

FORT SCOTT NATIONAL HISTORIC SITE

PRAIRIE RESTORATION PROJECT 1995

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A prairie sod transplantation project was the main focus of the Fort Scott National Historic Site (FSNHS) prairie restoration project for the summer of 1995. The other projects included the removal of exotic vegetation, removal of woody vegetation, continued cleaning of collected native forb seeds from summer 1994, and native forb seed collecting from donor prairie in prairie sod transplantation project. Slide photo-documentation was taken of FSNHS restoration progress, prairie sod transplantation project, and of native prairie species.

SLIDE PHOTO-DOCUMENTATION

The prairie units at FSNHS were photographed at the beginning of the summer to indicate the improvement of the units from the year before. These slides can be found in the FSNHS Prairie Slide Notebook. The slide notebook contains slides sections of all FSNHS prairie units, native prairie species, restoration projects, prairie fire burn, and exotics. The slides found in the Native Prairie Species (P) section are of individual native prairie species and of prairie landscapes. Slide documentation of the 1995 Prairie Sod Transplantation project are located in the section on Restoration Projects (RP). Prairie Fire Burn (PF) slides are of the accidental prairie burn on Unit A. The slides were taken right after the burn in April, then again with growth in June. The yellow flags seen in the slides indicate a prairie sod transplant section. The sections on Exotics (PE) contains slides of exotic species found in the prairie units of FSNHS and some of the identified exotics found on the donor prairie.

PRAIRIE SOD TRANSPLANTATION PROJECT

The main project for the summer of 1995 was the transplantation of native prairie sod from a construction zone south of Fort Scott to the burn area of Unit A at FSNHS. This project enabled FSNHS to increase the diversity forbs located at the site and to preserve a portion of the native prairie at the donor site. The native prairie at the donor site contained a good sample of native prairie species as well a few exotic species.

SITE LOCATION AND SOIL COMPOSITION




The donor prairie location was about 5 miles from FSNHS east of the existing Highway 69 between the "old drive-in" and the entrance into the industrial park (Hudson Dr.) (FIGURE 1). The prairie sod sections were transplanted in the burn area of Unit A at FSNHS (FIGURE 2). According to the "Soil Survey of Bourbon County, Kansas," both the donor site and FSNHS locations have the same soil type combinations. The soil types are Clareson stony silty clay loam (Cs) with a 1-4 percent slopes and Ringo-Clareson complex (RC) with a 9-15 percent slopes. The surface layers of Cs and RC is 10 inches thick with a root zone limitation of 30-32 inches thick due to the rocky substrate. Since both sites have the same combination of soil types, this will increase the chances of survival of the transplanted prairie species.

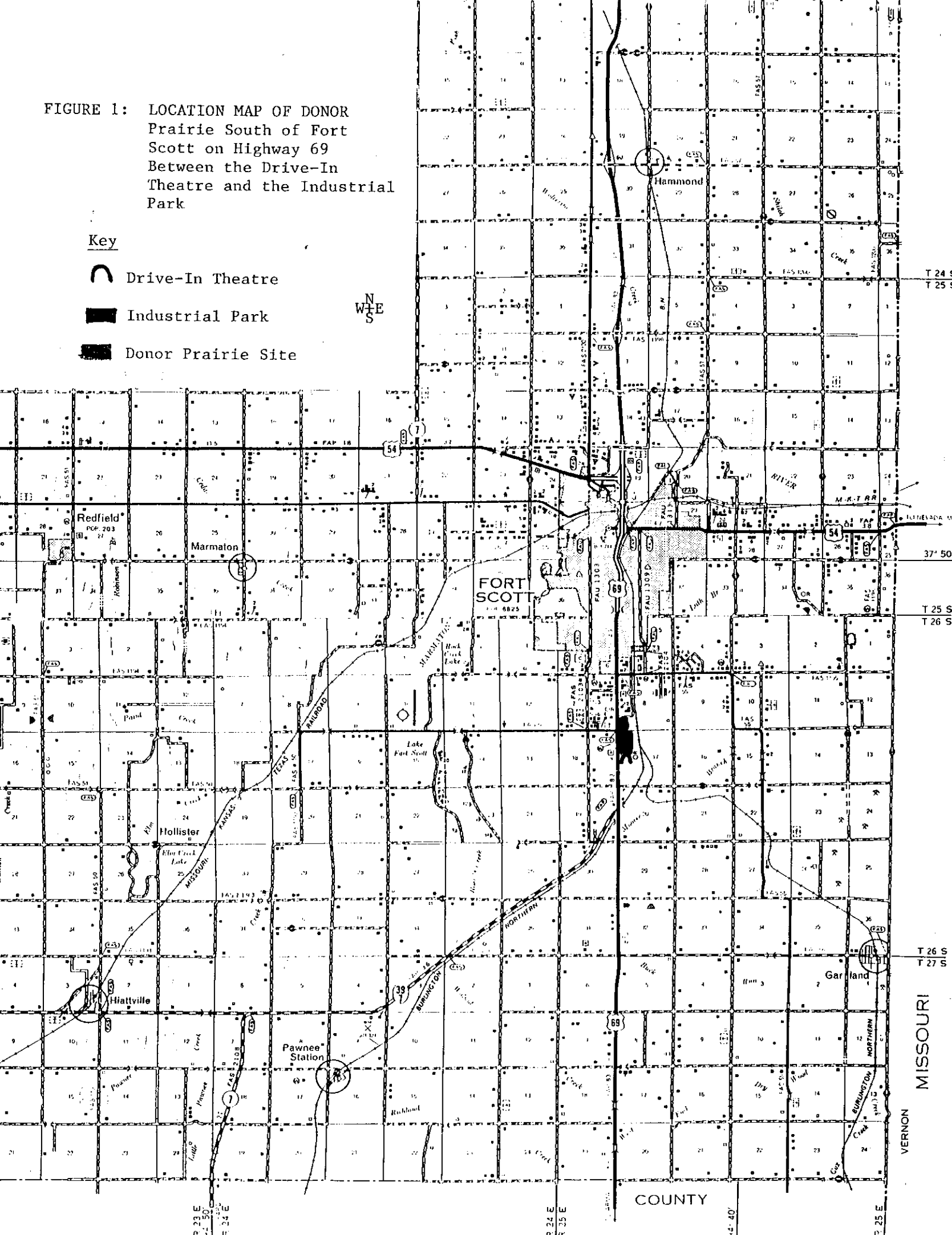
MATERIALS AND METHODS

The collection and transplantation of the prairie sod was accomplished through manual labor with the use of many tools.

FIGURE 1: LOCATION MAP OF DONOR
 Prairie South of Fort
 Scott on Highway 69
 Between the Drive-In
 Theatre and the Industrial
 Park

Key

-  Drive-In Theatre
-  Industrial Park
-  Donor Prairie Site



T 24 S

T 25 S

37' 50"

T 25 S

T 26 S

T 26 S

T 27 S

MISSOURI

VERNON

COUNTY

R 23 E
 R 24 E
 R 25 E
 R 26 E

R 40'

R 25 E

FIGURE 2: MAP OF FORT SCOTT NATIONAL HISTORIC SITE
 Prairie Units and Prairie Burn in Unit A

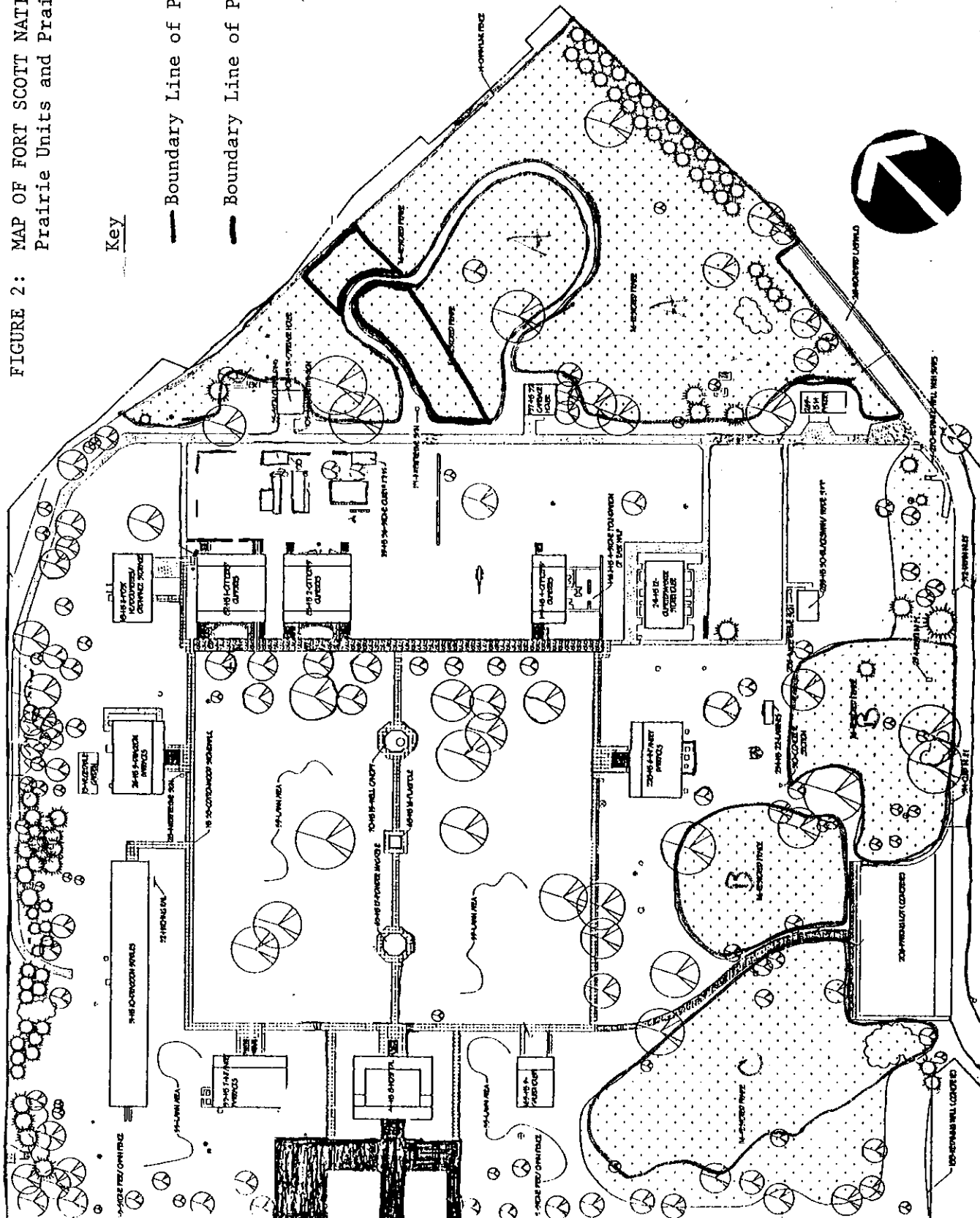
Key

— Boundary Line of Prairie Units

— Boundary Line of Prairie Burn in Unit A

LEGEND

- 160 ITEM NUMBER
- H5 B HISTORIC STEELPIPE NUMBER
- ⊗ QUICK COUPLE VALVE
- ⊙ WATER METER
- ▽ CLEANOUT
- ⊕ CONTAMINARY LIGHTING
- ⊗ UTILITIES / AC UNITS
- ⌒ STACKED WOOD WALLS
- ◇ TRASH RECEPTACLES
- NPS INTERPRETIVE SIGNS (MODERN)
- DRAIN INLET
- ▨ BRICK PAVEMENT
- ▧ COTTONWOOD STONE PAVEMENT
- ▩ FIELD STONE PAVEMENT
- ▨ CRUSHED LIMESTONE
- ▩ RESTORED PRAIRIE



These tools included: three shovels, a rounded tip spade, three 5-gallon buckets, 30 burlap bags, two wheelbarrows, water, many water hoses, a tarp, a small truck, and theushman. The small truck was used to transport all equipment needed to collect the prairie sod sections and to transport the sod back to Unit A for transplantation (Slides). The equipment used in collecting the sod were the shovels, spade, burlap bags, and the three 5-gallon buckets filled with water that was used to soak the burlap bags. Once a sod section was dug up, it was placed on a wet burlap bag then into the back of the truck to be transported to FSNHS. The majority of the sod sections were dug in the early morning. Those that were dug late in the afternoon were lightly watered, placed in the shade, and planted the next morning.

The average size of a sod section was around 12"W X 12"L X 9"D (Slides). A sod section size would range from 5"W X 5"L to 24"W X 48"L with the depth ranging from 4" to 18", all depending upon the amount of moisture in the soil at the time of digging. The depth of the sod section was just as important as the width or length because of the extensive root system of prairie species. But, the soil types of Clareson stony silty clay loam (Cs) and Ringo-Clareson complex (RC) have a root zone limitation of 30-32 inches thick due to the rocky substrate; therefore, limiting the root growth of the prairie species at 30-32 inches. When digging 4" to 18" deep in this root zone limitation, about 13-58 percent of the root growth of the prairie species is harvested.

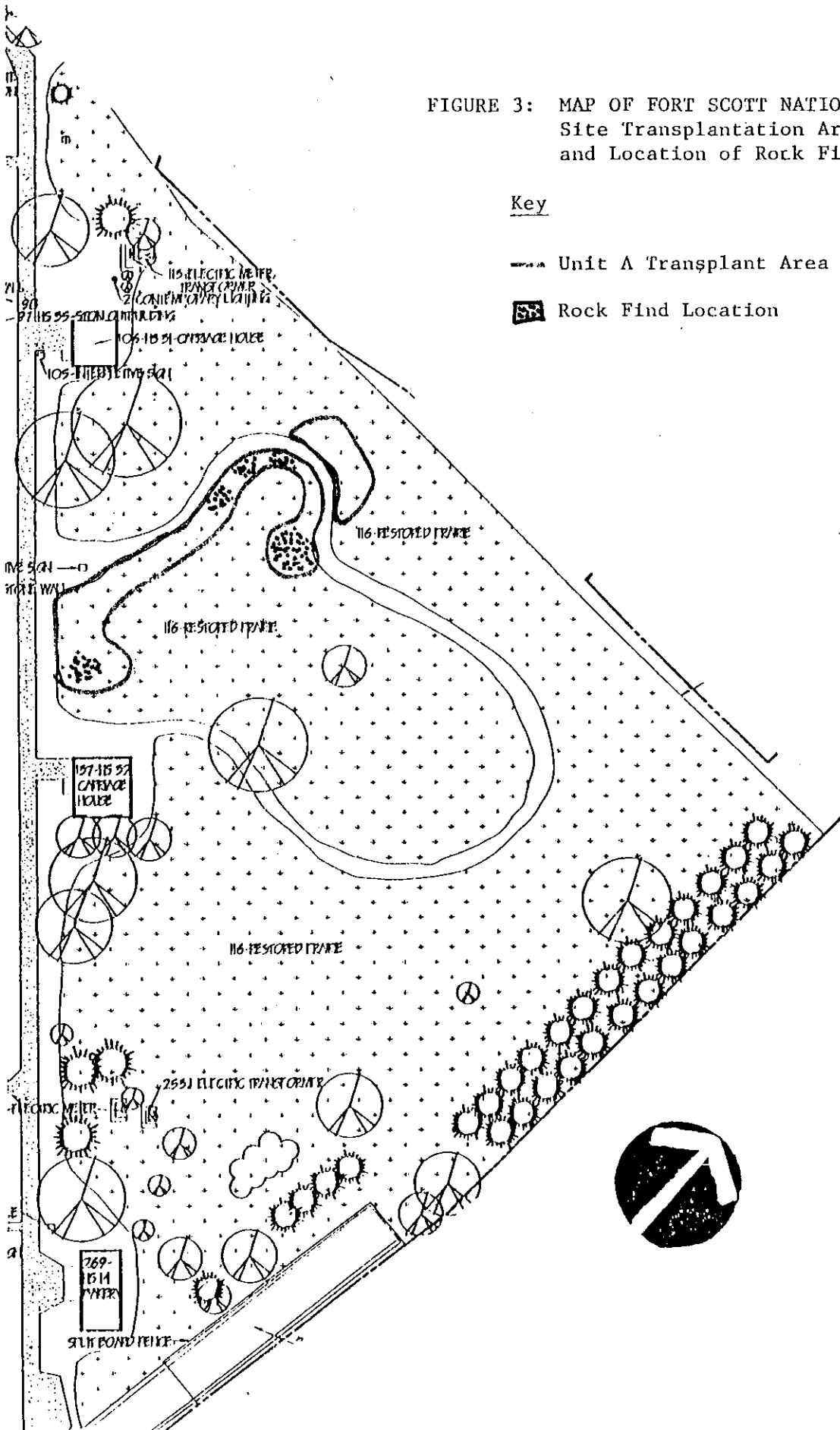
The transplanting of a prairie sod section was important because it moves more than just the grasses and forbs. The large sod sections are more likely to contain important components of a native grassland site (Clarke 1994). These components include an established seed bank, valuable mycorrhizal fungi, insects, soil invertebrates, and rhizobia bacteria that allow legumes to fix atmospheric nitrogen (Kearns 1985).

The sod sections were transplanted in the burn area of Unit A along the prairie trail in the late morning and the afternoon (FIGURE 3). The transplanted sections were either individually planted or many sections were planted in a large area. The transplant area was lightly watered the night before transplanting. This watering before transplanting ensured easier digging and also ensured that moisture was present in the soil at the time of planting. The sod sections were watered after transplantation and every weekday after that. In some areas dug for transplantation there was hand-laid rock exposed (FIGURE 3). The presence of the rock finds were noted and photographed by the historians for future reference.

KNOWN TRANSPLANTED NATIVE FORB

The donor prairie contained a wide diversity of native forbs that flowered from early spring to fall (TABLE 1). The presence of the fall flowering forbs was limited, most likely due to the yearly mowing of hay that tends to decrease their population. Some of the fall forbs that were identified were Ashy Sunflower (Helianthus mollis), Rosin Weed (Silphium integrifolium), Rough Blazing Star (Liatris aspera), and Grooved Yellow Flax (Linum

FIGURE 3: MAP OF FORT SCOTT NATIONAL HISTORIC Site Transplantation Area on Unit A and Location of Rock Finds



Key

Unit A Transplant Area

Rock Find Location

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

| SCIENTIFIC NAME | COMMON NAME | COEF |
|--------------------------------------|---------------------------|------|
| <u>Achillea millefolium</u> | Yarrow | 1 |
| <u>Amorpha canescens</u> | Leadplant | 8 |
| <u>Antennaria neglecta</u> | Feild Pussy Toes | 4 |
| <u>Arnoglossum plantagineum</u> | Prairie Indian Plantain | |
| <u>Asclepias sullivantii</u> | Prairie Milkweed | 9 |
| <u>Asclepias tuberosa</u> | Butterfly Milkweed | 5 |
| <u>Asclepias verticillata</u> | Whorled Milkweed | 2 |
| <u>Asclepias viridiflora</u> | Green Milkweed | 9 |
| <u>Asclepias viridis</u> | Spider Milkweed | 6 |
| <u>Baptisia australis</u> | Blue Wild Indigo | 8 |
| <u>Baptisia bracteata leucophaea</u> | Cream Wild Indigo | 6 |
| <u>Desmodium illinoense</u> | Illinois Tick Trefoil | 4 |
| <u>Dodecatheon meadia</u> | Shooting Star | 5 |
| <u>Echinacea pallida</u> | Pale Purple Coneflower | 7 |
| <u>Erigeron annuus</u> | Annual Fleabane | 1 |
| <u>Erigeron strigosus</u> | Daisy Fleabane | 3 |
| <u>Euphorbia corollata</u> | Flowering Spurge | 3 |
| <u>Fragaria virginiana</u> | Wild Strawberry | 2 |
| <u>Glandularia canadensis</u> | Rose Vervain | |
| <u>Helianthus mollis</u> | Ashy Sunflower | 6 |
| <u>Heliopsis helianthoides</u> | False Sun Flower | 5 |
| <u>Hieracium longipilum</u> | Long-Bearded Hawkweed | 5 |
| <u>Hypoxis hirsuta</u> | Yellow Star Grass | 4 |
| <u>Liatris aspera</u> | Rough Blazing Star | 10 |
| <u>Linum sulcatun</u> | Grooved Yellow Flax | 5 |
| <u>Lithospermum incisum</u> | Fringed Puccoon | 7 |
| <u>Penstemon pallidus</u> | Pale Bearded Tongue | 4 |
| <u>Penstemon tubaeiflorus</u> | Tube Bearded Tongue | 5 |
| <u>Petalostemum candidum</u> | White Prairie Clover | 8 |
| <u>Petalostemum purpurea</u> | Purple Prairie Clover | 8 |
| <u>Physostegia virginiana</u> | Obedient Plant | 5 |
| <u>Polygala sanguinea</u> | Feild Milkwort | 5 |
| <u>Polytaenia nuttallii</u> | Prairie Parsley | 8 |
| <u>Psoralea tenuiflora</u> | Scurfy Pea | 8 |
| <u>Pycnanthemum tenuifolium</u> | Slender Mountain Mint | 4 |
| <u>Ratibida pinnata</u> | Gray Headed Coneflower | 7 |
| <u>Rudbeckia hirta</u> | Black Eyed Susan | 1 |
| <u>Ruellia humilis</u> | Hairy Wild Petunia | 3 |
| <u>Salvia azurea</u> | Blue Sage | 4 |
| <u>Schrankia nutalii</u> | Cat's Claw Sensitive Bair | 6 |
| <u>Silphium laciniatum</u> | Compass Plant | 6 |
| <u>Silphium integrifolium</u> | Whole Leaf Rosinweed | 4 |
| <u>Sisyrinchium augustifolium</u> | Blue Eyed Grass | |
| <u>Sisyrinchium campestre</u> | Prairie Blue Eyed Grass | 4 |

| | | | |
|---------------------------------|------------------------|----|---|
| : <u>Solidago missouriensis</u> | Missouri Goldenrod | 4 | : |
| : <u>Solidago rigida</u> | Stiff Goldenrod | 6 | : |
| : <u>Spiranthes vernalis</u> | Spring Ladies' Tresses | 8 | : |
| : <u>Vernonia fasciculata</u> | Common Ironweed | 6 | : |
| : <u>Viola pedata</u> | Bird's Foot Violet | 5 | : |
| : <u>Viola pedatifida</u> | Prairie Violet | 10 | : |
| : | | | : |

sulcatum). The majority of the early spring to summer flowering forbs population was well established. Examples of these species include: Leadplant (Amorpha canescens), Butterfly Milkweed (Asclepias tuberosa), Scurfy Pea (Psoralea tenuiflora), White Prairie Clover (Petalostemum candidum), and Field Pussy Toes (Antennaria neglecta). The forbs found on the donor prairie range from high to low coefficients of conservatism. The transplantation of the some of the forbs was rather difficult due to their fibrous and extensive root systems. These plants include Amorpha canescens (Leadplant), Asclepias tuberosa (Butterfly Milkweed), A. viridis (Spider Milkweed), Baptisia australis (Blue Wild Indigo), B. bracteata leucophaea (Cream Wild Indigo), Schrankia nutallii (Cat's Claw Sensitive Bair), Silphium laciniatum (Compass Plant), and Psoralea tenuiflora (Scurfy Pea). The most dominant species found on the donor prairie were Leadplant, Spider Milkweed, Blue Wild Indigo, Cream Wild Indigo, Daisy Fleabane, Field Pussy Toes, Grooved Yellow Flax, White Prairie Clover, and Scurfy Pea. Only one or two plants of some plant species were located. These were Shooting Star (Dodecatheon meadia), Rough Blazing Star (Liatris aspera), Fringed Puccoon (Lithospermum incisum), and Prairie Indian Plantain (Arnoglossum plantagineum).

KNOWN TRANSPLANTED NATIVE GRASSES

The transplanted sod contained identified and unidentified native prairie grasses that were found in the donor prairie (TABLE 2). Of the identified grasses, Big Bluestem (Andropogon gerardii) and Side-Oats Grama (Bouteloua curtipendula) were the most abundant throughout the donor site. The presence of Gama Grass (Tripsacum dactyloides), Prairie Cord Grass (Spartina pectinata), and Prairie Dropseed (Sporobolus heterolepis) were found in large grouped areas throughout the donor site. Indian Grass (Sorghastrum nutans) and Canada Wild Rye (Elymus canadensis) were found in sporadic locations on the donor prairie.

| TABLE 2: KNOWN NATIVE PRAIRIE GRASSES FOUND IN PRAIRIE SOD TRANSPLANTATION SECTIONS | | |
|---|------------------------|------|
| SCIENTIFIC NAME | COMMON NAME | COEF |
| <u>Andropogon gerardii</u> | Big Bluestem | 5 |
| <u>Andropogon scoparius</u> | Little Bluestem | 5 |
| <u>Bouteloua curtipendula</u> | Side-oats Grama | 7 |
| <u>Elymus canadensis</u> | Canada Wild Rye | 5 |
| <u>Koeleria macrantha</u> | June Grass | 6 |
| <u>Panicum oligosanthos-scribnerianum</u> | Scribner's Panic Grass | 3 |
| <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 |

KNOWN POSSIBLE EXOTICS IN TRANSPLANTS

Since the donor site was a disturbed native prairie the presence of exotics was not uncommon (TABLE 3). One of the exotic's, Ox-Eye Daisy, is considered to be a prairie species

because it has naturalized itself in the prairies of the region. The Ox-eye Daisy (Chrysanthemum leucanthemum) was originally introduced in North America from Europe (Niering 1993). There were transplant sections with Ox-eye Daisy present in them. The population of this exotic on the donor site was extensive and would seem to indicate a large seed bed in the soil. All of the other exotics were either avoided in digging or the plants removed if found growing later at FSNHS transplant area.

| TABLE 3: EXOTIC PLANTS FOUND IN DONOR PRAIRIE SITE | |
|--|--------------------------|
| 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>Lespedeza cuneata</u> | Sericea Lespedeza |
| <u>Melilotus officinalis</u> | Yellow Sweet Clover |
| <u>Potentilla recta</u> | Rough Fruited Cinquefoil |
| <u>Prunella vulgaris</u> | Heal-All (Selfheal) |
| <u>Robinia pseudo-acacia</u> | Black Locust |
| <u>Setaria glauca</u> | Yellow Foxtail |
| <u>Trifolium pratense</u> | Red Clover |

TARGET VEGETATION

The target vegetation for removal in the summer of 1995 included the same extoic forbs and woody vegetation as the summer of 1994, with the addition of Gaint Ragweed (Ambrosia trifida), Curly Dock (Rumex crispus), and Velvet Leaf (Abutilon theophrasti) (TABLE 4). The three additional exotics were removed from the burn area in Unit A prior to the transplantation of prairie sod (FIGURE 3).

TABLE 4: FORT SCOTT NATIONAL HISTORIC SITE TARGET VEGETATION
for Removal in the Summer of 1995.

| Scientific Name | Common Name | Unit Location |
|------------------------------|---------------------|---------------|
| Exotic Vegetation | | |
| <u>Ambrosia trifida</u> | Giant Ragweed | A |
| <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>Rumex crispus</u> | Curly Dock | A |
| <u>Securigera varia</u> | Crown Vetch | A, C |
| <u>Sorghum halapense</u> | Johnson Grass | A, B, C |
| Woody Vegetation | | |
| <u>Cercis canadensis</u> | Redbud | B, C |
| <u>Julans nigra</u> | Black Walnut | A, B, C |
| <u>Morus alba</u> | White Mulberry | A, C |
| <u>Prunus americana</u> | Wild Plum | A, C |
| <u>Robinia pseudo-acacia</u> | Black Locust | A |
| <u>Ulmus americana</u> | American Elm | A, B |

TARGETED EXOTIC VEGETATION

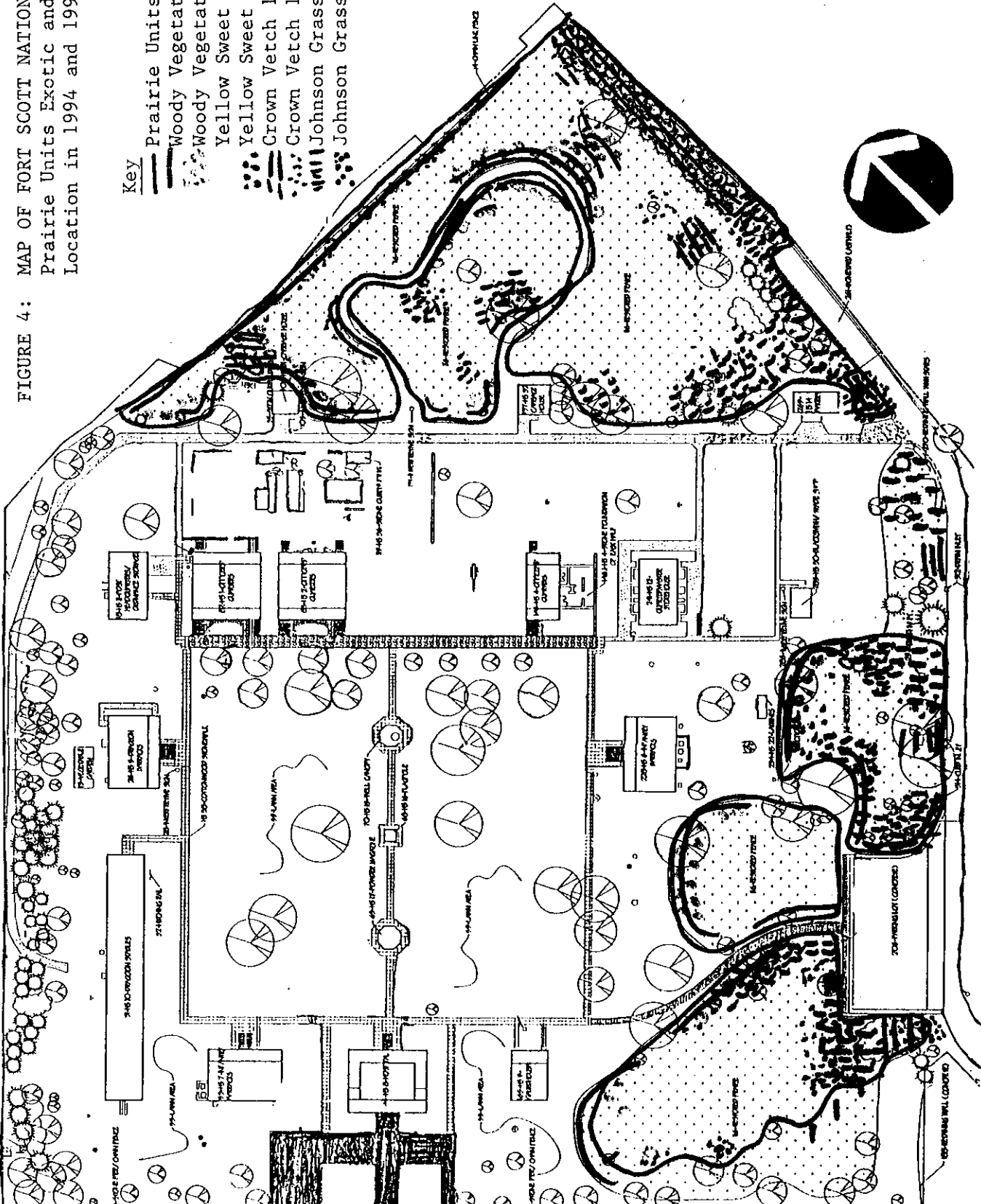
Securigera varia (Crown Vetch) population was reduced to some extent among the Austrian Pines (Pinus nigra) on Unit A from 1994 to 1995 (FIGURE 4). In 1994, the Crown Vetch was found to be well established in the Austrian Pines along the NE border of Unit A. Crown Vetch was still present in the same location in 1995, but the amount of regrowth was reduced. Unit C also contained the same small area of Securigera varia on the east side along the RV parking lot and the service road.

FIGURE 4: MAP OF FORT SCOTT NATIONAL HISTORIC SITE
 Prairie Units Exotic and Woody Vegetation
 Location in 1994 and 1995

- Key
- Prairie Units Border
 - Woody Vegetation 1994
 - Woody Vegetation 1995
 - Yellow Sweet Clover 1994
 - Yellow Sweet Clover 1995
 - Crown Vetch 1994
 - Crown Vetch 1995
 - Johnson Grass 1994
 - Johnson Grass 1995

LEGEND

- 160 ITEM NUMBER
- 158 HISTORIC STRUCTURE NUMBER
- ⊗ CUCK COUPLE VALVE
- ⊙ WATER METER
- ⊖ CLEANOUT
- ⊕ CONTINGUARY LIGHTING
- ⊗ UTILITIES / AC UNITS
- ⊠ SPACED WOOD WALLS
- ⊡ TRASH RECEPTACLES
- NPS INTERPRETIVE SIGNS (MOPERS)
- DRAIN INLET
- ▨ BRICK PAVEMENT
- ▧ COTTONWOOD STONE PAVEMENT
- ▩ FIELD STONE PAVEMENT
- ▨ CRIBBED LIMESTONE
- ▩ RESTORED FRAMES



Melilotus officinalis (Yellow Sweet Clover) regrowth in 1995 was also reduced from the area covered in 1994 (FIGURE 4). The largest amounts of Yellow Sweet Clover, in 1995, were found in Units A and C. In Unit A, Melilotus officinalis was located behind HS-14 (Historic Site-14) along the Boneyard Fence to the southern end of the Austrian Pines. The other small patches of Yellow Sweet Clover are located throughout Unit A. The presence of Yellow Sweet Clover in Unit C was greatly reduced due to the reduction of the southern boundary line. That boundary was reduced to eliminate the presence of the exotic and was included in the weekly mowing of the sites ground by maintenance. The remaining area of Unit C also had reduced invasion of Melilotus officinalis and was mostly located on the SW slope by the RV Parking Lot. The heavy invasion of Yellow Sweet Clover in Unit B was also reduced by the same process as Unit C. The northern boundary of Unit B was reduced for mowing by maintenance. The remaining area of Unit B contained a few spotted locations of Yellow Sweet Clover.

There was minor reduction of Sorghum halapense (Johnson Grass) in all of the Prairie Units (FIGURE 3). The biggest reduction of large areas of Johnson Grass to small sporadic locations was found in Unit B. This reduction was due to the reduction of the northern boundary line of Unit B. Unit C also contained sporadic areas of Johnson Grass along the brick path to the RV parking lot, by the plum thicket, and on the south side of the RV parking lot. The northeast corner behind HS-14 to the east side and up to the Austrian Pines in Unit A contains many

small to large areas of Sorgham halapense. The largest of these areas are located to the west and east of HS-14. Johnson Grass was also found in two locations in the burn of Unit A (FIGURE 3). The burn area of Unit A also contained sporadic species of Ambrosia trifida (Giant Ragweed), Abutilon theophrasti (Velvetleaf), and Rumex crispus (Curly Dock).

All of the prairie units still contain a limited distribution of Festuca arundinacea (Tall Fescue), Bromus tectorum (Downy Brome), and Bromus inermis (Smooth Brome). The Tall Fescue seemed to be stunted from the accidental prairie burn in Unit A (FIGURE 3).

TARGETED WOODY VEGETATION

Robinia pseudo-acacia (Black Locust) and Prunus americana (Wild Plum) had more suckling sprout regrowth than Morus alba (White Mulberry), Ulmus american (American Elm), and Juglans nigra (Black Walnut) due to the nature of the species (TABLE 4). The regrowth of Black Locust sprouts behind HS-31, on Unit A, covered the same area as 1994. The sprout regrowth of all species was evident along the prairie trail in Unit A. Unit B had heavy regrowth along the N border behind HS-6 and the border behind HS-22, the Latrine. The regrowth of any woody vegetation along the brick path in Unit B and Unit C was reduced to only two or three sprouts. The woody vegetation located on the W border E of HS-9 in Unit C in 1994 was reduced to six sprouts.

REMOVAL OF EXOTIC AND WOODY VEGETATION

The removal of exotic and woody vegetation at FSNHS during the summer of 1995 was limited due to the importance of the

prairie sod transplantation project. The removal that was accomplished was by manual and mechanical methods.

EXOTIC VEGETATION REMOVAL

The methods of manual removal of exotic vegetation was done by handpulling and shovel to remove the root systems. Melilotus officinalis (Yellow Sweet Clover) and Sorghum halapense (Johnson Grass) were pulled by hand out of all three Units after all night rains (FIGURE 4). One Johnson Grass area that was located along the Prairie Trail, Unit A, was removed by hand pulling and shovel to provide an area for prairie sod transplantation. All Johnson Grass roots that were exposed were removed from the soil before the soil was used in the transplantation project. The other exotics that were removed by hand in the burn area of Unit A were Ambrosia trifida (Giant Ragweed), Abutilon theophrasti (Velvetleaf), and Rumex crispus (Curly Dock). The hand-held shears used for seed collection in 1994 were used for the removal of Bromus inermis (Smooth Brome), Bromus tectorum (Downy Brome), and Festuca arundinacea (Tall Fescue) seed heads. The target area for this method of removal was behind HS-14 in Unit A. The push mower was used in the removal of Crown Vetch and Johnson Grass from behind HS-14 and among the Austrian Pines.

WOODY VEGETATION REMOVAL

Unit A was the target area for the removal of the woody vegetation (FIGURE 4). The target area was the border between HS-32 and the prairie trail interpretive sign and along the prairie trail. Ulmus americana (American Elm), Julans nigra (Black Walnut), and Robinia pseudo-acacia (Black Locust) were

extracted with a shovel to remove as much of the roots as possible.

NATIVE FORB COLLECTION

The native forbs that were collected in the summer of 1995 were located on the donor prairie site south of town on Highway 69 (FIGURE 1). The forbs that were collected include: Amorpha canescens (Leadplant), Asclepias tuberosa (Butterfly Milkweed), Asclepias viridis (Spider Milkweed), Baptisia australis (Blue Wild Indigo), Baptisia bracteata leucophaea (Cream Wild Indigo), Dodecatheon meadia (Shooting Star), Penstemon tubaeiflorus (Tube Bearded Tongue), Physostegia virginiana (Obedient Plant), and Polytaenia nuttallii (Prairie Parsley). The silky-hair pubescence found on both species of Asclepias seeds was removed by hand. The seeds of Shooting Star were placed on the transplant sod section by the plant. The remaining seeds that were collected were cleaned and placed with the seeds collected in 1994.

The seeds of Purple Prairie Clover, White Prairie Clover, Gray-Headed Coneflower, and Purple Coneflower that were collected in the summer of 1994 were taken to Wilson Creek National Battlefield. Those seeds were cleaned with a hammermill and a seed cleaner.

REFERENCES

- Bader, Brain J.. "Seed Handling Basic Concepts." UW-Arboretum. 1-7-1992.
- Clarke, Wanda M., Thomas B. Bragg. "Movement of Tallgrass Prairie Plant Species from Sod Transplant into Adjacent Reestablished Grassland." Prairie Naturalist. March 1994. p67-81.
- "Common Weeds of The United States." The Agricultural Research Service of the United States Department of Agriculture. Dover Publication Inc.. New York. 1971.
- Freeman, Craig C., Eileen K. Schofield. "Roadside Wildflowers of the Southern Great Plains." University Press of Kansas. 1991.
- Kearns, S. Kelly. "A Comparison of Transplanting Times and Methods for Salvaging Prairie Forbs and Grasses." Proceedings of the Ninth North American Prairie Conference. 1985.
- Ladd, Doug. "Tallgrass Prairie Wildflowers, A Falcon Field Guide." Falcon Press Publishing Co. Inc.. Helena and Billings, Montana. 1995.
- McGregor, Ronald L.. "Flora of the Great Plains." University Press of Kansas. 1986.
- "Missouri Flora." Missouri Department of Conservation. 1992.
- Niering, William A., Nancy C. Olmstead. "The Audubon Society Field Guide to North American Wildflowers Eastern Region." Alfred A. Knop Inc. New York, 1993.

- Phillips, Harry R.. "Growing and Propagating Wildflowers."
University of North Carolina Press. 1986.
- "Soil Survey of Bourbon County, Kansas." National
Cooperative Soil Survey. February 1981.
- Spencer, Edwin Rollin. "All About Weeds." Dover Publications
Inc.. New York. 1968.
- VanBruggen, Theodore. "Wildflowers: Grasses and Other
Plants of the Northern Plains and Black Hills." Fenske
Printing Inc. 1983.