# SECTION 3: THE AFFECTED ENVIRONMENT

The preserve's landscape of rolling hills, unplowed prairie, tree-lined drainages, fenced pastures, cultivated bottomlands, and stone and frame structures represents the relationship between the preserve's natural and cultural resources. The chert and limestone underlying the preserve's topography, along with the climate and drainage patterns of the land, nurtured the prairie grasses and forbs, and was, as a consequence, integral to supporting animal and human life. Drawn to the land because of these rich natural resources, humans used the bounty they found here to further shape the land.

## NATURAL RESOURCES

According to most authorities, the tallgrass prairie was the dominant presettlement vegetation type in the eastern third of the Great Plains occupying approximately 142.62 million acres (60 million hectares); today, only an estimated four percent remains (Samson and Knopf 1994). Now the most extensive portion of this ecosystem comprises a narrow strip within the Flint Hills region of eastern Kansas and northern Oklahoma (US Department of the Interior 1979). Preserved from the plow by a unique combination of thin, rocky soils, and perpetuated by fire, climate, and grazing, the preserve contains a nationally significant remnant of this once vast tallgrass ecosystem. The preserve is dominated by unplowed tallgrass prairie, and is rich in springs, seeps, and intermittent and perennial streams that dot the landscape.

### Geology

The preserve is wholly within the Flint Hills physiographic province. The Flint Hills have been formed by the erosion of a belt of resistant limestone and softer shale and sandstone that includes 40 separate formations and measures 3,000 feet (915 meters) in total thickness (Jones 1998). The highest elevations exceed 1,600 feet (500 meters) and the lowest are 1,150 feet (350 meters) in the Cottonwood River valleys.

### Climate

The climate of the Flint Hills is sub-humid, continental with large daily, monthly, and yearly variations in temperature and precipitation. The average mean annual temperature is about 55° F (13° C). Generally, temperatures range from the mid- 90s (°F) during the summer months to lows in the 30s (°F) in January (Kansas State University 1948-1996). The growing season averages more than 180 days. The Flint Hills lie in the 30-36 inch (76.9-92.3 cm) rainfall belt (Anderson 1953).

These large daily variations in temperature and precipitation can cause drastic shifts in weather patterns, resulting in safety concerns. The rapid approach of storms and other severe weather systems, with associated lightning and flash floods, are major concerns during certain months of the year. Likewise, the absence of these storms may bring elevated temperatures and the danger of heat stress to those unfamiliar with summer conditions on the prairie.

## Minerals

A 12-mile (20-km) wide uplift that extends through the preserve dominates the petroleum geology of Chase County. According to Carr, this uplift is the most important feature in both structural and stratigraphic trapping of oil and gas in Chase County. The preserve and surrounding area have a history of mineral activities (gas production) since 1929 (Carr 1998). Neither NPT (the surface landowner) nor the NPS owns or controls the current mineral interests. These were retained by Boatman's Bank (Trustee), now Bank of America, when the property was purchased by NPT. The bank reserved all oil, gas, and other minerals of any kind whether a liquid, solid, or gas hydrocarbon or non-hydrocarbon lying more than 200 feet (61 meters) below the surface, for a period of 35 years beginning June 4, 1994. The Trustee will not conduct exploration within 220 yards (201 meters) of the main house and barn, and will not engage in any commercial hard rock mining, surface mining, strip-mining, coal mining, or quarrying. The Trustee has assigned oil and gas exploration working interest to Chisholm Resources, Inc.

Presently, gas production on the preserve is from very shallow reservoirs (200-400 feet; 61-122 meters) and is of a low pressure and a low flow rate (Carr 1998). While it is generally agreed that these shallow reservoirs have additional potential, the characteristics of the gas produced may make production uneconomical (Carr 1998, National Park Service 1999). Potential production from deeper formations within the preserve would have to come from poorly defined strata and would be highly unlikely or speculative at best (Carr 1998, National Park Service 1999).

According to Carr, a total of 47 gas wells have been drilled on the preserve: 22 have been plugged and abandoned, and 25 remain shut-in, non-productive (National Park Service 1999). In addition to the shut-in gas wells, surface production equipment including well flowlines, field gathering lines, and meter runs exist on the preserve.

Associated with these operations are soil contamination, resulting in the loss of vegetation cover; actively eroding creek banks; and a lack of adequate signage and fencing to ensure resource protection (National Park Service 1999).

## Soils

Several soil associations are identified within Chase County but no site specific soil survey has been completed for the preserve. Soils are derived from limestones, sandstones, and shales. The soils may be relatively deep in the bottoms of the larger stream valleys, but are typically thin on the flanks and tops of the hills themselves; bedrock exposures are visible throughout the region (Jones 1998). The soils are excessively drained, and runoff is rapid with slopes ranging from 30-50% found on the preserve (see Figure 9).

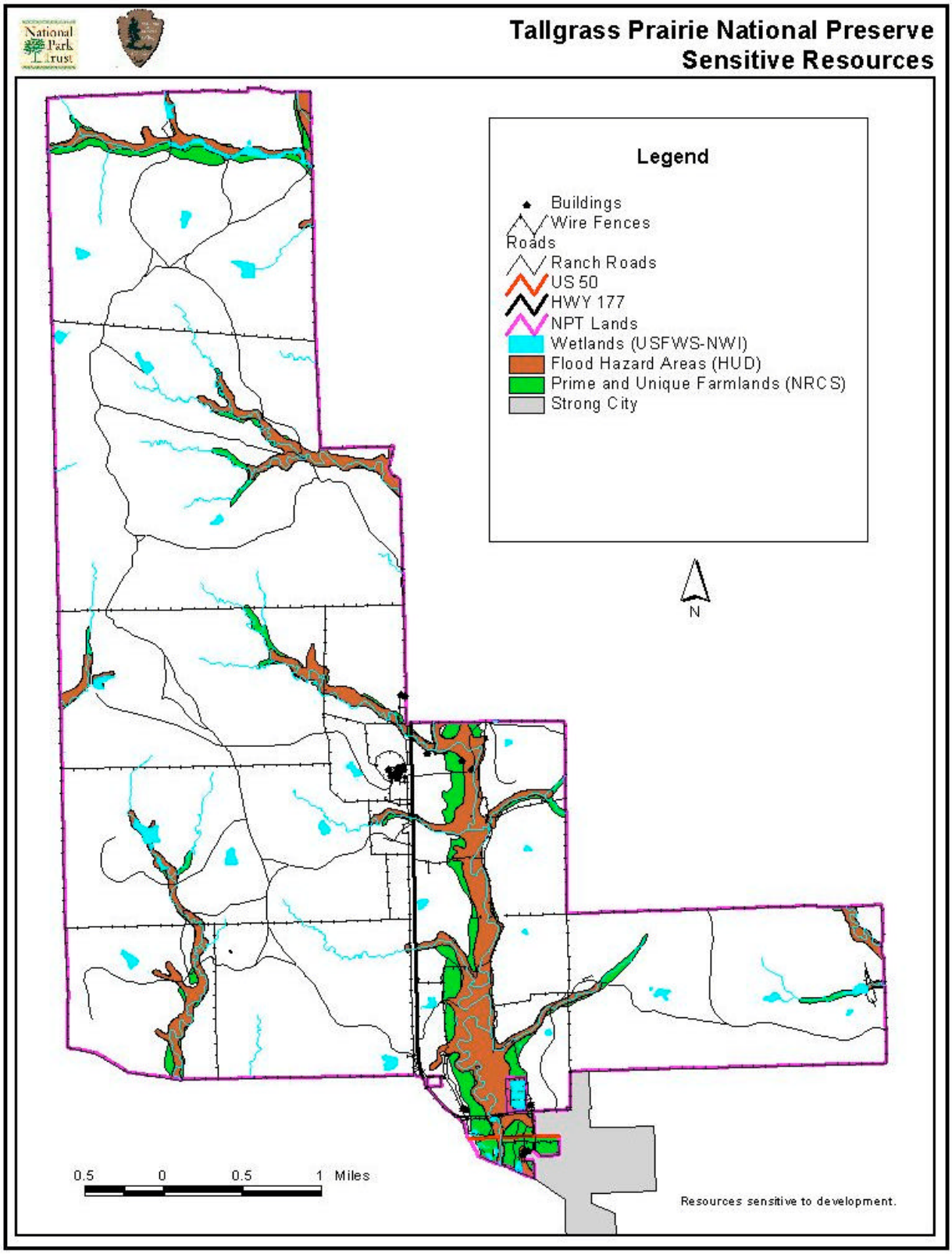

Tallgrass Prairie National Preserve
Sensitive Resources
Legend
Buildings
Wire Fences
Roads
Ranch Roads
US 50
HWY 177
NPT Lands
Wetlands (USFWS-NWI)
Flood Hazard Areas (HUD)
Prime and Unique Farmlands (NRCS)
Strong City
N
0.5 0 0.5 1 Miles
Resources sensitive to development.

**Figure 1**

**Prime and Unique Farmlands**

Prime or unique farmlands are defined as soils particularly suited for growing general or specialty crops. Prime farmland produces general crops such as common foods, forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables, and nuts.

There are three soil units within the preserve that are considered "prime farmland" soils--Redding, Chase, and Ivan (Broyles, 1999 personal communications). These are located in the area now planted in brome grass, and in some other areas of the preserve that historically have been under cultivation.

## Vegetation

Survey notes from the 1850s describe areas of “nearly all prairie” and a “small quantity of timber on the creeks” in the region of the present day preserve (Barnard 1997). Recent attempts by Lauver (1998) to classify vegetation alliances and plant communities found eight plant community types occurring within the preserve. The preserve is dominated by the *Andropogon gerdardii* (big bluestem) – *Sorgashastrum nutans* (Indian grass) – *Schizachyrium scoparium* (little bluestem) Flint Hills herbaceous vegetation community, or tallgrass prairie. Prairie is found on nearly level land as well as steep slopes on uplands and on a wide array of soils. Other community types such as the Bulrush-Spikerush Marsh and Limestone outcrops are very narrow and found in small patches (Lauver 1998).

The prairie vegetation, under the current grazing lease, is burned every spring, usually around March 20$^{th}$; it is grazed under a 35-year lease arrangement that began in 1995. The vegetation is subjected to an early intensive stocking regime, averaging two acres for a 550-pound steer for approximately 90-100 days between April 15$^{th}$ and July 31$^{st}$. The cattle are then removed and the vegetation is allowed a period of regrowth until the next spring.

The floodplain forests along Fox and Palmer creeks are examples of the ash-elm-hackberry-burr oak-black walnut floodplain forest community. It is characterized by nearly level bottoms and terraces along major streams and rivers (Lauver 1998). This floodplain community has been called the rarest in the state because of the tendency, historically, to plow these deeper soils and to replace native vegetation with agricultural or grazing crops (National Park Service, 1998 Enhancement Report). The bottomland along Fox Creek is currently planted in brome grass. Cool season grasses like brome are usually grazed in the spring between March 16 and June 30 and again in the fall between about September 1 and December 31, or they are cut for hay.

The riparian forest along Fox Creek has been heavily used by livestock and shows signs of soil compaction, erosion, and loss of herbaceous species. Some row crops are planted in the southern area along Fox Creek under an annual lease arrangement with NPT. The floodplain vegetation along Palmer Creek appears to be diverse and healthy (National Park Service Water Resources Division trip report March 1997).

Dominant species, identified by the Kansas Biological Survey, are *Andropogon gerdardii* (big bluestem), *Schizachyrium scoparium* (little bluestem), *Bouteloua curtipendula* (sideoats grama), *Amorpha canescens* (leadplant), *Sorgashastrum nutans* (Indian grass), *Buchloe dactyloides* (buffalograss), *Vernonia baldwinii* (ironweed), *Psoralea tenuiflora* (wild alfalfa), and *Bouteloua*

*hirsuta* (hairy grama). The relatively high cover of buffalograss and ironweed indicates that some areas of the preserve (ridgetops and creek floodplains) are prone to overgrazing (Lauver 1998).

More than 400 species of vascular plants have been identified within the preserve as of 1999, from observational data and 11 photopoint sites (Barnard 1999). Additional vegetation data documents 46 plant species from 100 plots within 10 sampling sites from the preserve. This research noted a dramatic decline in vegetative cover between the June and August sampling periods (Thomas 1997). Presently, floral data collection continues as part of a photopoint record (Barnard 1998) and vegetation community transects have been established within the riparian zones and selected prairie sites covering 100 individual plots (Thomas 1997).

**Threatened and Endangered Plant Species**

No plants are included on the state threatened, endangered, or Species in Need of Conservation (SINC) list (Kansas Department of Wildlife and Parks. Strategic Plan 1991-1996). However, two plants found within Kansas, *Platanthera praeclara* (western prairie-fringed orchid) (Sheviak and Bowles) and *Asclepias meadii* (Meades milkweed) (Torrey ex A. Gray), are on the federal list of threatened species. Neither of these are known to be within the preserve; surveys for other species have been limited or non-existent.

**Ecologically Critical Areas or Unique Natural Resources**

The tallgrass prairie is the dominant vegetation community within the preserve and constitutes a unique resource on a national and global scale. This habitat is also listed as state prime habitat (Kansas Department of Wildlife and Parks. Strategic Plan 1991-1996).

The many springs and seeps within the preserve, having associated free-flowing, intermittent, or perennial streams, are prime habitat within the state and considered crucial habitat "wherever they occur" (Kansas Department of Wildlife and Parks. Strategic Plan 1991-1996). Two perennial streams within the preserve form the habitat for the federally-listed endangered species, the *Notropis topeka* (Topeka shiner).

**Exotic Plant Species**

Over 30 plant species classified as "non-native" within the state have been found within the preserve. Many of these plant species do not constitute a serious threat to the resource, including *Lamium amplexicaule (L.)* (henbit), *Poa pratensis (L.)* (Kentucky bluegrass), and *Stellaria media (L.) (cyrillo)* (common chickweed). Other species, such as some members of the *Bromus* group or sweet clovers, are only of concern to severely impacted or overgrazed prairies.

*Andropogon Bladii* (Caucasian bluestem) represents a serious threat and has been found within the preserve. Control of this species is difficult because it responds positively to fire and is not impacted by mowing or normal grazing regimes. It has been found on the preserve in three sites, the largest, approximately one acre (0.4 hectares) in size. Dr. Clenton Owensby, Professor in the Department of Agronomy at Kansas State University (KSU), stated that he fears Caucasian bluestem more than any other exotic (Clubine 1992).

Special attention should be given to state-listed noxious weeds and especially to potential problem species such as *Lespedeza cuneata* (sericea lespedeza). While not found within the preserve, this species "may pose a serious threat to the biotic integrity and biodiversity of Flint Hills tallgrass prairie in the next decades" (National Park Service 1998 Enhancement Report).

## Water Resources

### Streams and Creeks

The major aquatic resources within the preserve consist of Palmer Creek, a tributary to Fox Creek, located in the northern portion of the preserve and flowing west to east; and Fox Creek, a major tributary to the Cottonwood River, which bisects the preserve flowing north to south. Floodplains for these stream reaches have been digitized and mapped from the Federal Emergency Management Agencies Flood Insurance Rate Maps. Additional unnamed tributaries discharge into the Fox Creek.

In 1998, the Kansas Department of Health and Environment initiated a monitoring program for Fox and Palmer creeks involving one fixed site on both. The sampling includes pH, temperature, dissolved oxygen, biological oxygen demand, nutrients, organics, heavy metals, bacteria, and some invertebrate samples. Prior to this program, no formal sampling procedure had been implemented, therefore routine water quality data is lacking.

The initial sampling in July 1998, showed extremely high fecal coliform and fecal streptococcus counts in both Fox and Palmer creeks. The counts from the August sampling were greatly reduced. (Kansas Health & Environment Laboratory 1998). The July samples exceeded the state water quality standard coliform count for whole body contact of 200/100 ml and also the state standard for non-contact, which is 2000/100ml. The high fecal counts may be the result of non-point source pollution due to runoff from heavily grazed pastures (Department of Health and Environment Kansas Water Quality assessment 1996).

Some earlier water quality data for Fox Creek is associated with fisheries sampling efforts. Fox Creek was given a high score for habitat for aquatic macroinvertebrates. Ninety-seven individual insect species and 23 species of fish were collected. However, Fox Creek was rated as ‘poor” in stream health, mainly due to an increase in species tolerant to pollution and a decrease in intolerant species (Kansas Department of Wildlife and Parks 1995**).**

A recent follow-up evaluation was performed on three preserve aquatic resources using a Bureau of Land Management technique for assessing riparian areas. This technique evaluates 17 factors including hydrology, vegetation, and stream geomorphology, and results in a finding in one of three categories: functioning, functional-at-risk, or nonfunctioning. Palmer Creek was assessed in two locations: a west portion and an east portion close to Fox Creek. The west segment was judged functioning, despite some concerns over the lack of woody species. The eastern portion exhibited degraded conditions due to erosion and was labeled nonfunctioning. An unnamed tributary to Fox Creek was labeled functional-at-risk due to incising at its lower end. The other condition assessments for this area were notable for their excellence (National Park Service Water Quality Division, trip report October 1997).

### Wetlands

Wetlands are an imperiled national resource, with a loss rate of 300,000 – 450,000 acres (121,114-181,671 hectares) annually on a national scale (Feierabend and Zelzany, 1987). Wetlands help convert plant material into nutrients; they function in flood and erosion control; and they improve water quality. The NPS strives for a “no-net-loss” of wetlands in any management action affecting those resources. Because of the lack of site-specific information regarding wetlands within the preserve, the NPT, through the Natural Resource Conservation Service (NRCS) has initiated a wetlands survey. This survey and subsequent NPS planning, management, and protection actions will be in compliance with Director’s Order and Procedural Manual #77-1: Wetlands Protection.

Current information regarding wetlands has been derived from the U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI). The Housing and Urban Development (HUD) flood hazard maps provide some information on some type of floodplain delineation. The state of Kansas reports all state and federal areas containing wetlands, but does not include the majority of wetlands on private lands. Wetlands within the state are currently classified as "waters of the state," and are designated for noncontact recreation, food procurement, and aquatic life support. There is no estimate of wetland losses within the state as of 1996, according to the Kansas Water Quality Assessment Report (Kansas Department of Health and Environment 1996).

### Stock Ponds, Seeps, Springs

Additional water resources include numerous seeps and springs; 26 ponds constructed for stock use, including Peyton Creek Detention Dam No.104, a 200-acre-ft watershed retention impoundment constructed under Permit No. DCS-0142 and operated by Peyton Creek Watershed District 71; and several tributaries with variable flows. The stock ponds serve as water sources for cattle and as retention ponds for surface water runoff during storm events.

The presence of a federally-listed species, *Notropis topeka* (Topeka shiner), in a tributary downstream from a pond has created concerns over the possibility of dam failure and the introduction of fish species from the pond which might impact that endangered species. However, the preserve lacks any water quality or biological data on species present within these ponds except for a survey for potential recreational fishery within ten ponds conducted by the Kansas Department of Wildlife and Parks (Kansas Dept. of Wildlife and Parks. 1996. Report: Ponds on the Z-Bar Ranch). A recent inventory of the 26 dams provided physical data regarding the ponds, dimensions, and maximum capacity. While all were classified as having a "low" hazard potential, a number of dams were identified as being in need of corrective work to assure structural soundness (Rizzo 1998).

The preserve lacks long-term data sets on water quality, hydrology, and geomorphology.

## Wildlife

### Mammals

Little is known about the mammal species within or transient to the preserve. Approximately 120 mammal species, including transient and exotic, occur within the state (Kansas Department of Wildlife and Parks Strategic Plan 1991-1996). Some adjunct data does exist for the area of the preserve with a total of 59 species of mammals reported by Moore in 1990 for Chase, Lyon, and Morris counties. The list was compiled from references dating from 1958, 1981, and 1985, and provides general information for mammals that might be sighted within the preserve.

Large mammal species, such as *Odocoileus hemionus hemionus* (mule deer*), Odocoileus virginianus* (white-tailed deer), and *Antilocapra americana* (antelope) have been observed within the area of the preserve. *Bison bison* (bison) were "abundant" in all counties in the state when the first European settlers arrived. They were gone from the Flint Hills area by the early 1870s; the last reported sightings in the state were in 1898 (Choate 1987). The report by Moore also contains four species that have historical sightings but are no longer found: *Ursus*

*americanus* (black bear), *Ursus horribilis* (grizzly bear), *Felis concolor* (mountain lion), and *Cervus canadensis* (elk).

Little is known regarding small mammals within the preserve. Restoration of some non-huntable species such as the *Lutra canadensis (Schreber)* (river otter) took place in the Cottonwood River during the 1970s (Sorenson, 1998, personal communication).

**Birds**

Bird species information compiled by the Kansas Ornithological Society documents 428 species of birds known to occur within the state. The NPS entered into a three-year grassland bird study with the U.S. Geological Survey, Biological Resources Division, which involved eight parks, including the preserve. The field work for the preserve study, a baseline bird survey, was completed in August 1999 with the final report identifying 132 bird species with 15 of those being specifically grassland associated species. The report recommends burning prior to breeding season or in the fall and burning on a 2- to 5-year rotation with variable frequency and seasonality.

The Kansas Coordinator for Partners in Flight Program has voiced concerns regarding species in decline, such as the *Tympanchus cupido (L.)* (greater prairie chicken). Studies of grassland bird reproduction and land management treatments from Konza and northeastern Oklahoma have shown that spring burning followed by grazing (especially early intensive stocking) resulted in reproduction levels below replacement rates (Kansas Biological Survey, personal communication, 1998).

**Reptiles and Amphibians**

Twenty-eight species of amphibians (8 salamanders, and 20 frogs and toads) and 53 species of reptiles (4 turtles, 12 lizards, and 37 snakes) are found in the state (Kansas Department of Wildlife and Parks Strategic Plan 1996). Twenty-one species, including both amphibians and reptiles, are found at the preserve (Kansas Herpetological Society 1997). However, these were identified in a cursory look, conducted by largely untrained volunteers, over a two-day period.

**Fisheries**

Twenty-four species of fish were identified in Fox Creek during a 1995 sampling effort (Kansas Department of Wildlife and Parks 1996). Concern was voiced at that time over the presence of *Micropterus salmoides (Lacepede)* (largemouth bass) and the absence of *Micropterus punctulatas (Rafinesque)* (spotted bass), indicating negative changes in the native fish fauna. Another sampling of Fox Creek in 1996 identified species that indicate a disturbed or unsettled community. The large number of stock ponds is thought to contribute to this imbalance, as species are released from ponds during flood events (Tillma 1996).

Additional sampling by the Kansas Department of Wildlife and Parks within Palmer Creek and two unnamed tributaries found 14 species of fish, including the Topeka shiner and the *Luxilis cardinalis* (cardinal shiner). The Topeka shiner, found in two of the unnamed tributaries, is federally listed as an endangered species under the authority of the Endangered Species Act of 1973 (Final Rule signed 11/25/98); and the cardinal shiner is a State SINC species. *Pimephales promelas (Rafinesque)* (fathead minnow), found in large numbers in ponds, were also located in the tributary headwaters, implicating the ponds in affecting the natural fishery (Kansas Department of Wildlife and Parks 1997).

When the Kansas Department of Health and Environment began monitoring Fox Creek, initial sampling found five species of unionid mussel, including the exotic *Corbicula fluminea* (Asiatic clam) (Medland 1997, personal communication).

**Threatened, and Endangered Species**

The Topeka shiner is federally-listed as an endangered species under the authority of the Endangered Species Act of 1973 (Final Rule signed 11/25/98).

The federally-listed threatened *Haliaeetus leucocephalus* (bald eagle) may also occasionally occur on the preserve.

The federally-endangered *Noturus placidus* (Neosho madtom) is suspected of being in the Cottonwood River of which Fox Creek is a tributary (National Park Service "Enhancement Report" 1998); however, it has not been found at the preserve.

The Kansas Natural Heritage inventory monitors some 130 species of vertebrates and invertebrates and some 400 species of plants in Kansas**.** The cardinal shiner is a State SINC species. As noted above, the Topeka shiner has been found in two unnamed tributaries within the preserve. No other occurrences are documented from within the preserve, although no formal surveys have been conducted for many of these species (Busby 1997, personal communication).

All aquatic areas are recognized as "hot spots" and should be sampled for invertebrates and mussels. Springs and seeps are considered as sites with high potential for biodiversity on the prairie, according to recent findings on the Konza Prairie. About 28% of the vascular plant species at Konza are found associated with these areas. Similar findings may also be true for aquatic invertebrates (National Park Service "Enhancement Report" 1998). It is thought to be highly unlikely that rare or endemic terrestrial plant or animal species will be discovered at the preserve.

## Air Quality

The Clean Air Act, P.L.88-206 as amended, designates units of federally-owned lands into different categories of air quality. According to specialists within the National Park Service Air Quality Division, the preserve, if federally owned, would fall in the Class II category and all applicable state air quality regulations would apply. (Flores, NPS Air Quality Division 1999, personal communication).

Site specific air quality data for the preserve is lacking, but overall, the air quality for the area is presumed to be good (Weir, 1997 personal communication, Kansas Department of Health and Environment). Particulate data, from the 1970s, exists for an Emporia station (approximately 18 miles (30 kilometers) east of the preserve). All of the current air quality data comes from a Wichita station; no data is currently being collected from Chase County or the preserve area. Analysis of lead, carbon monoxide, and sulfur dioxide levels revealed no problems that would impact the preserve. The only exceptional events with particulate matter less than 10 microns (PM-10) were due to dry, dusty conditions (Wier 1997, personal communication).

## Fire Management

The historic role of fire in the prairie ecosystem is well documented in the literature (Bragg 1995, Collins and Barber 1985, Hartnett et al.1996). Fire that is highly variable in both frequency

and seasonality is essential for the maintenance of a functioning prairie ecosystem. It is this variability that encourages the greatest expression of biological diversity.

Fire also plays an important role in the management of Flint Hills prairies as pastures. Since most of the leased pastures throughout the Flints Hills are lightly stocked in the latter months of the growing season, vegetation remains into the fall resulting in a large accumulation of biomass during the winter. Since it is difficult to control the spread of wildfires in grassland ecosystems and commercial grazing sets the pattern for the entire region, annual controlled spring burning is widely practiced.

## Viewsheds (Landscapes and Vistas)

Repeatedly, the public has identified the vistas and views as some of the preserve's most important resources. The relationship of earth and sky, the feeling of vastness, and the openness of the landscape all contribute to a "sense of place." There are very few intrusions on the land.

Several vistas are noteworthy within the preserve as representative of the larger, nearly undeveloped and sparsely populated Flint Hills region. From U.S. 50 north on State Hwy 177 the preserve flanks the highway on both sides, providing a pastoral scene and appealing landscape. The historic ranch headquarters area represents the only large human-constructed element visible, resulting in a broad vista of the verdant valley.

To the east of Hwy 177, from the front porch of the main ranch house, lies another broad vista of the distant gallery floodplain forest backed by the escarpment of rolling hills. Again, this view contains few human intrusions except for the cultivated brome field and a few barely visible fence lines.

To the west of Hwy 177, the tallgrass prairie rises to the main north-south ridge system that defines the preserve's more remote sections. Only a few trees are visible in the draws where water is more plentiful and the effects of fire are less active. This rounded landscape beckons one to come and examine it more closely.

Perhaps the most spectacular vistas within the preserve are atop the long north/south ridge system. From these vantage points, a person can see great distances in all directions. With the exception of the development associated with Strong City, few human structures are visible from these lookout points. Communication towers are located southeast and southwest of the preserve and can be seen from some areas within the preserve. Depending on the season, a rolling sea of green or brown expands to the horizon. Here, people have an opportunity to ponder the past and reflect on the vastness that American Indians and early Euroamerican settlers encountered.

Night is a special time to experience the preserve and its vast expanse of sky. Although lights from events in Strong City are visible, on most clear nights the sky appears as a giant dome of black, studded with stars, unaffected by city lights.

These relatively undisturbed viewsheds offer visitors a unique opportunity to experience a large expanse of prairie unaltered by modern intrusions.

## Grazing

Grazers inhabiting the tallgrass prairie prior to European settlement included bison, elk, pronghorn antelope, white-tailed deer, mule deer, numerous species of small rodents, and invertebrate species. The extent to which large grazers used the prairie is unclear (Roe 1970). The Flint Hills have been used intensively for cattle grazing since the early 1880s.

Cattle grazing regimes take several forms within the Flint Hills, including year-long cow-calf operations, May-to-October steer grazing operations, and intensive early stocking. The latter operation places twice the number of animals on the land for one-half the time. Cattle are usually brought on in late April and removed by late July to allow for recovery of the prairie. One

criticism of this regime concerns its homogeneity and the indication that intensive early stocking promotes a lack of diversity when used as the sole management strategy, though there is no compelling evidence against intensive early stocking as one component of land management (Hartnett, personal correspondence July 14, 1998).

However, declining populations of some avian species such as the greater prairie chicken are in part due to the practice of annual spring burning and early intensive stocking, which reduces vegetative cover during the nesting season (Kansas Biological Survey personal communication 1998). Early work by Weaver also questioned the role of heavy grazing of tallgrass prairie, and suggested that it resulted in degraded range with low diversity (Weaver 1954).

Research is underway regarding whether bison and cattle grazing may differ in their effects on tallgrass prairie vegetation composition and biodiversity. Although both cattle and bison display generalist food habits, bison select almost exclusively grasses and may reduce the dominance of matrix grasses. Other behaviors, such as wallowing and the bison's tendency to graze closer to the ground, may cause bison to differ from cattle in their effects on species richness and grassland biodiversity (Hartnett 1996).

Large herbivores alter the abundance of various plant species through the selective removal of preferred forage species. Bison diets consist of up to 90 percent grasses, while cattle diets consist of about 70 percent grasses (Plumb 1993). Selective grazing of grasses releases forbs from competition pressure and increases plant species diversity (Collins 1987).

Recently burned areas are often preferentially grazed by cattle or bison or both (Shaw and Carter 1990). Large grazers can trample vegetation (Wallace 1987) and engage in wallowing, the impacts of which may persist for decades. Other groups of small herbivores, such as *Geomys bursasrius (Shaw)* (pocket gophers), provide establishment sites for plant species uncommon in undisturbed prairie (Platt 1975), thus increasing diversity.

# CULTURAL RESOURCES

## Archeological Resources

Archeological investigations at the preserve have been limited. Prior to its establishment, only two prehistoric archeological sites had been formally identified within the preserve. The NPS Midwest Archeological Center conducted limited fieldwork in 1998, representing the preserve's first formal archeological investigations. Twelve prehistoric and historic sites were documented, confirming and verifying some of the finds previously discovered in the field or through archival research. The sites are scattered across the preserve, and include lithic scatters, a quarry/workshop site, cairns, early Euroamerican farmsteads, the Spring Hill Ranch headquarters area, an historic dump site, and the Lower Fox Creek School area. Isolated chipped stone implements have been found at several locations, and these will continue to be discovered. Many will relate to specific activity areas that are themselves associated with other sites, including camps or habitation sites.

The potential is high for the identification of sizeable numbers of prehistoric and historic sites and features within the area of the preserve, based on the density of sites documented in Chase and adjoining Morris counties. Prehistoric sites and features will likely range from probable kill sites to quarries, workshops, single and multiple component habitation or campsites, possible burial mounds, cairns, rock alignments, and tipi rings. Historic Euroamerican sites and features will likely include homestead/farmstead sites, dump sites, remnant plantings, fence lines, roads, and water control devices. Distribution will also vary across the preserve, in both the valley bottoms and stream terraces, and the upland areas (Jones 1999: 52-59).

## Ethnographic Resources

Collection of information about the park's ethnographic resources is ongoing. The area of the Flint Hills has been affiliated with numerous American Indian peoples including the Kaw, Pawnee, Wichita and Osage, and local communities. Ongoing consultation with these groups will assist in identifying and protecting important ethnographic resources. Such resources may be sites, structures, objects, landscapes or landscape features. Some documented archeological sites have ethnographic value and importance. Natural resources may also be identified as ethnographic resources, if they have legendary or religious significance, or traditional subsistence value to a group.

An Ethnographic Overview and Assessment is required for the preserve. The report will summarize the ethnography of pre-contact, post-contact, and contemporary groups represented in the preserve. The report will include a discussion of the groups' uses, perceptions, and occupation of the land, and cultural values associated with the natural and cultural resources. In addition to American Indian groups, traditionally-associated groups include local communities.

An Ethnobotany Report is underway. This report provides a comprehensive plant list that itemizes all plants used by American Indian tribes in the United States, and plant uses by those tribes. To date, over 200 ethnographic resources have been identified. Four are ethnographic landscapes, one for each of the four culturally affiliated tribes. There are 201 plant species currently listed in the Ethnobotany Report, nearly all of which are associated with American Indian uses.

No sacred sites or Indian Trust resources have been identified to date. In the event that future research and consultation identifies such resources at the preserve, all compliance requirements, consultation, and NPS policies will be followed.

## Structures

The preserve contains over 60 known structures and features (see Figure 10), and it is expected that as additional survey work is accomplished, more will be discovered. These resources document the evolution of farming, ranching, and rural lifeways on the property from the mid-19th to mid-20th centuries. Of the 60 known structures and features, 38 were documented as part of the List of Classified Structures (LCS) survey in 1997. The majority of these are concentrated at the Spring Hill Ranch headquarters, including a Second Empire house, a three-story barn, a springhouse/smokehouse, outhouse, icehouse, and a poultry house/scratch house. All of these are built of local limestone. There is also a stone schoolhouse, the Lower Fox Creek School, 1/2 mile to the north, and 36 miles (60 kilometers) of stone fence. Following completion of the HRS, the LCS will be updated and finalized.

The entire preserve property was listed as a National Historic Landmark (NHL) in 1997 for its association with the cattlemen's empire of the late 19th century and its association with the transition from the open range to the enclosed holdings of the large cattle companies in the 1880s. The period of national significance extends from the first purchases of lands by Stephen Jones in 1878 through 1904, when the ranch lands began to be sold off by Bernard "Barney" Lantry's sons. Eight buildings and four structures have been identified as contributing to the property's national significance. Vehicular traffic in the form of visitor parking, tour buses and stock trucks may come into direct contact with some of the resources, or cause heavy vibrations that may contribute to the collapse of fragile or deteriorated elements such as stone walls or stone bridges. Structures no longer actively in use at other locations across the preserve, such as stone walls and ruins, suffer from deterioration and possible impact from grazers. Range fires could also impact historic remains that include wood elements, such as the corrals.

## Cultural Landscapes

Two sites within the preserve are identified as contributing sites to the 1997 NHL designation: the garden terraces in front of the ranch house and the extensive ranch lands. There are five retaining walls forming terraces between the house and Highway 177, which runs north/south through the NHL. The terraces are built of local limestone in various masonry techniques, including dry-laid rubble, roughly squared rubble, and coursed ashlar with quarry face. The upper terrace contains a circular stone base for a fountain. The ranch lands include landscape features consisting of vast expanses of native prairie rangelands with intermittent corridors of woodlands along streams and drainage ways. The preserve's ranching and agricultural history can be seen in the relationship of pastures and former cultivated areas defined by stone fencelines, domestic spaces with historic plantings, remnants of hedgerows, and roads.

The NPS Midwest Regional Office has initiated a cultural landscapes inventory (CLI) at the preserve that should be completed in 2000. In addition to survey work at the school and ranch

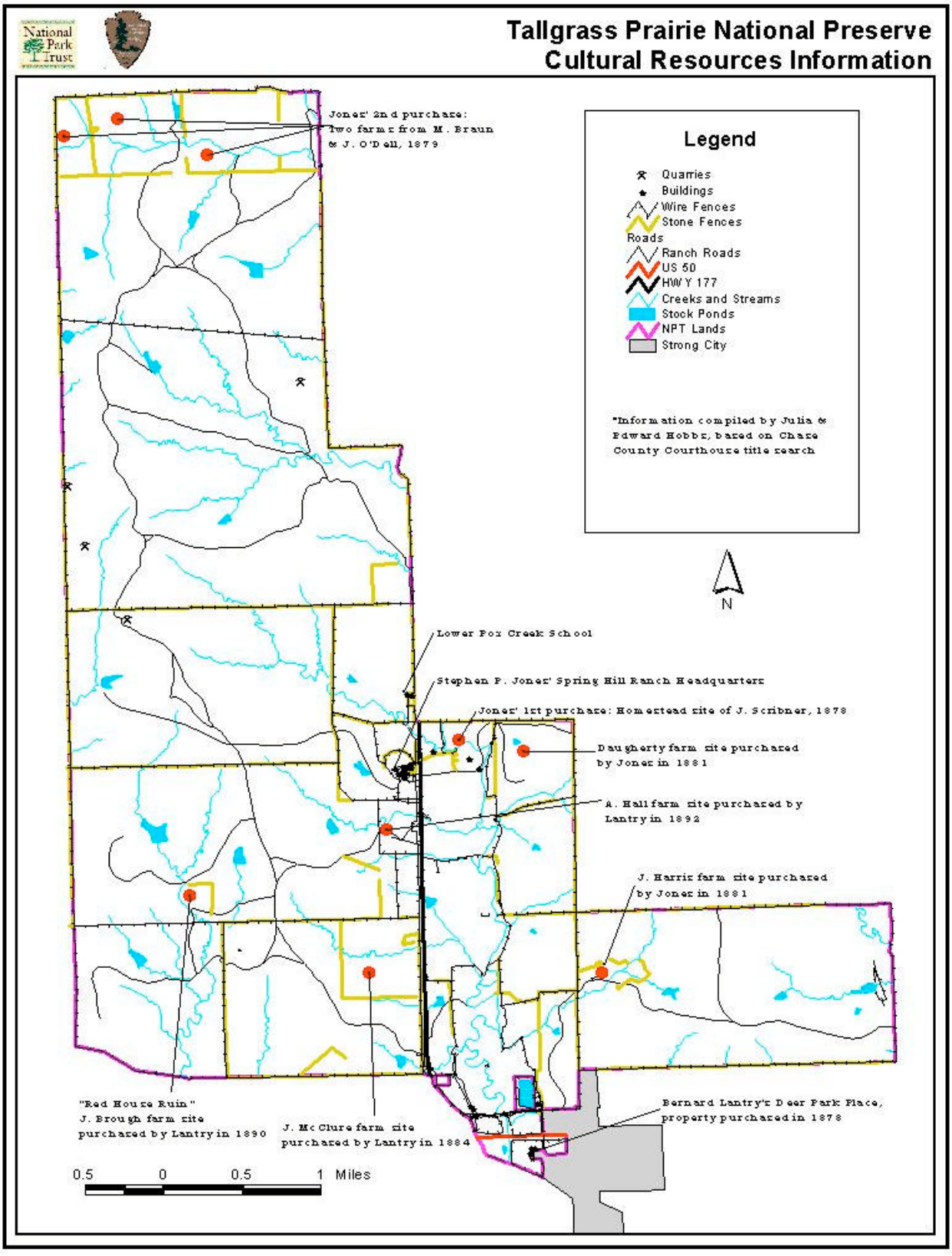

Tallgrass Prairie National Preserve
Cultural Resources Information
Joner' 2nd purchase: Two farms from M. Braun & J. O'Dell, 1879
Legend
Quarries
Buildings
Wire Fences
Stone Fences
Roads
Ranch Roads
US 50
HWY 177
Creeks and Streams
Stock Ponds
NPT Lands
Strong City
*Information compiled by Julia & Edward Hobbs, based on Chase County Courthouse title search
N
Lower Fox Creek School
Stephen P. Joner' Spring Hill Ranch Headquarters
Joner' 1st purchase: Homestead site of J. Scribner, 1878
Daugherty farm site purchased by Joner in 1881
A. Hall farm site purchased by Lantry in 1892
J. Harris farm site purchased by Joner in 1881
"Red House Ruin" J. Brough farm site purchased by Lantry in 1890
J. McClure farm site purchased by Lantry in 1884
Bernard Lantry's Deer Park Place, property purchased in 1878
0.5 0 0.5 1 Miles

**Figure 2**

headquarters area, basic information was collected at the Red House ruin site, several mid-19th century occupation sites, quarry sites, stone fencelines, and at water features. The ranch headquarters area includes plantings of mature walnut and juniper trees. The habitation sites show evidence of human occupation such as Osage orange hedgerows, stone fence enclosures, and surface depressions.

## Museum Collections

Both the NPS and the NPT have acquired cultural resource collections. At this time NPS-owned museum collections include archival and historic collections. The potential exists to develop an ethnographic collection; however, to date there are no known extant materials. Natural history specimens have been collected from the preserve by researchers at local universities such as Kansas State University and Emporia State University.

An Interim Scope of Collections Statement (SOCS) has been completed, and defines the use and scope of museum collections that contribute directly to the mission of the preserve. It also provides guidance on future acquisitions in order to prevent arbitrary growth of the collection. The NPT will assist in acquiring objects, archival materials, and visual materials, as defined in the SOCS.

The NPS and NPT hold joint stewardship of the collections. Presently, collections owned by both the NPS and the NPT are located in various places. NPT-owned collections are exhibited in the Spring Hill Ranch house, the barn, the smokehouse, and are stored in offices at the Midwest Archeological Center in Lincoln, Nebraska.. Collections owned by the NPS are stored at the preserve headquarters and temporarily at the Midwest Regional Office in Omaha, Nebraska.

# SOCIOECONOMIC ENVIRONMENT

The components of the socioeconomic environment include land use patterns and planning, demographic trends, the general economy (primary economic sectors, employment, and income levels), and visitor services. The region is defined as Chase, Morris, and Lyon counties in east central Kansas (see Figure 11). All of the following information is taken from "Descriptive Report of the Socioeconomic Environment, Tallgrass Prairie National Preserve," written by Northwest Economic Associates, 1998.

## Regional Land Use

The combined land area of the three counties totals nearly 1.5 million acres (605,561 hectares). The area is comprised primarily of grassland (74%) and cropland (22%). Woodland covers a small portion of the land area (3%). The remainder is made up of water bodies (<1%) and residential, commercial, industrial, urban, and other land types (<1% combined).

The three counties are similar in size, and grassland and cropland dominate all three counties. However, Chase County has a greater percent of its area in grassland than Lyon or Morris counties. The rocky Flint Hills make up most of Chase County, so a relatively small portion of its landbase is suitable for crop production. The remainder of Chase County is comprised of cropland (9%), woodland (4%), water (<1%), and other types of land.

The largest of the three counties, Lyon County, is the most developed. Nearly 89% of the total commercial/industrial area in the region is found in Lyon County. Nevertheless, only a little more than 1% of Lyon County land is in residential, commercial, industrial, or urban use.

For the most part, there are very few county- or city-level zoning or land use controls in the region. Chase and Morris counties have no county-level zoning ordinances. All unincorporated land in these counties is classified as agricultural. All counties have some land use controls aimed at maintaining sanitation codes with respect to water quality.

Strong City limits the location of trailer parks and prevents further housing development within the Cottonwood River floodplain. The cities of Cottonwood Falls and Strong City have been zoned as single-family residential, multiple-family residential, or commercial/industrial.

Land use in the region has been, and is expected to be in the foreseeable future, primarily agricultural. From 1987 to1992, the amount of land classified as grassland or cropland in the region increased. Over the next few years, with the exception of Emporia in Lyon County, the distribution and amount of non-agricultural land in residential, commercial, industrial, and other uses is expected to remain roughly the same. An increasing number of small manufacturing firms have recently located in Emporia; these will require more commercial support services and residential facilities. A new manufacturing plant in Chase County (Cottonwood Falls) opened in 1999, but will not alter existing land use in the county.

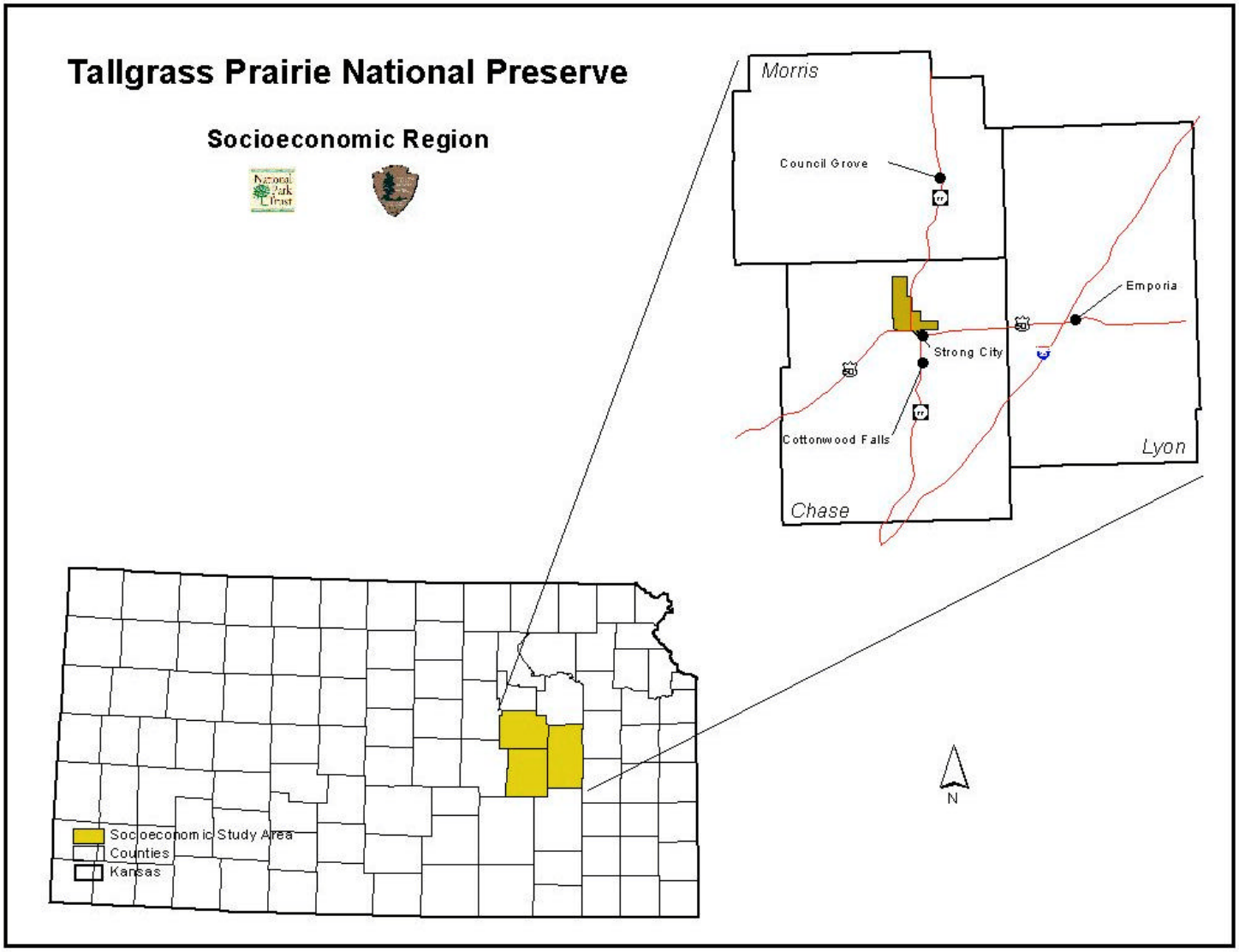

Tallgrass Prairie National Preserve
Socioeconomic Region
Morris
Council Grove
Emporia
Strong City
Cottonwood Falls
Lyon
Chase
N
Socioeconomic Study Area
Counties
Kansas

**Figure 3**

## Demographic Characteristics

Overall, the total population of the three counties has declined steadily over the past 10 to 15 years. Population for the state of Kansas, however, has been on the increase. Between 1990 and 1997, the state population increased by about 5%, but population in the region declined by almost 2% (43,920 to 43,175). Each of the individual counties experienced a decline in population between 1990 and 1997; most of these changes took place between 1995 and 1997.

The majority of people reside in Lyon County, which also contains the region's largest city, Emporia.

The population in the entire region has remained fairly evenly split between males and females over the 1990 to 1997 period. Each of the three counties has shown a similar gender mix throughout the same time period. The population also remained predominantly white during that period. However, since 1993, the number of whites living in the project region has decreased, while the population of other groups, in particular Asian and Pacific Islander, has increased.

Chase and Morris counties have a low percentage of minority populations and these numbers remained fairly constant through 1997. However, in Lyon County, during the last 5 to 10 years, the population of Hispanics, Asians, and Pacific Islanders has increased. The majority (98%) of Asians and Pacific Islanders that live within the region reside within Lyon County. Lyon County also has received the most in-migration of Asians and Pacific Islanders of the three counties, experiencing an increase of about 25% in this group between 1990 and 1997. Also, the Hispanic population of the region nearly doubled between 1980 and 1997, reflecting a similar statewide trend. Most of the region's Hispanic population live and work in Lyon County.

A major issue in the region is the overall aging of the population. Similar to statewide trends, a large percent of the population is over the age of 45. The middle age group, 25-44 year olds, has become smaller over the last few years. Senior citizens make up a high percentage of the population.

The education level of people 25 years and over for the region is similar to that of the state of Kansas as a whole. Lyon County has a greater share of individuals with graduate or professional degrees than the other two counties, most likely due to the presence of Emporia State University, Flint Hills Technical College, and a greater number of technical and support businesses.

Most cities have experienced a decline in population. However, unincorporated areas within Lyon and Morris counties have actually increased in population since 1990, which seems to mirror the state's demographic trend.

Emporia is the largest city in the region, with a population of nearly 25,000 people. Next in size is Council Grove, in Morris County, with a much smaller (and fairly constant) population of fewer than 2,300 people. The largest towns in the immediate vicinity of the preserve are Cottonwood Falls, with a population of 850, and Strong City, with a population of 600. Both towns are in Chase County and both experienced a small decline in population between 1990 and 1996.

The decline in the overall population level of the region may be attributed to two inter-related factors. First, fewer persons are involved in agriculture, and reduced opportunities have caused agricultural workers to leave the area. Second, greater numbers of young people are going to college elsewhere or seeking higher paying jobs in larger urban areas such as Kansas City or Wichita.

## General Economy of the Area

Although agriculture is not the largest sector in the region in terms of percent of earnings, most of the land base in the region remains devoted to agriculture. Economic conditions of farming and ranching are relevant to the development of the GMP and require special consideration.

Livestock sales from ranching represent the largest component of agricultural income. Agricultural earnings in the region have fluctuated over the past decade and, with low beef prices the past several years, are not expected to increase substantially in the near future. Agricultural employment decreased by about 4% during the period 1990 to 1996. However, agricultural support services increased, both in number of establishments and employment, over the same time period.

Land devoted to agriculture has remained relatively constant during the past decade, but the number of landowners has decreased and farm size has increased over the same time period. This reflects a regional (as well as national) trend towards consolidation of land into larger holdings. An additional trend is away from owner-operated farms and ranches and towards investor- or absentee-owned land that is managed by local operators.

Despite the decreasing number of small crop farming and ranching operations, small businesses dominate the region's economy. In 1995, 98% of all businesses in the project region had less than 100 employees. Between 1990 and 1995, 80 new establishments were created in the region, an increase of about 8%. The majority of this increase was in businesses employing fewer than 20 people. However, the number of establishments employing between 100 and 499 employees nearly doubled (from 9 to 16) during the same time period.

Between 1980 and 1995, the largest growth in the region, in terms of earning, has taken place in the retail trade, services, and manufacturing sectors. The importance of manufacturing is illustrated by the fact that between 1980 and 1996, the sector accounted for about 30% of all earnings in the region.

In terms of earnings by industry, non-farm earnings have been substantially higher than farm earnings ($518.3 million non-farm versus $8.1 million farm in 1996). From 1980 to 1996, farm earnings have been quite variable. Non-farm earnings over the same time period increased by about 92%, from $269.7 to $518.3 million. This indicates that, as a whole, the region has benefited from a healthy rate of economic growth.

The growth in earnings described above is reflected in the employment figures of the same time period. Although farm employment decreased by 17% during the 1980 to 1996 period, non-farm employment increased by 25%. The industrial sectors employing the most persons in 1996 included services, manufacturing, state and local government, and retail trade.

Some persons have started to invest in the renovation of older buildings and the opening of restaurants and shops in Cottonwood Falls and Strong City. The future of Cottonwood Falls may be partially tied to developing tourism and encouraging "niche" stores to become established. The situation in Morris County is somewhat different. While the county's economy is primarily based on agriculture, the county and the city of Council Grove have more diversified economies, with increasing emphasis on tourism related services and small manufacturing. This diversity, including a large government service sector, has insulated the area from large fluctuations in the local economy. Consequently, Morris County has been able to avoid some of the problems of out-migration and unemployment experienced by Chase County. From 1980 to 1996, the fastest growing sectors in Morris County, in terms of earnings, have been in wholesale and retail trade, services, and government sectors.

For future economic development, Lyon County and Emporia are focusing on a more diversified economy based on light manufacturing, commercial retail, and tourism. The continued presence of Emporia State University will allow many other economic opportunities to develop. The presence of Flint Hills Technical College (a two-year technical school) will increase opportunities to recruit other manufacturing firms requiring skilled workers.

The economic trends described above are mirrored in the trends in income levels in the region. Along with increased levels of employment, there has been a trend toward increased levels of per capita income. Between 1990 and 1996, per capita income in the region increased about 30%, from $14,400 to $18,670. This increase is larger than the cost of living increase over the same time period, as measured by the consumer price index.

The percentage of people living in poverty in the region increased between 1979 and 1993; this percentage was somewhat higher than that experienced by the state. In 1993, the region had a poverty rate of 14.3%; the rate in Chase County was 15.0%.

One indicator as to whether incomes are sufficient to satisfy the basic needs of families is the number of food stamp recipients. Although the number of recipients in the project region increased by about 43% between 1990 and 1994, there was nearly a 10% decrease between 1994 and 1996. However, federal welfare reform legislation may have played a role in this most recent change.

# VISITOR SERVICES/VISITOR USE

## Visitor Use Data

NPS records indicate the following 1998 and 1999 attendance at the preserve:

| | 1998 | 1999 |
|---|---|---|
| January | 172 | 281 |
| February | 332 | 734 |
| March | 387 | 1,069 |
| April | 1,587 | 1,331 |
| May | 3,045 | 3,135 |
| June | 2,640 | 3,428 |
| July | 2,988 | 2,446 |
| August | 2,230 | 2,221 |
| September | 2,035 | 2,099 |
| October | 2,192 | 2,894 |
| November | 1,041 | 1,746 |
| December | 345 | 402 |
| TOTAL | 18,994 | 21,786 |

## Visitor Experience

A range of visitor experience goals has been developed for the preserve in an effort to guide park development and programming. Many of these goals will be implemented, facilitated, or affected by the preserve's interpretation and education program.

Current visitation at the preserve is restricted to tours of the historic ranch headquarters area, and visits to the Lower Fox Creek School and the interpretive trail between the school and the ranch headquarters. These features are contained within approximately 66 acres (27 hectares) of the preserve; most of the current interpretation and visitor services programs take place within this area. Currently, a staff-guided bus tour and periodic special events provide the only access to more remote portions of the preserve.

As the preserve is in its initial development, visitor facilities such as a visitor center, restrooms, and interpretive media and programming are either non-existent or limited. Due to this limited access, and limited visitor services development, few of the visitor experience goals are currently being met.

All of today's visitors are day users and arrive by private vehicle, group tour bus, or bicycle. Some school programs are being held at the site. Much of the visitation is from the region, as the park has not developed a large national constituency. Older visitors make up a considerable percentage of current visitors, as do families and grandparents with their grandchildren. As the preserve is developed for visitor use, it is expected that the site will increasingly become known as a destination attraction rather than as a pass-through attraction.

Public comments indicate a strong interest in gaining access to the more remote areas of the preserve for hiking, horseback riding, fishing, camping, nature study, personal solitude, personal enrichment, etc. There is an interest within the American Indian community to gain access to the park for a variety of activities.

The adequacy of visitor services in the region is related to the type of visitation promoted by local governments and chambers of commerce. With perhaps the exception of the annual Strong City Rodeo and the boating and fishing lakes, the region has been primarily a "pass-through" attraction; that is, visitors will stop in for a few hours or a day on their way to another destination. As an area that mostly receives "pass-through" visits, the region currently has adequate services. Some improvements may be possible by better coordination of advertisement of available visitor services between the three counties and the major cities in the region.

In the future, however, local governments, visitor centers, and chambers of commerce may want to promote the region as a "destination" location, where visitors would spend a few days touring the historical, cultural, and recreational facilities in the area. Lyon, Morris, and Chase counties are working together on a tourism plan to encourage extended visitation in the tri-county region. The counties hope to establish a unique "niche" in the tourism market, based on the historical importance of the cattle industry, the Flint Hills, and the Santa Fe Trail. This may lead to a need to expand the number of family-oriented lodging and eating facilities, camping facilities, and medical services in Chase and Morris counties.

# MANAGEMENT INFRASTRUCTURE

## Existing Local Policies, Land Use Plans

Public Law 104-333, which authorized the preserve, states that it will be administered in accordance with the enabling legislation, cooperative agreements, and the provisions of law generally applicable to units of the National Park System. It further states that the application of regulations and the maintenance and development of facilities on private lands must be with the consent of the landowner, currently the NPT. The law also includes the authority to expend federal funds for the cooperative management of private property within the preserve for research, resource management, visitor protection, and use.

In August 1997, the NPT and the NPS entered into an interim cooperative agreement for the management of the preserve until the GMP is completed. Then, a long-term legal agreement will be developed. The interim agreement covers many general and specific operational matters.

The NPT and the current grazing lessee have a formal agreement covering specific procedures for access on the leased lands until the GMP is finalized. A separate agreement between the NPT and the grazing lessee also covers the unloading and loading of cattle, including the use of corrals in the ranch headquarters area.

## Public Health and Safety

The water system for the historic ranch headquarters does not meet public health standards. The system's age and structural condition are unknown. Two shallow wells, which essentially function only as cisterns, are the only source of water, and lie within the alluvial plain of Fox Creek (NPS 1997 Trip Reports and Public Health Survey Report 1997). A bacterial analysis of the well-water indicated fecal coliform too numerous to count. The water in the system is currently batch chlorinated at the ranch headquarters cistern but the water is still not considered safe for consumption. Potable water must be brought in for both public and staff consumption.

In addition to its quality, the water system is inadequate for fire protection purposes (NPS, 1997 Trip Report). There are no hydrants, reservoirs, or detection and suppression systems in the major buildings. The preserve currently does not have any staff structural fire fighting capability (NPS, 1997 Trip Report). The Chase County Volunteer Fire Department would provide support if a structural fire occurred on the preserve, with an estimated response time of 12 to 15 minutes.

Currently, local county authorities provide emergency medical services and law enforcement support with equipment used for containing prairie fires.

The electrical systems in the ranch house, ranch hand’s house, and outbuildings need to be upgraded. The majority of the interior wiring is outdated, does not meet current National Electric Codes, and cannot carry the locally heavy load, even though some panel boxes have been upgraded (NPS, 1997 Trip Report).

The two existing septic systems in the historic ranch headquarters area, which serve the ranch house and ranch hand’s house separately, are used by the preserve staff. Both need to be replaced to ensure compliance with Environmental Protection Agency and state standards for onsite wastewater treatment and disposal. Portable toilets currently provide accommodations for the public and as visitation increases, waste treatment will become a critical issue.

The potential for wildland fire may be of increasing concern as the preserve is further developed and visitation increases. For more than a decade, most ongoing ranching operations, including the pasturing of horses in the headquarters and adjacent nature trail areas, have been eliminated. This has led to an increase in vegetation and

resultant fuel loads. In the future, access to all areas could be restricted during periods of high or extreme fire danger.

Lead paint testing, conducted in December 1997 in the historic ranch headquarters and Lantry Ranch headquarters areas, found the presence of significant amounts of lead in many of the structures. Most building exterior surfaces indicated the presence of lead. In addition, all the interior wood surfaces in the ranch house have high levels of lead but are in very good repair so there is no immediate health threat. When major preservation projects are completed on the buildings in the future, the necessary precautions would need to be taken.

State Highway Route 177, the Flint Hills Scenic Byway, cuts through the preserve and passes in front of the historic ranch headquarters and schoolhouse areas. As future visitation and traffic increase, related public safety concerns would increase. Staff at the preserve observe situations in which drivers slow considerably or stop completely on or along the highway in order to take pictures. Due to line-of-sight concerns regarding turning into the existing parking lot from the north, the Kansas Department of Transportation performed an on-site evaluation; they determined that the distance meets the minimum highway requirements.

The preserve is located in an area of Kansas that has tested positive for hantavirus pulmonary syndrome. As a precaution, the barn, which now serves as the contact station during the main (May-October) visitor season, was completely cleaned in March 1998 by an NPS crew with experience in hantavirus mitigation. The park has standard operating procedures for spraying the barn routinely and before special uses with an approved mixture.

Prior to the NPT's purchase of the property, a private contractor completed a Phase I Environmental Assessment. The assessment involved a visual survey of the property from light aircraft, followed by a ground reconnaissance of potentially suspect areas. Also included were a review of property records, discussions with former owners/occupants and local officials, and an asbestos survey to evaluate potential asbestos containing materials in the buildings. The study identified four items of concern: two underground storage tanks which have since been removed, and two areas where dumping has occurred. All contemporary items have been removed from the main dumping area across from the historic ranch headquarters along Fox Creek. The other dumping area noted in the assessment was deeded to Strong City in the 1950s for a sewage treatment plant that is no longer in existence; the site is currently being used by the city as a trash burning site. The results of the asbestos sampling did not indicate its presence in the structures. Prior to transfer to the NPS, a more extensive Level I survey would need to be performed on any property that is determined for federal ownership.

Within the preserve boundary, near Strong City, there exists a long earthen mound stretching along the Fox Creek floodplain. This dike system was most likely built to protect the former Lantry Ranch headquarters area from flooding. Today, it also protects several residences near the creek.

## Existing Special Uses

In March 1995, the NPT and Mr. Edward Bass of Fort Worth, Texas signed a 35-year grazing lease. The lease involves 10,734 acres (4,334 hectares) or over 98% of the preserve (see Figure 12). The rent ($2 million) was pre-paid in advance, and provides for annual adjustments and the termination of all or part of the lease through a buy-back of the grazing rights. Implementation of any of the action alternatives would require the buy-back of at least portions of the current lease. The lease provides for annual burns and the use of an early intensive stocking regime on all but approximately 490 acres (198 hectares). This 490 acres (198 hectares) is bottomland along Fox Creek which was formerly cultivated. It is no longer cultivated annually and is now primarily planted to perennial brome pasture, with some areas in second growth native grasses. The lease also provides for periodic review of grazing operations and allows NPT access for visitors programs and other purposes. Initial rent was based on current market rates, with provisions for annual adjustments to reflect changes in lease market rates. NPT is actively pursuing funding sources to purchase back portions of the grazing lease in order to implement the General Management Plan.

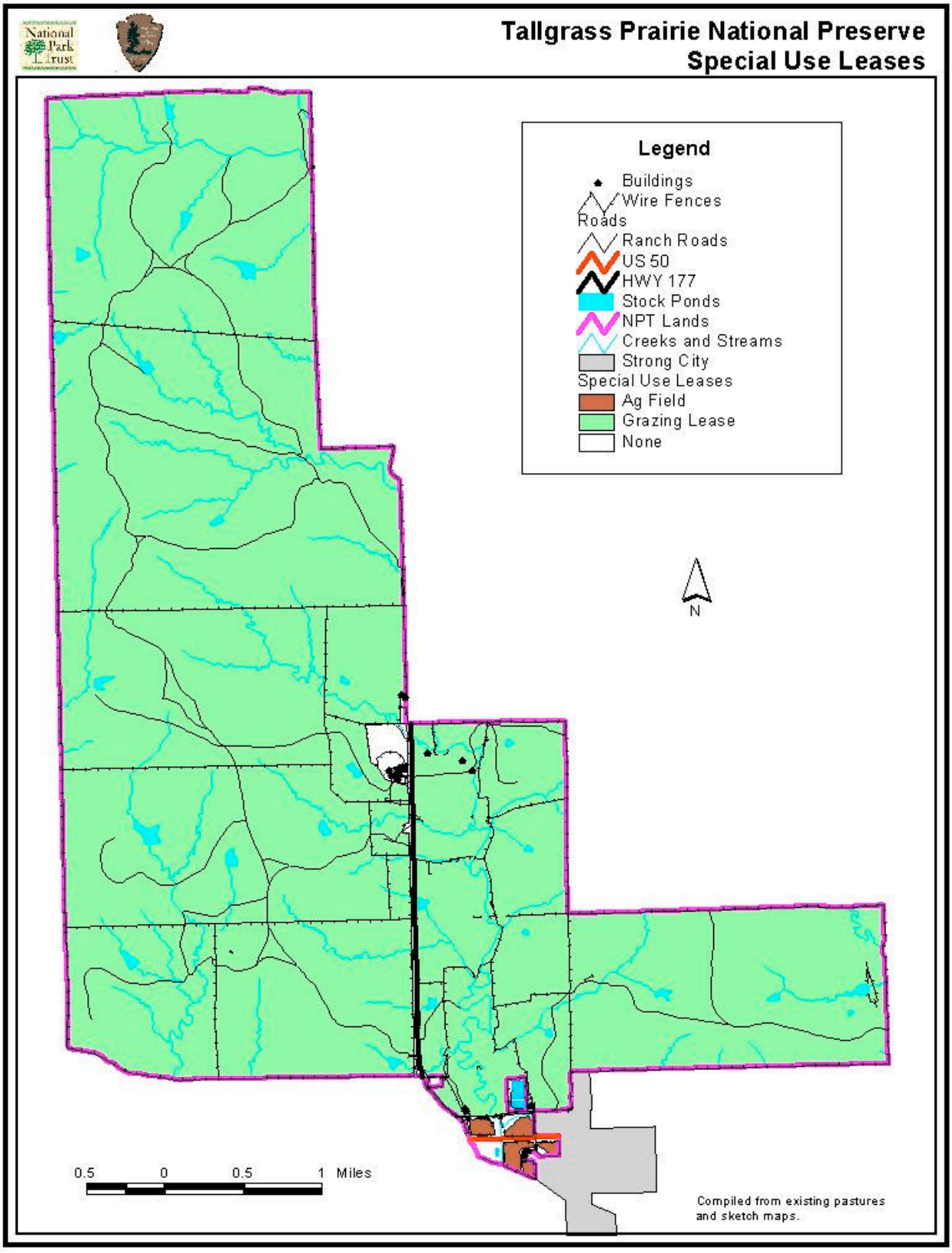
When NPT purchased the property in 1994, the oil and gas development rights were retained in trust by Boatman's First National Bank of Kansas City for 35 years. Since that time, the Bank of America has become the Trustee. When NPT purchased the property in 1994, the oil and gas lessee was Knighton Oil Company. Knighton Oil Company has recently assigned all of their leasehold working interests to Chisholm Resources, Inc. Prior to this assignment, Knighton Oil Company approached NPT about purchasing the oil and gas leasehold estate and the mineral interests owned by the Bank of America, as Trustee. After considerable investigation and consultation with professionals in the field, it was determined that the asking price was above fair market value and was not within

NPT's fiscal capabilities. Gas production has resumed following a 2-3 year period of non-production under Knighton Oil Company.

There are approximately 43 acres (17.4 hectares) in the southern portion of the preserve near U.S. 50 that are not in the grazing lease. The bottomland along Fox Creek is currently planted in brome grass. Cool season grasses like brome are usually grazed in the spring between March 16 - June 30 and again in the fall between September 1 - December 31 or they may be cut for hay.

## Rights-of-Way, Easements, and Agreements

There are a number of rights-of-way (ROWs) which exist in the preserve, including an overhead electrical transmission line, a buried high pressure gas pipeline with adjacent telecommunications (fiber optics cable) line, sanitary sewer lines, and a small watershed district detention dam and pond. The ROW for the gas pipeline, which transverses from east to west across the southern portion of the preserve, consists of a 66-foot-wide strip of land, lying 33 feet on the northerly side and 33 feet on the southerly side of the centerline of the pipeline, and a 30 foot by 169 foot site known as the Strong City Town Border Site ROW. The City of Strong City has a permanent easement to operate the city sewage lagoon and has a state permit to discharge effluent from the treatment lagoon into the Cottonwood River via Fox Creek.


Tallgrass Prairie National Preserve
Special Use Leases
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Wire Fences
Roads
Ranch Roads
US 50
HWY 177
Stock Ponds
NPT Lands
Creeks and Streams
Strong City
Special Use Leases
Ag Field
Grazing Lease
None
N
0.5 0 0.5 1 Miles
Compiled from existing pastures and sketch maps.

**Figure 4**

In addition, there are other ROWs that have legal documentation but have not been located. It is not known if they have been abandoned or transferred to another entity or are still in force. These include pipeline, telegraph and other forms of communication, highway, and railroad ROWs. Some date back to 1886.

The potential for future ROWs or reactivation of past easements or agreements is good. Recently (1998), a communication company requested a ROW for another buried fiber optics line adjacent to the high-pressure gas line. However, they decided on an alternate route around the preserve instead.

ROWs represent a major issue because of the potential impact on preserve resources, visitors, and future operations.

## Advisory Committee

The advisory committee (see Appendix 10 for a list of members) was established under Section 1007 of the enabling legislation. Appointed by the secretary of the interior in October 1997, the 13-member committee's duties are to advise the secretary and the director of the NPS concerning the development, management, and interpretation of the preserve. This includes providing timely advice during the preparation of the GMP.

The enabling legislation is very specific about the appointment terms and composition of committee members. The members include three representatives from NPT (current property owner); three representatives of local landowners, cattle ranchers, or other agricultural interests; three representatives of conservation or historic preservation interests; one representative of the Chase County commission; one representative of the communities of Strong City and Cottonwood Falls; one representative of the State Governor; and a range management specialist representing state institutions of higher education. Nominations to the committee are submitted to the Secretary by the designated groups, organizations, or entities, or by self-nominations. Members are appointed for three year terms, except that nine of the initial appointment were for four or five years. Each member may be reappointed to serve a subsequent term. The committee does not have a termination date.