Vascular Flora of Iroquois County Conservation Area and Hooper Branch Savanna Nature Preserve, Iroquois County, Illinois

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ABSTRACT

The vascular flora of the Hooper Branch Savanna Nature Preserve, Iroquois County, Illinois was studied during the 2001 growing season. A total of 334 taxa were found: nine fern and fern-allies, 90 monocots, and 235 dicots. The families with the largest number of taxa included the Poaceae with 52 taxa, the Asteraceae with 46 taxa, and the Cyperaceae with 21 taxa, of which 13 were members of the genus *Carex*. An overstory and ground layer analysis of five mature second growth dry sand savanna sites and one mature second growth sand flatwoods that occurs on the site was also undertaken. In the five dry sand savanna sites, tree density averaged 157 stems/ha, with an average basal area of 11 m^2/ha. In the overstory *Quercus velutina* Lam. (black oak) ranked first with an average importance value (IV) of 178.8 (out of 200). Associated species included *Q. alba* L. (white oak), *Prunus serotina* Ehrh. (wild black cherry), and *Q. palustris* Muenchh. (pin oak). In the ground layer *Carex pensylvanica* Lam. (Pennsylvania sedge) ranked first with an importance value of 62.8 (out of 200). Associated species included black oak, *Schizachyrium scoparium* (Michaux) Nash (little bluestem), and *Cassia fasciculata/nictitans,* [*C. fasciculata* Michaux (partridge pea) and *C. nictitans* L. (wild sensitive plant)], all with IV's >10. In the sand flatwoods, tree density averaged 302 stems/ha, with an average basal area of 25.7 m^2/ha. In the overstory pin oak ranked first with an importance value of 188.6 (out of 200). Associated species included *Nyssa sylvatica* Marsh. (sour gum) and white oak. In the ground layer *Carex haydenii* Dewey (Hayden's sedge) ranked first with an importance value of 50.8 (out of 200). Associated species included pin oak seedlings and *Calamagrostis canadensis* (Michaux) Beauv. (bluejoint grass), with IV's >25.

INTRODUCTION

Hooper Branch Savanna Nature Preserve (HBSNP), Iroquois County, Illinois, is located in the Kankakee Sand Area Section of the Grand Prairie Division (Schwegman, et al. 1973). It is within the eastern edge of the former Lake Watseka, a glacial lake formed approximately 14,000 years ago during the Kankakee Torrent (Willman & Frye 1970). Lake Watseka was eventually drained, due to incising of the Illinois and Kankakee rivers, exposing large areas of sand deposits along its shoreline. Wind action sorted these sand deposits into sand dunes and swales, largely on terraces along the Kankakee River Valley. In response to hypsithermal climatic stress, about 8300 A.D., prairie vegetation began replacing deciduous forest in Illinois (King 1981). In 1820, prairie vegetation covered 92% of Iroquois County (Hedborn 1984, Iverson, et al. 1989). Regular fires that swept across the prairies were a major factor in the development and maintenance of savanna communities (Johnson & Ebinger 1992). Exclusion of fire has allowed many oak savanna communities to become closed forest with dense understories (Gleason 1912, 1913, Transeau 1935, Vogel 1974, Ebinger & McClain 1991). The present study was undertaken to determine the structure and composition of the dry sand savanna and the sand flatwoods communities at HBSNP, compare the present dry sand savanna community to an earlier study of this community (Johnson & Ebinger 1992), develop a vouchered flora, and to locate Illinois threatened and endangered species,.

MATERIALS AND METHODS

Field trips were made to the HBSNP at various times during the 2001 growing season. During each trip (11 trips) voucher specimens were collected, habitat data for each taxon were determined, and the plant communities were delineated. The material collected was identified and deposited in the herbarium of the Illinois Natural History Survey (ILLS), Champaign, Illinois. Criteria for designating native and non-native taxa followed Fernald (1950), Steyermark (1963), Mohlenbrock (1986), and Gleason and Cronquist (1991).

In late October of 2001, a woody overstory survey was undertaken on five sites (each 4 ha in size, 400 m x 100 m) of the dry sand savanna and one site (1 ha in size, 100 m x 100 m) of the sand flatwoods at the HBSNP. Figure 1 gives the approximate locations of the permanent markers. A total of 80 quadrats, 50 m on a side, were established within the dry sand savanna and a total of 4 quadrats, 50 m on a side were established within the sand flatwoods. In each quadrat, all living and dead-standing woody individuals 10 cm dbh (diameter at breast height, 1.4 m above the ground) and above were identified and their diameters recorded. From these data, density (stems/ha), basal area (m^2/ha), relative density, relative dominance, importance value (IV), and average diameter (cm) were calculated for each species. Determinations of the IV follows the procedure used by McIntosh (1957), and is the sum of the relative density and relative dominance of a given species. Density (stems/ha) of woody understory species was determined using nested circular plots 0.0001, 0.001, and 0.01 ha in size. At each study site twenty points were located approximately 25 m apart along a randomly placed transect located the length of each site. At each point the circular plots were established. Four additional 0.0001 ha circular plots were located 6 m from each center along the cardinal compass directions. In the 0.0001 ha circular plots tree seedlings ($\leq$50 cm tall) and all shrubs were counted. In the 0.001 ha circular plots small saplings (>50 cm tall and <2.5 cm dbh) were counted, and in the 0.01 ha circular plots large saplings (2.5 to 9.9 cm dbh) were counted.

In early October of 2001, a ground layer species (including woody species $\leq$50 cm tall) survey was undertaken on the five sites of the dry sand savanna and the one sand flatwoods. A total of 250 quadrats, 1 m on a side, were established within the dry sand savanna and 50 quadrats, 1 m on a side, were established within the sand flatwoods. Quadrats were located along the permanent center transect line established for sampling the woody overstory in each of the study sites. Starting north (transects 1 and 5) or east (transects 2, 3, and 4) at 50 m intervals, 5 of the 9 potential points were selected using a random numbers table (single digit, 0 to 8). In the sand flatwood, plots were randomly placed along the center line of the central transect (Figure 1). At each of the 5 points, 10 plots 1 m^2 were located right (odd-numbered meters) or left (even-numbered meters) of a 10 m long segment from the transect point. Direction of the 10 m segment was established using a compass and a random numbers table (single digit, 0. to 7) where 1 was north, 2-northeast, 3-east, 4-southeast, etc. The cover of each species rooted in a quadrat was determined using Daubenmire (1959) cover classes as modified by Bailey and Poulton (1968) (class 1 = 0 to 1%, class 2 = >1 to 5%, class 3 = >5 to 25%, class 4 = >25 to 50%, class 5 = >50 to 75%, class 6 = >75 to 95%, class 7 = >95 to 100%). From these data, cover (%), relative cover, frequency (%), relative frequency, and importance value of each species were calculated. Nomenclature follows Mohlenbrock (1986).

DESCRIPTION OF THE STUDY AREA

The study area, located about 9 kilometer northeast of Beaverville, Iroquois County, Illinois, was recognized as a high quality dry to dry-mesic sand savanna by the Illinois Natural Areas Inventory (White & Madany 1978). It was dedicated as an Illinois Nature Preserve in 1985 (most of Sec 13 T29N R11W). This 195 ha tract of sand savanna, sand prairie, sand flatwoods, and successional communities, is north and adjacent to the Iroquois County Conservation Area. The sand savanna remnant, mostly dry sand savanna with patches of dry-mesic sand savanna, is about 144 ha in size and occurs on dunes and swales. The sand flatwoods, 5 ha in size, is located in the southeast corner of the HBSNP and the remaining 46 ha includes small patches of high quality sand prairie, degraded sand prairie, and successional communities. An east-west access road transverses this area dividing it into two nearly equal parts. The elevation at the HBSNP varied from 201 to 212 m above sea level. Before dedication as a nature preserve, the area had been grazed, lightly logged, occasionally burned, and had its hydrology altered (Glass 1985). Like the black oak savanna community the sand flatwoods community has been affected by various land use practices such as logging, burning (obvious at the time of this survey with many downed logs heavily fire damaged), and altering hydrology. A large ditch runs along the east and much of the north boundary of the sand flatwoods. A levee has been positioned between the levee and the sand flatwoods to prevent excess runoff, however a large breech in this levee is presently located at the southeast corner of the sand flatwoods.

The soil is of the Gilford-Chelsea-Watseka association (Kiefer 1982). These soils are formed in glacial outwash and in wind- or water-deposited sand. They range from excessively drained soils which are slightly acidic, light colored, and that have little organic matter (savanna communities) to very poorly drained soils which are neutral, black, and loamy (flatwoods communities).

The climate of east-central Illinois is continental with cool winters, hot summers, and little or no water deficit in any season of the year (Page 1949, Fehrenbacher et al. 1967, Schwegman et al. 1973). According to the Midwest Climate Center (2002), nearest station (32 km to the south-southwest) at Watseka, Illinois, the mean annual precipitation is 100.2 cm with the month of July having the highest rainfall (10.5 cm) and the mean annual temperature is 9.6°C with the hottest month being July (average of 22.9°C) and the coldest month being January (average of -6.1°C). The number of frost free days is 160 to 170 (Page 1949).

RESULTS AND DISCUSSION

Vascular Plant Species Present: The documented flora in the HBSNP consisted of 334 species and subspecific taxa within 209 genera and 66 families. Of these taxa, 30 (9%) were not native to Illinois. Pteridophytes were poorly represented at HBSNP, accounting for only 9 taxa (2.7% of all taxa) while Spermatophytes accounted for the remainder. Among the Spermatophytes, monocots accounted for 90 taxa in 52 genera and 8 families (26.9% of all taxa), while dicots accounted for 235 taxa in 150 genera and 52 families (70.4% of all taxa). Genera with the most taxa were: *Carex* (sedge) 13, *Polygonum* (smartweed) 8, *Asclepias* (milkweed) 5, *Aster* (aster) 5, *Hypericum* (shore St. John's-wort) 5, *Panicum* (panic grass) 5, *Rubus* (blackberry) 5, *Solidago* (goldenrod) 5, and *Viola* (violet) 5. Families with the most taxa were: Poaceae (grass family) 52, Asteraceae (aster family) 46, (Cyperaceae) sedge family 21, Fabaceae (pea

family) 17, Rosaceae (rose family) 13, Caryophyllaceae (pink family) 11, Polygonaceae (smartweed family) 11, Scrophulariaceae (figwort family) 11, and Lamiaceae (mint family) 10. Four species listed by the Illinois Endangered Species Protection Board (1999) as endangered were recorded, *Hypericum adpressum* Bart. (shore St. John's wort), *Polygonum careyi* Olney (Carey's heartease), *Rubus setosus* Bigel. [= *R. schneideri* Bailey (bristly blackberry), and *Viola primulifolia* L. (primrose violet), and their locations mapped (Figure 2). For a complete list of taxa and the natural communities where the species were observed see Appendix 1. For a brief discussion on tree and large shrub encroachment at HBSNP see Appendix II.

Woody Overstory of the Dry Sand Savanna: The canopy layer densities were similar at the five sites surveyed (Figure 1), with an average of 157 stems/ha, ranging from 122.9 stems/ha at Site 4 to 187.5 stems/ha at Site 3 (Table 1). The dominant species was black oak, with an average IV of 178.8, ranging from 151.0 at Site 4 to 194.7 at Site 3. White oak, black cherry, and pin oak were the only other tree species encountered. White oak was the next most commonly encountered tree, with an average IV of 20.4, where it was most commonly encountered in Site 4 (IV 48.2), Site 1 (IV 26.0), and Site 5 (IV 15.6). These sites were at slightly lower elevations or contained small inclusions of lower elevated areas where the savanna was locally more mesic than at Sites 2 and 3. Black cherry and pin oak were both represented by a few scattered individuals. Average diameter of black oak (27.2 cm) and white oak (24.4 cm) was similar at all 5 sites indicating a similar age throughout the HBSNP (Table 1). Size class distributions (Table 1) of black oak varied somewhat between the 5 sites, but the majority of the trees were less than 40 cm dbh (78% at Site 1; 80% at Site 2; 93% at Site 3; 79% at site 4; 86% at Site 5) indicating that all sites have a similar developmental history.

Site 2 and 3 (each 4 ha in size) from the present study (Figure 1) correspond closely to the locations of two sites (each 3 ha in size) studied at the HBSNP by Johnson & Ebinger (1992). Black oak in the present study (field work completed in October 2001) at sites 2 and 3 had an average IV of 192.4 while black oak in the Johnson & Ebinger (1992) study (field work completed in October 1989) had an average IV of 199. Presently both white oak and black cherry have made minor increases in IV since 1989, 0.7 to 6.1 and 0.3 to 1.5 respectively. The total number of stems/ha also increased from 136 to 170.4 primarily by black oak that has increased from 135.2 stems/ha in 1989 to 163.2 stems/ ha in 2001. Most of this increase of black oak is in the 10 - 19 cm diameter class where the number of stems has increased from 47.9 stems/ha in 1989 to 80.5 stems/ha in 2001. As a result, the average diameter of black oak has decreased from an average of 26 cm in 1989 to 24.5 cm in 2001.

Dead-standing individuals are a common feature of these savannas, with an average of 23.3 stems/ha or 12.9% of all standing stems (Table 2). Dead-standing individuals were most common in Site 4 (35 stems/ha), Site 5 (31.8 stems/ha), and Site 3 (26.8 stems/ha). Individuals of dead-standing black oak were the most frequent dead-standing tree species at all sites and comprised the greatest basal area at each site (Site 1, 97%; Site 2, 97.6%, Site 3, 99.5%, Site 4, 97%, Site 5, 95.5%). Presently the density of dead-standing stems (Table 2) at Sites 2 and 3 (11.4 stems/ha and 26.8 stems/ha) was slightly higher to much higher than that reported by Johnson & Ebinger in 1989 (8.7 stems/ha and 9.3 stems/ha). Site 2 has not been burned very often while Site 3 is generally burned at least every other year. The increase in dead-standing individuals was predicted by Johnson & Ebinger (1992), greater tree mortality was expected from the continued use of burning as a common management practice.

Coppice trees are relatively common in the savannas, averaging 20.5 trees/ha and ranging from 9.6 to 30 trees/ha, at HBSNP (Table 3). Coppice stems were found at all 5 sites and both black oak and white oak produced coppice stems. Black oak accounted for most of the coppice trees/ha (81% at Site 1; 89% at Site 2; 95% at Site 3; 77% at Site 4; 90% at Site 5). These multiple stemmed trees could be the result of past cutting, but many are likely the result of fire which kills the above ground parts of saplings and small trees with the resulting sprouts developing into forest trees.

Woody Understory of the Dry Sand Savanna: All shrubs and all woody seedlings (≤50 cm tall) densities averaged 51,380 stems/ha. Site 4 had the greatest density with 75,900 stems/ha and Site 5 had the lowest density with 37,900 stems/ha (Table 4). Rosa carolina L. (pasture rose) had the greatest density (stems/ha) in four of the five sites, followed by black oak, Rubus allegheniensis Porter (common blackberry), and Rhus copallina L. (dwarf sumac). Site 5 had the greatest diversity with 11 species. Regular burns probably enhance the growth of some shrub species (pasture rose and common blackberry), while less frequent burns were important for the establishment and continued success of others, especially seedlings of black oak and white oak. Densities of woody seedlings at Sites 2 & 3 are similar to those reported by Johnson and Ebinger (1992). Pasture rose was the most important species for both studies with black oak, dwarf sumac, and common blackberry also common.

Small Saplings of the Dry Sand Savanna: Small saplings (>50 cm tall <2.5 cm dbh) densities averaged 1,280 stems/ha. Site 1 had the greatest density with 1800 stems/ha and the greatest diversity with 3 species encountered (Table 4). Black oak small saplings were encountered at all five sites and had the greatest density of stems/ha at each site. The results for stems/ha of small saplings at Sites 2 & 3 are slightly lower than those reported previously. Johnson and Ebinger (1992) reported an average of 1583 stems/ha of small saplings (86.8% black oak) while in the present study at Sites 2 & 3 averaged 950 stems/ha of small saplings (97.4% black oak). The difference is probably the result of recent burns, particularly at Site 3.

Large Saplings of the Dry Sand Savanna: Large saplings (2.5 to 9.9 cm dbh) densities averaged 27 stems/ha. Site 1 had the greatest density with 50 stems/ha and Site 5 did not have any large saplings within the 4 ha sample site (Table 4). Large saplings of black oak dominated 4 of the 5 sites. Other large saplings recorded were white oak (Site 4) and black cherry (Sites 3 & 4). The results for stems/ha of large saplings at Sites 2 & 3 are much lower than those reported reported previously. Johnson and Ebinger (1992) reported an average of 361.5 stems/ha of large saplings (98.6% black oak) while in the present study, Sites 2 & 3 averaged 27.5 stems/ha of large saplings (81.8% black oak). Again, the use of fire as a management tool is probably responsible for much of this decrease.

Ground Layer Species of the Dry Sand Savanna: Ground layer species (including woody species ≤50 cm tall) were diverse, 80 taxa were recorded in the plots. Of these, three were naturalized, *Achillea millefolium* L. (common yarrow), *Poa pratensis* L. (Kentucky bluegrass), and *Rumex acetosella* L. (sour dock). *Carex pensylvanica* Lam. (Pennsylvania sedge), with an average IV of 62.8 (42.3 at Site 1; 49.3 at Site 2; 75.7 at Site 3; 48.9 at Site 4; 97.7 at Site 5), was the dominant species in the ground layer (Tables 5, 6, 7. 8. 9). Two additional graminoid species, *Schizachyrium scoparium* (Michaux) Nash (little blue stem) and *Sporobolus clandestinus* (Biehler) Hitchc. (dropseed), were common. Prominent forbs included *Cassia fasciculata* Michaux (partridge pea), *Cassia nictitans* L. (wild sensative plant), and *Euphorbia corollata* L. (flowering spurge). The common woody species was black oak. The most common

shrubs were dwarf sumac, pasture rose, and common blackberry. Bare ground had an average cover of 38.59% and ranged from 25.84% (Site 1) to 55.45% (Site 5). The high percentage of bare ground in the sand savannas at HBSNP is clearly related to the limited availability of moisture in these dry uplands.

Woody Overstory of the Sand Flatwoods: The sand flatwoods, located in the southeast corner of HBSNP (Figure 1), is dominanted by pin oak with an IV of 188.6 (Table 10). The size class distribution (Table 10) of pin oak clearly shows that the majority of the trees were <50 cm dbh (>96%) with the majority of the individuals in the 20 - 29 cm (29.7%) and 30 - 39 cm (32.6%) diameter classes. *Nyssa sylvatica* Marsh (sour gum), white oak, and *Quercus coccinea* Muenchh. (scarlet oak) were the only other tree species encountered in the plots. Sour gum was best represented, 84.2% of its total stems/ha, in the smallest size class (10 - 19 cm) and like white oak had only one individual in the 30 - 39 cm size class. Scarlet oak was only observed within this community and not represented in the area surveyed.

Dead-standing individuals were occasionally encountered and had an average of 23 stems/ha or 7.6% of all standing stems. Dead-standing individuals were all pin oak and had a basal area of 0.974 m^2/ha with an average diameter of 22.3 cm. Coppice trees were relatively common in the sand flatwoods with 23 trees/ha (Table 11). Coppice trees were recorded for all species in the flatwoods. However, pin oak accounted for 82.6% of the density (trees/ha) and 91.5% of the basal area (m^2/ha) of the coppice trees in the sand flatwoods.

Woody Understory of the Sand Flatwoods: All shrubs and all woody seedlings (≤50 cm tall) densities were 41,800 stems/ha (Table 12). Pin oak had the highest density of stems/ha, 35,000 or 83.7% of all the shrubs and woody seedlings ≤50 cm tall. *Ilex verticillata* (L.) Gray (winterberry) had the highest density of stems/ha for shrubs. Seven additional species were recorded in this strata, *Sassafras albidum* (Nutt.) Nees (sassafras), sour gum, black cherry, common blackberry, *Rubus occidentalis* L. (black raspberry), *Spiraea tomentosa* L. (hardhack), and *Toxicodendron radicans* (L.) Kuntze (poison ivy). No small saplings (>50 cm tall <2.5 cm dbh) were recorded within the area surveyed. Large saplings (2.5 - 9.9 cm dbh) densities totaled 35 stems/ha (Table 12). Three species were recorded, pin oak (15 stems/ha), sour gum (10 stems/ha), and black cherry (10 stems/ha). The present drainage situation and burning through this area is most likely responsible in part for the lack of small saplings and very low numbers of large saplings.

Ground Layer Species of the Sand Flatwoods: Ground layer species (including woody ≤50 cm tall) were not very diverse, 40 taxa were recorded in the plots. Of these, one was naturalized, *Taraxacum* officinale Weber (dandelion). *Carex haydenii* (Hayden's sedge) and *Calamagrostis canadensis* (Michaux) Beauv. (bluejoint grass) were the dominant herbaceous species with IV's of 50.8 and 26.7 respectively (Table 13). Pin oak was the dominant woody species with an IV of 34.2. The three most common shrubs recorded were *Rubus hispidus* L. (swampy dewberry), winterberry, and common blackberry. Two forbs, *Aster umbellatus* Mill. (flat-top aster) and *Apios americana* Medic. (groundnut) were locally common. Bare ground had an average cover of 70.8%. The high percentage of bare ground in the sand flatwoods at HBSNP is clearly related to the seasonally high water table. During winter and spring this area is frequently ponded.

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Table 1. Density by diameter class (stems/ha), basal area (m^2/ha), relative density, relative dominance, importance value, and average diameter of the woody species recorded for the five savanna sites studied at the Hooper Branch Savanna Nature Preserve, Iroquois County, Illinois.

Species	Diameter Classes (cm) 10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 - 69	70+	Total stems/ha	Basal Area m^2/ha	Rel. Den.	Rel. Dom.	I.V.	Av. Diam. (cm)
Site # 1													
Quercus velutina	60.0	21.5	20.0	14.5	12.3	1.8	0.3	130.4	9.629	85.7	88.0	173.7	26.7
Quercus alba	14.0	3.5	0.3	1.5	1.3	0.5	0.5	21.6	1.297	14.1	11.9	26.0	22.6
Prunus serotina	0.3	–	–	–	–	–	–	0.3	0.007	0.2	0.1	0.3	18.2
Totals	74.3	25.0	20.3	16.0	13.6	2.3	0.8	152.3	10.933	100.0	100.0	200.0	
Site # 2													
Quercus velutina	71.5	25.8	17.8	14.5	12.8	2.3	–	144.7	9.985	94.6	95.5	190.1	25.8
Quercus alba	5.8	0.5	0.3	0.3	1.3	–	–	8.2	0.461	5.2	4.4	9.6	22.7
Prunus serotina	0.3	–	–	–	–	–	–	0.3	0.005	0.2	0.1	0.3	15.1
Totals	77.6	26.3	18.1	14.8	14.1	2.3	–	153.2	10.451	100.0	100.0	200.0	
Site # 3													
Quercus velutina	89.5	51.5	27.0	7.5	3.8	1.5	0.8	181.6	9.425	96.9	97.8	194.7	23.2
Quercus alba	1.8	1.0	–	0.3	–	–	–	3.1	0.105	1.6	1.1	2.7	19.6
Prunus serotina	1.5	1.0	0.3	–	–	–	–	2.8	0.105	1.5	1.1	2.6	20.6
Totals	92.8	53.5	27.3	7.8	3.8	1.5	0.8	187.5	9.635	100.0	100.0	200.0	
Site # 4													
Quercus velutina	21.3	26.5	27.3	14.5	2.8	2.3	0.5	95.2	8.139	77.6	73.4	151.0	30.5
Quercus alba	11.5	4.8	3.3	2.0	2.5	1.3	1.5	26.9	2.931	21.8	26.4	48.2	31.0
Prunus serotina	0.5	–	–	–	–	–	–	0.5	0.006	0.4	0.1	0.5	12.4
Quercus palustris	0.3	–	–	–	–	–	–	0.3	0.003	0.2	0.1	0.3	15.9
Totals	33.6	31.3	30.6	16.5	5.3	3.6	2.0	122.9	11.079	100.0	100.0	200.0	
Site # 5													
Quercus velutina	29.0	51.3	53.5	15.8	4.5	0.5	0.7	155.3	12.077	91.7	92.7	184.4	29.6
Quercus alba	6.3	4.3	1.0	1.0	1.3	0.3	–	14.2	0.949	8.3	7.3	15.6	26.0
Totals	35.3	55.6	54.5	16.8	5.8	0.8	0.7	169.5	13.026	100.0	100.0	200.0	

Table 2. Density (stems/ha), basal area (m^2/ha), and average diameter (cm) of dead-standing individuals recorded for the five study sites in the oak sand savanna at the Hooper Branch Savanna Nature Preserve, Iroquois County, Illinois

Species	Density (stems/ha)	Basal Area (m^2/ha)	Average Diameter (cm)
Site # 1			
Quercus velutina	9.5	0.717	26.3
Quercus alba	0.8	0.008	11.7
Prunus serotina	1.3	0.013	11.2
Totals	11.6	0.738	
Site # 2			
Quercus velutina	10.3	0.566	21.9
Quercus alba	0.8	0.008	11.7
Prunus serotina	0.3	0.004	13.5
Totals	11.4	0.578	
Site # 3			
Quercus velutina	26.3	1.421	26.6
Prunus serotina	0.5	0.007	13.5
Totals	26.8	1.428	
Site # 4			
Quercus velutina	32.0	1.376	20.7
Quercus alba	3.0	0.042	13.2
Totals	35.0	1.418	
Site # 5			
Quercus velutina	30.0	1.428	21.6
Quercus alba	1.5	0.065	21.2
Prunus serotina	0.3	0.003	12.8
Totals	31.8	1.496	

Table 3. Density (trees/ha), coppice stems per tree, basal area (m^2/ha), and average diameter (cm) of coppice trees recorded for the five study sites in the oak sand savanna at the Hooper Branch Savanna Nature Preserve, Iroquois County, Illinois

Species	Density (trees/ha)	Coppice (stems/tree)	Basal Area (m^2/ha)	Average Diameter (cm)
Site # 1				
Quercus velutina	7.8	2.25	1.237	28.2
Quercus alba	1.8	2.43	0.089	15.9
Totals	9.6	--	1.326	
Site # 2				
Quercus velutina	18.8	1.96	1.340	38.8
Quercus alba	2.0	1.88	0.071	28.8
Prunus serotina	0.3	1.00	0.005	15.1
Totals	21.1	--	1.416	
Site # 3				
Quercus velutina	26.0	2.21	3.355	27.5
Quercus alba	1.0	2.50	0.068	17.9
Prunus serotina	0.3	2.00	0.026	25.4
Totals	27.3	--	3.449	
Site # 4				
Quercus velutina	11.0	2.25	2.235	32.2
Quercus alba	3.3	2.00	0.615	31.0
Totals	14.3		2.850	
Site # 5				
Quercus velutina	27.0	2.25	5.551	31.9
Quercus alba	3.0	2.00	0.308	22.3
Totals	30.0		5.859	

Table 4. Density (stems/ha), of the seedlings and shrubs, small saplings, and large saplings at the five savanna sites in the oak sand savanna at the Hooper Branch Savanna Nature Preserve, Iroquois County, Illinois

Seedlings (≤50 cm tall) and all shrubs.

Species	Site # 1	Site # 2	Site # 3	Site # 4	Site # 5
Quercus velutina	11300	6600	5600	9000	8900
Quercus alba	100	--	100	5100	500
Prunus serotina	200	200	300	900	100
Sassafras albidum	100	--	--	--	1500
Prunus americana	--	--	400	--	--
Rosa carolina	24400	23900	31300	31400	6100
Rubus alleghiensis	3900	6200	7300	12300	3300
Rhus copallina	2900	3000	6500	9700	16000
Rhus glabra	2300	3000	500	1000	300
Amorpha canescens	1400	1400	200	--	800
Corylus americana	--	--	--	5400	200
Salix humilis	--	--	--	700	200
Vaccinium angustifolilum	--	--	--	400	--
Totals	46600	44300	52200	75900	37900

Small Saplings (>50 cm tall <2.5 cm dbh).

Species	Site # 1	Site # 2	Site # 3	Site # 4	Site # 5
Quercus velutina	1350	1350	500	1000	800
Quercus alba	100	--	--	500	400
Prunus serotina	--	--	50	--	--
Sassafras albidum	350	--	--	--	--
Totals	1800	1350	550	1500	1200

Large Saplings (2.5 - 9.9 cm dbh).

Species	Site # 1	Site # 2	Site # 3	Site # 4	Site # 5
Quercus velutina	50	20	25	15	--
Quercus alba	--	--	--	10	--
Prunus serotina	--	--	10	5	--
Sassafras albidum	--	--	--	--	--
Totals	50	20	35	30	--

Table 5. Frequency (%), average cover, relative frequency, relative cover, and importance values (IV) of the ground layer species encountered in an oak sand savanna (Site # 1) at the Hooper Branch Savanna Nature Preserve, Iroquois County, Illinois. Species with an IV of 1.0 or less are not included.

Species	Frequency %	Average Cover	Relative Frequency	Relative Cover	I.V.
Carex pensylvanica	96	18.13	10.5	31.8	42.3
Schizachyrium scoparium	66	6.41	7.2	11.3	18.5
Cassia fasciculata/nictitans	74	4.56	8.1	8.0	16.1
Rhus glabra	34	3.98	3.7	7.0	10.7
Quercus velutina	48	2.10	5.3	3.7	9.0
Sporobolus clandestinus	34	2.12	3.7	3.7	7.4
Amorpha canescens	20	2.44	2.2	4.3	6.5
Solidago nemoralis	24	2.11	2.6	3.7	6.3
Euphorbia corollata	42	0.86	4.6	1.5	6.1
Rubus allegheniensis	18	1.66	2.0	2.9	4.9
Koeleria cristata	26	1.06	2.8	1.9	4.7
Rosa carolina	22	1.28	2.4	2.2	4.6
Helianthus divaricatus	18	1.26	2.0	2.2	4.2
Panicum oligosanthes	30	0.35	3.3	0.6	3.9
Lithospermum carolinense	20	0.79	2.2	1.4	3.6
Conyza canadensis	20	0.59	2.2	1.0	3.2
Liatris aspera	18	0.68	2.0	1.2	3.2
Phlox bifida	22	0.46	2.4	0.8	3.2
Helianthemum spp.	22	0.36	2.4	0.6	3.0
Lespedeza capitata	24	0.17	2.6	0.3	2.9
Aureolaria pedicularia	10	0.78	1.1	1.4	2.5
Viola pedata	16	0.38	1.8	0.7	2.5
Euthamia graminifolia	16	0.28	1.8	0.5	2.3
Panicum villosissimum	16	0.28	1.8	0.5	2.3
Rumex acetosella	16	0.18	1.8	0.3	2.1
Apios americana	10	0.20	1.1	0.4	1.5
Comandra umbellata	12	0.11	1.3	0.2	1.5
Sporobolus cryptandrus	8	0.33	0.9	0.6	1.5
Tephrosia virginiana	6	0.42	0.7	0.7	1.4
Prunus serotina	6	0.37	0.7	0.6	1.3
Monarda punctata	6	0.32	0.7	0.6	1.3
Stipa spartea	6	0.37	0.7	0.6	1.3
Rhus copallina	8	0.14	0.9	0.2	1.1
Cyperus filiculmis	8	0.09	0.9	0.2	1.1
Poa pratensis	8	0.14	0.9	0.2	1.1
Others (23 species)			8.7	2.2	10.9
Totals			100.0	100.0	200.0
Average bare ground		25.84			

Table 6. Frequency (%), average cover, relative frequency, relative cover, and importance values (IV) of the ground layer species encountered in an oak sand savanna (Site # 2) at the Hooper Branch Savanna Nature Preserve, Iroquois County, Illinois. Species with an IV of 1.0 or less are not included.

Species	Frequency %	Average Cover	Relative Frequency	Relative Cover	I.V.
Carex pensylvanica	100	17.55	12.9	36.4	49.3
Schizachyrium scoparium	46	6.47	5.9	13.4	19.3
Quercus velutina	52	2.79	6.7	5.8	12.5
Rubus allegheniensis	30	3.46	3.9	7.2	11.1
Sporobolus clandestinus	46	2.32	5.9	4.8	10.7
Rhus copallina	34	2.79	4.4	5.8	10.2
Cassia fasciculata/nictitans	60	0.70	7.7	1.5	9.2
Tephrosia virginiana	16	2.32	2.1	4.8	6.9
Aureolaria pedicularia	14	2.10	1.8	4.4	6.2
Rumex acetosella	20	1.56	2.6	3.2	5.8
Helianthemum spp.	36	0.33	4.6	0.7	5.3
Euphorbia corollata	32	0.51	4.1	1.1	5.2
Rhus glabra	10	1.50	1.3	3.1	4.4
Monarda punctata	28	0.34	3.6	0.7	4.3
Conyza canadensis	28	0.19	3.6	0.4	4.0
Lespedeza capitata	26	0.23	3.3	0.5	3.8
Panicum villosissimum	24	0.17	3.1	0.4	3.5
Rosa carolina	20	0.40	2.6	0.8	3.4
Amorpha canescens	16	0.23	2.1	0.5	2.6
Lithospermum carolinense	12	0.40	1.5	0.8	2.3
Panicum oligosanthes	12	0.16	1.5	0.3	1.8
Comandra umbellata	10	0.15	1.3	0.3	1.6
Physalis virginiana	12	0.06	1.5	0.1	1.6
Gnaphalium obtusifolium	10	0.10	1.3	0.2	1.5
Phlox bifida	10	0.05	1.3	0.1	1.4
Stipa spartea	10	0.05	1.3	0.1	1.4
Koeleria cristata	8	0.09	1.0	0.2	1.2
Viola pedata	8	0.09	1.0	0.2	1.2
Others (16 species)			6.1	2.2	8.3
Totals			100.0	100.0	200.0
Average bare ground		43.46			

Table 7. Frequency (%), average cover, relative frequency, relative cover, and importance values (IV) of the ground layer species encountered in an oak sand savanna (Site # 3) at the Hooper Branch Savanna Nature Preserve, Iroquois County, Illinois. Species with an IV of 1.0 or less are not included.

Species	Frequency %	Average Cover	Relative Frequency	Relative Cover	I.V.
Carex pensylvanica	100	33.85	17.7	58.0	75.7
Quercus velutina	44	4.44	7.8	7.6	15.4
Rhus copallina	48	3.69	8.5	6.3	14.8
Rubus flagellaris	20	4.35	3.5	7.5	11.0
Schizachyrium scoparium	30	3.06	5.3	5.2	10.5
Cassia fasciculata/nictitans	50	0.80	8.9	1.4	10.3
Helianthemum spp.	40	0.75	7.1	1.3	8.4
Tephrosia virginiana	20	2.73	3.5	4.7	8.2
Rosa carolina	36	0.68	6.4	1.2	7.6
Euphorbia corollata	34	0.62	6.0	1.1	7.1
Liatris aspera	12	0.74	2.1	1.3	3.4
Panicum virgatum	18	0.14	3.2	0.2	3.4
Lespedeza capitata	16	0.28	2.8	0.5	3.3
Panicum villosissimum	12	0.11	2.1	0.2	2.3
Aureolaria pedicularia	6	0.66	1.1	1.1	2.2
Sporobolus clandestinus	8	0.09	1.4	0.2	1.6
Polygala polygama	8	0.09	1.4	0.2	1.6
Lespedeza virginica	8	0.04	1.4	0.1	1.5
Rumex acetosella	8	0.04	1.4	0.1	1.5
Desmodium obtusum	6	0.18	1.1	0.3	1.4
Aristida purpurascens	6	0.08	1.1	0.1	1.2
Leptoloma cognatum	6	0.08	1.1	0.1	1.2
Hieracium scabrum	6	0.03	1.1	0.1	1.2
Others (9 species)			4.0	1.2	5.2
Totals			100.0	100.0	200.0
Average bare ground		31.28			

Table 8. Frequency (%), average cover, relative frequency, relative cover, and importance values (IV) of the ground layer species encountered in an oak sand savanna (Site # 4) at the Hooper Branch Savanna Nature Preserve, Iroquois County, Illinois. Species with an IV of 1.0 or less are not included.

Species	Frequency %	Average Cover	Relative Frequency	Relative Cover	I.V.
Carex pensylvanica	98	17.32	17.3	31.6	48.9
Quercus velutina	64	7.79	11.3	14.2	25.5
Quercus alba	32	8.66	5.6	15.8	21.4
Rubus allegheniensis	46	5.36	8.1	9.8	17.9
Rubus hispidus	18	6.21	3.2	11.3	14.5
Schizachyrium scoparium	40	3.59	7.0	6.5	13.5
Sorghastrum nutans	34	0.95	6.0	1.7	7.7
Cassia fasciculata/nictitans	34	0.62	6.0	1.1	7.1
Rosa carolina	28	0.73	4.9	1.3	6.2
Rhus copallina	16	1.20	2.8	2.2	5.0
Hieracium scabrum	16	0.28	2.8	0.5	3.3
Euphorbia corollata	16	0.18	2.8	0.3	3.1
Panicum villosissimum	14	0.17	2.5	0.3	2.8
Desmodium obtusum	10	0.49	1.8	0.9	2.7
Rumex acetosella	12	0.16	2.1	0.3	2.4
Euthamia graminifolia	10	0.05	1.8	0.1	1.9
Antennaria plantaginifolia	8	0.24	1.4	0.4	1.8
Aster linariifolius	8	0.14	1.4	0.3	1.7
Potentilla simplex	8	0.09	1.4	0.2	1.6
Krigia biflora	8	0.09	1.4	0.2	1.6
Helianthemum spp.	8	0.04	1.4	0.1	1.5
Prunus serotina	6	0.13	1.1	0.2	1.3
Panicum virgatum	6	0.13	1.1	0.2	1.3
Comandra umbellata	6	0.03	1.1	0.1	1.2
Others (8 species)			3.7	0.4	4.1
Totals			100.0	100.0	200.0
Average bare ground		36.90			

Table 9. Frequency (%), average cover, relative frequency, relative cover, and importance values (IV) of the ground layer species encountered in an oak sand savanna (Site # 5) at the Hooper Branch Savanna Nature Preserve, Iroquois County, Illinois. Species with an IV of 1.0 or less are not included.

Species	Frequency %	Average Cover	Relative Frequency	Relative Cover	I.V.
Carex pensylvanica	100	32.35	24.5	73.2	97.7
Quercus velutina	52	6.09	12.7	13.8	26.5
Rhus copallina	32	1.53	7.8	3.5	11.3
Cassia fasciculata/nictitans	34	0.27	8.3	0.6	8.9
Rosa carolina	30	0.35	7.4	0.8	8.2
Panicum villosissimum	22	0.31	5.4	0.7	6.1
Schizachyrium scoparium	16	0.38	3.9	0.9	4.8
Helianthemum spp.	18	0.09	4.4	0.2	4.6
Lithospermum caroliniense	10	0.49	2.5	1.1	3.6
Euphorbia corollata	12	0.11	2.9	0.5	3.4
Hieracium scabrum	12	0.06	2.9	0.1	3.0
Rubus flagellaris	6	0.42	1.5	1.0	2.5
Quercus alba	4	0.60	1.0	1.4	2.4
Rubus allegheniensis	6	0.18	1.5	0.4	1.9
Lespedeza capitata	6	0.08	1.5	0.2	1.7
Solidago nemoralis	6	0.08	1.5	0.2	1.7
Ambrosia artemisiifolia	6	0.03	1.5	0.1	1.6
Smilacina stellata	4	0.07	1.0	0.2	1.2
Aureolaria pedicularia	2	0.30	0.5	0.7	1.2
Phlox bifida	4	0.02	1.0	0.1	1.1
Lespedeza virginica	4	0.02	1.0	0.1	1.1
Panicum oligosanthes	4	0.02	1.0	0.1	1.1
Others (9 species)			4.3	0.1	4.4
Totals			100.0	100.0	200.0
Average bare ground		55.45			

Table 10. Density by diameter class (stems/ha), basal area (m^2/ha), relative density, relative dominance, importance value, and average diameter of the woody species recorded for a sand flatwoods studied at the Hooper Branch Savanna Nature Preserve, Iroquois County, Illinois.

Species	Diameter Classes (cm) 10 - 19	20 - 29	30 - 39	40 - 49	50 - 59	60 +	Total stems/ha	Basal Area m^2/ha	Rel. Den.	Rel. Dom.	I.V.	Av. Diam. (cm)
Quercus palustris	35	82	90	59	9	1	276	25.015	91.4	97.2	188.6	32.2
Nyssa sylvatica	16	2	1	–	–	–	19	0.436	6.3	1.7	8.0	15.9
Quercus alba	3	3	1	–	–	–	7	0.295	2.3	1.1	3.4	22.2
Totals	54	87	92	59	9	1	302	25.746	100.0	100.0	200.0	

Table 11. Density (trees/ha), coppice stems per tree, basal area (m^2/ha), and average diameter (cm) of coppice trees recorded for a sand flatwoods studied at the Hooper Branch Savanna Nature Preserve, Iroquois County, Illinois

Species	Density (trees/ha)	Coppice (stems/tree)	Basal Area (m^2/ha)	Average Diameter (cm)
Quercus palustris	19	1.95	3.228	32.0
Quercus alba	2	2.00	0.219	25.6
Nyssa sylvatica	2	2.00	0.079	15.8
Totals	23	--	3.526	--

Table 12. Density (stems/ha) of seedlings and shrubs, small saplings, and large saplings in the sand flatwoods at the Hooper Branch Savanna Nature Preserve, Iroquois County, Illinois

Species	Seedlings and Shrubs	Small Saplings	Large Saplings
Quercus palustris	35000	--	15
Sassafras albidum	2300	--	--
Nyssa sylvatica	900	--	10
Prunus serotina	100	--	10
Ilex verticillata	2100	--	--
Spiraea tomentosa	500	--	--
Rubus occidentalis	500	--	--
Rubus allegheniensis	200	--	--
Toxicodendron radicans	200	--	--
Totals	41800	--	35

Table 13. Frequency (%), average cover, relative frequency, relative cover, and importance values (IV) of the ground layer species encountered in a sand flatwoods studied at the Hooper Branch Savanna Nature Preserve, Iroquois County, Illinois. Species with an IV of 1.0 or less are not included.

Species	Frequency %	Average Cover	Relative Frequency	Relative Cover	I.V.
Carex haydenii	62	9.22	15.7	35.1	50.8
Quercus palustris	68	4.43	17.3	16.9	34.2
Calamagrostis canadensis	30	5.02	7.6	19.1	26.7
Aster umbellatus	10	1.42	2.5	5.4	7.9
Erechtites hieracifolia	24	0.17	6.1	0.6	6.7
Sassafras albidum	16	0.47	4.1	1.8	5.9
Rubus hispidus	14	0.61	3.6	2.3	5.9
Quercus alba	10	0.73	2.5	2.8	5.3
Ilex verticillata	10	0.68	2.5	2.6	5.1
Apios americana	10	0.54	2.5	2.1	4.6
Rubus allegheniensis	8	0.67	2.0	2.5	4.5
Eupatorium serotinum	14	0.17	3.6	0.6	4.2
Solidago canadensis	6	0.66	1.5	2.5	4.0
Bidens frondosa	12	0.21	3.0	0.2	3.2
Panicum lanuginosum	10	0.15	2.5	0.6	3.1
Boehmeria cylindrica	10	0.05	2.5	0.2	2.7
Conyza canadensis	10	0.05	2.5	0.2	2.7
Polygonum punctatum	8	0.04	2.0	0.2	2.2
Potentilla simplex	6	0.08	1.5	0.3	1.8
Nyssa sylvatica	6	0.08	1.5	0.3	1.8
Vaccinium angustifolium	2	0.30	0.5	1.1	1.6
Lycopus sp.	6	0.03	1.5	0.1	1.6
Rubus flagellaris	4	0.12	1.0	0.5	1.5
Rubus occidentalis	4	0.12	1.0	0.5	1.5
Agrostis scabra	4	0.02	1.0	0.1	1.1
Others (15 species)	--	--	8.0	1.4	9.4
Totals			100.0	100.0	200.0
Average bare ground		70.80			

APPENDIX 1

The vascular taxa encountered and collected at the Hooper Branch Savanna Nature Preserve are listed below by major groups, Pteridophytes (ferns and fern-allies) and Spermatophytes (seed plants), the latter divided into Monocots and Dicots. The families, genera, and species are alphabetically arranged within each group. Non-native species are indicated by an asterisk (*). After the binomial and authority, the communities where the species was observed is given (1 = sand flatwoods, 2 = dry-mesic sand prairie, 3 = dry sand prairie, 4 = dry-mesic sand savanna, 5 = dry sand savanna, 6 = cultural). Following the community number(s), collecting numbers preceded by the initial of the collector's name are given (E for John E. Ebinger, Ev for Robert A. Evers, F for Mary A. Feist, and P for Loy R. Phillippe).

PTERIDOPHYTES

ASPLENIACEAE

Athyrium filix-femina (L.) Mertens var. *angustum* (Willd.) G. Lawson: 6; P 33691
Onoclea sensibilis L.: 1, 6; F 1137

DENNSTAEDTIACEAE

Pteridium aqualinum (L.) Kuhn var. *latiusculum* (Desv.) Underw.: 4, 6; F 952

EQUISETACEAE

Equisetum arvense L.: 6; P 32922
Equisetum laevigatum A. Br.: 4, 5; P 33118

OPHIOGLOSSACEAE

Botrychium dissectum Sprengel: 6; F 1160

OSMUNDACEAE

Osmunda cinnamomea L.: 1; P 32915
Osmunda regalis L. var. *spectabilis* (Willd.) Gray: 1;. P 32901

THELYPTERIDACEAE

Thelypteris palustris Schott.: 1, 6; F 1140

SPERMATOPHYTES: ANGIOSPERMS

MONOCOTS

ALISMACEAE

Alisma plantago-aquatica L. var. *parviflora* (Pursh) Torrey: 6; F 1148

COMMELINACEAE

Commelina erecta L.: 4, 5; P 33222, P 33518
Tradescantia ohiensis Raf.: 2, 3, 4, 5; P 33113

CYPERACEAE

Carex bebbii Olney: 6; P 33137
Carex bicknellii Britton in Britton & Brown: 4; P 33146
Carex cumulata (L. Bailey) Mackenzie: 6; F 1156
Carex emmonsii Dewey: 1, 4, 5, 6; P 32902
Carex haydenii Dewey: 1; P 32907
Carex meadii Dewey: 4; P 32890
Carex muhlenbergii Schk.: 4, 5; P 32885
Carex pensylvanica Lam.: 2, 3, 4, 5; P 32873
Carex scoparia Schkuhr in Willd.: 6; F 951, F 962, F 1143
Carex suberecta (Olney) Britton: 1; P 33243
Carex swanii (Fernald) Mackenzie: 1, 4, 6; P 33131
Carex tetanica Schk.: 1; P 32940
Carex umbellata C. Schkuhr. ex Willd.: 4, 6; P 32936
Cyperus filiculmis Vahl: 3, 4, 5; P 33129
Cyperus filiculmis Vahl ssp. *filiculmis* X *C. schweinitzii* Torrey: 4; P 33259
Cyperus schweinitzii Torrey: 4, 5; P 33510
Cyperus strigosus L.: 6; F 1147
Rhynchospora capitellata (Michx.) Vahl: 6; P 33426
Scleria triglomerata Michx.: 2, 3; P 33492
Scirpus cyperinus (L.) Kunth.: 6; P 33685
Scirpus tabernaemontanii K.C. Gmel.: 6; Ev 102868

IRIDACEAE

Iris germanica L.: 1, 6; P 33032
Sisyrinchium albidum Raf.: 4, 5; P 32872

JUNCACEAE

Juncus acuminatus Michx.: 6; P 33423
Juncus dudleyi Wieg.: 4, 5, 6; P 33228, P 33415
Juncus marginatus Rostk.: 6; P 33427
Juncus tenuis Willd.; 1, 4, 6; P 33229

LILIACEAE

Asparagus officinalis L.: 6; F 965
Hypoxis hirsuta (L.) Coville: 4, 5; P 32910
Lilium michiganense Farw.: 1, 6; P 32900
Polygonatum commutatum (Schult.) A. Dietr.: 4, 5; F 948
Smilacina racemosa (L.) Desf.: 4, 5; P 33756, P 33031
Smilacina stellata (L.) Desf.: 4, 5; P 32880, F 1174

ORCHIDACEAE

Platanthera lacera (Michx.) G. Don: 1, 6; P 33246
Spiranthes cernua (L.) Rich.: 6; P 33762

POACEAE

Agropyron repens (L.) Beauv.: 6; P 33253
Agrostis alba L.: 1, 6; P 33252
Agrostis hyemalis (Walt.) BSP.: 4, 5, 6; P 33120
Agrostis scabra Willd.: 1, 4, 5, 6; F 1169
Alopecurus carolinianus Walt.: 6; P 32937
Andropogon gerardii Vitman: 2, 3, 4, 5, 6; P 33496
Aristida intermedia Scribn. & Ball: 3, 6; F 1134
Aristida purpurascens Poir. in Lam.: 4, 5; P 33516
Aristida tuberculosa Nuttall: 3, 4; F 1122
Boutelous curtipendula (Michx.) Torrey: 4; F 1164
**Bromus inermis* Leyss.: 6; P 33133
**Bromus japonicus* Murray: 6; P 33134
**Bromus tectorum* L.: 6; P 32881
Calamagrostis canadensis (Michx.) Beauv.: 1; P 33239
Cenchrus longispinus (Hack.) Fernald: 6; P 33432
**Dactylis glomerata* L.: 6; F 957
Digitaria filimormis (L.) Koel.: 5, 6; P 33678
Digitaria ischaemum (Schreber) Muhl.: 6; F 1161
Echinochloa muricata (P. Beauv.) Fernald var. *muricata*: 6; F 1166
Elymus canadensis L.: 3, 4, 5; P 33512
Eragrostis spectabilis (Pursh) Steud.: 3, 4, 6; P 33507
**Festuca elatior* L.: 6; P 33132

Glyceria septentrionalis Hitchcock: 6; F 950
Koeleria cristata (L.) Pers.: 2, 3, 4, 5; P 33067
Leersia virginica Willd.: 1; P 33499
Leptoloma cognatum (Schult.) Chase: 3, 4, 5, 6; P 33409
Muhlenbergia mexicana (L.) Trin.: 1; P 33498
Panicum lanuginosum Ell. var. *lindheimeri* (Nash) Fernald: 1, 6; P 33241
Panicum oligosanthes Schult.var. *oligosanthes*: 2, 3, 4, 5; P 33068
Panicum perlongum Nash: 4; P 33147
Panicum villosissimum Nash: 4, 5, 6; P 33024
Panicum virgatum L.: 2, 3, 4, 5, 6; P 33410
Paspalum ciliatifolium Michx. var. *muhlenbergii* (Nash) Fernald: 6; F 1181
Paspalum bushii Nash in Britton: 2, 3, 4, 5, 6; P 33517
Phalaris arundinacea L.: 6; P 33138
**Poa annua* L.: 6; P 32938
**Poa compressa* L.: 4, 5, 6; P 33143
**Poa pratensis* L.: 2, 3, 4, 5, 6; P 32893
Schizachyrium scoparium (Michx.) Nash: 2, 3, 4, 5; site record only
**Setaria faberi* Herrm.: 6; P 33445
**Setaria viridis* (L.) Beauv. var. *major* (Goudin) Pospichal: 4, 6; P 33513.2
**Setaria viridis* (L.) Beauv. var. *viridis*: 4, 6; P 33513.1
Sorghastrum nutans Nash: 2, 3, 4, 5, 6; F 1153
Spartina pectinata Link.: 1; P 33695
Sphenopholis obtusata (Michx.) Scribn. var. *major* (Torrey) Erdman: 6; P 33139
Sporobolus clandestinus (Biehler) A. Hitchcock: 2, 3, 4, 5; F 1127
Sporobolus cryptandrus (Torrey) Gray: 3, 4, 5; F 1123, P 33679
Sporobolus heterolepis (Gray) Gray: 4; F 1163
Stipa spartea Trin.: 2, 4, 5; P 33066
Tridens flavus (L.) Hitchcock: 2, 3, 4, 5; P 33490
Triplasis purpurea (Walt.) Chapm.: 4, 5; P 33508
Vulpia octoflora (Walter) Rydb.: 4, 5, 6; P 32877

DICOTS

AMARANTHACEAE

Froelichia floridana (Nuttall) Moq.: 2, 3, 4, 5, 6; P 33418

ANACARDIACEAE

Rhus copallina L.: 1, 4, 5, 6; P 33444
Rhus glabra L.: 2, 3, 4, 5; P 33672
Rhus typhina L: 2, 3, 4, 5, 6; F 966

APIACEAE

**Daucus carota* L.: 6; F 1145
Eryngium yuccifolium Michx.: 2; P 33442
Sanicula canadensis L.: 6; F 1179

APOCYNACEAE

Apocynum sibiricum Jacq.: 1, 6; P 33238

AQUIFOLIACEAE

Ilex verticillata (L.) Gray: 1; P 33249

ASCLEPIADACEAE

Asclepias amplexicaulis Sm.: 4; P 33123
Asclepias incarnata L.: 6; P 33424
Asclepias syriaca L.: 6; F 1171
Asclepias tuberosa L.: 4; P 33236
Asclepias verticillata L.: 4; P 33227

ASTERACEAE

**Achillea millefolium* L.: 2, 3, 4, 5, 6; P 33114
Ambrosia artemisiifolia L.: 1, 2, 3, 4, 5, 6; P 33506
Ambrosia trifida L.: 6; F 1178
Antennaria plantaginifolia (L.) Richardson: 1, 2, 3, 4, 5; P 32879
Aster dumosus L.: 4, 5; P 33766
Aster linariifolius L.: 3, 4, 5; F 1126
Aster oolentangiensis Riddell: 4, 5; P 33755
Aster pilosus Willd.: 2, 3, 4, 5, 6; P 33759
Aster umbellatus Mill.: 1; P 33500
Bidens frondosa L.: 1; site record only
Cirsium discolor (Muhl.) Spreng.: 4, 6; F 1154
Conyza canadensis (L.) Cronq.: 1, 2, 3, 4, 5, 6; F 1132
Coreopsis lanceolata L.: 4, 5, 6; F 971
Coreopsis palmata Nuttall: 4, 5 , 6; P 33223
Coreopsis tripteris L.: 3, 4, 6; F 1180
Erechtites hieracifolia (L.) Raf.: 1, 6; F 1168
Erigeron annuus (L.) Pers.: 1, 6; P 33144
Erigeron strigosus Muhl.: 2, 3, 4, 5; P 33121
Eupatorium altissimum L.: 4, 5, 6; P 33758
Eupatorium perfoliatum L.: 1, 6; P 33686
Eupatorium serotinum Michx.: 1, 6; F 1128
Euthamia graminifolia (L.) Salisb.: 2, 3, 4, 5; P 33765
Galinsoga quadriradiata R. & P.: 6; P 33693
Gnaphalium obtusifolium L.: 4, 5, 6; F 1130
Helianthus divaricatus L.: 2, 3, 4, 5; P 33437
Helianthus mollis Lam.: 3, 4; P 33489
Hieracium gronovii L.: 4, 5, 6; P 33414
Hieracium scabrum Michx.: 3, 4, 5; F 1162
Hymenopappus scabiosaeus L' Hér: 4, 6; P 33023
Krigia biflora (Walt.) Blake: 2, 4, 5; P 32894
Krigia virginica (L.) Willd.: 4, 5; P 32875
Lactuca canadensis L.: 1, 3, 4, 6; F 1158
Liatris aspera Michx.: 2, 3, 4, 5; P 33677

Liatris spicata (L.) Willd.: 6; F 1152
Parthenium integrifolium L.: 1, 4, 5; P 33240
Rudbeckia hirta L.: 2, 3, 4, 5, 6; F 946
Senecio plattensis Nuttall: 6; P 32918
Solidago canadensis L.: 1, 2, 3, 4, 5, 6; P 33754
Solidago gigantea Aiton: 1, 6; P 33683
Solidago missouriensis Nuttall: 6; P 33435
Solidago nemoralis Aiton: 2, 3, 4, 5, 6; P 33671
Solidago speciosa Nuttall: 4; P 33752
Sonchus arvensis L. var. *glabrescens* (Guenther) Grab. & Wimmer: 6; P 33429
**Taraxacum officinale* Weber: 1, 4, 12; P 32896
Tragopogon pratensis L.: 3, 6; P 33130
Vernonia gigantea (Walter) Trel.: 1, 4, 5, 6; P 33440, P 33764

BETULACEAE

Corylus americana Walt.: 4, 5, 6; P 33443

BORAGINACEAE

Hackelia virginiana (L.) I.M. Johnston: 6; P 33681
Lithospermum carolinense (Walter) MacMillan: 3, 4, 5; P 32876

BRASSICACEAE

Arabis glabra (L.) Bernh.: 4, 6; F 967
Arabis lyrata L.: 4; P 33125
Capsella bursa-pastoris (L.) Medik.: 6; P 32932
Cardamine parviflora L.: 6; P 32934
Cardamine pensylvanica Muhl.: 1; P 33026
Draba reptans (Lam.) Fernald: 6; P 32933
Lepidium virginicum L.: 2, 3, 4, 5, 6; P 32895
Rorippa islandica (Oeder) Borbas var. *fernaldiana* Butt. & Abbe: 6; P 33140

CAMPANULACEAE

Lobelia inflata L.: 4, 5, 6; F 1151
Lobelia spicata Lam. var. *leptostachys* (A. DC.) Mack. & Bush: 4, 5; P 33258
Triodanis perfoliata (L.) Nieuwl. var. perfoliata: 4, 5; P 33116

CAPRIFOLIACEAE

**Lonicera maackii* (Rupr.) Maxim.: 6; P 32926
Sambucus canadensis L.: 6; F 959
Viburnum opulus L.: 6; P 32925

CARYOPHYLLACEAE

**Arenaria serpyllifolia* L.: 6; P 32912
**Cerastium vulgatum* L.: 6; P 32917
**Dianthus armeria* L.: 6; P 33235
**Holosteum umbellatum* L.: 6; P 32883
**Lychnis alba* Mill.: 6; F 945
Paronychia canadensis (L.) Wood: 1, 4, 6; P 33505
**Saponaria officinalis* L.: 6; P 33257
Silene antirrhina L.: 6; P 32927
**Silene cserei* Baumg.: 6; P 33218
Silene stellata (L.) Aiton f.: 4, 5; P 33434
**Stellaria media* (L.) Vill.: 6; P 32930

CHENOPODIACEAE

Chenopodium desiccatum A. Nels.: 2, 3, 4, 5; P 33514
Cycloloma atriplicifolium (Spreng.) Coult.: 6; F 1184

CISTACEAE

Helianthemum bicknellii Fernald: 4, 5; P 33689
Helianthemum canadense (L.) Michx.: 4, 5; P 33021, P 33763
Lechea minor L.: 2, 4; P 33494, P 33757.2
Lechea pulchella Raf.: 2; P 33495
Lechea villosa Ell.: 3, 4; F 1131, P 33757.1

CLUSIACEAE

Hypericum adpressum Barton: 6; P 33422
Hypericum gentianoides (L.) BSP: 3, 6; F 1129
Hypericum majus (Gray) Britt.: 6; P 33421
Hypericum mutilum L.: 6; F 1135
**Hypericum perforatum* L.: 6; P 33255

CONVOLVULACEAE

Calystegia sepium (L.) R. Br.: 6; P 33145

CORNACEAE

Cornus obliqua Raf.: 6; F 960

ELAEAGNACEAE

Elaeagnus umbellata Thunb.: 6; P 32921

ERICACEAE

Gaylussacia baccata (Wang.) K. Koch: 1, 4; P 32906
Vaccinium angustifolium Aiton: 1, 4; P 32905
Vaccinium corymbosum L.: 6; P 33141

EUPHORBIACEAE

Acalypha gracilens Gray: 1, 4; P 33816
Acalypha rhomboidea Raf.: 6; P 33692
Chamaesyce geyeri (Engelman & Gray) Small: 3, 4; F 1120
Chamaesyce maculata (L.) Small: 6; P 33675
Chamaesyce nutans (Lag.) Small: 6; P 33676
Croton glandulosus L.: 4; P 33509
Euphorbia corollata L.: 2, 3, 4, 5; P 33122, P 33493
Poinsettia dentata (Michx.) Kl. & Garcke: 4, 5, 6; P 33511

FABACEAE

Amorpha canescens Pursh: 2, 3, 4, 5; P 33232
Apios americana Medic.: 1, 4, 5; P 33753
Baptisia lactea (Raf.) Thieret: 4; P 33237
Baptisia leucophaea Nuttall: 4; P 33228
Cassia fasciculata Michx.: 2, 3, 4, 5, 6; P 33416
Cassia nictitans L.: 2, 3, 4, 5, 6; P 33408
Desmodium obtusum (Muhl.) DC.: 3, 4; F 1124, P 33673
Desmodium paniculatum (L.) DC.: 6; P 33687
Desmodium sessilifolium (Torrey) Torrey & Gray: 3, 4; F 1121
Lespedeza capitata Michx.: 2, 3, 4, 5, 6; F 1119
Lespedeza hirta (L.) Hornem.: 3, 4; F 1183
Lespedeza x longifolia DC.: 4; F 1173
Lespedeza virginica (L.) Britt.: 4, 5, 6; F 1157
Medicago lupulina L.: 6; F 970
Melilotus alba Medik.: 6; P 33219
Tephrosia virginiana (L.) Pers.: 3, 4, 5; P 33226
Vicia villosa Roth: 6; F 944

FAGACEAE

Quercus alba L.: 1, 4, 5; P 33674
Quercus coccinea Muenchh.: 1; P 33248
Quercus palustris Muenchh.: 1; site record only
Quercus velutina Lam.: 2, 3, 4, 5, 6; F 1159

GENTIANACEAE

Bartonia virginica (L.) BSP. 1; P 33439
Gentiana saponaria L.: 2; P 33818

LAMIACEAE

Lycopus americanus Muhl.: 1; P 33502
Lycopus uniflorus Michx.: 6; F 1136
Monarda fistulosa L.: 4; P 33438
Monarda punctata L.: 2, 3, 4, 5, 6; P 33413
Nepeta cataria L.: 6; P 33694
Physostegia virginiana (L.) Benth.: 6; P 33611
Prunella vulgaris L.: 6; P 33612
Pycnanthemum virginianum (L.) Dur. & Jacks.: 1, 6; P 33441
Scutellaria leonardii Epline: 4, 5; F 956
Stachys tenuifolia Willd. var. *hispida* (Pursh) Fernald: 6; F 1142

LAURACEAE

Sassafras albidum (Nuttall) Nees: 1, 4, 5, 6; P 32923

MALVACEAE

**Abutilon theophrastii* Medik.: 6; F 1125

MELASTOMATACEAE

Rhexia virginica L.: 6; P 33419

MOLLUGINACEAE

Mollugo verticillatus L.: 4, 5, 6; P 33412

NYSSACEAE

Nyssa sylvatica Marshall: 1; P 33245

ONAGRACEAE

Circaea lutetiana L. ssp. *canadensis* (L.) Aschers & Magnus: 1; P 33497
Epilobium coloratum Biehler: 6; F 1146, F 1177
Ludwigia alternifolia L.: 6; F 1141
Oenothera biennis L.: 6; F 1150
Oenothera laciniata Hill; 6; F 953
Oenothera rhombipetala Nuttall: 4, 5, 6; P 33433

OXALIDACEAE

Oxalis dillenii Jacq.: 4, 5, 6; P 32884

PHYTOLACCACEAE

Phytolacca americana L.: 4, 5, 6; F 1175

PLANTAGINACEAE

Plantago aristata Michx.: 6; P 33250
Plantago patagonica Jacq.: 4, 6; F 973.1
Plantago rugelii Decne.: 4, 6; P 33436

POLEMONIACEAE

Phlox bifida Beck: 2, 3, 4, 5; P 32874
Phlox glaberrima L.: 1; P 33251

POLYGALACEAE

Polygala polygama Walt.: 2, 3, 4, 5; P 33115
Polygala sanguinea L.: 6; P 33420

POLYGONACEAE

Polygonella articulata (L.) Meisn.: 4, 6; P 33767
Polygonum careyi Olney: 6; F 1138, F 1185
Polygonum hydropiper L.: 6; F 1149
Polygonum lapathifolium L.: 6; F 1165
Polygonum opelousanum Riddell: 1; P 33501
Polygonum pensylvanicum L.: 6; F 1155
Polygonum punctatum Ell.: 1, 6; F 1139
Polygonum scandens L.: 6; P 33682
Polygonum tenue Michx.: 4, 5; P 33417
**Rumex acetosella* L.: 2, 3, 4, 5, 6; P 32919
**Rumex crispus* L.: 6; P 33254

PORTULACACEAE

Claytonia virginica L.: 4, 5; P 32891
Talinum rugospermum Holz.: 4, 5; P 33411, P 33519, F 1133, F 1133.1, F 1172

PRIMULACEAE

Lysimachia quadriflora Sims: 6; P 33431

PYROLACEAE

Monotropa hypopithys L.: 1; F 1182

RANUNCULACEAE

Anemone cylindrica Gray: 4, 5; P 33117
Ranunculus abortivus L.: 1, 4, 5, 6; P 32928
Ranunculus sceleratus L.: 6; F 963

RHAMNACEAE

Ceanothus americanus L.: 4; P 33234

ROSACEAE

Aronia melanocarpa (Michx.) Ell.: 6; P 32898
Fragaria virginiana Duchesne: 4, 6; P 32892
Malus pumila Mill.: 6; P 33680
Potentilla simplex Michx.: 1, 4, 5, 6; P 32904
Prunus americana Marsh.: 4, 5; site record only
Prunus serotina Ehrh.: 1, 2, 3, 4, 5, 6; P 32882
Rosa carolina L.: 2, 3, 4, 5; P 33119
Rubus allegheniensis Porter: 1, 2, 3, 4, 5, 6; P 32920
Rubus flagellaris Willd.: 1, 2, 3, 4, 5, 6; P 32903
Rubus hispidus L.: 1, 4, 6; P 33127
Rubus occidentalis L.: 1, 4, 6; P 32899
Rubus schneideri Bailey: 1; F 969
Spiraea tomentosa L.: 1, 6; P 33430

RUBIACEAE

Galium aparine L.: 1, 6; P 32916
Galium circaezans Michx.: 4, 5, 6; F 961
Galium pilosum Aiton: 4, 5; P 33224
Hedyotis caerulea (L.) Hook: 1; P 32909

SALICACEAE

Salix discolor Muhl.: 6; P 32935
Salix exigua Nuttall: 6; P 32924
Salix humilis Marshall: 2, 3, 4, 5, 6; P 32911
Salix nigra Marshall: 6; P 33135

SANTALACEAE

Comandra umbellata (L.) Nuttall: 2, 3, 4, 5; P 32889

SCROPHULARIACEAE

Aureolaria flava (L.) Farw.: 1; P 33696
Aureolaria pedicularia L.: 3, 4, 5; P 33407

Linaria canadensis (L.) Dum.-Cours.: 2, 3, 4, 5; P 32886
Lindernia dubia (L.) Pennell: 1, 6; F 1167
Mimulus ringens L.: 1, 6; F 1144
Pedicularis canadensis L.: 4, 5, 6; P 32897
Scrophularia lanceolata Pursh: 4, 5; P 33029
**Verbascum thapsus* L.: 6; F 1170
**Veronica arvensis* L.: 6; P 32929
Veronica peregrina L.: 6; P 32931
Veronicastrum virginicum (L.) Farw.: 1, 2; P 33491

SOLANACEAE

Physalis virginiana Mill.: 4, 5, 6; P 33124, P 33690
Solanum carolinense L.: 6; F 972
**Solanum dulcamara* L.: 1, 6; F 958
Solanum ptycanthum Dunal: 1, 4, 5, 6; P 33515

URTICACEAE

Boehmeria cylindrica (L.) Sw.: 1; P 33503
Parietaria pensylvanica Muhl.: 1, 4, 5, 6; F 964, P 33504
Pilea pumila (L.) Gray: 1; site record only
Urtica dioica L.: 6; F 1176

VERBENACEAE

Verbena hastata L.: 6; P 33428

VIOLACEAE

Viola lanceolata L.: 1, 6; P 32908
Viola pedata L.: 3, 4, 5; P 32887
Viola primulifolia L.: 1, 6; P 32939, P 33425
Viola rafinesquii Greene: 6; P 33022
Viola sagittata Aiton: 4; P 32878

VITACEAE

Parthenocissus quinquefolia (L.) Planch.: 4, 5, 6; P 33761
Vitis riparia Michx.: 1, 4, 5, 6; P 33760

APPENDIX II. TREE AND LARGE SHRUB ENCROACHMENT AT HOOPER BRANCH SAVANNA NATURE PRESERVE, IROQUOIS COUNTY, ILLINOIS

Aerial photographs from 1940, 1954, 1988, and 1999 were digitized to demonstrate woody encroachment (tree & large shrub) at the Hooper Branch Savanna Nature Preserve (HBSNP), Iroquois County, Illinois. These aerial photographs were borrowed from the University of Illinois Map Library and scanned with a Microtek ScanMaker. Four stratified random 5 hectare sites, approximately 10.256% of the HBSNP (Figure 3), were interpreted and then digitized using ARC/INFO (Table 14).

Data interpretation was difficult depending on the quality and resolution of the original photos, problems with registering the photos, and problems with the interpretation of the data, specifically differentiating between trees and other features which show up as black or dark gray such as shadows and wet areas. The 1940 and 1954 aerial photographs were flown in July while the 1988 and 1999 aerials were flown in April.

In 1940 approximately 63.9 ha or 32.75% of the present area was covered by trees and large shrubs (Table 14). These species have increased dramatically, in 1954 there was approximately 88.53 ha or 45.4% cover, in 1988 approximately 105.39 ha or 54.15%, and in 1999 approximately 113.49 ha or 58.2%. This is a dramatic increase of 49.63 ha in 59 years. Trees and large shrubs, from 1940 (32.75% cover) to 1999 (58.2% cover), have significantly increased at the HBSNP.

Table 14. Cover (ha) of trees and large shrubs within 15, 5 hectare, stratified random sites digitized from aerial photography during four years (1940, 1954, 1988, & 1999) within Hooper Branch Savanna Nature Preserve, Iroquois County, Illinois.

5 hectare sites	1940 (ha)	1954 (ha)	1988 (ha)	1999 (ha)
1	1.56	1.49	3.93	3.29
2	2.43	2.77	1.54	2.39
3	0.95	2.37	2.28	3.25
4	1.61	2.45	3.08	2.71
Totals	6.55	9.08	10.83	11.64

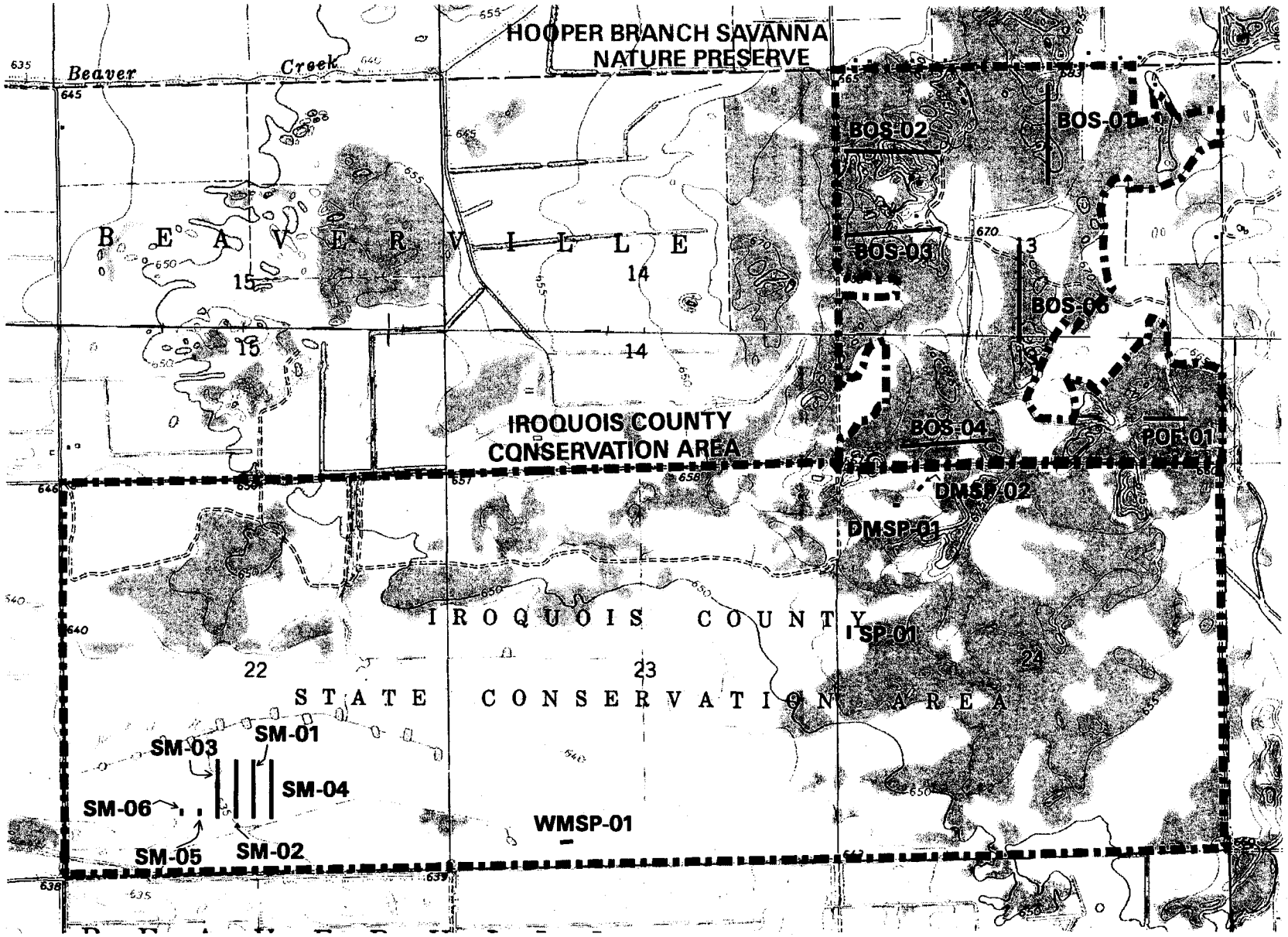


Figure 1. Iroquois County Conservation Area and Hooper Branch Savanna NP, Iroquois County, Illinois Location of transect lines.

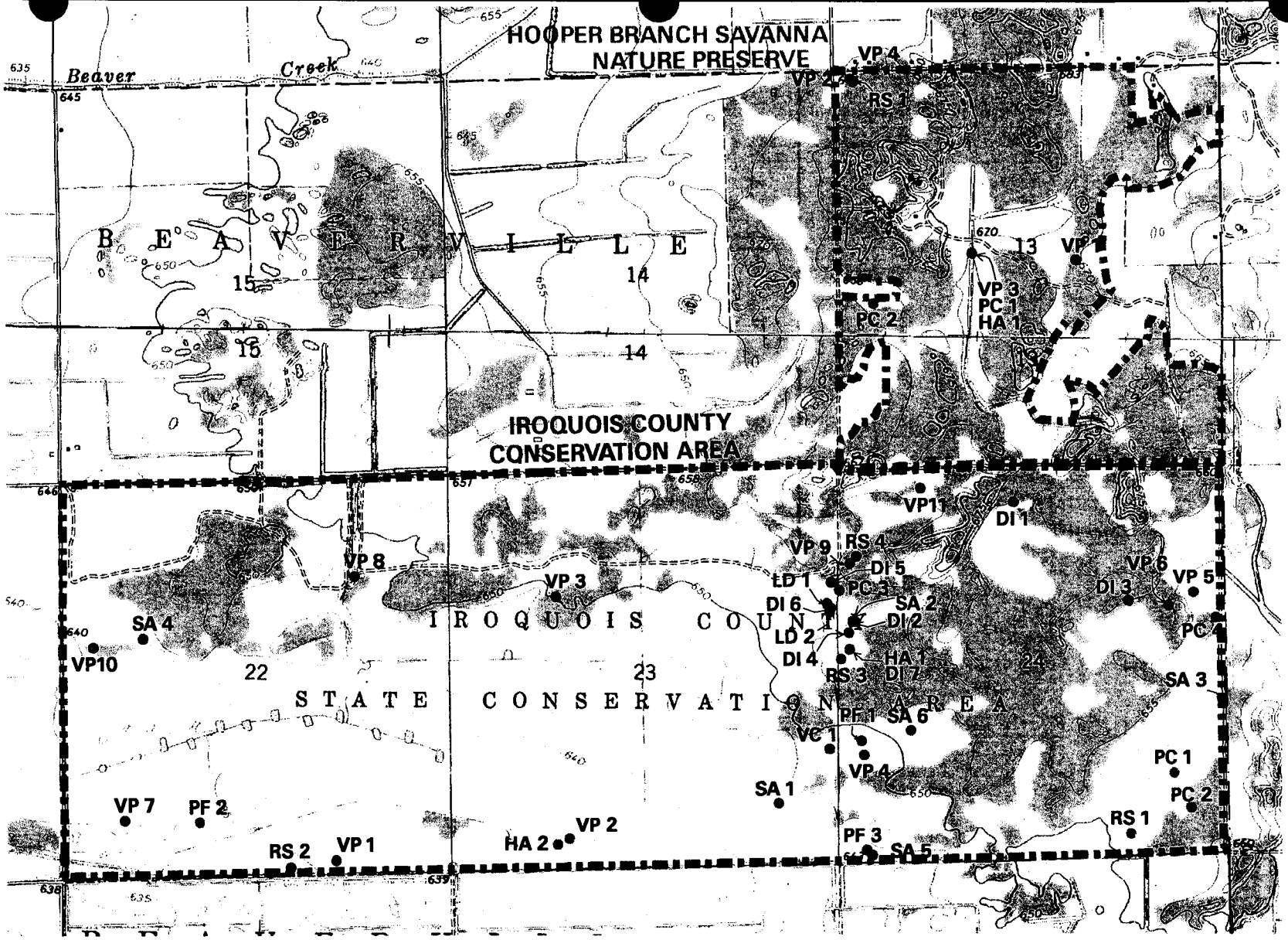


Figure 2. Iroquois County Conservation Area and Hooper Branch Savanna NP, Iroquois County, Illinois. Location of endangered and threatened plant species.

DI Drosera intermedia
HA Hypericum adpressum
LD Lycopodium dendroideum
PC Polygonum careyi
PF Platanthera flava var. herbiola
RS Rubus setosa
SA Sisyrinchium atlanticum
VC Veronica scutellata
VP Viola primulifolia

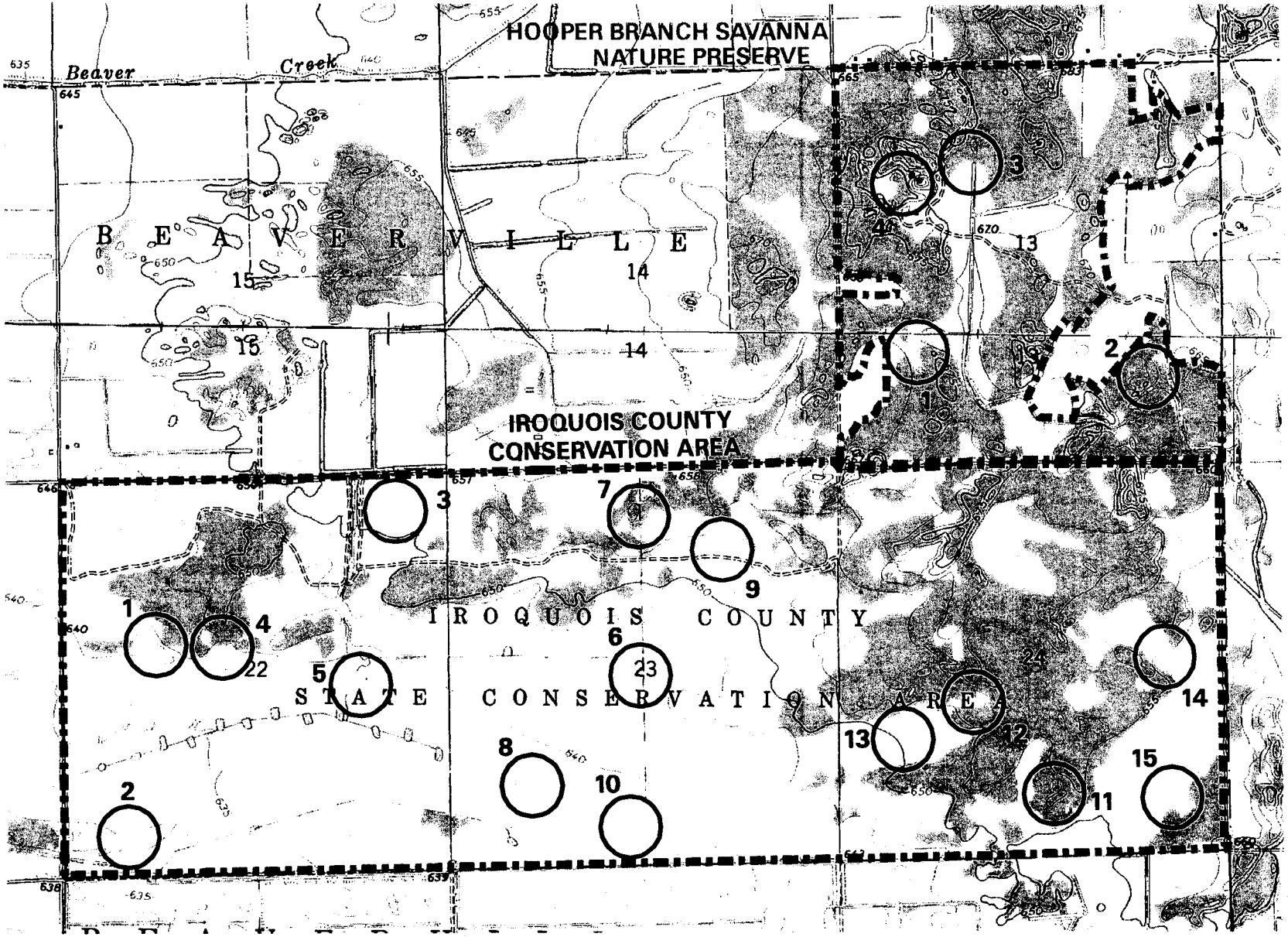
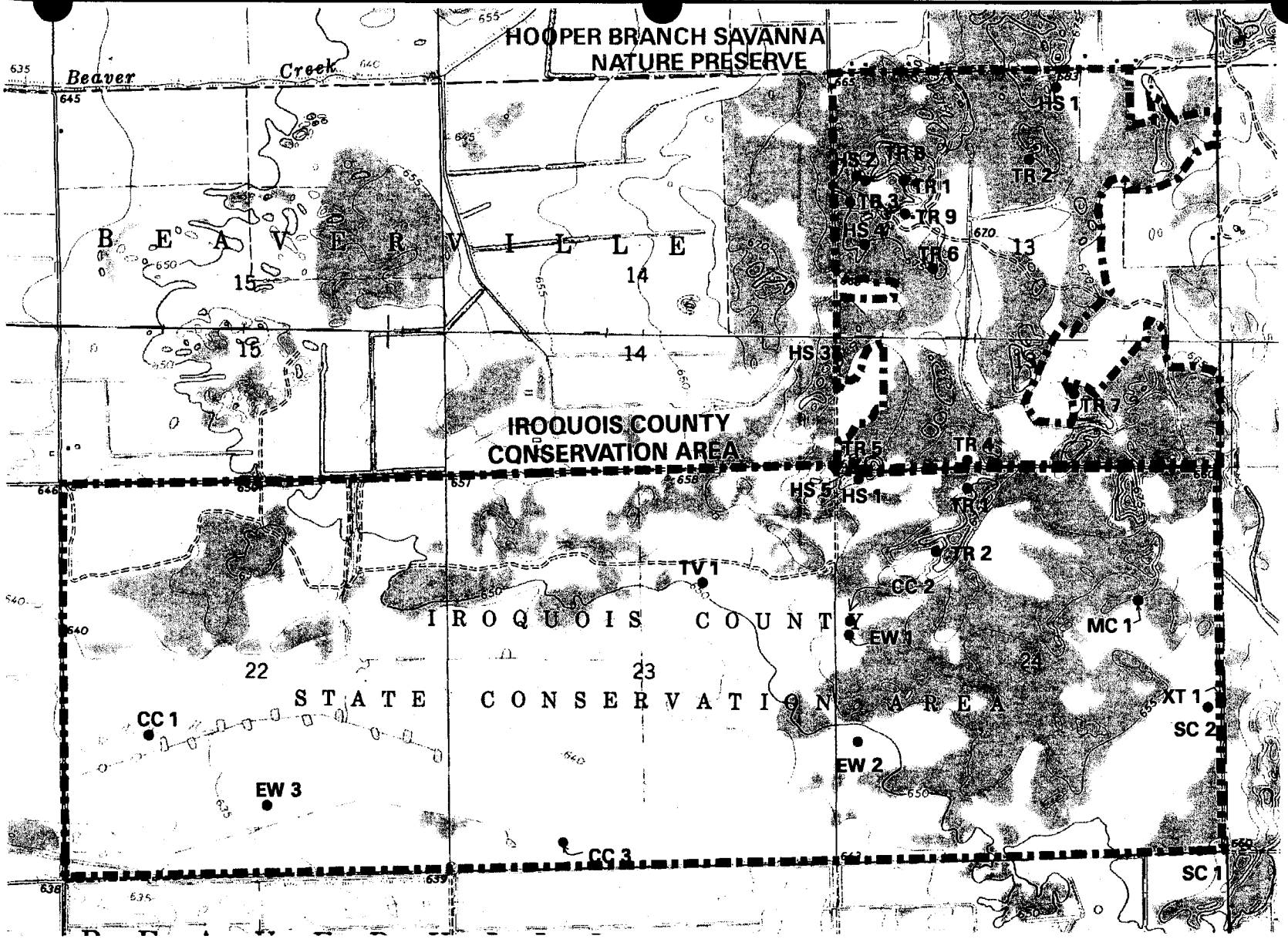


Figure 3. Iroquois County Conservation Area and Hooper Branch Savanna NP, Iroquois County, Illinois
Location of 5 hectare sampling sites.



Iroquois County Conservation Area and Hooper Branch Savanna NP, Iroquois County, Illinois. Location of additional plants of special interest.

CC Carex crawei
EW Eleocharis wolfii
HS Hymenoppapus scabiosaeus
MC Maianthemum canadense
SC Scleria pauciflora
TR Talinum rugospermum
TV Toxicodendron vernix
XT Xyris torta

Iroquois County Conservation Area
Approximate Location of Transects

I. Sedge Meadow

Transect #	Latitude & Longitude				Transect Length	Relative Position
SM-01.	40°	59'	03.00"	North	250 meters	North
	-087	35'	20.30"	West		
	40°	58'	55.20"	North		South
	-087°	35'	20.30"	West		
SM-02.	40°	59'	03.00"	North	250 meters	North
	-087°	35'	23.50"	West		
	40°	58'	55.20"	North		South
	-087°	35'	23.50"	West		
SM-03.	40°	59'	03.00"	North	250 meters	North
	-087°	35'	26.60"	West		
	40°	58'	55.20"	North		South
	-087	35'	26.60"	West		
SM-04.	40°	59'	03.00"	North	250 meters	North
	-087°	35'	29.90"	West		
	40°	58'	55.20"	North		South
	-087°	35'	29.90"	West		
SM-05	40°	58'	56.17"	North	35 meters	North
	-087°	35'	33.20"	West		
	40°	58'	55.20"	North		South
	-087°	35'	33.20"	West		
SM-06	40°	58'	56.17"	North	35 meters	North
	-087°	35'	36.50"	West		
	40°	58'	55.20"	North		South
	-087°	35'	36.50"	West		

II. Wet-Mesic Sand Prairie

WMSP-01.	40°	58'	52.26"	North	50 meters	West
	-087°	34'	29.70"	West		
	40°	58'	52.40"	North		East
	-087°	32'	27.92"	West		

III. Shrub Prairie

SP-01.	40°	59'	21.18"	North	50 meters	North
	-087°	33'	37.92"	West		
	40°	59'	19.56"	North		South
	-087°	33'	37.92"	West		

IV. Dry-Mesic Sand Prairie

DMSP-01.	40°	59'	37.14"	North	25 meters	East
	-087°	33'	29.04"	West		
	40°	59'	37.14'	North		West
	-087°	33'	30.17"	West		
DMSP-02.	40°	59'	39.78"	North	25 meters	Southwest
	-087°	33'	25.08"	West		
	40°	59'	39.38"	North		
	-087°	33'	25.58"	West		

Location of Illinois Threatened & Endangered Plants
Iroquois County Conservation Area
Iroquois County, Illinois

Voucher specimen collections are by: F (Mary Ann Feist), and P (Loy R. Phillippe). Populations not vouchered are designated by n.v.

Scientific Name	Common Name	Voucher #'s
Drosera intermedia Hayne	Narrow-leaved Sundew	
01. 40° 59' 38.04" North Latitude -087° 33' 09.06" West Longitude		P 33614
02. 40° 59' 22.08" North Latitude -087° 33' 37.50" West Longitude		P 33405
03. 40° 59' 25.14" North Latitude -087° 32' 48.54" West Longitude		P 33487
04. 40° 59' 20.58" North Latitude -087° 33' 38.10" West Longitude		n.v.
05. 40° 59' 27.20" North Latitude -087° 33' 41.30" West Longitude		n.v.
06. 40° 59' 23.80" North Latitude -087° 33' 41.30" West Longitude		n.v.
07. 40° 59' 18.36" North Latitude -087° 33' 37.98" West Longitude		n.v.
Hypericum adpressum Bart.	Shore St. John's Wort	
01. 40° 59' 18.36" North Latitude -087° 33' 37.98" West Longitude		F 1186
02. 40° 58' 52.26" North Latitude -087° 34' 29.70" West Longitude		n.v.
Lycopodium dendroideum Michx.	Ground Pine	
01. 40° 59' 24.42" North Latitude -087° 33' 42.00" West Longitude		P 33825
02. 40° 59' 23.28" North Latitude -087° 33' 41.52" West Longitude		n.v.

Platanthera flava (L.) Lindl. var. herbiola (R. Br.) Luer Tubercled Orchid

01.	40°	59'	06.06"	North	Latitude	P 33049
	-087°	33'	36.00"	West	Longitude	
02.	40°	58'	54.84"	North	Latitude	P 33061
	-087°	35'	33.12"	West	Longitude	
03.	40°	58'	51.72"	North	Latitude	F 986
	-087°	33'	34.80"	West	Longitude	

Polygonum careyi Olney — Carey's Heartsease

01.	40°	59'	02.25"	North	Latitude	P 33700
	-087°	32'	40.27"	West	Longitude	
02.	40°	58'	57.69"	North	Latitude	P 33477
	-087°	32'	37.20"	West	Longitude	
03.	40°	59'	26.16"	North	Latitude	F 1185
	-087°	33'	39.84"	West	Longitude	
04.	40°	59'	23.00"	North	Latitude	n.v.
	-087°	32'	33.00"	West	Longitude	

Rubus setosus Bigel. (= R. schneideri Bailey) — Bristly Blackberry

01.	40°	58'	54.12"	North	Latitude	P 33273
	-087°	32'	48.00"	West	Longitude	
02.	40°	58'	49.00"	North	Latitude	P 33221
	-087°	35'	17.00"	West	Longitude	
03.	40°	59'	17.10"	North	Latitude	F 990
	-087°	33'	39.48"	West	Longitude	
04.	40°	59'	30.72"	North	Latitude	n.v.
	-087°	33'	36.84"	West	Longitude	

Sisyrinchium atlanticum Bickn. — Eastern Blue-eyed Grass

01.	40°	58'	57.84"	North	Latitude	P 32959
	-087°	33'	50.40"	West	Longitude	
02.	40°	59'	22.08"	North	Latitude	P 32944
	-087°	33'	37.50"	West	Longitude	
03.	40°	59'	12.12"	North	Latitude	P 33398
	-087°	32'	29.70"	West	Longitude	

04.	40°	59'	19.08"	North	Latitude	F 984
	-087°	35'	43.38"	West	Longitude	
05.	40°	58'	51.06"	North	Latitude	F 987
	-087°	33'	33.84"	West	Longitude	
06.	40°	59'	07.62"	North	Latitude	n.v.
	-087°	33'	27.06"	West	Longitude	

Veronica scutellata L. — Marsh Speedwell

01.	40°	59'	05.10"	North	Latitude	P 32953
	-087°	33'	41.46"	West	Longitude	

Viola primulifolia L. — Primrose Violet

01.	40°	58'	50.00"	North	Latitude	P 33037
	-087°	35'	08.94"	West	Longitude	
02.	40°	58'	53.04"	North	Latitude	P 33040
	-087°	34'	27.60"	West	Longitude	
03.	40°	59'	25.08"	North	Latitude	P 33042
	-087°	34'	30.18"	West	Longitude	
04.	40°	59'	04.32"	North	Latitude	P 33052
	-087°	33'	35.34"	West	Longitude	
05.	40°	59'	26.28"	North	Latitude	P 33070
	-087°	32'	36.90"	West	Longitude	
06.	40°	59'	24.54"	North	Latitude	P 33071
	-087°	32'	41.40"	West	Longitude	
07.	40°	58'	55.02"	North	Latitude	P 33073
	-087°	35'	46.44"	West	Longitude	
08.	40°	59'	27.54"	North	Latitude	P 33641
	-087°	35'	05.88"	West	Longitude	
09.	40°	59'	29.76	North	Latitude	P 32942
	-087	33'	37.98"	West	Longitude	
10.	40°	59'	17.88"	North	Latitude	F 977
	-087°	35'	52.14"	West	Longitude	
11.	40°	59'	39.72"	North	Latitude	F 1370
	-087°	33'	25.50"	West	Longitude	

Location of Illinois Plants of Special Interest
Iroquois County Conservation Area
Iroquois County, Illinois

Voucher specimen collections are by: E (John E. Ebinger), F (Mary Ann Feist), and P (Loy R. Phillippe). Populations not vouchered are designated by n.v.

Scientific Name	Common Name	Voucher #'s
Carex crawei Dewey	Sedge	
01. 40° 59' 06.30" North Latitude -087° 35' 42.36" West Longitude		P 33072
02. 40° 59' 22.08" North Latitude -087° 33' 37.50" West Longitude		P 32949
03. 40° 58' 52.50" North Latitude -087° 34' 28.56" West Longitude		n.v.
Eleocharis wolfii Gray	Wolf's Spike Rush	
01. 40° 59' 20.22" North Latitude -087° 33' 37.62" West Longitude		P 33047
02. 40° 59' 06.06" North Latitude -087° 33' 36.00" West Longitude		P 33048
03. 40° 58' 57.18" North Latitude -087° 35' 21.30" West Longitude		P 33213
Hymenopappus scabiosaeus L'Hér	Old Plainsman	
01. 40° 59' 41.00" North Latitude -087° 33' 36.00" West Longitude		E 21282
Maianthemum canadense Desf.	False Lily-Of-The-Valley	
01. 40° 59' 25.14" North Latitude -087° 32' 46.50" West Longitude		P 33488

Scleria pauciflora Muhl. ex Willd. var. caroliniana (Willd.) Wood — Nut Rush

01.	40°	58'	50.46"	North	Latitude	P 33403
	-087°	32'	35.40"	West	Longitude	
02.	40°	59'	11.00"	North	Latitude	
	-087°	32'	34.00	West	Longitude	

Talinum rugospermum Holzinger — Flower-Of-An-Hour

01.	40°	59'	39.96"	North	Latitude	P 33619
	-087°	33'	16.74"	West	Longitude	
02.	40°	59'	31.50"	North	Latitude	P 33406
	-087°	33'	22.20"	West	Longitude	

Toxicodendron vernix (L.) Kuntze — Poison Sumac

01.	40°	59'	27.00"	North	Latitude	P 33619
	-087°	34'	03.72"	West	Longitude	

Xyris torta Sm. — Twisted Yellow-eyed Grass

01.	40°	59'	12.12"	North	Latitude	P 33399
	-087°	32'	29.70"	West	Longitude	