

FORT SCOTT NATIONAL HISTORIC SITE

PRAIRIE RESTORATION PROJECT 1996

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The main focus of Fort Scott National Historic Site (FSNHS) prairie restoration project for the summer of 1996 was the monitoring of the prairie sod transplants, the removal of exotic vegetation, and the removal of woody vegetation. Slide photo-documentation was taken of FSNHS restoration progress, prairie transplant success, and lepidoptera (butterfly) species noticed within the prairie units. The native forb seed that was collected in 1994 and 1995 was measured to determine the area to be planted.

SLIDE PHOTO-DOCUMENTATION

The prairie units at FSNHS were photographed to document the first year success of the 1995 prairie sod transplantation project, the exotics located on prairie units, development of prairie units, and the lepidoptera (butterfly) species noticed within the prairie units (see FSNHS Prairie Slides notebook). The majority of the slides were taken of the 1995 prairie sod transplantation in Unit A. These slides are located in the slide notebook under restoration projects (RP). The slides taken of Unit A coincide with the restoration project slides. Other slides of Unit A consist of a brief overview of the unit and the exotics present. Unit B slides also consist of an overview of the unit and the exotics present. Some of the exotics found in Unit B are located in the Exotics Found on Prairies (PE) section of the slide notebook. The slides of Unit C indicate the exotics found, examples of exotic removal, and prairie species located in the unit. Slides of Giant Ragweed, Trumpet Vine, and exotic woody species were added to the Exotics Found on Prairies (PE).

PRAIRIE SOD TRANSPLANTATION PROJECT

The focus of the prairie sod transplantation project for the summer of 1996 was to monitor and survey the success of the prairie species in the 1.43 acres that were transplanted in Unit A (MAP 1). The transplant section was surveyed to find the number of species that survived the transplant from the donor site. Also, to indicate the presence of exotic species and new native species. The transplant section was monitored to identify the progress of the native species throughout the summer.

KNOWN TRANSPLANTED NATIVE FORBS

The 1995 native forbs transplantation project of FSHNS indicated a great first year success rate in the growth of the transplanted species. Of the known transplanted native forbs, 74% of them were located in the Unit A transplantation section of FSNHS (MAP 1, TABLE 1). Of these native forbs that were located, Ashy Sunflower (Helianthus mollis), Field Pussy Toes (Antennaria neglecta), Hairy Wild Petunia (Ruellia humilis), Gray Headed Coneflower (Ratibida pinnata), White Prairie Clover (Petalostemum candidum), Whole Leaf Rosinweed (Silphium integrifolium), and Slender Mountain Mint (Pycnanthemum tenuifolium) were the most abundant. The most sensitive species, because there were only one or two plants located in the the transplantation unit, are Cat's Claw Sensitive Bair (Schrankia nutalii), Obedient Plant (Physostegia virginiana), Bracted Plantain (Plantago aristata), Wild Garlic (Achillea millefolium), Long-Bearded Hawkweed (Hieracium longipilum), and Tube Bearded Tongue (Penstemon

MAP 1: MAP OF FORT SCOTT NATIONAL HISTORIC SITE
 Prairie Units and Transplantation Area

Key

- Boundary of Prairie Units
- Boundary Line of Transplantation

LEGEND

- | | | | |
|-----|------------------------------|-----|---------------------------|
| 160 | ITEM NUMBER | 160 | PRICK PAVEMENT |
| 168 | HISTORIC STRUCTURE NUMBER | 168 | COTTONWOOD STONE PAVEMENT |
| ⊕ | QUICK COUPLE VALVE | ⊕ | FIELD STONE PAVEMENT |
| ⊗ | WATER METER | ⊗ | CRIBBED LIMESTONE |
| ▽ | CLEANOUT | ▽ | RESTORED PAVEMENT |
| ⊙ | CONTINGENT LIGHTING | ⊙ | |
| ⊕ | UTILITIES / AC UNITS | ⊕ | |
| ⊗ | SPACED WOOD WALLS | ⊗ | |
| ⊙ | TRASH RECEPTACLES | ⊙ | |
| □ | NPS INTERPRETIVE SIGNS (NO.) | □ | |
| □ | DRAIN INLET | □ | |

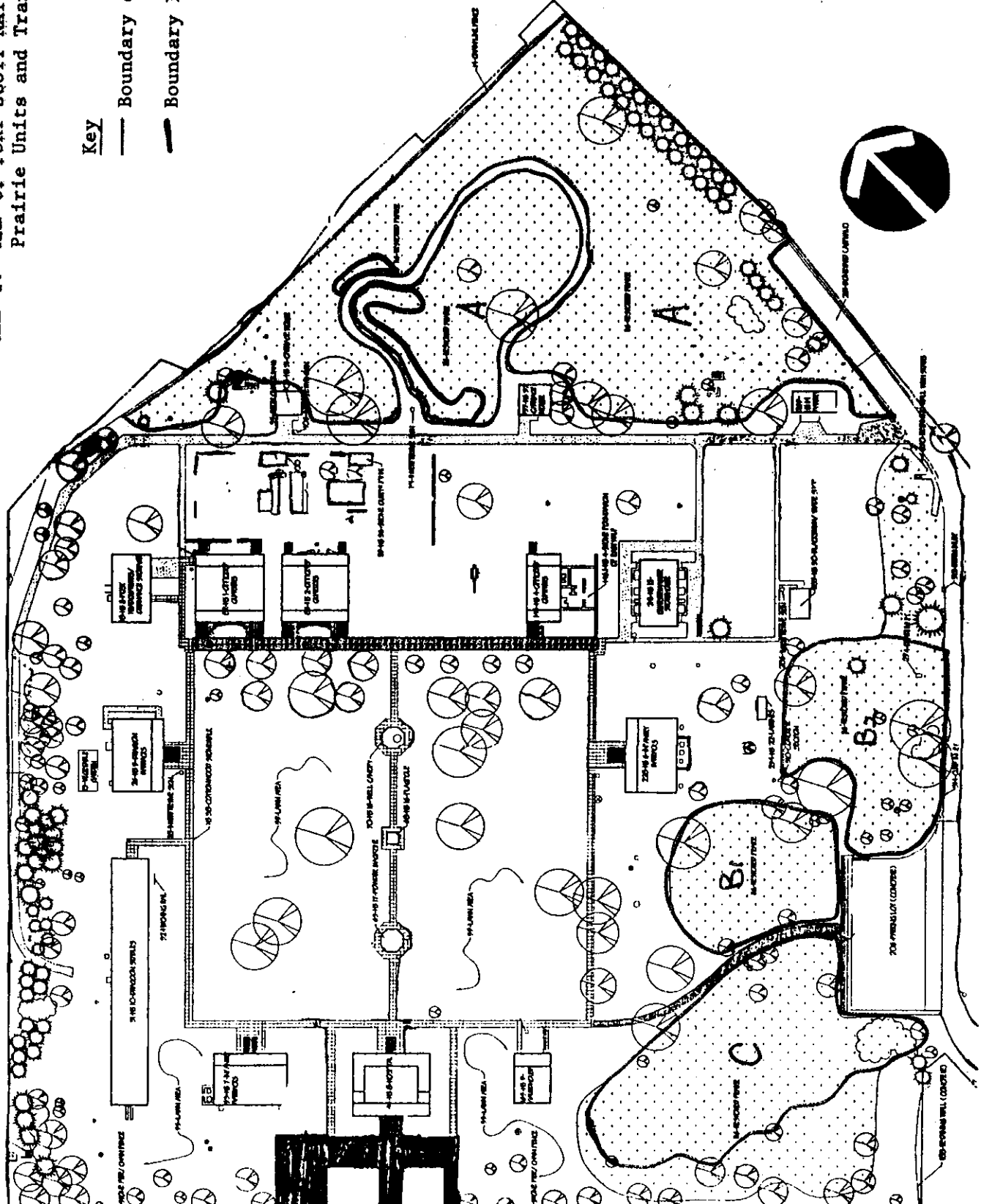


TABLE 1: KNOWN NATIVE PRAIRIE FORBS FOUND IN PRAIRIE
TRANSPLANTATION SECTION IN 1996

SCIENTIFIC NAME	COMMON NAME	# OF PLANTS
<u>Achillea millefolium</u>	Yarrow	12
<u>Allium canadense</u>	Wild Garlic	1
<u>Amorpha canescens</u>	Leadplant	16
<u>Antennaria neglecta</u>	Field Pussy Toes	182
<u>Asclepias tuberosa</u>	Butterfly Milkweed	11
<u>Asclepias viridis</u>	Spider Milkweed	4
<u>Baptisia australis</u>	Blue Wild Indigo	8
<u>B. bracteata leucophaea</u>	Cream Wild Indigo	6
<u>Desmodium illinoense</u>	Illinois Tick Trefoil	8
<u>Echinacea pallida</u>	Pale Purple Coneflower	7
<u>Erigeron annuus</u>	Annual Fleabane	6
<u>Erigeron strigosus</u>	Daisy Fleabane	44
<u>Euphorbia corollata</u>	Flowering Spurge	15
<u>Euthamia gymnospermoides</u>	Plains Grass-leaved Goldenrod	12
<u>Fragaria virginiana</u>	Wild Strawberry	4
<u>Helianthus mollis</u>	Ashy Sunflower	303
<u>Heliopsis helianthoides</u>	False Sunflower	8
<u>Hieracium longipilum</u>	Long-Bearded Hawkweed	2
<u>Liatris aspera</u>	Rough Blazing Star	3
<u>Linum sulcatum</u>	Grooved Yellow Flax	14
<u>Oxalis spp.</u>	Wood Sorrel	4
<u>Penstemon pallidus</u>	Pale Bearded Tongue	3
<u>Penstemon tubaefflorus</u>	Tube Bearded Tongue	2
<u>Petalostemum candidum</u>	White Prairie Clover	63
<u>Petalostemum purpurea</u>	Purple Prairie Clover	12
<u>Physostegia virginiana</u>	Obedient Plant	1
<u>Plantago aristata</u>	Bracted Plantain	1
<u>Psoralea tenuiflora</u>	Scurfy Pea	8
<u>Pycnanthemum tenuifolium</u>	Slender Mountain Mint	50
<u>Ratibida pinnata</u>	Gray Headed Coneflower	87
<u>Rudbeckia hirta</u>	Black Eyed Susan	8
<u>Ruellia humilis</u>	Hairy Wild Petunia	95
<u>Salvia azurea</u>	Blue Sage	3
<u>Schrankia nutalii</u>	Cat's Claw Sensitive Bair	1
<u>Silphium laciniatum</u>	Compass Plant	9
<u>Silphium integrifolium</u>	Whole Leaf Rosinweed	54
<u>Solidago missouriensis</u>	Missouri Goldenrod	36
<u>Solidago rigida</u>	Stiff Goldenrod	120
<u>Tradescantia ohiensis</u>	Common Spiderwort	3
<u>Vernonia fasciculata</u>	Common Ironweed	43
<u>Viola pedata</u>	Bird's Foot Violet	3
<u>Viola pedatifida</u>	Prairie Violet	31

tubaeflorus). There is a low population range of 3-9 plants in seventeen more native forbs species that were found in the prairie transplantation unit. This low population is a factor to the survival of those species. Their continued success will depend on the root growth of the species, competition with other natives, and their ability to reproduce. The remaining native forbs species located in the transplantation unit have a population of 44-11 plants found per species.

NATIVE FORBS NOT LOCATED IN TRANSPLANT UNIT

Of the 50 known species of transplanted native forbs in 1995, there were 8 species that were not located in the transplants in 1996 (TABLE 2). The factors that mostly contributed to the failure of these species are their extensive tap root systems and the fact that only one plant was transplanted.

TABLE 2: NATIVE FORBS NOT LOCATED IN TRANSPLANT UNIT IN 1996 BUT WERE PRESENT IN TRANSPLANT UNIT IN 1995	
SCIENTIFIC NAME	COMMON NAME
<u>Arnoglossum plantagineum</u>	Prairie Indian Plantain
<u>Asclepias sullivantii</u>	Prairie Milkweed
<u>Asclepias verticillata</u>	Whorled Milkweed
<u>Asclepias viridiflora</u>	Green Milkweed
<u>Glandularia canadensis</u>	Rose Vervain
<u>Lithospermum incisum</u>	Fringed Puccoon
<u>Polytaenia nuttallii</u>	Prairie Parsley
<u>Spiranthes vernalis</u>	Spring Ladies' Tresses

NATIVE FORBS THAT WERE NOT POSITIVELY IDENTIFIED

Ten percent of the native forbs species that were transplanted in 1995 were not positively identified in the transplant unit in

1996 (TABLE 3). Yellow Star Grass, Blue Eyed Grass, and Prairie Blue Eyed Grass were not positively identified because they have an early spring blooming and growth period. There were basal leaves found that looked like Dodecatheon media (Shooting Star) but the species never bloomed to confirm a positive identification. Field Milkwort (Polygala sanguinea) was not positively identified.

TABLE 3: NATIVE FORBS THAT WERE NOT POSITIVELY IDENTIFIED IN TRANSPLANT UNIT IN 1996 BUT WERE PRESENT IN 1995	
SCIENTIFIC NAME	COMMON NAME
<u>Dodecatheon media</u>	Shooting Star
<u>Hypoxis hirsuta</u>	Yellow Star Grass
<u>Polygala sanguinea</u>	Field Milkwort
<u>Sisyrinchium augustifolium</u>	Blue Eyed Grass
<u>Sisyrinchium campestre</u>	Prairie Blue Eyed Grass

NEWLY IDENTIFIED NATIVE FORBS

There were five new native forbs species identified in the transplant units in 1996 (TABLE 4). The specific species of Oxalis (Wood Sorrel) is unknown due to the similarities of the plants in this genus. All of the other species but the Wood Sorrel bloomed and produced seed. Common Spiderwort and Plains Grass-leaved Goldenrod were found in the large transplant section where the Johnson Grass was located along the prairie trail. There were four or less of each of these species, so they may not be present in the transplant units next year.

TABLE 4: NATIVE FORBS THAT WERE IDENTIFIED IN TRANSPLANT UNITS IN 1996 BUT WERE NOT FOUND IN 1995		
SCIENTIFIC NAME	COMMON NAME	COEF
<u>Allium canadense</u>	Wild Garlic	1
<u>Euthamia gymnospermoides</u>	Plains Grass-leaved Goldenrod	
<u>Oxalis spp.</u>	Wood Sorrel	
<u>Plantago aristata</u>	Bracted Plantain	1
<u>Tradescantia ohiensis</u>	Common Spiderwort	4

NATIVE FORBS SPECIES IN TRANSPLANT THAT BLOOMED

In the transplantation unit, 76% of the known native forbs species bloomed (TABLE 5). The forbs with the most individual plants that bloomed were Ashy Sunflower, Stiff Goldenrod, Hairy Wild Petunia, Gray Headed Coneflower, White Prairie Clover, Whole Leaf Rosinweed, Common Ironweed, and Daisy Fleabane. There are eight species of native forbs that are known to have produced and dispersed seed. The species that produced seed are Yarrow, Leadplant, Butterfly Milkweed, Spider Milkweed, Illinois Tick Trefoil, Pale Purple Coneflower, Annual Fleabane, Daisy Fleabane, and Grooved Yellow Flax. The remaining native forbs were still in bloom and it is unknown at this time if they produced seed.

INSECTS NOTICED IN AND AROUND TRANSPLANTATION AREA

There was a lot of Lepidoptera (Butterflies and Moths) activity around the flowering native forbs in the transplantation area. Many of the Lepidoptera species would fly back and forth between the transplanted areas in Unit A, feeding on the forbs. The most predominant species are Missouri Woodland Swallowtail

TABLE 5: KNOWN NATIVE PRAIRIE FORBS FOUND IN 1996 PRAIRIE
TRANSPLANTATION SECTION THAT BLOOMED

SCIENTIFIC NAME	COMMON NAME	# OF PLANTS
<u>Achillea millefolium</u>	Yarrow	1
<u>Allium canadense</u>	Wild Garlic	1
<u>Amorpha canescens</u>	Leadplant	2
<u>Asclepias tuberosa</u>	Butterfly Milkweed	11
<u>Asclepias viridis</u>	Spider Milkweed	2
<u>Desmodium illinoense</u>	Illinois Tick Trefoil	3
<u>Echinacea pallida</u>	Pale Purple Coneflower	2
<u>Erigeron annuus</u>	Annual Fleabane	6
<u>Erigeron strigosus</u>	Daisy Fleabane	44
<u>Euphorbia corollata</u>	Flowering Spurge	15
<u>Euthamia gymnospermoides</u>	Plains Grass-leaved Goldenrod	12
<u>Helianthus mollis</u>	Ashy Sunflower	303
<u>Heliopsis helianthoides</u>	False Sunflower	8
<u>Hieracium longipilum</u>	Long-Bearded Hawkweed	1
<u>Liatris aspera</u>	Rough Blazing Star	3
<u>Linum sulcatum</u>	Grooved Yellow Flax	14
<u>Penstemon pallidus</u>	Pale Bearded Tongue	3
<u>Penstemon tubaeiflorus</u>	Tube Bearded Tongue	2
<u>Petalostemum candidum</u>	White Prairie Clover	63
<u>Petalostemum purpurea</u>	Purple Prairie Clover	12
<u>Physostegia virginiana</u>	Obedient Plant	1
<u>Plantago aristata</u>	Bracted Plantain	1
<u>Pycnanthemum tenuifolium</u>	Slender Mountain Mint	50
<u>Ratibida pinnata</u>	Gray Headed Coneflower	87
<u>Rudbeckia hirta</u>	Black Eyed Susan	8
<u>Ruellia humilis</u>	Hairy Wild Petunia	95
<u>Salvia azurea</u>	Blue Sage	3
<u>Silphium laciniatum</u>	Compass Plant	9
<u>Silphium integrifolium</u>	Whole Leaf Rosinweed	54
<u>Solidago missouriensis</u>	Missouri Goldenrod	36
<u>Solidago rigida</u>	Stiff Goldenrod	120
<u>Tradescantia ohiensis</u>	Common Spiderwort	3
<u>Vernonia fasciculata</u>	Common Ironweed	43

(Papilio joanae), variety of Skipper's (F. Hesperidae), Snowberry
Clearwing (Hernaris diffinis), Red Admiral (Vanessa atalanta
rubria), Pearl Crescent (Phyciodes tharos tharos), Monarch (Danaus
plexippus), Painted Lady (Vanessa cardui), Clouded Sulphur (Colias

philodice philodice), Hairstreaks (F. Lycaenidae), Black Swallowtail (Pailio polyxenes asterius), Plume Moth (F. Pterophoridae), Question Mark (Polygonia interrogantionis) Zebra Swallowtail (Eurytides marcellus), Hackberry (Asterocampa celtis celtis) and Tiger Swallowtail (Pterourus glaucus glaucus). The Slender Mountain Mint plants provided many Pea Weevil (Bruchus pisorus) with food and shelter. Long Horned Beetles (Tetraopes tetrophthalmus) were found on Ashy Sunflower, False Sunflower, Gray Headed Coneflower, Black Eyed Susan, and Whole Leaf Rosinweed. The native forbs also played as a host to a variety of other species from the following families of Coleoptera (beetle), Orthoptera (Grasshoppers, Katydid, & Crickets) and Hemiptera (Aphids, Leafhoppers, and True Bugs). Insects species that were frequently noticed in the air were Odonata (Dragonfly & Damselfly), Hymenoptera (Bees & Wasps), and a few Ephemeroptera (Mayflies).

NATIVE GRASS IN TRANSPLANT UNITS

The transplanted sod still contains all of the grasses identified in 1995 with the addition of four species (TABLE 6). Prairie Brome (Bromus kalmii) is one of newly identified species and is fairly abundant in all of the transplantation section. The others, a Rush (Juncus spp.) and a Sedge (F. Cyperaceae) were located in two of the transplanted units. Their population was limited to four plants per species. Switch Grass (Panicum virgatum) was identified this year and is located throughout most of the transplant section. Scribner's Panic Grass and Side-Oats Grama Grass were the most abundant species of grasses found in

the transplantation section. The lowest distribution of two clumps of each species were Little Bluestem, and June Grass. Indian Grass (Sorghastrum nutans) has six clumps throughout the transplant unit. The three large clumps of Gama Grass flowered and produced seed.

:
: TABLE 6: KNOWN NATIVE PRAIRIE GRASSES FOUND IN 1996 PRAIRIE :
: SOD TRANSPLANTATION SECTIONS :
:
:
:

SCIENTIFIC NAME	COMMON NAME	COEF
<u>Andropogon gerardii</u>	Big Bluestem	5
<u>Andropogon scoparius</u>	Little Bluestem	5
<u>Bromus kalmii</u>	Prairie Brome	
<u>Boutlelous curtispendula</u>	Side-Oats Grama Grass	7
F. Cyperaceae	Sedge	
<u>Elymus canadensis</u>	Canada Wild Rye	5
F. Juncaceae	Rush	
<u>Koeleria macrantha</u>	June Grass	6
<u>Panicum ologosanth-</u> <u>scribnerianum</u>	Scribner's Panic Grass	3
<u>Panicum virgatum</u>	Switch Grass	4
<u>Sorghastrum nutans</u>	Indian Grass	5
<u>Spartina pectinata</u>	Prairie Cord Grass	5
<u>Sporobolus heterolepis</u>	Prairie Dropseed	6
<u>Tripsacum dactyloides</u>	Gama Grass	5

:
:
:

EXOTICS LOCATED IN TRANSPLANT AREA

The presence of exotic species in the transplantation area was expected to occur in 1996 due to the fact that the donor site was a disturbed native prairie. The amount of exotic species discovered in the transplantation area of FSNHS during the summer of 1996 is a controllable amount (TABLE 7). Ox-eye Daisy (Chrysanthemum leucanthemum) was the most abundant exotic in all of the transplant section. This was expected since its population was extensive on the donor prairie and that would seem to indicate a

large seed bed in the soil. To prevent the scattering of seeds, the bloom buds and seed heads were removed from all of the Ox-eye Daisy plants before they were hand pulled. The next highest occurring exotics were Tall Fescue (Festuca arundunacea)

TABLE 7: EXOTICS FOUND IN THE TRANSPLANT AREA IN 1996	
SCIENTIFIC NAME	COMMON NAME
<u>Chrysanthemum leucanthemum</u>	Ox-Eye Daisy
<u>Daucus carota</u>	Queen Anne's Lace
<u>Dianthus armeria</u>	Deptford Pink
<u>Festuca arundinacea</u>	Tall Fescue
<u>Hypericum perforatum</u>	Common St. John's-wort
<u>Lespedeza cuneata</u>	Sericea Lespedeza
<u>Potentilla recta</u>	Rough Fruited Cinquefoil
<u>Prunella vulgaris</u>	Heal-All
<u>Setari glauca</u>	Yellow Foxtail
<u>Trifolium pratense</u>	Red Clover

and Yellow Foxtail (Setari glauca). These exotics have sporadic locations throughout the transplantation unit. The seed heads were removed and some of the plants of Tall Fescue and Yellow Foxtail were hand pulled. The seeds of Deptford Pink were collected to prevent scattering and the plants removed. Queen Anne's Lace was also hand pulled before it went to seed and the roots were dug up if they broke off. All other exotic species were hand pulled.

TARGETED VEGETATION

The vegetation targeted for removal in the summer of 1996 included the same exotic forbs and woody vegetation as the past two summers, with the addition of six species of exotic vegetation and six woody species (TABLE 8). The increase in the woody species

is due to a concentrated effort to remove the woody vegetation from the prairie units.

TABLE 8: FORT SCOTT NATIONAL HISTORIC SITE TARGETED VEGETATION FOR REMOVAL IN THE SUMMER OF 1996.		
SCIENTIFIC NAME	COMMON NAME	UNIT LOCATION
Exotic Vegetation		
<u>Ambrosia artemisiifolia</u>	Common Ragweed	A, B, C
<u>Ambrosia trifida</u>	Giant Ragweed	A, B, C
<u>Abutilon theophrasti</u>	Velvetleaf	A
<u>Bromus inermis</u>	Smooth Brome	A, B, C
<u>Bromus tectorum</u>	Downy Brome	A, B, C
<u>Campsis radicans</u>	Trumpet Vine	A, B
<u>Festuca arundinacea</u>	Tall Fescue	A, B, C
<u>Lathyrus latifolius</u>	Sweet Pea	A, B
<u>Melilotus officinalis</u>	Yellow Sweet Clover	A, B, C
<u>Parthenocissus spp.</u>	Virginia Creeper	A, B
<u>Phytolacca americana</u>	Pokeweed	A, B
<u>Rhus radicans</u>	Poison Ivy	A, B, C
<u>Rumex crispus</u>	Curly Dock	A, B
<u>Securigera varia</u>	Crown Vetch	A, C
<u>Sorghum halapense</u>	Johnson Grass	A, B, C
<u>Verbascum blattaria</u>	Moth Mullein	A
<u>Vitis spp.</u>	Grape	A, B
Woody Vegetation		
<u>Acer negundo</u>	Box Elder	A, C
<u>Alianthus altissima</u>	Tree of Heaven	A, B
<u>Celtis occidentalis</u>	Hackberry	A, B, C
<u>Cercis canadensis</u>	Redbud	B, C
<u>Diospyros virginiana</u>	Persimmon	A
<u>Juglans nigra</u>	Black Walnut	A, B, C
<u>Maclura pomifera</u>	Osage Orange	B
<u>Morus alba</u>	White Mulberry	A, B, C
<u>Prunus americana</u>	Wild Plum	A, C
<u>Quercus rubra</u>	Red Oak	C
<u>Robinia pseudo-acacia</u>	Black Locust	A
<u>Ulmus americana</u>	American Elm	A, B, C
<u>Ulmus parvifolia</u>	Chinese Elm	B, C

TARGETED EXOTIC VEGETATION

Sorghum halapense (Johnson Grass), Melilotus officinalis (Yellow Sweet Clover), and Securigera varia (Crown Vetch) were the major focus of the targeted exotic vegetation removal for the summer of 1996. Other less voracious species that were also important targeted exotic vegetation were Ambrosia trifida (Giant Ragweed), A. artemissifolia (Common Ragweed), Bromus inermis (Smooth Brome), B. tectorum (Downy Brome), Campsis radicans (Trumpet Vine), and Rhus radicans (Poison Ivy). All of the remaining exotic species were not too numerous but were removed because they do not represent the true native prairie species (TABLE 8).

There was minor reduction of Sorghum halapense (Johnson Grass) in all of the prairie units (MAP 2). Unit C contains five groups of Johnson Grass and four of these groups are located along the northern border of Unit C by the red brick path. The first of these four groups of Johnson Grass is located around the Black Walnut and Red Oak trees along the railroad tie walkway. This group was spread out and sparsely populated. The other three condensed groups of Sorghum halapense, located along the red brick path, were 10 to 20 yards from Unit C border by the Sugar Maple (217 on the Cultural Landscape Report). The last group of Johnson Grass in Unit C was by the Wild Plum thicket on the SW corner. In Unit B1 (MAP 2), the first location of Johnson Grass was on the NW side within 15 yards from the border. This area had three groups of Sorghum halapense that were fairly good sized and well

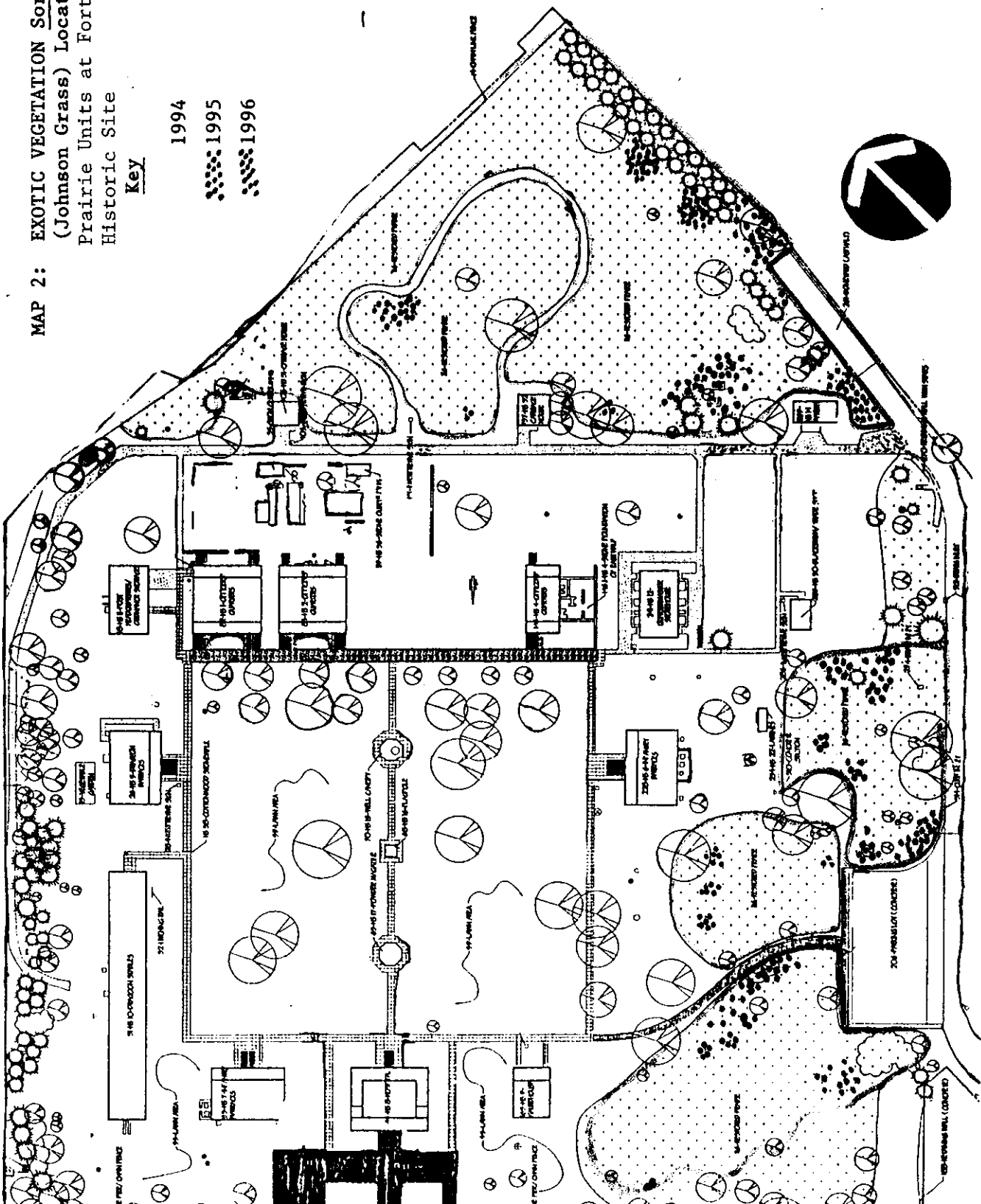
MAP 2: EXOTIC VEGETATION *Sorghum halapense*
 (Johnson Grass) Location from 1994-1996 in
 Prairie Units at Fort Scott National
 Historic Site

Key

- 1994
- 1995
- 1996

LEGEND

- 160 ITEM NUMBER
- H58 HISTORIC STRUCTURE NUMBER
- ⊕ CLICK COUPLE VALVE
- ⊗ WATER METER
- ▽ CLEANOUT
- ⊙ CONTEMPORARY LIGHTING
- ⊞ UTILITIES / AC UNITS
- ⊠ STACKED WOOD WALLS
- ◇ TRASH RECEPTACLES
- NPS INTERPRETIVE SIGNS (MODE)
- DRAIN INLET
- ▨ BRICK PAVEMENT
- ▧ COTTONWOOD STONE PAVEMENT
- ▩ FIELD STONE PAVEMENT
- ▤ CELESTIAL LIMESTONE
- ▥ RESTORED FRAMES



populated. The other Sorghum halapense located in B1 was along the border by the NW corner of the RV parking lot and contained a few sporadic plants. Unit B2 (MAP 2) contained Johnson Grass on the SW border and the S corner of the unit by the RV parking lot. The group located on the S corner was well populated, but the other group on the SW border contained a few sporadic plants. Another group of Johnson Grass was located directly across from the latrine within 10 yards from the border. The last group of Sorghum halapense in Unit B2 was located all around the Scotch Pine (290 in the Cultural Landscape Report) on the N border. Unit A still contains Johnson Grass on the NE corner behind HS-14 to the E side and up to the Austrian Pines. The Johnson Grass in this area is spread out in sporadic locations. Sorghum halapense was also located around the Austrian Pines and the electric transformer W of HS-14. The transplant area of Unit A still had the presence of Johnson Grass, but the population was greatly reduced (MAP 2). This reduction was due to the digging up the rhizomes of Sorghum halapense.

Securigera varia (Crown Vetch) population has been greatly reduced among the Austrian Pines in Unit A from 1994 to 1996 (MAP 3). In 1994, the Crown Vetch was found to be well established in the Austrian Pines along the NE border of Unit A. Crown Vetch is still present in the same location, but plant regrowth has been reduced and the area located within the Austrian Pines is also reduced. The areas where Securigera varia is located in the Austrian Pines is along the E border by Highway 69, the N corner,

MAP 3: EXOTIC VEGETATION *Securigera varia*
(Crown Vetch) Location 1994-1996 in
Prairie Units at Fort Scott National
Historic Site

Key

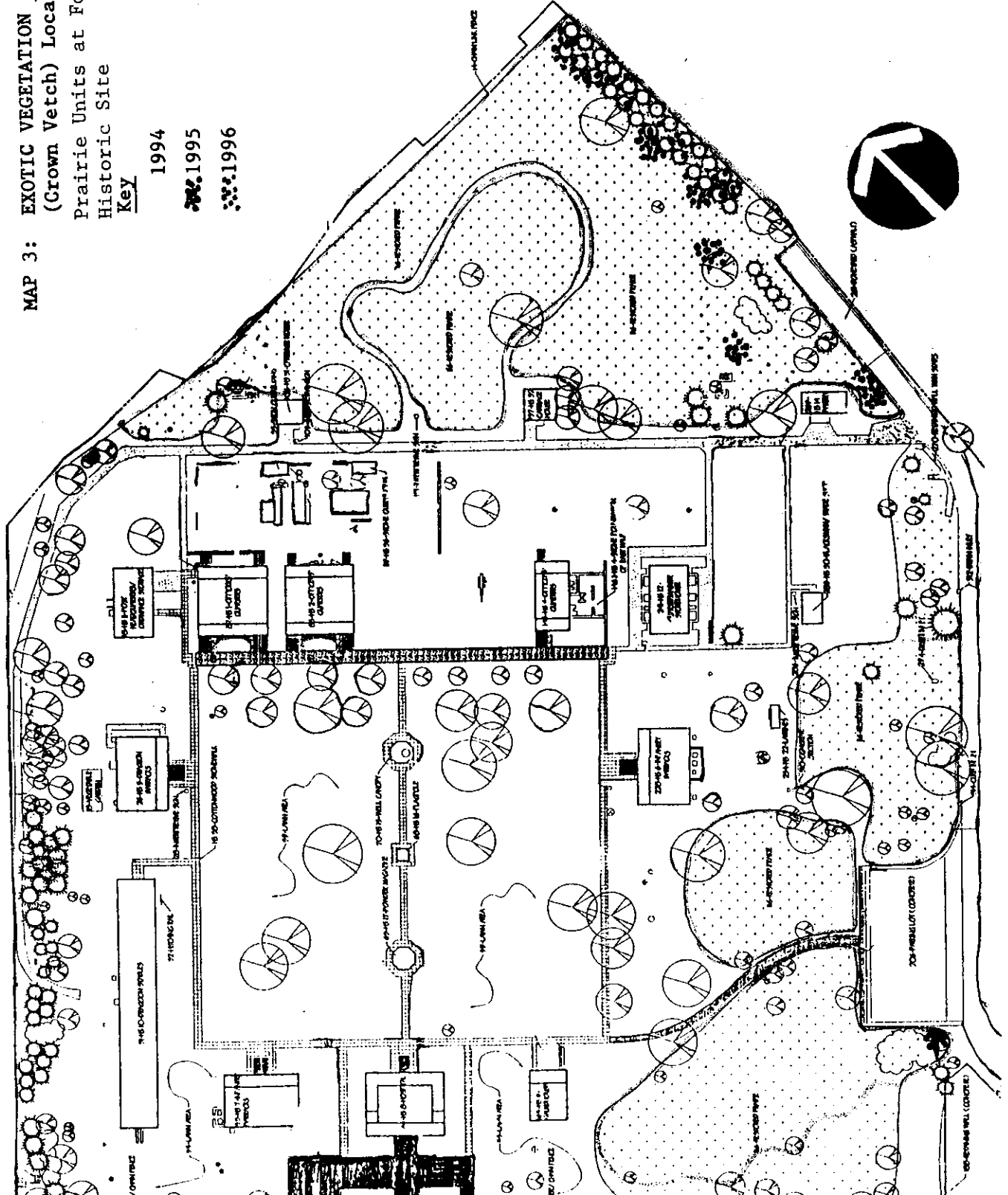
1994

1995

1996

LEGEND

- | | |
|------|--------------------------------|
| 160 | ITEM NUMBER |
| H5 B | HISTORIC STRUCTURE NUMBER |
| ⊗ | CLICK COUPLE VALVE |
| ⊕ | WATER METER |
| ⊖ | CLEANOUT |
| ⊙ | CONTemporary LIGHTING |
| ⊗ | UTILITIES / AC UNITS |
| ⊕ | STACKED WOOD WALLS |
| ⊖ | TRASH RECEPTACLES |
| □ | NPS INTERPRETIVE SIGNS (MODEL) |
| □ | DRAIN INLET |
| | BRICK PAVER |
| | COTTONWOOD STONE PAVER |
| | FIELD STONE PAVER |
| | CRUSHED LIMESTONE |
| | RE-STORED PRAIRIE |



and one location W of the Austrian Pines by the drainage ditch. The hillside E of HS-14 has some reduction of growth of Crown Vetch. The other areas of reduction of Securigera varia in Unit A are located between HS-14 and the Wild Plum thicket, and around the base of the Cottonwood tree (255 in the Cultural Landscape Report). The presence of Crown Vetch east of the Wild Plum thicket by the RV parking lot in Unit C has also been reduced.

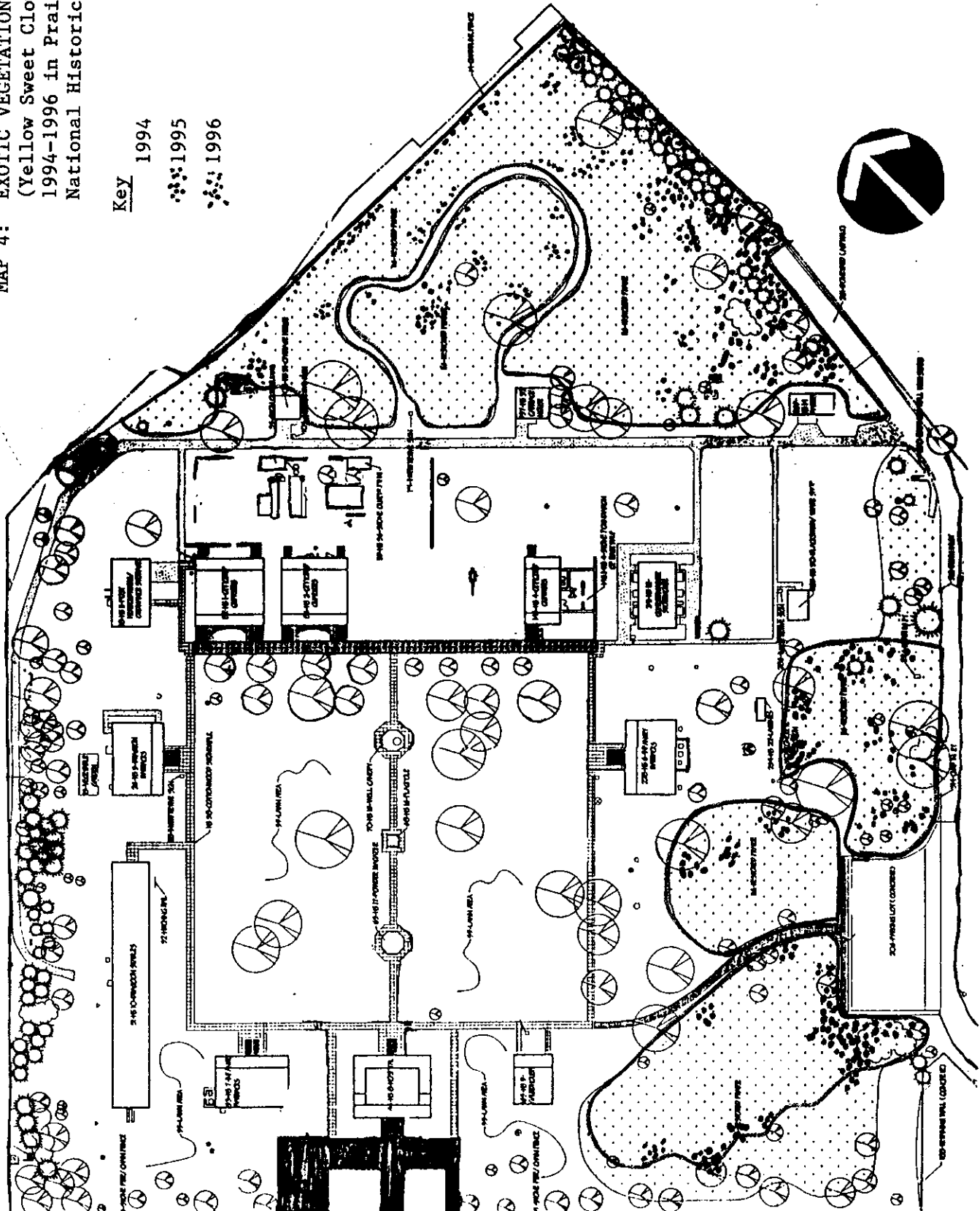
The presence of Melilotus officinalis (Yellow Sweet Clover) has been reduced considerably from 1994 to 1996 (MAP 4). Unit C had four small areas of Yellow Sweet Clover located on the SW border in the shade of four Oak trees (175, 177, 178, & 179 in the Cultural Landscape Report). The other location of Melilotus officinalis in Unit C was west of the Wild Plum thicket along the SW slope by the RV parking lot. Unit B1 had two areas of Yellow Sweet Clover located in the center of the unit. Yellow Sweet Clover was located in the W corner and along the SW border of Unit B2 around the picnic area. The Scotch Pine (290 in the Cultural Landscape Report) located in Unit B2 was also surrounded by sporadic groups of Melilotus officinalis. Unit A contained scattered groups of Yellow Sweet Clover from HS-14 along the boneyard fence to the southern end of the Austrian Pines. This area seemed to be reduced a little compared to 1995. The other location of Melilotus officinalis in Unit A was west of the American Elm (143 in the Cultural Landscape Report) in the center of the unit. There were six small groups of Yellow Sweet Clover in this area.

MAP 4: EXOTIC VEGETATION Melilotus officinalis
 (Yellow Sweet Clover) Location from
 1994-1996 in Prairie Units at Fort Scot
 National Historic Site

Key
 1994
 1995
 1996

LEGEND

- | | |
|-----|----------------------------|
| 160 | ITEM NUMBER |
| 158 | HISTORIC STRUCTURE NUMBER |
| ⊕ | CLICK COUPLE VALVE |
| ⊗ | WATER METER |
| ▽ | CLEANOUT |
| ● | CONTAMINARY LIGHTING |
| ⊞ | UTILITIES / AC UNITS |
| └┘ | STACKED WOOD WALLS |
| ◇ | TRASH RECEPTACLES |
| □ | NPS INTERPRETIVE SIGNS (M) |
| □ | DRAIN INLET |
| | BRICK PAVER |
| | COTTONWOOD STONE PAVE |
| | FIELD STONE PAVER |
| | COLORIED LIMESTONE |
| | RESTORED FRAME |



All of the prairie units still contain a distribution of Festuca arundinacea (Tall Fescue), Bromus tectorum (Downy Brome), and B. inermis (Smooth Brome). The presence of the Brome species is located mainly along the borders of Units A and B. Mowing of this area in the future could aid in the reduction of these species.

Ambrosia artemisiifolia (Common Ragweed) and A. trifida (Giant Ragweed) were present in all prairie units. These species were located mainly along the border of the prairie units in sparse to dense populations. In Unit C, both species were sparsely located around the Wild Plum thicket by the RV parking lot and the Black Walnut trees along the railroad ties on the red brick path. There was a very densely populated area of Giant Ragweed from the Hackberry (307 in the Cultural Landscape Report) by the picnic area to the north corner of the prairie Unit B1. Another area in Unit B1 that contained Giant Ragweed is on the west corner by the brick path around the Red Maple tree (222 in the Cultural Landscape Report). In Unit B2 the W corner to the SW corner along the picnic area had a sporadic distribution of both species, but Ambrosia trifida was more predominant. The main location of the ragweed species in Unit A is located N and E of HS-31 with the predominant species being Giant Ragweed. There are other sporadic locations of Common Ragweed and Giant Ragweed throughout the remaining area of Unit A.

Units A and B contained meager distributions of Trumpet Vine, Sweet Pea, Virginia Creeper, Pokeweed, Curly Dock, and Grape.

Trumpet Vine (Campsis radicans) is located around the Austrian Pines and the N border in Unit A and in the SE border of Unit B2. Lathyrus latifolius (Sweet Pea) was found W of HS-14 by the Cottonwood tree (250 in the Cultural Landscape Report) in Unit A and in the center of Unit B2. Virginia Creeper (Parthenocissus spp.) and Grape (Vitis spp.) were located around the two American Elm trees in the center of Unit A and behind HS-14. In Unit B2 these species were located along the border behind the latrine and the N border of Unit B1. Pokeweed (Phytolacca americana) and Curly Dock (Rumex crispus) were located E of HS-31 in Unit A and in the densely populated area of Giant Ragweed from the Hackberry by the picnic area to the N corner of Unit B1. Unit A contained a few species of Velvetleaf (Abutilon theophrasti) and Moth Mullein (Verbascum blattaria) in the N corner by the Austrian Pines.

Poison Ivy (Rhus radicans) is well established in specific locations in all prairie units. Since Poison Ivy can cause severe skin inflammation, itching, and blistering with direct contact, it was mowed in the areas of public accessibility. In Unit B1 from around the Hackberry (307 in the Cultural Landscape Report) by the picnic area, some plant regrowth has occurred in one area that was mowed. The W corner of Unit B2 by the picnic area was also mowed but no regrowth has been noticed to this date. Another area where Rhus radicans was located in Unit B2 but not mowed is along the SE border where the Chinese Elm and Hackberry trees (296 & 299 in the Cultural Landscape Report) are located. In Unit C, Poison Ivy was located at the base of the Red Oak tree (177 in the Cultural

Landscape Report) on the S border. Rhus radicans is located on the E side of HS-31 around the base of the Chinese Elm and American Elm (117 & 118 in the Cultural Landscape Report) in Unit A. Poison Ivy is located at the base of both of the American Elm trees (142 & 143 in the Cultural Landscape Report) in the center of Unit A. The final location of Rhus radicans in Unit A is under the Cottonwood (255 in the Cultural Landscape Report) NW of the N corner of the boneyard.

TARGETED WOODY VEGETATION

The removal of woody vegetation was of major importance for the summer of 1996 because there has been a very limited removal of woody vegetation in the summer of 1995. A complete woody vegetation analysis was done before any removal was started (TABLE 8). All woody vegetation was recorded on a working map from the Cultural Landscape Report (see that map). Black Walnut (Juglans nigra), White Mulberry (Morus alba), and American Elm (Ulmus americana) were the most predominant species on all the prairie units. Black Locust (Robinia pseudo-acacia) is a problem for the W corner of Unit A behind HS-31. Other woody species in Unit A were located along the prairie trail and along the border of the unit around HS-32. There were several Chinese Elm (Ulmus parvifolia) sprouts located behind HS-14 in Unit A. Along the northern border fence on Unit A there is an encroachment of Persimmon (Diospyros virginiana). Unit B2 had heavy regrowth of Hackberry (Celtis occidentalis) along the N border behind HS-6 and HS-22, the latrine. Unit B1 also had heavy regrowth of Black

Walnut and Tree of Heaven along the NW border south of HS-6. There were more sprouts located along the brick path in Unit B1 and Unit C than there were in 1995. The Wild Plum thicket in Unit C has more sprout growth around the thicket and is starting more sprouts west of the present thicket. The W border of Unit C also had more regrowth of American Elm, Black Walnut, and Box Elder (Acer negundo).

REMOVAL OF EXOTIC AND WOODY VEGETATION

The removal of exotic and woody vegetation at FSNHS during the summer of 1996 was very important, due to the fact that the woody vegetation had limited removal during the summer of 1995. The removal of vegetation was accomplished by manual and mechanical methods.

EXOTIC VEGETATION REMOVAL

The methods of manual removal of exotic vegetation were done by hand pulling and using a shovel to remove the root systems. Exotic species that were removed by this method were Yellow Sweet Clover, Ragweed, Velvetleaf, Curly Dock, Johnson Grass, Crown Vetch, and Moth Mullein. A sickle bar mower was used to remove the growth of Crown Vetch from among the Austrian Pines and the slope E of HS-14 in Unit A. This area was mowed three times. The growth of Common Ragweed, Giant Ragweed, and Poison Ivy located at the corner E of Unit B1 was also mowed with the sickle bar mower. The few prairie grass species that were present in that area did regrow as well as some of the Poison Ivy. The W corner of Unit B2 that contained Giant Ragweed, Poison Ivy, Smooth Brome, Downy

Brome, and Blackberry vines was also mowed. The hand-held shears used for seed collection in 1994 were used to remove the seed heads of Smooth Brome, Downy Brome, and Tall Fescue behind HS-14 in Unit A.

WOODY VEGETATION REMOVAL

All of the woody vegetation in the prairie units were removed with hand-held clippers or a chain saw. The sprouts were removed with the clippers by cutting them off at ground level. The chain saw was used to remove larger sprouts or small trees.

NATIVE FORBS SEEDS

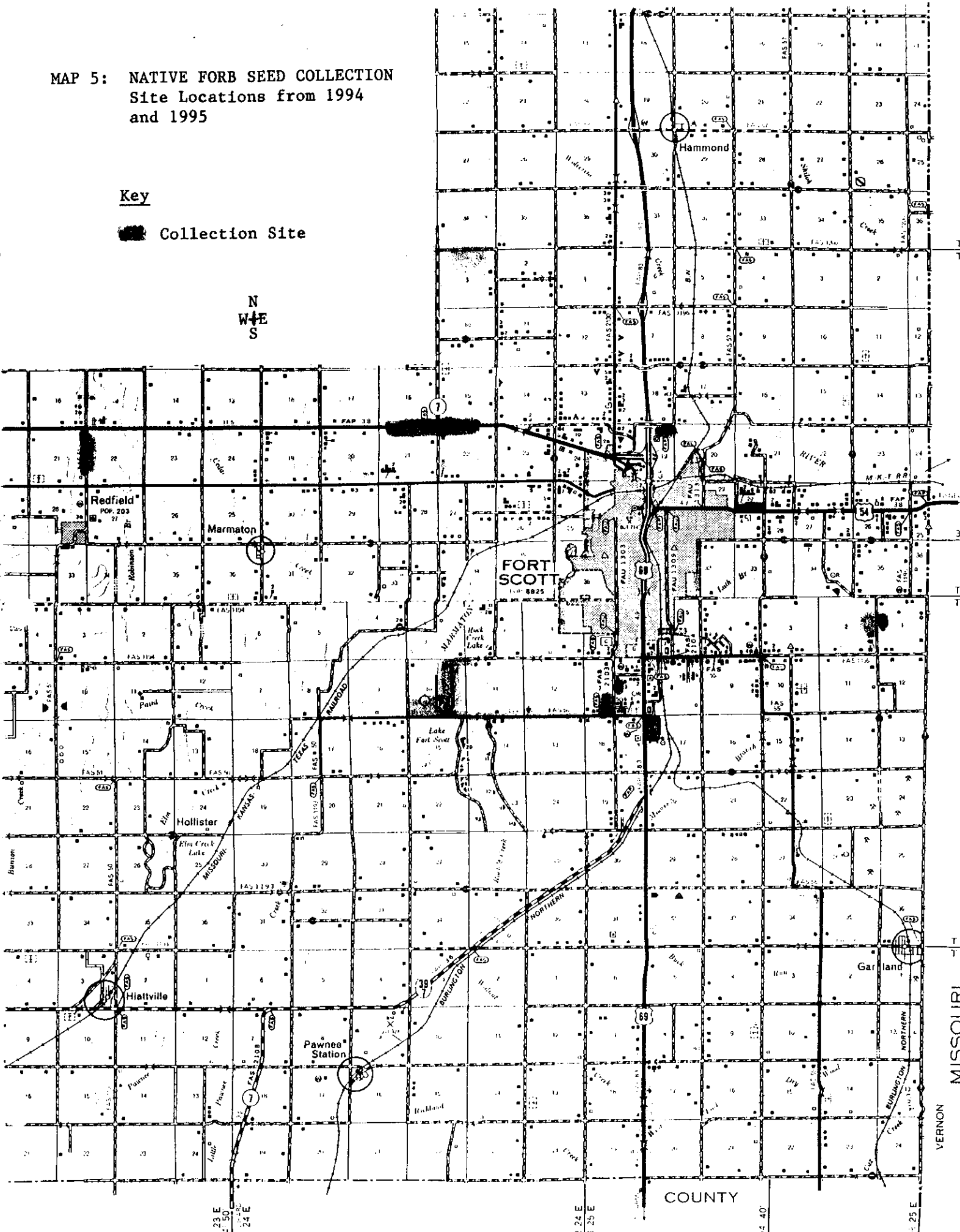
Gama Grass and a variety of native forbs seed were collected in the summer of 1994 and 1995 from area native prairie locations (MAP 5, TABLE 9). The seeds of Purple Prairie Clover, White Prairie Clover, Gray-Headed Coneflower, and Purple Coneflower were cleaned with a hammermill and seed cleaner. All of the other native forbs seeds were cleaned by hand. A total of 4.5 pounds of native forbs and Gama Grass seed has been collected. This amount of native seed will cover half an acre, with a goal of 30 seeds per square foot. Because the no till ground will not dry out as fast as loose soil and will retain top and ground moisture that is vital to germination of the native species, Mervin Wallace of the Missouri Wildflower Nursery said it would be more beneficial to the germination of the forbs species to be spread out on the bare ground late in November. The ground moisture helps to establish the root system of the native species. Broadcasting native prairie seeds on bare ground will allow the natural process of seed

MAP 5: NATIVE FORB SEED COLLECTION
Site Locations from 1994
and 1995

Key

● Collection Site

N
W ← E
S



COUNTY

MISSOURI

VERNON

R 23 E
R 24 E

R 24 E
R 25 E

T 24 N
T 25 N

T 24 N
T 25 N

TABLE 9: NATIVE PRAIRIE FORBS SEEDS AND PRAIRIE GAMA GRASS SEEDS COLLECTED IN 1994 AND 1995		
SCIENTIFIC NAME	COMMON NAME	AMOUNT COLLECTED IN OUNCES
<u>Achillea millefolium</u>	Yarrow	1.6
<u>Amorpha canescens</u>	Leadplant	0.3
<u>Asclepias tuberosa</u>	Butterfly Milkweed	1.6
<u>Asclepias viridis</u>	Spider Milkweed	mixed w/above
<u>Baptisia australis</u>	Blue Wild Indigo	2.2
<u>B. bracteata leucophaea</u>	Creamy Wild Indigo	mixed w/above
<u>Desmodium illinoense</u>	Illinois Tick Trefoil	0.3
<u>Dodecatheon meadia</u>	Shooting Star	<0.1
<u>Echinacea pallida</u>	Pale Purple Coneflower	10.9
<u>Hieracium longipilum</u>	Long Bearded Hawkweed	<0.1
<u>Liatris aspera</u>	Rough Blazing Star	0.6
<u>Liatris punctata</u>	Prairie Blazing Star	4.9
<u>Liatris pycnostachya</u>	Dotted Blazing Star	mixed w/above
<u>Linum sulcatum</u>	Grooved Yellow Flax	0.2
<u>Penstemon spp.</u>	Bearded Tongue	0.3
<u>Petalostemum candidum</u>	White Prairie Clover	40.8
<u>Petalostemum purpureum</u>	Purple Prairie Clover	mixed w/above
<u>Polytaenia nuttallii</u>	Prairie Parsley	4.2
<u>Ratibida pinnata</u>	Gray Headed Coneflower	1.6
<u>Rudbeckia hirta</u>	Black Eyed Susan	2.6
<u>Schrankia nutalii</u>	Cat's Claw Sensitive Bair	<0.1
<u>Silphium laciniatum</u>	Compass Plant	1.4
<u>Tripsacum dactyloides</u>	Gama Grass	0.2

incorporation into the ground by the freezing and thawing over the winter months. If it is a dry spring into the last two weeks of April to May (temperature around 75-80 F) following the fall planting, watering twice a day is recommended. Mervin Wallace also recommended planting Lanceleaf Coreopsis (Coreopsis lanceolata) and Broomsedge (Andropogon virginica) because these species will allow the forbs to become established. Lanceleaf Coreopsis is helpful because it provides ground cover that prevents weed growth and will last two to three years. Broomsedge is a weak prairie grass that

will be eliminated as the forbs become established. If weeds become a problem then the area can be mowed at a height of six inches. This height will reduce the growth of the weeds and still allow the germinating forbs to grow.

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