highway Departments, Power Companies, State Conservation/Natural Resource Departments) should enable the future of *Lysimachia fraseri* to be secure.

B. Illinois

The biggest threats to *Lysimachia fraseri* in Illinois were small population size and an inability to persist or recover from natural disturbance. There

remains an abundance of potential habitat along Lusk Creek, Burke Branch, and other creeks in Pope County, so this species may still be present in Illinois.

McNeil (1992) thought that timbering would be a threat to this species, as it would allow too much light to penetrate to the forest floor. This scenario might be responsible for the demise of the Lusk Creek population where a single treefall in the mid-1990's changed the light regime and microclimate. Beth Shimp (personal communication) thought that the location of the treefall was in the center of the population. When informed at the Illinois Academy of Science Meeting in April 2000 that the population of *Lysimachia fraseri* was down to one individual, Dr. John Ebinger, emeritus professor of botany at Eastern Illinois University, remarked that the species was gone in Illinois and it would do no good to look for it during 2000. Dr. Ebinger noted that the change in the environment following the treefall was probably so great as to effectively destroy the population.

Bates (1998) noted that the greatest threats to this species were shading and competition from successional growth, disturbance of hydrological processes in riparian corridors, and roadside and human disturbances to populations along roadsides and powerlines.

Bates (1998) surveyed the Lusk Creek population and noted the decline from 100 plants in 1991 to three plants in 1998. She suggested the use of canopy clearing to help maintain this population. It is more likely that removal of the competing shrubs and herbs would be beneficial since the population is within an open canopy. It would be very interesting to clear the competing vegetation from the known site at Lusk Creek and determine if this species has been dormant for several years waiting for proper environmental conditions to return to the site.

10. Recommended Status

A. Federal

Lysimachia fraseri is currently considered a species of special concern with a G3 global ranking since it is only known from 7 states and 21 counties.

B. State

Lysimachia fraseri has been listed as state endangered in Illinois because of its occurrence in two populations in Pope County. It is suggested that this species be removed from the state list in Illinois. *Lysimachia fraseri* should be considered extirpated in Illinois; however, yearly searches should continue for the species in suitable habitat in Pope County with the objective of re-discovering the species in the state.

11. Critical Habitats

Figures 3 and 4 show the historic locations of *Lysimachia fraseri* in Illinois.

12. Interested Organizations

Illinois Department of Natural Resources
Illinois Endangered Species Protection Board
Illinois Native Plant Society
Illinois Natural History Survey
Illinois Nature Preserves Commission
U.S.D.A. Forest Service, Shawnee National Forest

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14. Field Work Summary

Extensive field work was carried out for the project by Mark A. Basinger. A total of 11 days and 116 hours were spent in the field; three days in May, four days in June, two days in July, and two days in August. A total of seven days in 1999 and four days in 2000 were spent in the field. Field assistants included

Beth Shimp, Jody Shimp, and Mike Spanel.

15. Rare Native Plant Species Noted During Survey

Although this survey determined the demise of *Lysimachia fraseri* in Illinois, several state or forest listed species were located and are mentioned in this section. Figures 5 and 6 provide approximate locations for these species.

A) *Carex emmonsii* Dewey ex. Torr. This sedge was not collected and was found to be local in dry and dry-mesic upland forest on the east side of Lusk Creek adjacent to the *Lysimachia fraseri* population. This species was identified on both Shawnee National Forest and Illinois Department of Natural Resources land. *Carex emmonsii* is easily identified in the field by its cespitose nature because it has short rhizomes. The leaves and flowering culms are quite lax and often are lying on the leaf litter. (Fernald 1950; Mohlenbrock 1986; Gleason and Cronquist 1991; Yatskievych 1999).

B) *Carex laxiflora* Lam. This sedge was observed in mesic upland forest approximately 5-7 m south of the *Lysimachia fraseri* site. This species can be confused with *Carex digitalis* Willd., but it is distinguished by the bottom pistillate scales that lack perigynia (Fernald 1950; Radford et al. 1968; Mohlenbrock 1986; Gleason and Cronquist 1991; Yatskievych 1999). Several plants were observed in May 1999.

C) *Carex nigromarginata* Schwein. This sedge was observed in a dry-mesic upland forest along Lusk Creek south of the *Lysimachia fraseri* site. The species was identified on privately-owned land. *Carex nigromarginata* is easily identified by the dark reddish-purple pistillate scales that conceal the perigynia. The pistillate spikes are most often borne on culms that are shorter than the tufts of leaves (Fernald 1950; Mohlenbrock 1986; Gleason and Cronquist 1991; Yatskievych 1999).

D) *Carex physorhyncha* Liebm. ex Steudel This sedge was collected in sandy soil at the *Lysimachia fraseri* site on 19 May 1999. Two plants were located during the survey on 13 May 2000. Like *Carex emmonsii*, this species forms colonies from long-creeping rhizomes. However, *Carex physorhyncha* lacks pigmentation on the pistillate scales that subtend the perigynia. The scales are green with a broad white margin (Fernald 1950; Radford et al. 1968; Yatskievych 1999).

E) *Dichanthelium yadkinense* (Ashe) Mohlenb. This species was collected in sandy soil at the Lysimachia fraseri site on 19 May 1999. It was noted that this species was actually common along the margin of Lusk Creek in gravelly and sandy soil from its junction with Little Lusk Creek and Bear Branch to the crossing of the Eddyville Road bridge. *Dichanthelium yadkinense* is easily identified in the field by the presence of whitish punctate glands on the leaf sheaths. The stems, nodes, leaf sheaths, and leaves are primarily glabrous or with only scattered trichomes and the

spikelets are glabrous, 2.0-2.5 mm long, and acute at the tip (Fernald 1950; Mohlenbrock 1986; Gleason and Cronquist 1991; Yatskievych 1999).

E) *Lilium superbum* L. Turk's cap lily was observed in the state-owned nature preserve approximately 75-100 m north of the *Lysimachia fraseri* site along the west bank of Lusk Creek where the sandstone cliff is adjacent to the creek. One colony of 10-15 plants was observed in May 1999. This taxon was identified based upon the smooth abaxial leaf surface and the white bulb (a small plant was excavated and then replanted) (Fernald 1950; Radford et al. 1968; Mohlenbrock 1986; Gleason and Cronquist 1991; Yatskievych 1999).

F) *Matelea obliqua* (Jacq.) Woodson Climbing milkweed was locally common in forest openings along Cooney Creek. No collection was made. This taxon was identified by the pubescent calyx and pedicels and narrow corolla lobes that were rose-colored and more than 4 times longer than wide (Fernald 1950; Radford et al. 1968; Mohlenbrock 1986; Gleason and Cronquist 1991).

G) *Stellaria pubera* Michx. Giant chickweed was found to be common along both Cooney Creek and Burke Branch during the surveys in 1999. A collection was made along Cooney Creek. This taxon is easily identified by the opposite, elliptic leaves, swollen nodes, and trichomes in lines on the stem (Fernald 1950; Radford et al. 1968; Mohlenbrock 1986; Gleason and Cronquist 1991).

All collections are deposited at the Illinois Natural History Survey (ILLS) in Champaign-Urbana.

16. Invasive Non-Native Plant Species Noted During Survey

A) *Dioscorea oppositifolia* L. (= *Dioscorea batatas* Decne.) Chinese yam was found to be scattered along Lusk Creek in sandy soil and flood wrack areas from Bear Branch to the crossing of the Eddyville Road bridge. Several large populations were observed, especially on elevated gravel bars and sandy margins of the creek that are not severely flooded. Chinese yam was found at the *Lysimachia fraseri* site along Lusk Creek during the 2000 survey. It was evident that the 4 plants found were recent sprouts that had germinated from aerial bulbils that were transported downstream by the creek. This species appears to be widespread in the Lusk Creek watershed.

B) *Microstegium vimineum* (Trin.) A. Camus Eulalia was an abundant grass along both Burke Branch and Cooney Creek and it was occasionally observed along Lusk Creek. In the Cretaceous Hills Section this grass was often observed forming monocultures along intermittent creeks and along trails in pine plantations. Eulalia was not as abundant at Lusk

Creek and was limited to the margins of the creek bank. Eulalia was an associate at the *Lysimachia fraseri* site but it was not an abundant taxon. This species is widespread throughout the southern Illinois region.

17. Other Knowledgeable Individuals

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Table 1. Checklist of plant species associated with the *Lysimachia fraseri* Duby population at Lusk Creek, Pope Co., Illinois (* = non-native taxon).

Species	Lusk Creek
Acer rubrum L.	x
Acer saccharum Marsh.	x
Allium canadense L.	x
**Allium vineale* L.	x
Alnus serrulata (Ait.) Willd.	x
Amphicarpaea bracteata (L.) Fern.	x
Aruncus dioicus (L.) Fern.	x
Asimina triloba (L.) Dunal	x
Athyrium angustum (Willd.) Presl	x
Brachyelytrum erectum (Schreb.) Beauv.	x
Cacalia atriplicifolia L.	x
Campsis radicans (L.) Seem.	x
Carex grisea Wahlenb.	x
Carex physorhyncha Liebm.	x
Carex torta Boott.	x
Carex tribuloides Wahlenb.	x
Carpinus caroliniana Walt.	x
Carya glabra (Mill.) Sweet	x
Cerastium arvense L.	x
Clematis virginiana L.	x
Collinsonia canadensis L.	x
Cornus florida L.	x
Cryptotaenia canadensis (L.) DC.	x
Dichanthelium boscii (Poir.) Gould & Clark	x
Dichanthelium clandestinum (L.) Gould	x
Dichanthelium latifolium (L.) Gould	x

Table 1. Cont.

Species	Lusk Creek
Dichanthelium yadkinense (Ashe) Mohlenbr.	x
**Dioscorea opposiitifolia* L.	x
Diospyros virginiana L.	x
Dryopteris marginalis (L.) Gray	x
Eleocharis obtusa (Willd.) Schult.	x
Elephantopus carolinianus Raeusch.	x
Eupatorium fistulosum Barratt.	x
Fagus grandifolia Ehrh.	x
Festuca obtusa Biehler	x
Fraxinus americana L.	x
Hydrangea arborescens L.	x
Hypericum punctatum Lam.	x
Ilex decidua Walt.	x
Ilex verticillata (L.) Gray	x
Impatiens capensis Meerb.	x
Ipomoea pandurata (L.) G.F.W. Meyer	x
Krigia biflora (Walt.) Blake	x
Lindera benzoin (L.) Blume	x
Liparis liliifolia (L.) Rich.	x
Liriodendron tulipifera L.	x
**Lonicera japonica* Thunb.	x
Luzula multiflora (Retz.) Legeune.	x
**Microstegium vimineum* (Trin.) A. Camus	x
Osmunda regalis L. var. *spectabilis* (Willd.) A. Gray	x
Parthenocissus quinquefolia (L.) Planchon	x

Table 1. Cont.

Species	Lusk Creek
Phacelia purshii Buckley	x
Phlox paniculata L.	x
Platanus occidentalis L.	x
**Polygonum cespitosum* Blume var. *longisetum* (DeBruyn) Stewart	x
Polygonum virginianum L.	x
Polystichum acrostichoides (Michx.) Schott	x
Potentilla simplex Michx.	x
Prunella vulgaris L. var. *elongata* Benth.	x
Pycnanthemum tenuifolium Schrader	x
Quercus alba L.	x
Quercus rubra L.	x
Ranunculus recurvatus L.	x
**Rosa multiflora* Thunb.	x
Rubus enslenii Tratt	x
Rudbeckia laciniata L.	x
Salvia lyrata L.	x
Sanicula gregaria Bickn.	x
Senecio aureus L.	x
Silene stellata Ait.f.	x
Silphium perfoliatum L.	x
Smilacina racemosa (L.) Desf.	x
Smilax glauca Walt.	x
Smilax hispida Muhl.	x
Solidago caesia L.	x
Solidago patula Muhl.	x

Table 1. Cont.

Species	Lusk Creek
Solidago rugosa Mill.	x
Sphenopholis obtusata (Michx.) Scribn.	x
Spigelia marilandica L.	x
Staphylea trifolia L.	x
Symphoricarpos orbiculatus Moench	x
Toxicodendron radicans (L.) Kuntze	x
Uvularia sessilifolia L.	x
Vaccinium arboreum Marsh.	x
Vaccinium pallidum Ait.	x
Viburnum dentatum L.	x
Viburnum prunifolium L.	x
Vitis cinerea Engelm.	x
Zizia aurea (L.) K. Koch	x
Total Number of Associated Species	89

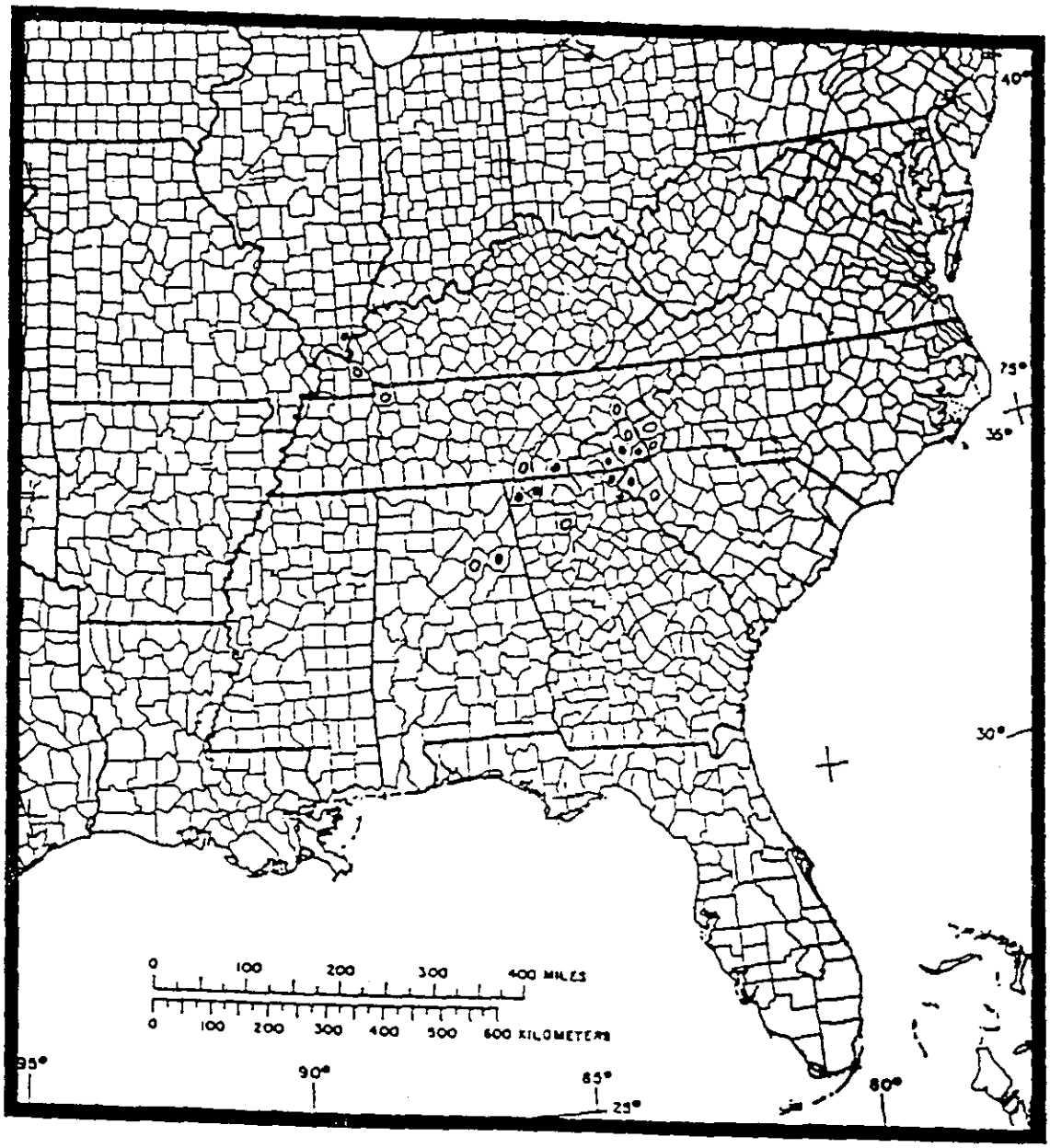

Figure 1. Distribution of *Lysimachia fraseri* Duby in eastern United States (filled circles = extant populations; open circles = historical population; adapted from Bates, 1998).

Figure 2. Habitat for only known population of Lysimachia fraseri in Illinois; Lusk Creek Canyon Natural Area, Pope County 16 May 2000.

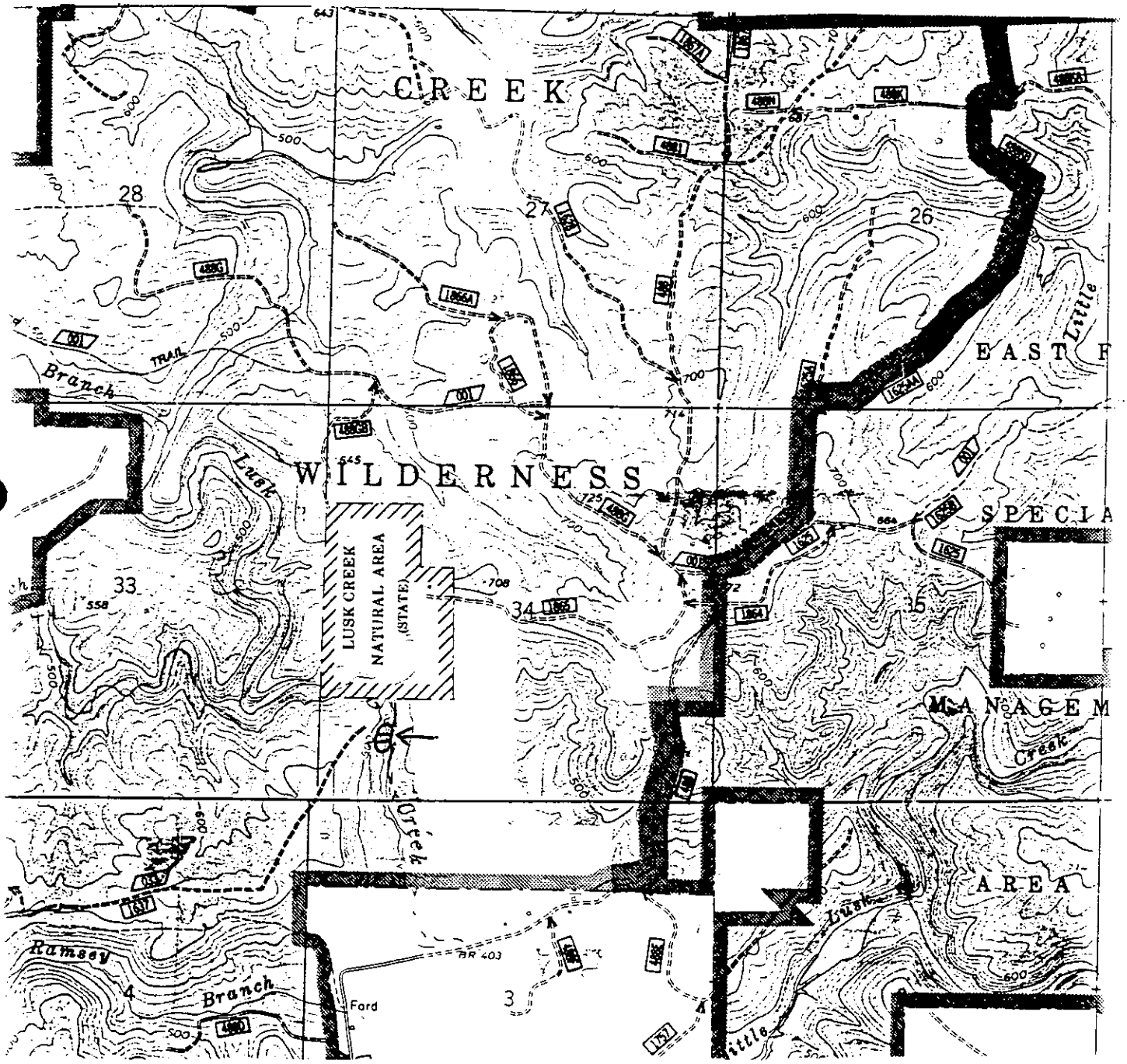

Figure 3. Location of *Lysimachia fraseri* Duby along Lusk Creek, Pope County, Illinois.

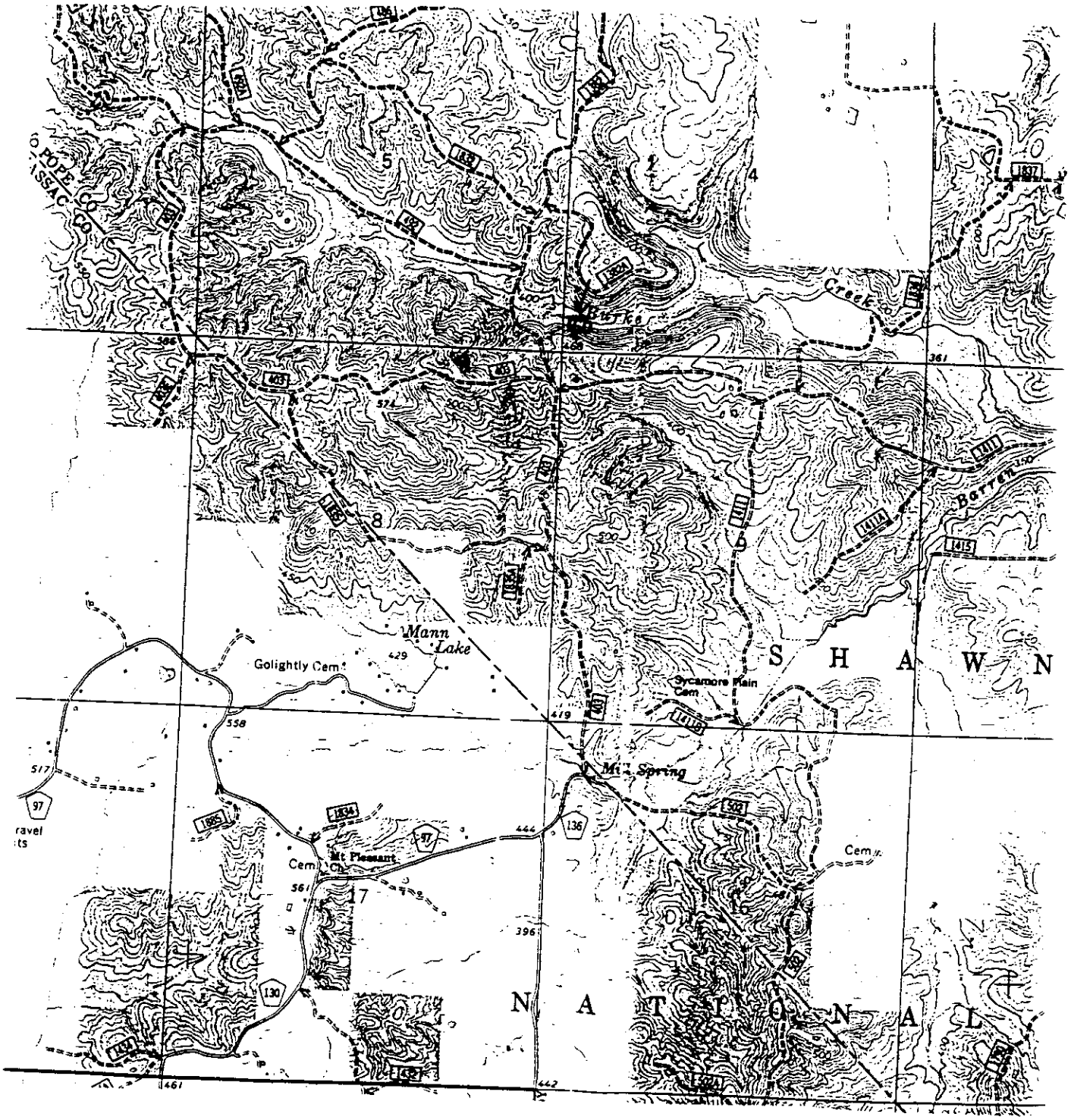

Figure 4. Historic location of *Lysimachia fraseri* Duby along Burke Branch, Pope County, Illinois.

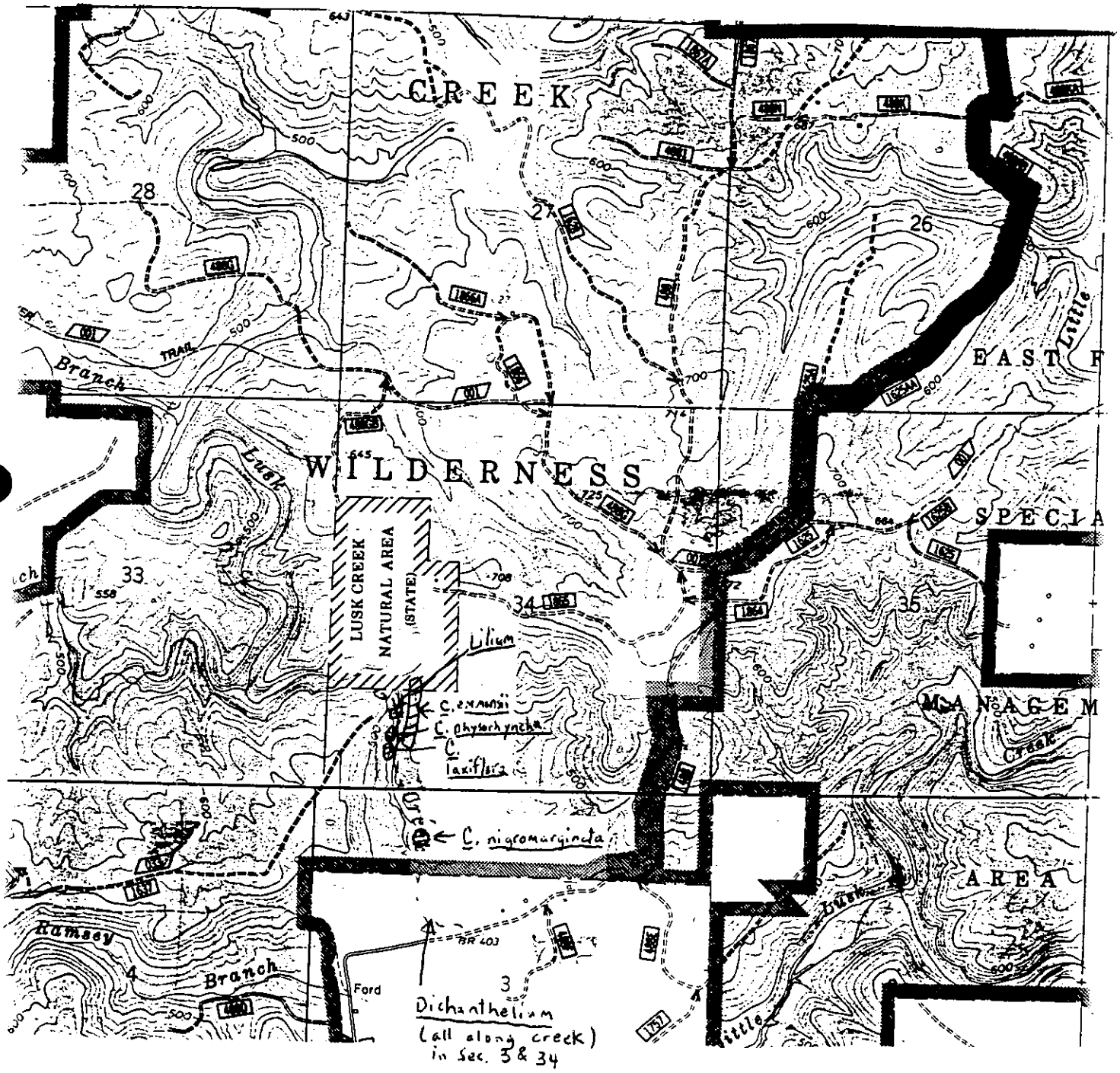

Figure 5. Locations of *Carex emmonsii* Dewey, *C. laxiflora* Lam., *C. nigromarginata* Schwein., *C. physorhyncha* Liebm., *Dichanthelium yadkinense* (Ashe) Mohlenbr., and *Lilium superbum* L. along Lusk Creek, Pope County, Illinois.

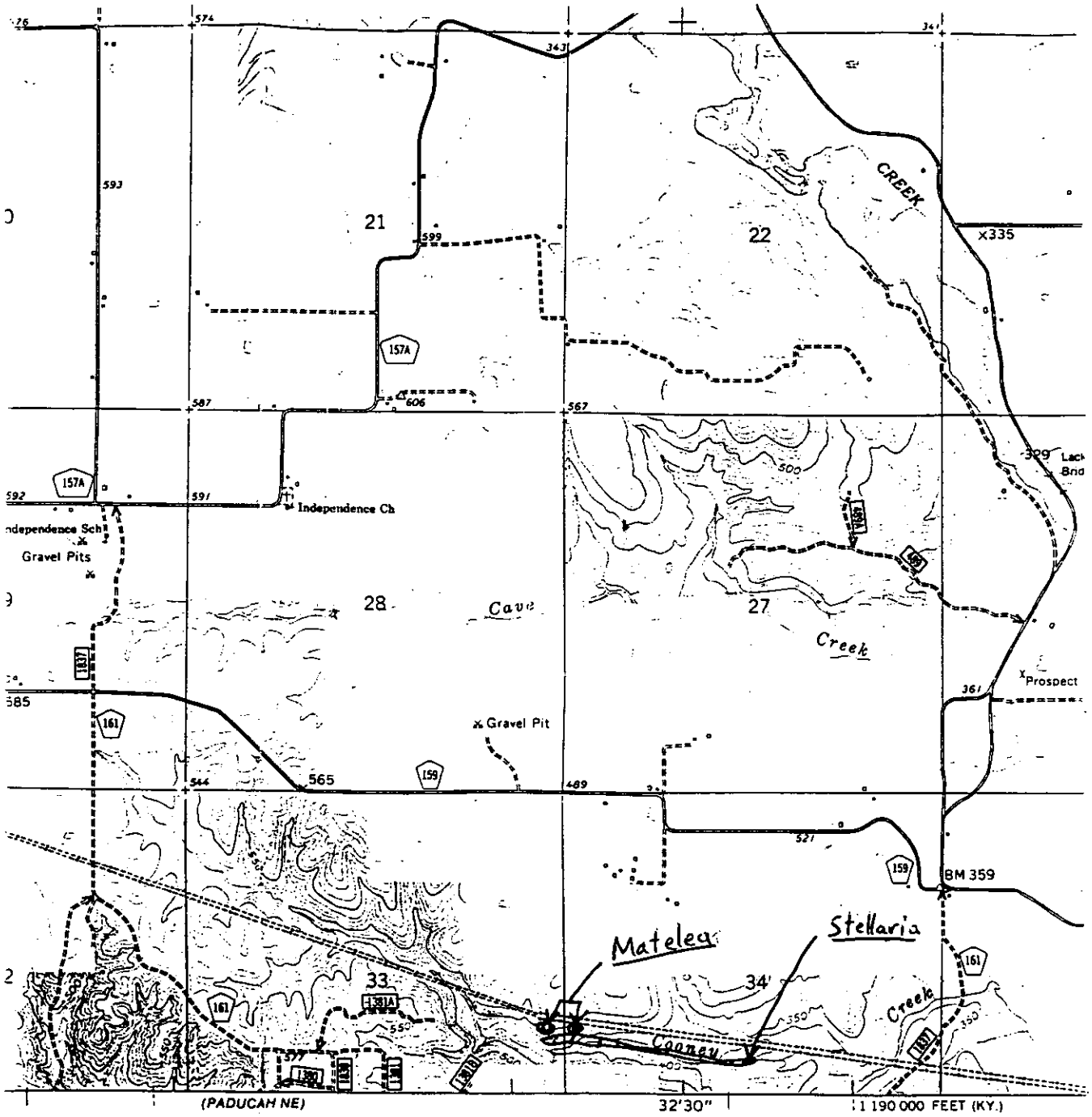

Figure 6. Locations of *Matelea obliqua* (Jacq.) Woodson and *Stellaria pubera* Michx. along Cooney Creek and Burke Branch, Pope County, Illinois.

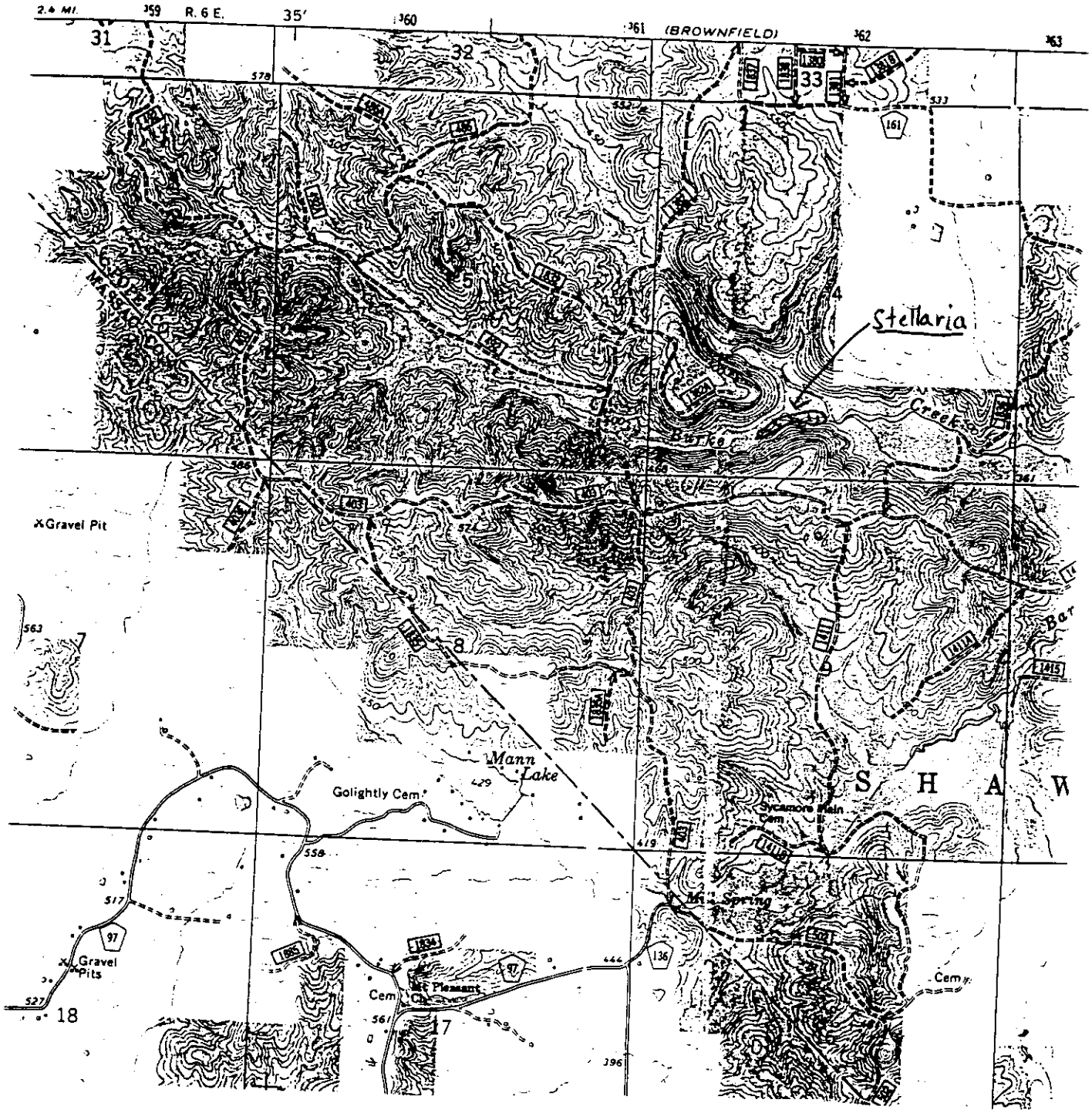

Figure 6. Locations of *Matelea obliqua* (Jacq.) Woodson and *Stellaria pubera* Michx. along Cooney Creek and Burke Branch, Pope County, Illinois.

ILLINOIS NATURAL HERITAGE DATA BASE
ELEMENT OCCURRENCE AND SIGHTING REPORT FORM

Name of Element: *Carex emmonsii* Dewey

Date Last Observed: 17 May 2000

Location: (If possible please provide a map showing the location)

County: Pope County

Directions from the nearest landmark: east slope of Lusk Creek across from the Lysimachia fraseri site. Plants were found on both IDNR and Shawnee National Forest land.

Name of Topographic Quad(s): Eddyville

Legal Description: SW/4 SW/4 Sec. 34 T11S R6E

Site name: Lusk Creek National Natural Landmark

Nature of Observation: Conducting a status survey of Lysimachia fraseri.

Description of Area: Dry-mesic and dry upland forest, facing west to southwest, quite steep, dominated by oaks, especially white oak.

Comments: Actual number of plants not estimated but this sedge was not rare in this habitat. It was easy to ID by the lax nature of the leaves and the culms.

Name of Observer: Mark A. Basinger
Observer's Telephone Number: 618 / 949 - 3305

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Routing:
- Endangered Species Protection Board____
- Nature Preserves Commission _____
- Avian Ecology Program_____
- Botany Program_____
- Other_____
- Natural Areas Program_____
- Region Administrator_____
- Dist Heritage Biologist_____
- Mammal Program _____

ILLINOIS NATURAL HERITAGE DATA BASE
ELEMENT OCCURRENCE AND SIGHTING REPORT FORM

Name of Element: *Carex laxiflora* Lam.

Date Last Observed: 19 May 1999

Location: (If possible please provide a map showing the location)

County: Pope County

Directions from the nearest landmark: 5 to 7 m south of the Lysimachia fraseri site along Lusk Creek. Shawnee National Forest land.

Name of Topographic Quad(s): Eddyville

Legal Description: SW/4 SW/4 Sec. 34 T11S R6E

Site name: Lusk Creek National Natural Landmark

Nature of Observation: Conducting a status survey for Lysimachia fraseri.

Description of Area: Mesic upland forest, silty loam soil that was also quite rocky. American beech and sugar maple were common trees in the immediate area.

Comments: Approx. 5 plants were in this area. Easy to ID by the empty pistillate scale at the base of the pistillate spike.

Name of Observer: Mark A. Basinger
Observer's Telephone Number: 618 / 949 - 3305

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Routing:
- Endangered Species Protection Board____
- Nature Preserves Commission _____
- Avian Ecology Program_____
- Botany Program_____
- Other_____
- Natural Areas Program_____
- Region Administrator_____
- Dist Heritage Biologist_____
- Mammal Program _____

ILLINOIS NATURAL HERITAGE DATA BASE
ELEMENT OCCURRENCE AND SIGHTING REPORT FORM

Name of Element: *Carex nigromarginata* Schwein.

Date Last Observed: 17 May 2000

Location: (If possible please provide a map showing the location)

County: Pope County

Directions from the nearest landmark: In mesic upland forest on east bank of Lusk Creek, approx. 300 m north of the Rose Ford. Population was on privately owned land.

Name of Topographic Quad(s): Eddyville

Legal Description: NW/4 NW/4 Sec. 3 T12S R6E

Site name: Lusk Creek National Natural Landmark

Nature of Observation: Conducting a status survey for Lysimachia fraseri.

Description of Area: Mesic upland forest above entrenched braided channel of Lusk Creek. The area where the plants were found was on the east side of a braided portion of the creek with an island in the middle of the channel.

Comments: There was one cluster of 5-10 plants. The plants were quite shaded by sugar maple and pawpaw, but most were in fruit. It was easy to ID as this species because the perigynia were almost completely concealed by the reddish-purple scales.

Name of Observer: Mark A. Basinger

Observer's Telephone Number: 618 / 949 - 3305

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Routing: Endangered Species Protection Board____ Natural Areas Program_____
Nature Preserves Commission _____ Region Administrator_____
Avian Ecology Program_____ Dist Heritage Biologist_____
Botany Program_____ Mammal Program _____
Other_____

ILLINOIS NATURAL HERITAGE DATA BASE
ELEMENT OCCURRENCE AND SIGHTING REPORT FORM

Name of Element: *Carex physorhyncha* Liebm.

Date Last Observed: 17 May 2000

Location: (If possible please provide a map showing the location)

County: Pope County

Directions from the nearest landmark: Growing in sandy soil at the Lysimachia fraseri site.

Name of Topographic Quad(s): Eddyville

Legal Description: SW/4 SW/4 Sec. 34 T11S R6E

Site name: Lusk Creek National Natural Landmark

Nature of Observation: Conducting a status survey for Lysimachia fraseri.

Description of Area: Mesic upland forest, sandy soil along the bank of Lusk Creek.

Comments: Two plants were observed. Easy to ID by the long-creeping rhizomes and pale perigynia and pistillate scales that were green with a whitish margin.

Name of Observer: Mark A. Basinger

Observer's Telephone Number: 618 / 949 - 3305

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Routing:

Endangered Species Protection Board____	Natural Areas Program_____
Nature Preserves Commission _____	Region Administrator_____
Avian Ecology Program_____	Dist Heritage Biologist_____
Botany Program_____	Mammal Program _____
Other_____	

ILLINOIS NATURAL HERITAGE DATA BASE
ELEMENT OCCURRENCE AND SIGHTING REPORT FORM

Name of Element: *Dichanthelium yadkinense* (Ashe) Mohlenb.

Date Last Observed: 17 May 2000

Location: (If possible please provide a map showing the location)

County: Pope County

Directions from the nearest landmark: Quite frequent in occurrence along the banks of Lusk Creek in rocky and sandy soil from the confluence of Bear Branch to the Rose Ford.

Name of Topographic Quad(s): Eddyville

Legal Description: SW/4 SW/4 Sec. 34 T11S R6E and NW/4 NW/4 Sec. 3 T12S R6E.

Site name: Lusk Creek National Natural Landmark

Nature of Observation: Conducting a status survey for Lysimachia fraseri.

Description of Area: Stream terraces and rocky or sandy margins of Lusk Creek. Plants were also observed in mesic upland forest along the creek and on gravel bars.

Comments: 1000's of plants were observed. Very easy to ID by glabrous nature (or subglabrous) and pale, white punctate glands on the leaf sheaths.

Name of Observer: Mark A. Basinger

Observer's Telephone Number: 618 / 949 - 3305

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Routing:

Endangered Species Protection Board____	Natural Areas Program_____
Nature Preserves Commission _____	Region Administrator_____
Avian Ecology Program_____	Dist Heritage Biologist_____
Botany Program_____	Mammal Program _____
Other_____	

ILLINOIS NATURAL HERITAGE DATA BASE
ELEMENT OCCURRENCE AND SIGHTING REPORT FORM

Name of Element: *Lilium superbum* L.

Date Last Observed: 19 May 1999

Location: (If possible please provide a map showing the location)

County: Pope County

Directions from the nearest landmark: Approx. 75 to 100 m north of the Lysimachia fraseri site along Lusk Creek. Plants were found just south of where the sandstone cliff goes straight into the creek (thus there is no bank or terrace).

Name of Topographic Quad(s): Eddyville

Legal Description: SW/4 SW/4 Sec. 34 T11S R6E

Site name: Lusk Creek National Natural Landmark

Nature of Observation: Conducting a status survey of Lysimachia fraseri.

Description of Area: Mesic upland forest, silty loam soil, a lot of vines (Smilax) and pawpaw were growing with the lilies. There was one colony observed with between 10 and 20 plants.

Comments: Plants had smooth undersurface of the leaves and the bulb of one immature plant was white. Plants were within the IDNR state preserve.

Name of Observer: Mark A. Basinger

Observer's Telephone Number: 618 / 949 - 3305

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Routing: Endangered Species Protection Board____ Natural Areas Program_____
Nature Preserves Commission _____ Region Administrator_____
Avian Ecology Program_____ Dist Heritage Biologist_____
Botany Program_____ Mammal Program _____
Other_____

ILLINOIS NATURAL HERITAGE DATA BASE
ELEMENT OCCURRENCE AND SIGHTING REPORT FORM

Name of Element: *Matelea obliqua* (Jacq.) Woodson

Date Last Observed: 14 June 1999

Location: (If possible please provide a map showing the location)

County: Pope County

Directions from the nearest landmark: Found along Cooney Creek in dry-mesic to dry upland forest in a former opening that has closed in a lot in recent years.

Name of Topographic Quad(s): Brownfield

Legal Description: NE/4 SE/4 Sec. 33 T14S R6E and NW/4 SW/4 Sec. 34 T14S R6E.

Site name: Cooney Creek

Nature of Observation: Conducting a status survey for Lysimachia fraseri.

Description of Area: Dry and/or dry-mesic upland forest, forest opening along Cooney Creek, rocky soil, a trail (perhaps used by ATV's) is within the area where the milkweeds are.

Comments: 10 to 20 plants were observed. Most were sterile but 2 had the long narrow petals that characterize this species. Shawnee National Forest land.

Name of Observer: Mark A. Basinger

Observer's Telephone Number: 618 / 949 - 3305

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Routing:
- Endangered Species Protection Board ____
- Nature Preserves Commission _____
- Avian Ecology Program _____
- Botany Program _____
- Other _____
- Natural Areas Program _____
- Region Administrator _____
- Dist Heritage Biologist _____
- Mammal Program _____

ILLINOIS NATURAL HERITAGE DATA BASE
ELEMENT OCCURRENCE AND SIGHTING REPORT FORM

Name of Element: *Stellaria pubera* Michx.

Date Last Observed: 14 June 1999

Location: (If possible please provide a map showing the location)

County: Pope County

Directions from the nearest landmark: Scattered along the banks of Cooney Creek; only observed when the creek was within hardwood forest; no plants observed when creek was surrounded by pines.

Name of Topographic Quad(s): Brownfield

Legal Description: NE/4 SE/4 Sec. 33 and NW/4 SW/4 Sec. 34 T14S R6E.

Site name: Cooney Creek

Nature of Observation: Conducting a status survey for Lysimachia fraseri.

Description of Area: Dry to dry-mesic upland forest, rocky, well-drained soil, hardwood forest dominated by oak species.

Comments: Well over 100 plants were observed along the banks of Cooney Creek. Shawnee National Forest land.

Name of Observer: Mark A. Basinger

Observer's Telephone Number: 618 / 949 - 3305

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Routing:

Endangered Species Protection Board____	Natural Areas Program_____
Nature Preserves Commission _____	Region Administrator_____
Avian Ecology Program_____	Dist Heritage Biologist_____
Botany Program_____	Mammal Program _____
Other_____	