Floristic Quality of Vegetation at Lead and Zinc Mined Lands in Cherokee County, Kansas

Kansas Biological Survey Report #149

November 21, 2008

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KANSAS BIOLOGICAL SURVEY

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1.0 Introduction

The Cherokee County study site is in a former mining area known as the Tri-State Mining District, which covers 2,500 square miles across southeast Kansas, southwest Missouri, and northeast Oklahoma (Figure 1). Lead and zinc were mined in the Tri-State Mining District for more than a century, from the 1850s until 1970. Mining began in Missouri in the mid-1800s, peaked in 1916, then shifted to Kansas and Oklahoma. Kansas production peaked in the 1930s and gradually diminished until the last mine closed in 1970 (Drake 2007).

The Cherokee County site, the area of this study, is a 115-square mile mining area in extreme southeast Kansas. The mining operations in Kansas were primarily below ground and involved sinking shafts to underground ore bodies. The ore was brought to the surface, where it was crushed. Lead and zinc were extracted by gravity separation and flotation in water. More than 4,000 acres in Cherokee County were left with waste from this long period of mining and smelting. The former mining sites included large tracts of mine and mill wastes, subsidence pits where the ground collapsed, and open mine shafts.

Figure 1. Map of the Tri-State Mining District. Cherokee County is in the southeast corner of Kansas. Dark polygons are historic mining areas. Map from Kansas Geological Survey, Public Information Circular (PIC) 17.

The U.S. Environmental Protection Agency declared the area a Superfund site in 1983, and cleanup efforts began. In some of the areas included in this study, cleanup under existing Records of Decision are complete. Some sites' remediation involved leveling and adding small amounts of amendments; other remediation sites had the ground covered with an 8-10 inch layer of clay soil. In both cases native grasses were planted. These remediated sites are referred to in this report as low-quality revegetated and high-quality revegetated sites, respectively, based on field observation. Other sites have not been remediated yet and may be partially vegetated or covered with mine wastes including chat/mine waste, which is defined as a "gravel-like waste created from lead and zinc mining activities" (EPA Final Rule 2007).

Plant communities on sites associated with mining appear to have been profoundly impacted. According to the First Biennial Report of the Kansas State Board of Agriculture (1878), the original government land surveyors determined that 90 percent of Cherokee County was tallgrass prairie before the land was opened to Euro-American settlement by the Kansas-Nebraska Act of 1854. Kansas has the greatest acreage in North America of remaining tallgrass prairie, including some in Cherokee County near the mining areas. These native prairies are representative of the vegetation before human disturbance and thus serve as an appropriate reference group when assessing the impacts of mining on the land.

This study was conducted to measure floristic quality at sites impacted by mining-related and remedial activities. The Kansas Biological Survey was funded by the U.S. Fish and Wildlife Service, as part of a USFWS asessment of injury to natural resources, to conduct a Floristic Quality Assessment (FQA) of former mining sites (Figure 2) in 2007 and 2008. A FQA is an objective evaluation tool for assessing the health of plant communities in relation to native plant communities (Jog et al. 2006). During this study, other data were collected, including native species richness and percent of bare ground. The purpose of this assessment was to determine the floristic quality and whether there were differences between various mining-related sites and nearby areas of native prairie vegetation.

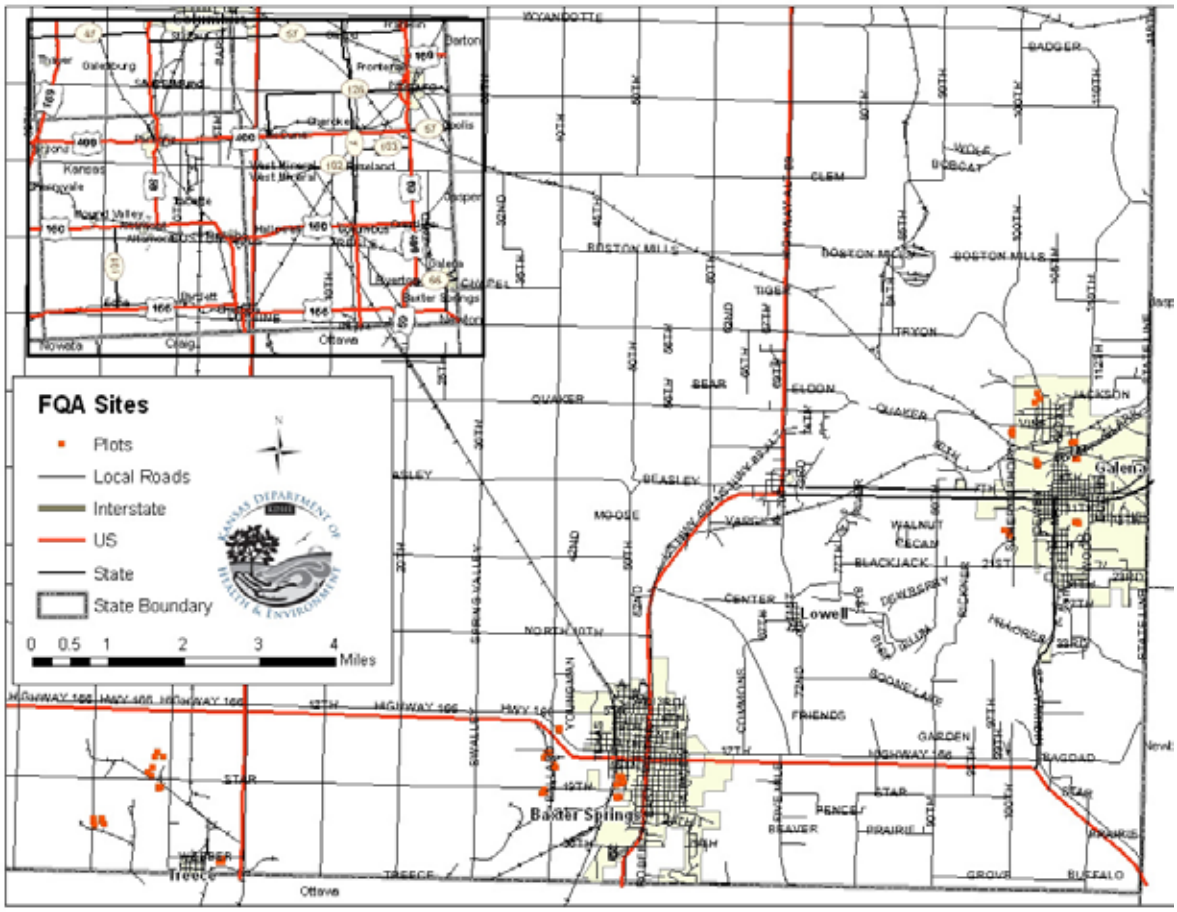

Figure 2. Cherokee County, Kansas, study area. Study sites are marked with red squares.

2.0 Floristic Quality Assessment

2.1 History of Floristic Quality Assessment

Floristic Quality Assessment **(FQA)** is a standardized tool used to estimate the overall ecological quality of a site based on the presence of vascular plants growing there (Freeman and Morse 2002, Swink and Wilhelm 1994, Taft et al. 1997). Ecologists, botanists, environmental professionals, and land managers use FQA to establish baseline assessments, to conduct long-term monitoring, and to assess restoration progress in a variety of ecological settings (Herman et al. 1997; Jog et al. 2006; Taft et al. 1997). This quantitative measure can facilitate comparison of different sites as well as monitor changes over time at a single site.

Developed in the 1970s (Swink and Wilhelm 1979; Wilhelm 1977), the method has been refined from its original form (Rooney and Rogers 2002; Taft et al. 1997; Wilhelm and Ladd 1988) and now is in use or development in numerous states and provinces in the United States and Canada (Taft et al. 1997). The method was developed to avoid subjective measures of natural community quality,

such as “high” or “low.” It has clear advantages over other evaluation tools, including repeatability and ease of application. Ideally, FQA should be used with other data and context-based measures (Rooney and Rogers 2002), such as native species richness, which is the total number of native species, and percent of bare ground, to estimate the integrity of native plant communities (Taft et al. 1997).

Figure 3. Bidens polylepis*, Coreopsis begger-ticks, has a Coefficient of Conservatism (CoC) of 1, meaning it thrives in highly disturbed habitats. It was found frequently in the study sites.*

2.2 Coefficients of Conservatism

The FQA method is based on calculating an average Coefficient of Conservatism **(CoC)** and a floristic quality index (**FQI**) for a site. A CoC is an integer from 0–10 that is assigned to each native plant species in a given geographic region, often a state or province. Naturally occurring hybrids and non-native species are not assigned coefficients.

CoC expresses two basic ecological tenets: plants differ in their tolerance of the type, frequency, and amplitude of human disturbance; plants differ in their fidelity to remnant natural plant communities (Taft et al. 1997). As employed in FQA, these two principles exhibit an inverse relationship: the lower a species’ tolerance of human-mediated disturbance, the higher its likelihood of occurring only in a natural plant community. **Low coefficient values (0–3)** denote species without a strong affinity for natural communities (Figure 3). **High coefficient values (7–10)** denote species that have a strong affinity for natural communities and tolerate only limited anthropogenic disturbance. **Intermediate coefficient values (4–6)** have only moderate affinities to natural communities (See Appendix 1 for a list of CoC values for the plants found in the study area). With these principles as a guide, the CoC value applied to each species represents a relative rank based on observed tolerance and patterns of occurrence regionally. Non-native species are not assigned coefficients because they were not part of the pre-settlement landscape.

2.3 Determining Floristic Quality for Kansas Sites

Native plant species in Kansas have been assigned a CoC from 0 to 10 through a peer review process under the direction of staff at the R.L. McGregor Herbarium at the University of Kansas. That process involved a group of 17 knowledgeable scientists and resource managers who generated scores for all Kansas native plant species; their work was then reviewed by a panel of experts who considered problematic taxa and species ranges to validate their scores and to make adjustments (Freeman and Morse 2002). We used this CoC list in our study.

By recording data on all species in a specified area and repeating the inventory in several locations, one can objectively compare the quality of vegetation among sites and determine one measure of the degree of harm or adverse impact that has occurred. The FQA process begins with a thorough inventory of plants at a site of interest. The checklist then is used to calculate the FQI for the site.

2.4 Calculating Floristic Quality

The Floristic Quality Assessment is essentially an average score of the quality of the species found at a site or specific location. To calculate the FQI of the site, a mean C value (mean C) is calculated. The mean C value for a site is the arithmetic mean of the coefficients of all native vascular plants occurring on the entire site (mean C = ΣC/N), with N being the number of species without regard to dominance or frequency. Non-native species are excluded from the calculation of mean C. The FQI is the mean C multiplied by the square root of the total number of species (√ N) inventoried on the site; FQI = (ΣC/N)*(√ N) (Swink and Wilhelm 1979; Wilhelm 1977).

3.0 Methods and Materials

3.1 Criteria for Locating Sites

Sites were chosen with help from the U.S. Fish and Wildlife Service and the Kansas Department of Health and Environment to determine the floristic quality of a variety of mined sites in Cherokee County, Kansas. Three types of sites were chosen: chat/mine waste sites, transition zone sites, and revegetated sites. Chat/mine waste sites (some now graded) are, in some cases, void of vegetation and represent the most profoundly impacted sites. Transition zone sites, usually adjacent to mined areas or chat/mine waste sites, have not been restored in any way, but contain volunteer species and a mix of impacted and partially-impacted areas. These sites include areas in the transition zone between mine wastes and unimpacted surrounding areas. On the revegetated sites, we identified by observation two types of sites: low-quality and high-quality. Generally, low-quality revegetated sites were leveled and capped with bio-solids or small amounts of soil, while high-quality revegetated sites were capped with approximately 8-10 inches of soil. All revegetated sites had been seeded with a warm season native grass mix.

Native tallgrass prairies represent the vegetation of the area prior to mining and serve as a reference for comparison. Data from remnant high-quality native tallgrass prairies in Cherokee County were obtained (Loring et al., 2005) and used for comparative purposes. These data are summarized below. A dense, stable plant cover is desirable for sites that have been previously impacted by mining because holding the soil reduces soil erosion and downstream impacts. Therefore, establishing native tallgrass prairie species, especially perennial grasses and a diverse mix of other species, is a desirable goal for remediation and restoration efforts.

3.2 Description of Site Locations

At each site location, three 20 by 20 meter plots were established. Location data for each plot was recorded by a global positioning system and photographs were taken so each could be mapped or relocated in the future. Twenty sites were randomly chosen for sampling. (See Appendix 2 for global positioning systems locations, Appendix 3 for maps and photos taken at the time of fieldwork for all sites, and Appendix 4 for the floristic quality index of each site).

The following list delineates site types and names at the 20 locations:

Chat/mine waste sites (severely impacted sites that are chat piles or leveled chat piles), three plots each at the following sites:

Diamond Site
King Brand Site
Muncie Complex Site
Retirement Site
Sonny Boy Site

Figure 4. Diamond Site is typical of the chat/mine waste sites.

Transition zone sites (mining-impacted sites), three plots each at the following sites:

Big Elk Site
King Brand Site
Lisa Jane Site
Muncie Complex Site
Sonny Boy Site

Figure 5. Lisa Jane Site is a transition zone site.

Low-Quality Revegetated sites (remediated sites with some soil and amendments added), three plots each at the following sites:

Blue Hole Site
Galena Repair Site
Hell's Half Acre Site
Southern Star Site
West Schermerhorn Site

Figure 6. Galena Repair Site is an example of a low-quality revegetated site.

High-Quality Revegetated sites, (remediated sites with 8-10 inches of soil added), three plots each at the following sites:

Hartley Site
Ballard Site
Cemetery Site
Fire Station Site
Homestake Site

Figure 7. Ballard Site is an example of a high-quality revegetated site.

3.3 Vegetation Data Collection

In each 20 by 20 meter plot, the percent cover of each plant species and bare ground (from 0 to 100 percent) were recorded by Frank Norman and Kelly Kindscher during the fall of 2007. Species cover data were collected using the modified Daubenmire cover class methodology (Daubenmire 1959; Bailey and Poulton 1968) where cover is visually estimated for each rooted plant within or extending into each plot. Total cover for individual species is added together for a total percent cover for each plot, which with species overlap can be over 100 percent. Cover for bare ground in each plot was also estimated as sampled plots were not completely vegetated. Scientific names used in this study are from the USDA PLANTS Database (USDA, NRCS 2008). Each species was characterized as annual or perennial, native or exotic (USDA, NRCS 2008), and its CoC was recorded. All data were entered into a Microsoft Excel spreadsheet.

4.0 Statistical Analysis

4.1 Statistics Test and Program

Analysis of Variance (ANOVA) was used to determine if there are significant differences between groups of sites in the Floristic Quality Assessment scores, native species richness, and bare ground. This statistical test is used to determine if there is significant variation between sites. When there are significant differences between groups of sites, post-hoc tests (the L.S.D. or least significance difference test) were performed on all permutations of site groups to determine which groups (chat/mine waste, transition zone, low-quality revegetated and high-quality revegetated) were significantly different from each other in all comparisons. Statistics were calculated in SPSS version 16.0. All statistical differences reported are equal to or more conservative than the standard 0.05 probability level.

5.0 Results

5.1 Vegetation

The vegetation survey work at the 20 sites with 60 total plots (three 20 by 20 m plots at each site) resulted in 150 species being found on the plots (Appendix 1). The most common species found were of two groups, weedy annual species (the most common being common ragweed, *Ambrosia artemisiifolia,* and witchgrass, *Panicum capillare*) and native grass species (the most common being switch grass, *Panicum virgatum*, and big bluestem, *Andropogon gerardii*). The native prairie grasses are found in abundance in both the low-quality and high-quality revegetated sites, where they were planted. While the weedy annual species were found in most of the study sites, they were especially common in the transition zone or non-remediated sites. Species lists and cover values are given for each site in Appendix 5.

5.1.a Native Species Richness and CoC

Native species richness (the total number of native species) was calculated by summing the number of native species in each plot. Using an ANOVA test, there are statistical differences ($p=0.000$) in native species richness between groups of sites (Figure 8). When each comparison between groups is made using the L.S.D. test following the ANOVA, all groups (chat/mine waste, transition zone, low-quality revegetated, and high-quality revegetated) were statistically different from each other ($p<0.012$) except between the transition zone and low-quality revegetated sites ($p=0.234$) (Table 1).

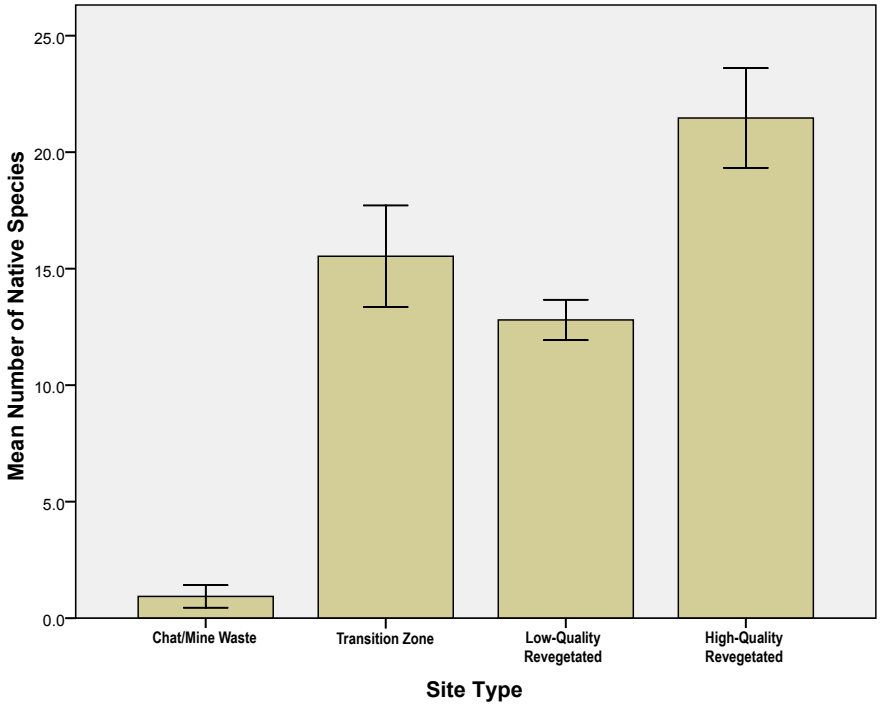

Figure 8. Comparison of Mean Number of Native Species and Standard Errors by Site Types.

On average, less than one native species per plot occurred at the chat/mine waste sites, while the best sites were high-quality revegetated sites, which had more than 21 species per plot on average (see Table 1). Also, plant species with CoC scores reflecting the highest quality vegetation (species with scores of 7-10) were uncommon in our plots. Of the total 150 species observed in our plots, only four of the species with these high coefficients were observed in any plot.

The species with scores reflecting lower quality vegetation and low CoC (0–3) represented 73 of the total 150 species and were found at all site types but were more commonly found on chat/mine waste and transition zone plots.

5.1.b. Bare Ground

The amount of bare ground at a site is a useful measure because it indicates the inability of plants to grow in an area and protect an area from erosion and runoff. Since FQA does not measure density of vegetation, these observations were very important for this assessment.

There was a gradient in decreasing bare ground (Figure 9). The chat/mine waste sites had an average of 99.9% bare ground (Table 1 and Appendix 4), while the high-quality revegetated sites had the least bare ground, with a mean of 20.1%. In contrast, on local native prairies, there is less than 1% bare ground (Loring, personal communication, 2008).

There are statistical differences (p=0.000) in native species richness among groups of sites (p=0.000). Following this ANOVA, the L.S.D. test indicated that all sites were different from each other (p=0.000), except for the comparison of the transition and low-quality revegetated sites, which were not statistically different (p=0.109). These two groups of sites had large amounts of bare ground, 73.9 % and 65.0% respectively (Table 1).

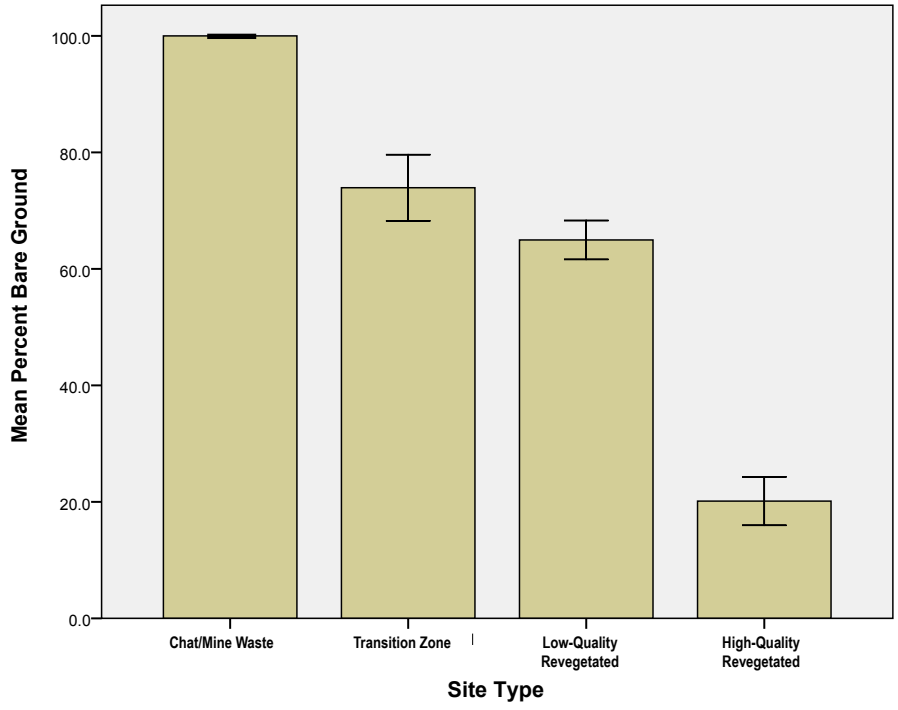

Figure 9. Comparison of Mean Percent of Bare Ground and Standard Errors by Site Types.

Site type	Number of plots	Mean Native Species Richness	Mean Percent Bare Ground
Chat/mine waste	15	0.9[abcd]	99.9[abcd]
Transition Zone	15	15.5[abd]	73.9[abd]
Low-Quality Revegetated	15	12.8[acd]	64.9[acd]
High-Quality Revegetated	15	21.5[abcd]	20.1[abcd]

Table 1. Mean native species richness and bare ground for site types. Statistical differences were found between site types for both native species richness and bare ground ($p<0.001$). Letters shared between sites indicate specific site differences ($p<0.05$) where a = chat/mine waste, b = transition zone, c = low-quality revegetated, and d = high-quality revegetated sites.

5.1.c. Annuals

The most common species was annual common ragweed, and it was found in 44 of 60 total plots. Twelve of the top 20 most common species at all sites were annuals, including these native, weedy species: common ragweed, common sunflower (*Helianthus annuus*), and tall water hemp (*Amaranthus rudis*) (Appendix 1). Annuals such as these natives are a common constituent of tallgrass prairies and Midwestern plant communities, but their numbers and abundance are much lower than in these mining-disturbed sites. Values for annual cover ran as high as 60% for the Lisa Jane Transition Zone site and 57% percent for the Hartley High-Quality Revegetated site. Cover for individual annual species is usually less than 1% in Kansas native tallgrass prairies (Kindscher 1994, Kindscher and Wells 1995). Cover by annuals or any vegetation type was virtually non-existent in the chat/mine waste sites.

5.1.d. Floristic Quality Assessment (FQA) Results

There are statistical differences ($p=0.000$) among the groups of sites using ANOVA (Figure 10). Using the L.S.D. tests, all groups (chat/mine waste, transition zone, low-quality revegetated, and high-quality revegetated) were different from each other ($p=0.000$), except for the transition zone and low-quality revegetated sites ($p=0.934$) which both had average scores of 6.4.

The FQI scores ranged at the lowest end from 0.0 at 14 chat/mine waste site plots (sampled plots where there were no plant species present) to over 16.7 at one high-quality revegetated site (Hartley plot C). Seven of the top eight scores were at high-quality revegetated sites (Appendix 4).

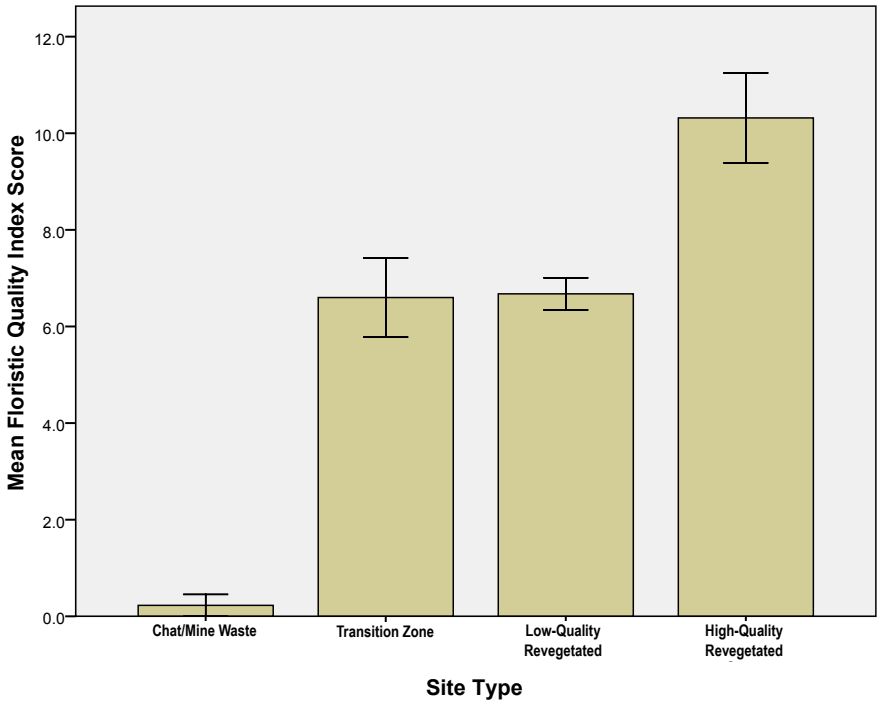

Figure 10. Comparison of Mean Floristic Quality Index Score and Standard Errors by Site Types.

However, all of these FQI numbers are smaller than local native tallgrass prairies. Sampling conducted at seven local native tallgrass prairies resulted in an FQI score averaging over 34 (Table 2) and one site having a score of 43.6, while the lowest score was 19.5 (Loring et al. 2005). These data are not statistically comparable to the data obtained in this study because they were collected in the spring of a different year and the plot size was different. When the data were collected for this current study in the fall of 2007, the native prairies had been cut for hay and therefore could not be accurately sampled using the same plot size as the mining district sites. While we cannot make a direct comparison, generally the FQI score was higher and the percent of bare ground was less on native prairies than on any of the four site types evaluated in this study.

Tallgrass Prairie Sites Surveyed in Cherokee County	8
Total Acreage of Sites	290 acres
Average FQI Score	34.8
Native Species Richness Per Site	72.5 species

Table 2. Survey of Native Prairies in Cherokee County, Kansas, and average site attributes. Data collected in spring 2005 by Loring et al. (2005).

6.0 Discussion

In using Floristic Quality Assessment and collection of cover data to quantify the adverse impacts to the terrestrial habitats or plant communities, we have been able to provide an integrated vegetation analysis on sites directly impacted by mining and remediated areas compared to native tallgrass prairie sites.

6.1 Vegetation

Historical factors greatly affect the distribution and quality of native prairies (Kettle et al., 2000). On Cherokee County native tallgrass prairie sites (Loring et al., 2005), we found much higher FQI scores, higher number of native species, and the least amount of bare ground compared to sites assessed in this study. The greater number of species found in the native prairie provides resilience to the vagaries of weather and climate. Since different species thrive under different conditions, a large variety of species allows for at least some species to thrive under almost all conditions, while those species preferring slightly different conditions will continue to persist. These conditions provide almost complete ground cover, protecting the soil from direct exposure to the erosive forces of wind or water.

There were fewer native plant species at chat/mine waste sites (average of 1 per plot), when compared to transition zone (15), and low- and high-quality revegetated sites (13 and 21 species respectively).

The greater amount of bare ground, especially at chat/mine waste sites, which had almost no vegetation (Table 1) is an indicator of altered sites. Bare ground was also substantial at the revegetated sites (averaging 64% at the low-quality revegetated sites and 20% at the high-quality sites), indicating that erosion of the revegetated soils will occur in the future.

Twelve of the top 20 most common species in our botanical inventory were annuals (Appendix 1). Sites with exclusively short-lived annuals indicate conditions that inhibit the persistence of longer-lived plants and a higher successional stage plant community.

6.1.a Stunted Vegetation

At most of the chat/mine waste and transition zone sites, we observed stunted vegetation. On some chat/mine waste sites that we visited in 2007, we could see seedlings emerging, but upon later visits, they had all died. Some plants, such as the annual tall water-hemp, had yellow, instead of typical green, center veins in their leaves.

6.1.b Native Grasses and Other Species

Native grasses (big bluestem; switch grass; Indian grass, *Sorghastrum nutans,* and little bluestem, *Schizachryium scoparium*) were present at a large number of sites (35, 37, 27, and 32 sites, respectively). They comprised the dominant vegetative cover where they were planted at revegetated sites and were found at many unplanted transition zone sites, although they provided less cover. Because these species are found at all the sites except chat/mine waste sites, other native species, especially species with high CoC, are better indicators of plant community health.

6.1.c Floristic Quality Analysis

The floristic quality analysis shows definitively that there are vegetative quality differences between sites (Appendix 4) and groups of sites (Figure 10). Plant species with high CoC are most common at the high-quality revegetated sites, while chat/mine waste sites have no high-quality vegetation present. As previously stated, a direct comparison with native prairie cannot be made, but even the high-quality revegetated sites did not approach the floristic quality of local native tallgrass prairies.

7.0 Conclusion

Chat/mine waste sites had the lowest floristic quality assessment scores. The high-quality revegetated sites had the highest scores of the studied sites. Transition zone and low-quality revegetated sites had intermediate values. The floristic quality differences between site types were statistically significant and were observed among all sites, except for transition zone and low-quality revegetated sites, which were not significantly different.

These data have identified the FQI as useful in ranking the floristic quality of sites related to current conditions and future remediation efforts.

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9.0 Acknowledgements

Many people provided assistance on this project. The study site locations were determined with the help of Leo Henning and Chris Hase of the Kansas Department of Health and Environment and John Miesner of the U.S. Fish and Wildlife Service. Quinn Long at the University of Kansas helped with field work. Craig Freeman and Caleb Morse of the R. L. McGregor Herbarium at the University of Kansas provided assistance with botanical identification of specimens. Rachel Craft did the data entry at the Kansas Biological Survey.

In addition, this document was peer-reviewed under the direction of Craig Freeman by David Ode, Botanist/Ecologist for the South Dakota Game, Fish and Parks Department, and Brad Guhr of the Dyck Arboretum, Hesston, Kansas. Jennifer Delisle of the Kansas Biological Survey provided additional editorial assistance. And we greatly appreciated the funding and direction that was provided by John Miesner at the U.S. Fish and Wildlife Service.

Appendix 1: Species, locations, and the Kansas Coefficient of Conservatism

Scientific Name	Common Name	Number of Locations	KS CoC
Acalypha virginica	Virginia copperleaf	5	0
Acer saccharinum	silver maple	1	2
Achillea millefolium	yarrow	7	1
Agalinis fascicularis	false foxglove	1	6
Agalinis heterophylla	prairie false foxglove	16	8
Amaranthus tuberculatus	tall water-hemp	33	0
Ambrosia artemisiifolia	common ragweed	44	0
Ambrosia trifida	giant ragweed	1	0
Ampelopsis cordata	heart-leaf raccoon-grape	1	2
Andropogon gerardii	big bluestem	35	4
Andropogon virginicus	broom-sedge bluestem	28	0
Apocynum cannabinum	hemp dogbane	3	0
Aristida oligantha	old-field threeawn	33	0
Asparagus officinalis	asparagus	1	*
Bidens polylepis	coreopsis beggar-ticks	25	1
Bidens sp.	beggarticks	2	-
Bouteloua curtipendula	side-oats grama	8	5
Bradburia pilosa	soft goldenaster	2	4
Brickellia eupatorioides	false boneset	3	2
Bromus japonicus	Japanese brome	3	*
Carex blanda	woodland sedge	1	1
Carex brevior	short-beak sedge	1	5
Carex sp.	sedge	14	-
Catalpa bignonioides	southern catalpa	2	*
Celtis occidentalis	common hackberry	2	1
Cerastium brachypodum	mouse's-ear-chickweed	20	2
Chamaecrista fasciculata	showy partridge pea	4	2
Chamaesyce humistrata	spreading sandmat	1	3
Chamaesyce maculata	spotted mat-spurge	8	0
Chasmanthium latifolium	broad-leaf wood-oat	1	4
Cirsium altissimum	tall thistle	1	2
Clematis pitcheri	Pitcher's clematis	2	4
Clematis terniflora	sweet autumn virginsbower	1	*
Conyza canadensis	tall horseweed	14	0
Cornus drummondii	roughleaf dogwood	1	1
Croton capitatus	woolly croton	2	1
Croton monanthogynus	one-seed croton	1	1
Cuscuta sp.	dodder	5	-
Cynodon dactylon	common bermuda grass	4	*
Cyperus bipartitus	brook flat-sedge	2	4
Cyperus esculentus	yellow nut-sedge	17	0
Cyperus sp.	flatsedge	3	-
Dactylis glomerata	orchardgrass	2	*
Daucus carota	Queen-Anne's-lace	4	*

Appendix 1: Species, Locations and Kansas CoC

Scientific Name	Common Name	Number of Locations	KS CoC
Desmodium illinoense	Illinois tickclover	3	5
Dichanthelium acuminatum	pointed dichanthelium	14	3
Dichanthelium scoparium	velvet panicum	3	7
Digitaria sanguinalis	crab grass	12	*
Diodia teres	rough buttonweed	1	2
Eleocharis obtusa	blunt spike-rush	1	3
Eleocharis sp.	spike-rush	2	-
Elymus canadensis	Canada wildrye	2	5
Eragrostis spectabilis	purple love grass	3	3
Eragrostis trichodes	sand lovegrass	1	4
Erigeron annuus	annual fleabane	12	0
Erigeron strigosus	daisy fleabane	1	4
Eupatorium serotinum	fall joe-pye-weed	6	2
Fimbristylis autumnalis	slender fimbry	1	5
Fraxinus pennsylvanica	green ash	4	0
Froelichia gracilis	slender snakecotton	1	3
Galium sp.	bedstraw	2	-
Hedeoma hispida	rough false-penny-royal	1	1
Hemerocallis sp.	daylily	3	-
Humulus japonica	Japanese hop	1	*
Ilex decidua	deciduous holly	1	5
Ipomoea lacunosa	white morning-glory	1	0
Iris germanica	German iris	1	*
Iva annua	annual sumpweed	5	0
Juncus diffusissimus	slimpod rush	1	5
Juncus effusus	common rush	1	2
Juncus interior	inland rush	8	2
Juniperus virginiana	eastern red-cedar	12	1
Kummerowia stipulacea	Korean low bush-clover	9	*
Lactuca serriola	prickly lettuce	2	*
Leersia oryzoides	rice cutgrass	1	4
Lepidium densiflorum	prairie pepper-grass	10	0
Leptochloa fusca	bearded sprangletop	1	0
Lespedeza capitata	round-head bush-clover	1	6
Lespedeza cuneata	sericea bush-clover	8	*
Liatris pycnostachya	thick-spike gayfeather	3	7
Lonicera japonica	Japanese honeysuckle	1	*
Melilotus albus	white sweet clover	5	*
Morus alba	white mulberry	1	*
Muhlenbergia mexicana	Mexican wire-stem muhly	1	4
Oenothera biennis	common evening-primrose	1	0
Opuntia macrorhiza	bigroot prickly pear	2	3
Oxalis dillenii	gray-green wood-sorrel	3	0
Panicum anceps	beaked panicgrass	4	4

Appendix 1: Species, Locations, and Kansas CoC

Scientific Name	Common Name	Number of Locations	KS CoC
Panicum capillare	witch grass	36	0
Panicum virgatum	switch grass	37	4
Parthenocissus quinquefolia	Virginia creeper	1	1
Pascopyrum smithii	western wheat grass	4	2
Paspalum laeve	field paspalum	5	2
Paspalum setaceum	sand paspalum	1	2
Penstemon digitalis	smooth beardtongue	12	4
Penstemon tubaeflorus	tube beardtongue	1	3
Persicaria punctata	dotted smartweed	3	3
Phlox pilosa	prairie phlox	1	7
Plantago virginica	pale-seed plantain	13	1
Poa pratensis	Kentucky blue grass	1	*
Polanisia dodecandra	rough-seed clammyweed	1	0
Polygonum sp.	knotweed	2	-
Populus deltoides	plains cottonwood	4	0
Potentilla recta	sulfur cinquefoil	1	*
Prunus serotina	black cherry	2	3
Pycnanthemum tenuifolium	narrow-leaf mountain-mint	1	4
Rhus copallina	dwarf sumac	8	3
Rhus glabra	smooth sumac	6	1
Rubus flagellaris	American dewberry	4	5
Rudbeckia hirta	black-eyed-Susan	16	2
Rumex acetosella	sheep sorrel	3	*
Rumex crispus	curly dock	5	*
Sabatia campestris	Texas star	2	6
Salix nigra	black willow	1	2
Sassafras albidum	white sassafras	2	2
Schedonorus arundinaceus	tall fescue	8	*
Schizachyrium scoparium	little bluestem	32	5
Schoenoplectus pungens	common threesquare	1	3
Setaria parviflora	bristlegrass	9	3
Sideroxylon lanuginosum	woolly jungle-plum	1	5
Smilax bona-nox	saw greenbrier	2	5
Solanum carolinense	Carolina horse nettle	3	1
Solidago canadensis	Canadian goldenrod	10	2
Solidago nemoralis	gray goldenrod	2	2
Sorghastrum nutans	yellow Indian grass	26	5
Sorghum halepense	Johnson grass	2	*
Spiranthes lacera	southern slender ladies'-tresses	1	6
Sporobolus clandestinus	rough dropseed	3	6
Strophostyles leiosperma	slick-seed wildbean	3	3
Strophostyles sp.	fuzzybean	2	-
Symphoricarpos orbiculatus	buckbrush	2	1
Symphyotrichum novae-angliae	New England aster	2	3

Scientific Name	Common Name	Number of Locations	KS CoC
Symphyotrichum patens	sky-drop aster	3	5
Symphyotrichum pilosum	hairy aster	28	0
Symphyotrichum praealtum	willow-leaf aster	2	3
Toxicodendron radicans	eastern poison ivy	3	0
Tridens flavus	purpletop	10	1
Tridens strictus	longspike tridens	2	6
Trifolium pratense	red clover	1	*
Trifolium repens	white clover	1	*
Triodanis perfoliata	clasping-leaf Venus'-looking-glass	18	2
Triticum aestivum	wheat	1	*
Ulmus pumila	Siberian elm	10	*
Verbascum blattaria	moth mullein	16	*
Verbascum thapsus	flannel mullein	8	*
Verbena hastata	blue verbena	1	4
Viola sp.	violet	1	-
Vitis cinerea	graybark grape	1	5
Vitis riparia	riverbank grape	1	2
Yucca filamentosa	Adam's needle	2	*
Bare Ground	Bare Ground	60	

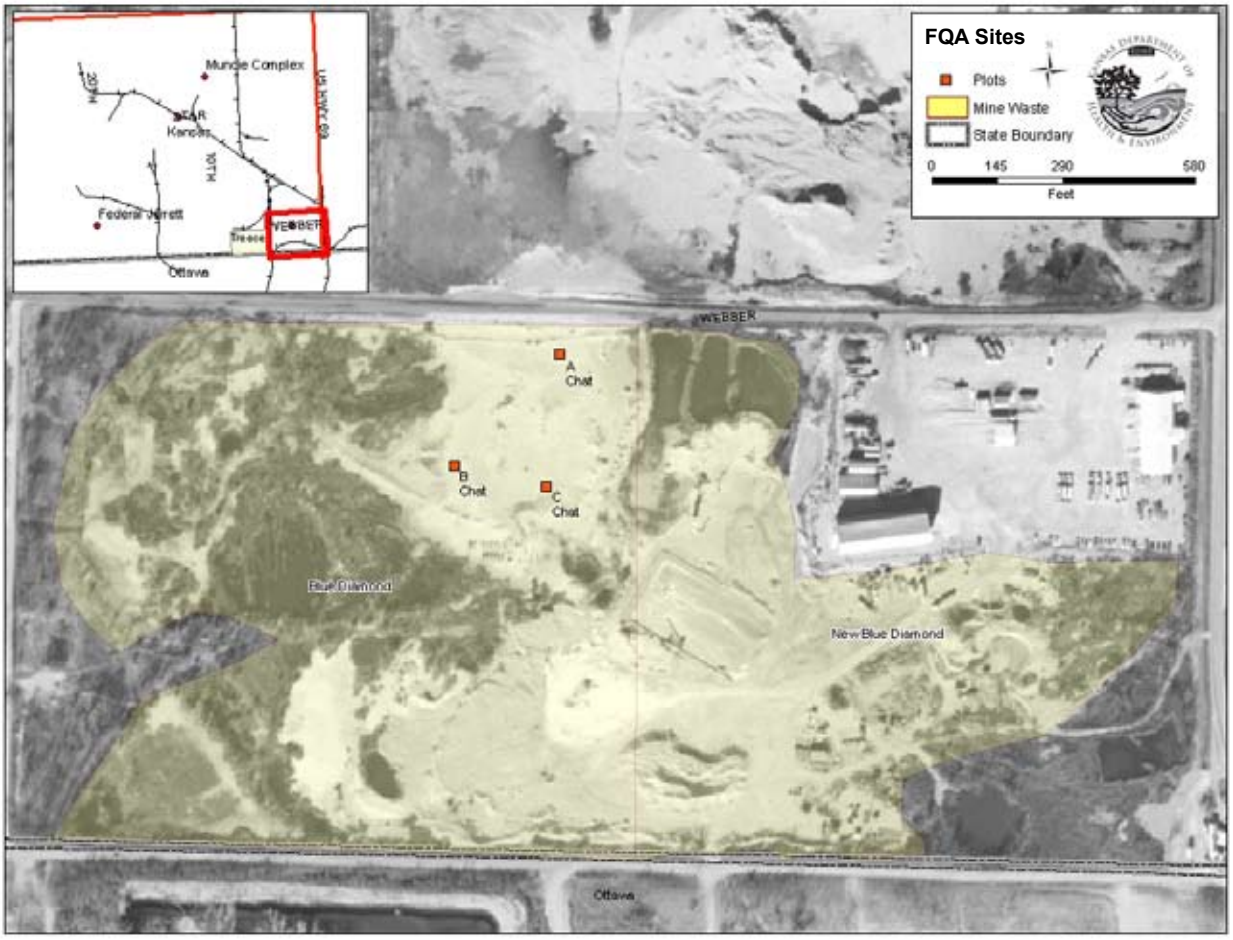
Appendix 2: GPS Coordinates of Sites, datum = NAD83

Site Name	Site Type	Plot	Latitude	Longitude
Diamond	Chat/Mine Waste	Plot A	N37.00.114	W94.50.195
		Plot B	N37.00.073	W94.50.242
		Plot C	N37.00.066	W94.50.200
King Brand	Chat/Mine Waste	Plot A	N37.00.547	W94.52.047
		Plot B	N37.00.500	W94.52.056
		Plot C	N37.00.456	W94.52.024
Muncie Complex	Chat/Mine Waste	Plot A	N37.01.259	W94.51.069
		Plot B	N37.01.309	W94.51.147
		Plot C	N37.01.256	W94.51.185
Retirement Center	Chat/Mine Waste	Plot A	N37.00.903	W94.44.526
		Plot B	N37.00.883	W94.44.556
		Plot C	N37.00.892	W94.44.584
Sonny Boy	Chat/Mine Waste	Plot A	N37.01.041	W94.44.577
		Plot B	N37.01.132	W94.44.578
		Plot C	N37.01.137	W94.44.501
Big Elk	Transition Zone	Plot A	N37.00.913	W94.51.088
		Plot B	N37.00.898	W94.51.124
		Plot C	N37.00.928	W94.51.131
King Brand	Transition Zone	Plot A	N37.00.481	W94.51.891
		Plot B	N37.00.511	W94.51.936
		Plot C	N37.00.539	W94.51.924
Lisa Jane	Transition Zone	Plot A	N37.01.384	W94.45.597
		Plot B	N37.01.333	W94.45.621
		Plot C	N37.01.390	W94.45.538
Muncie Complex	Transition Zone	Plot A	N37.01.036	W94.51.232
		Plot B	N37.01.079	W94.51.282
		Plot C	N37.01.135	W94.51.213
Sonny Boy	Transition Zone	Plot A	N37.01.045	W94.44.523
		Plot B	N37.01.050	W94.44.570
		Plot C	N37.01.051	W94.44.568
Blue Hole	Low-Quality Revegetated	Plot A	N37.04.145	W94.38.045
		Plot B	N37.04.142	W94.38.080
		Plot C	N37.04.133	W94.38.029
Galena Repair Site	Low-Quality Revegetated	Plot A	N37.05.042	W94.38.154
		Plot B	N37.05.051	W94.38.131
		Plot C	N37.05.056	W94.38.105
Hell's Half Acre	Low-Quality Revegetated	Plot A	N37.04.858	W94.38.101
		Plot B	N37.04.875	W94.38.080
		Plot C	N37.04.854	W94.38.066
Southern Star	Low-Quality Revegetated	Plot A	N37.05.180	W94.39.003
		Plot B	N37.05.151	W94.39.022
		Plot C	N37.05.125	W94.39.003
West Schermerhorn	Low-Quality Revegetated	Plot A	N37.03.983	W94.39.028
		Plot B	N37.04.012	W94.39.025
		Plot C	N37.04.026	W94.39.089
Amax Hartley	High-Quality Revegetated	Plot A	N37.01.226	W94.45.485
		Plot B	N37.01.231	W94.45.444
		Plot C	N37.01.249	W94.45.477
Ballard	High-Quality Revegetated	Plot A	N37.00.944	W94.45.593
		Plot B	N37.00.958	W94.45.621
		Plot C	N37.00.924	W94.45.638
Cemetery Site	High-Quality Revegetated	Plot A	N37.05.544	W94.38.624
		Plot B	N37.05.606	W94.38.664
		Plot C	N37.05.508	W94.38.696
Fire Station Site	High-Quality Revegetated	Plot A	N37.04.834	W94.38.652
		Plot B	N37.04.781	W94.38.640
		Plot C	N37.04.295	W94.38.620
Homestake	High-Quality Revegetated	Plot A	N37.01.662	W94.45.420
		Plot B	N37.01.649	W94.45.406
		Plot C	N37.01.676	W94.45.401

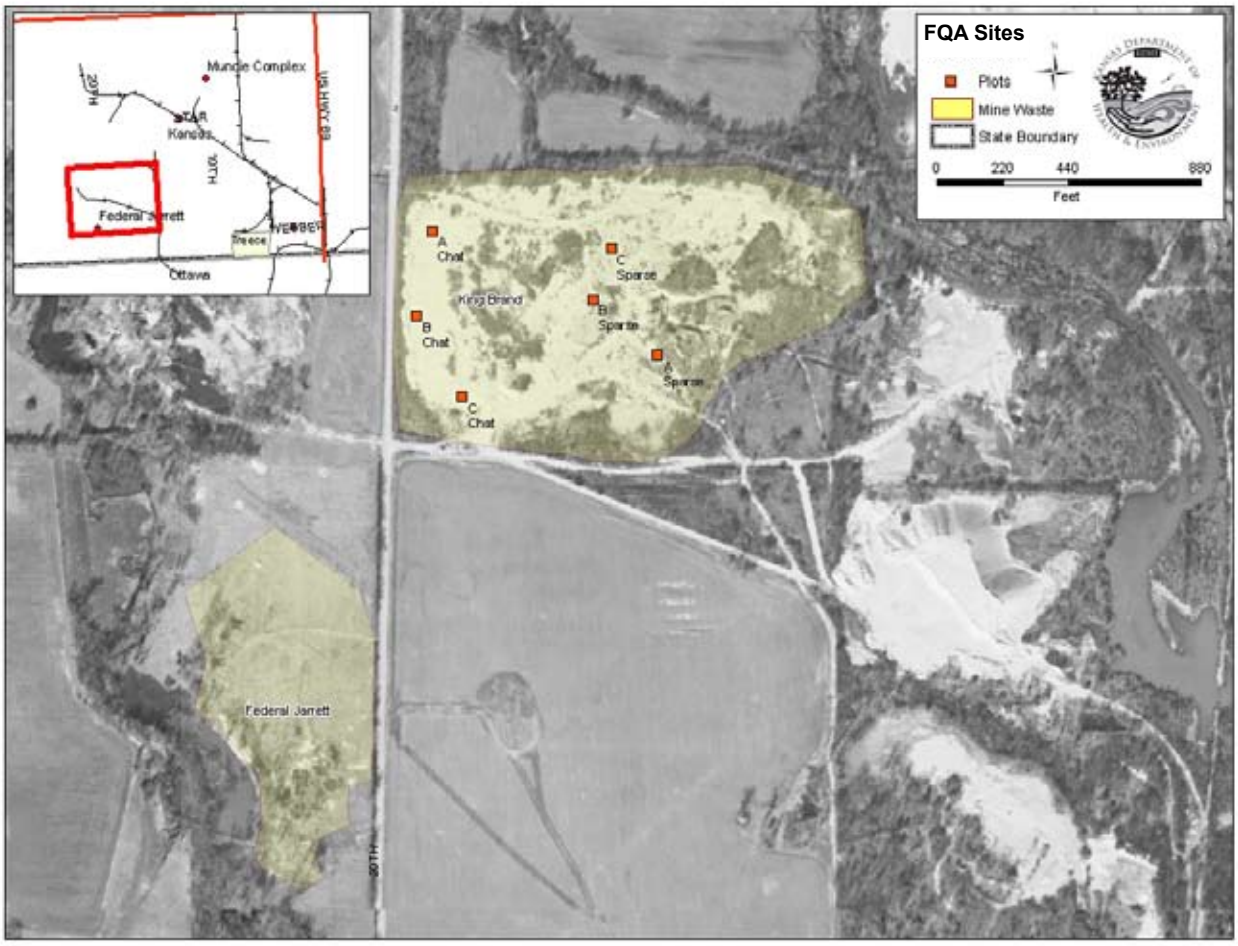
Appendix 3: Photographs and maps of FQA sites

Photographs by Frank Norman and maps by Chris Hase, Kansas Department of Health and Environment

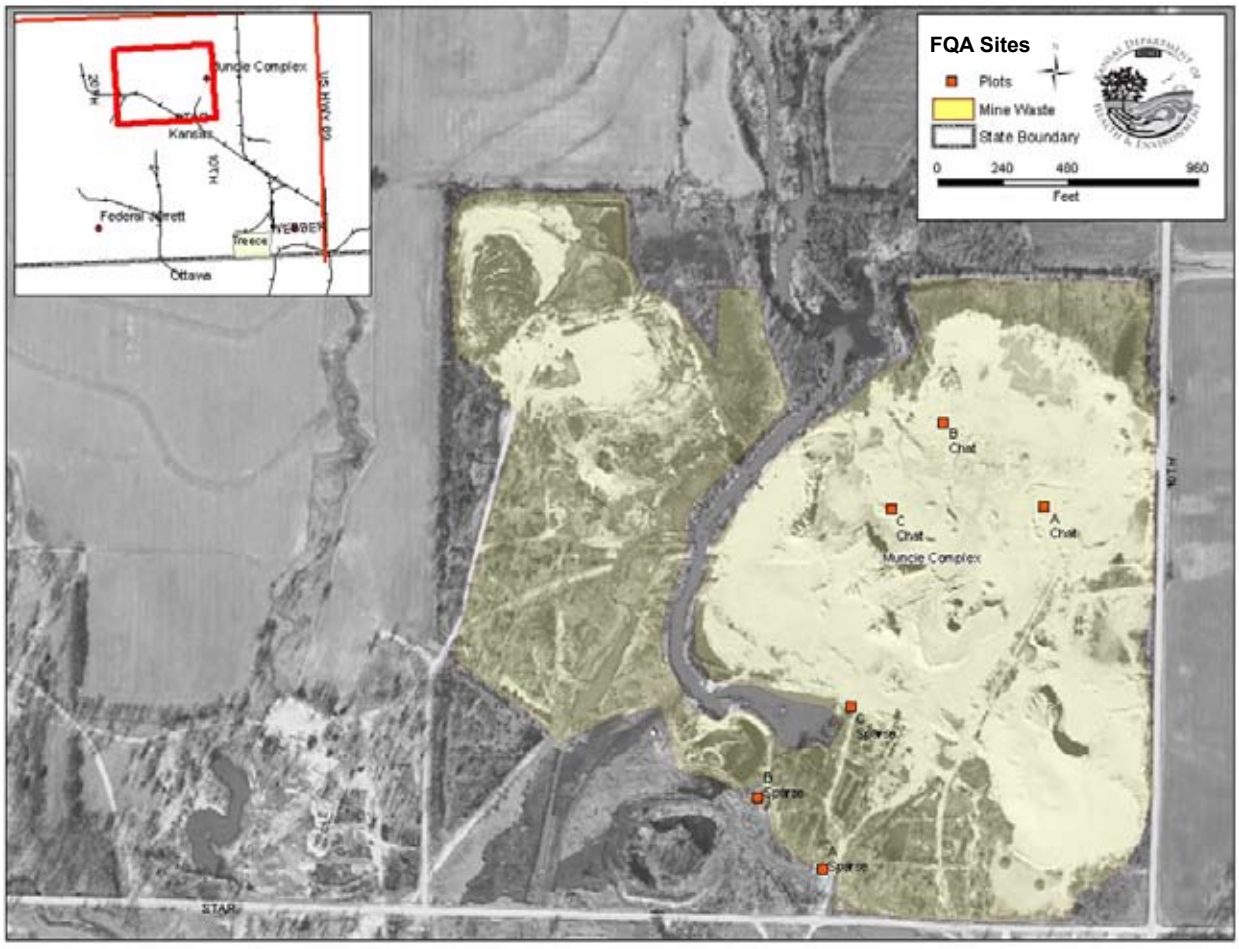
Diamond Chat/Mine Waste site, Cherokee County, Kansas



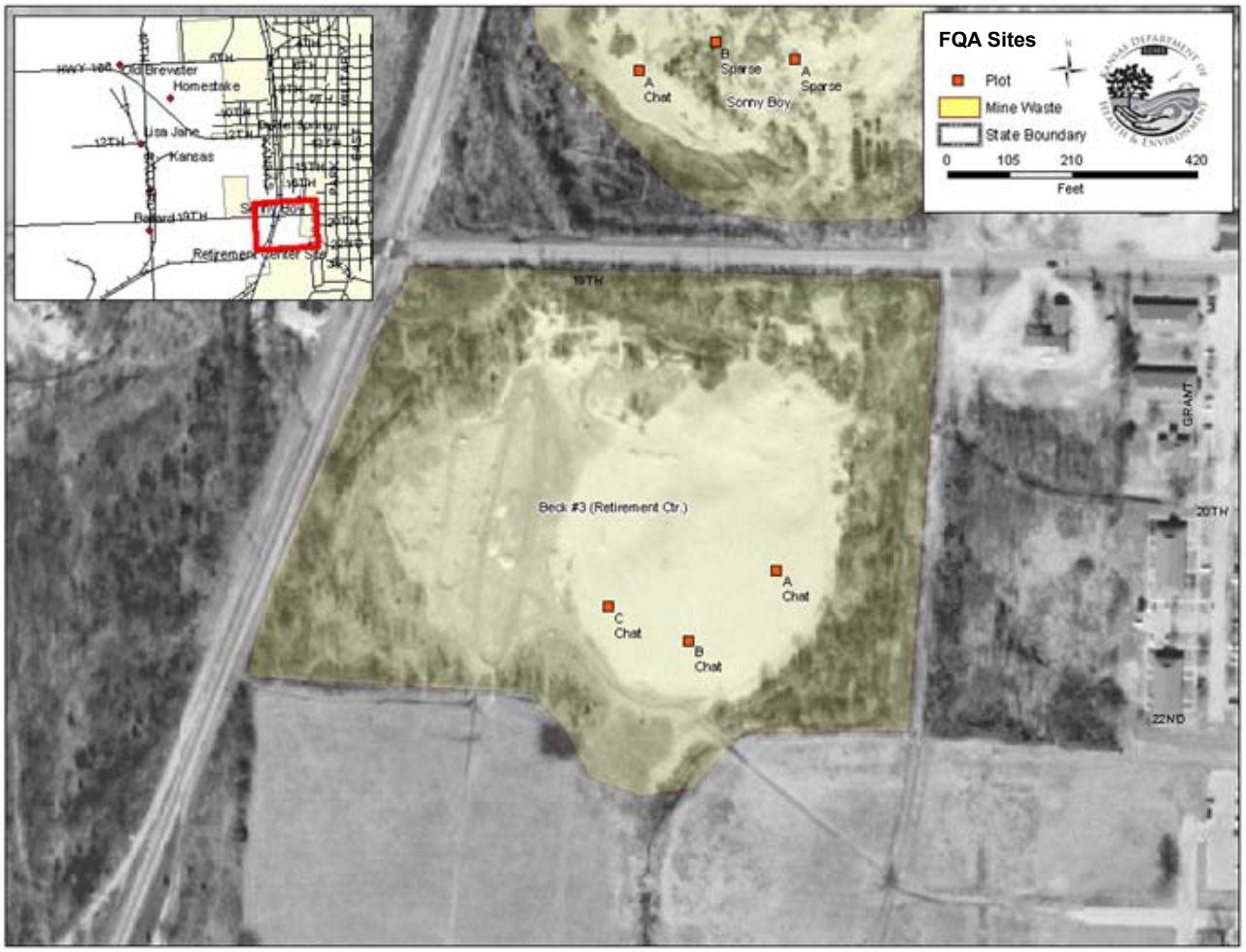
King Brand Chat/Wine Waste site, Cherokee County, Kansas



Muncie Complex Chat/Mine Waste site, Cherokee County, Kansas.

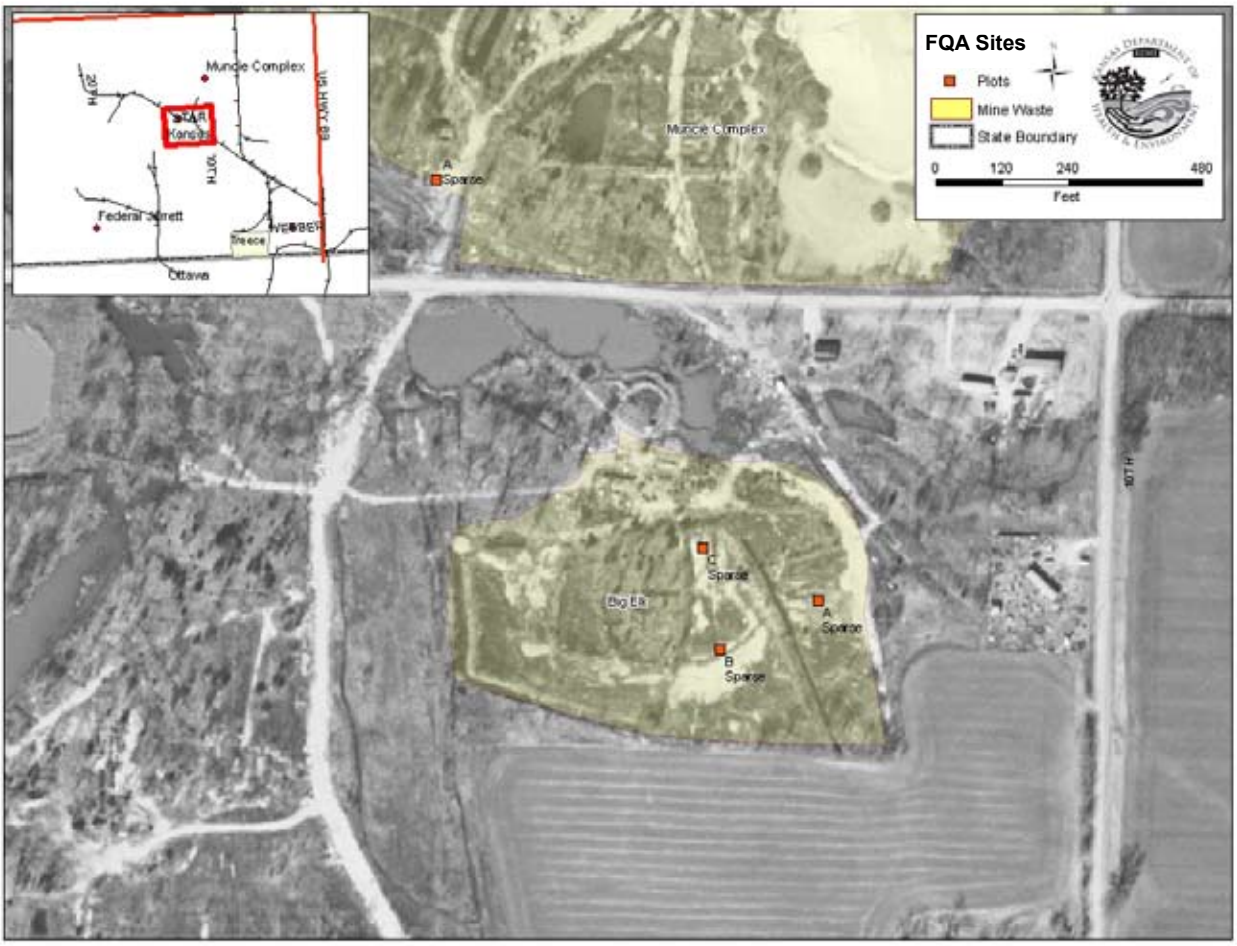


Retirement Center Chat/Mine Waste site, west edge of Baxter Springs, Kansas.

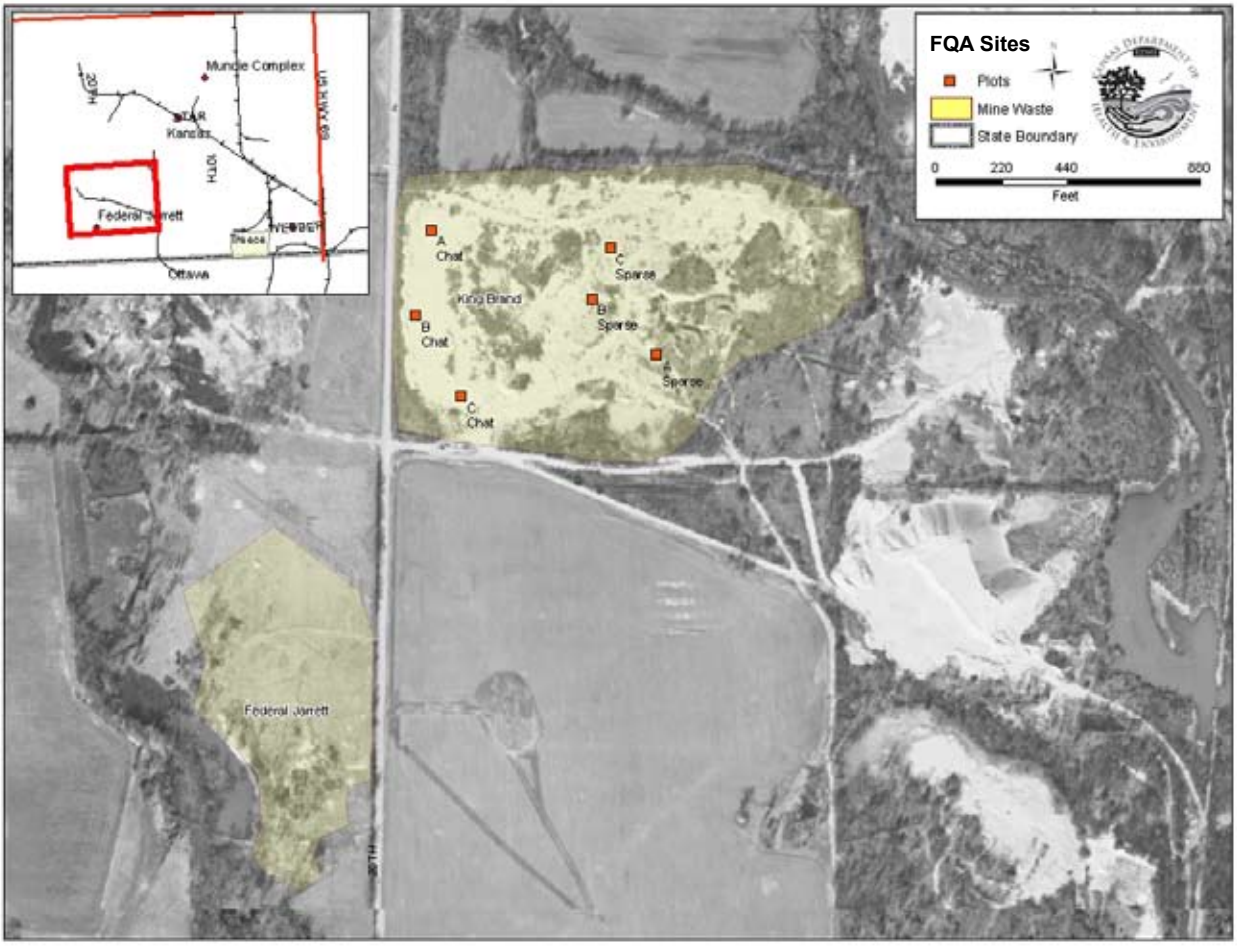


Sonny Boy Chat/Mine Waste site, Baxter Springs, Kansas

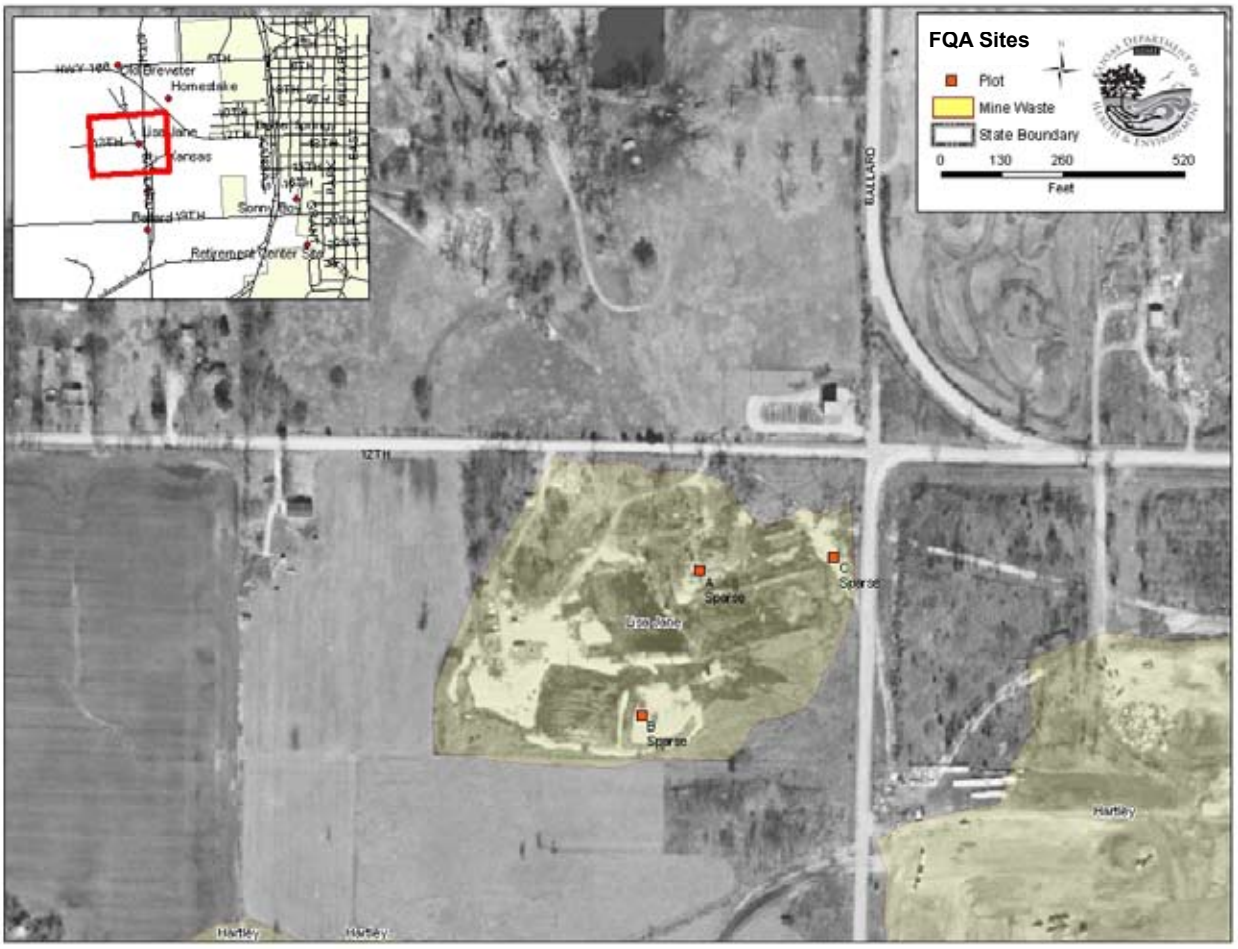
Big Elk Transition Zone site, Cherokee County, Kansas



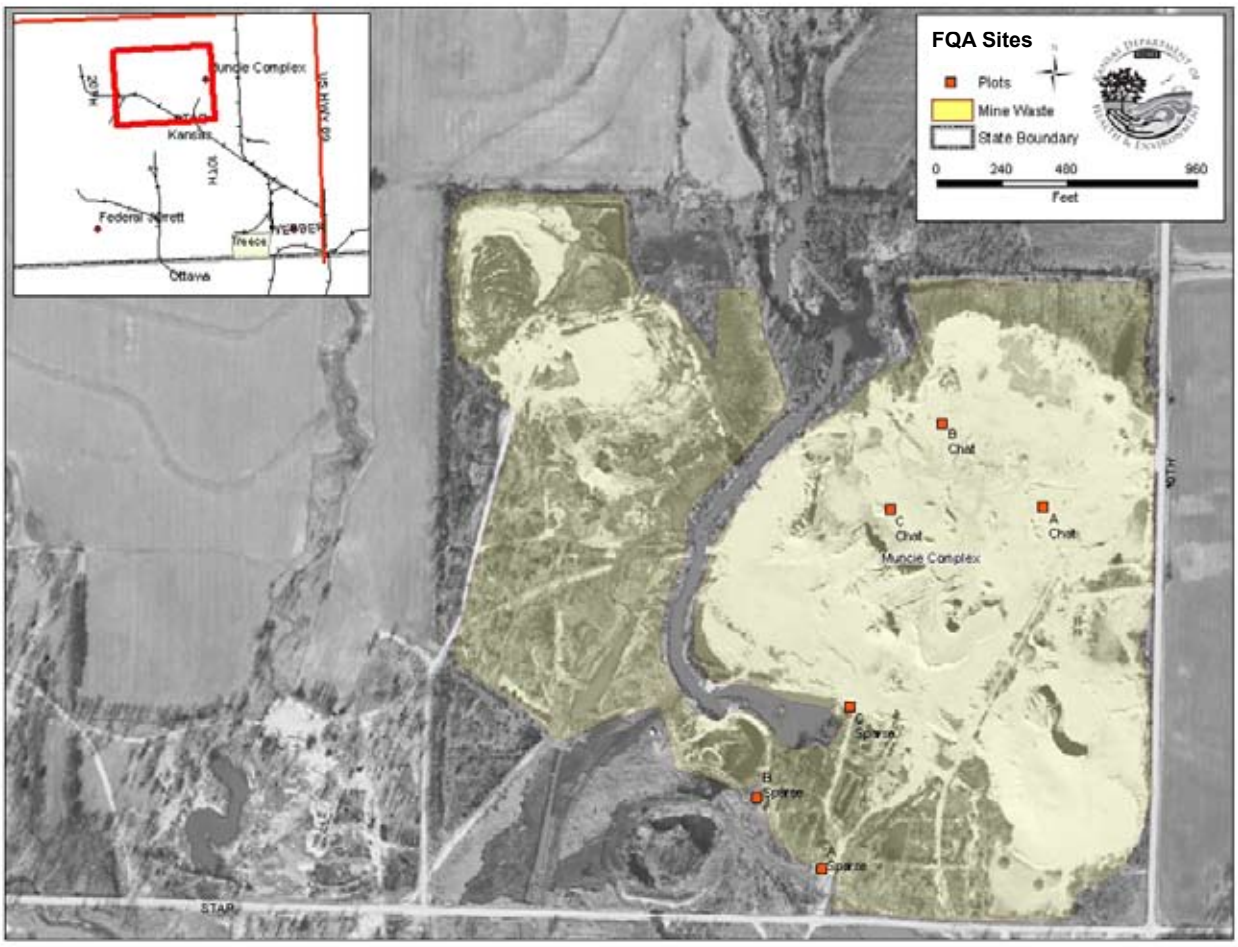
King Brand Transition Zone site, Cherokee County, Kansas



Lisa Jane Transition Zone site, Cherokee County, Kansas

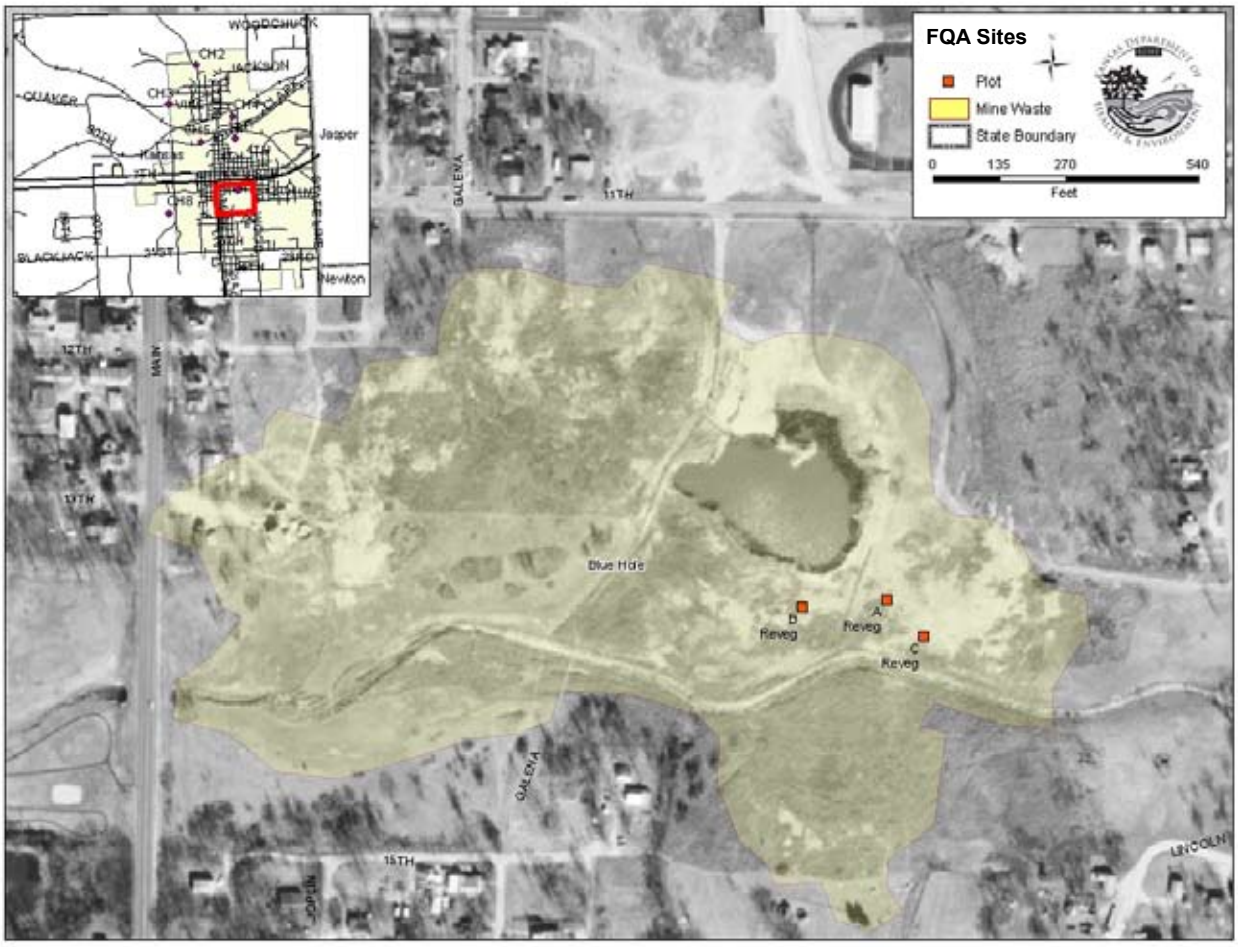


Muncie Complex Transition Zone site, Cherokee County, Kansas. Plots are marked "Sparse" on the map below.

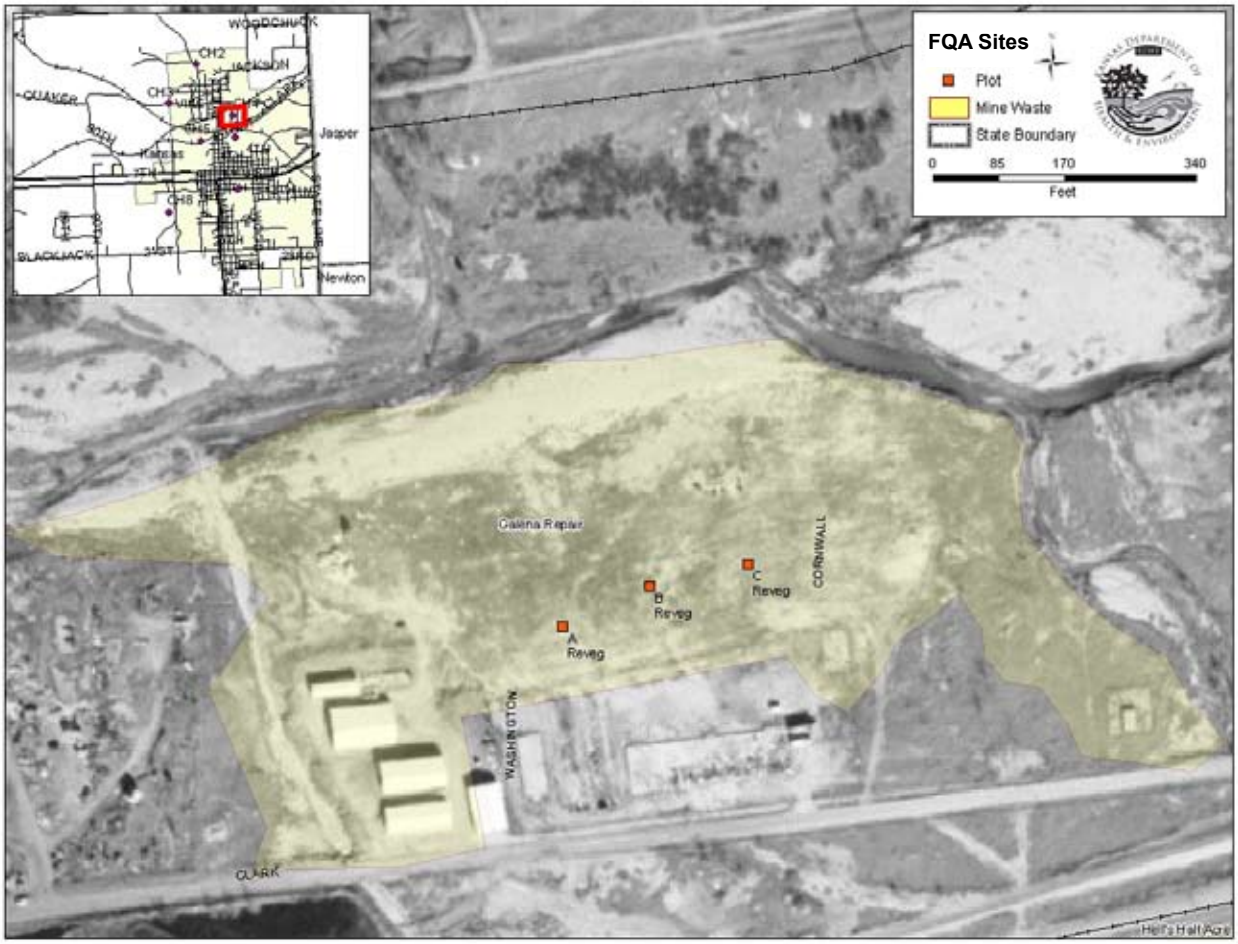


Sonny Boy Transition Zone site, Cherokee County, Kansas.
Plots are marked "Sparse" on the map below.

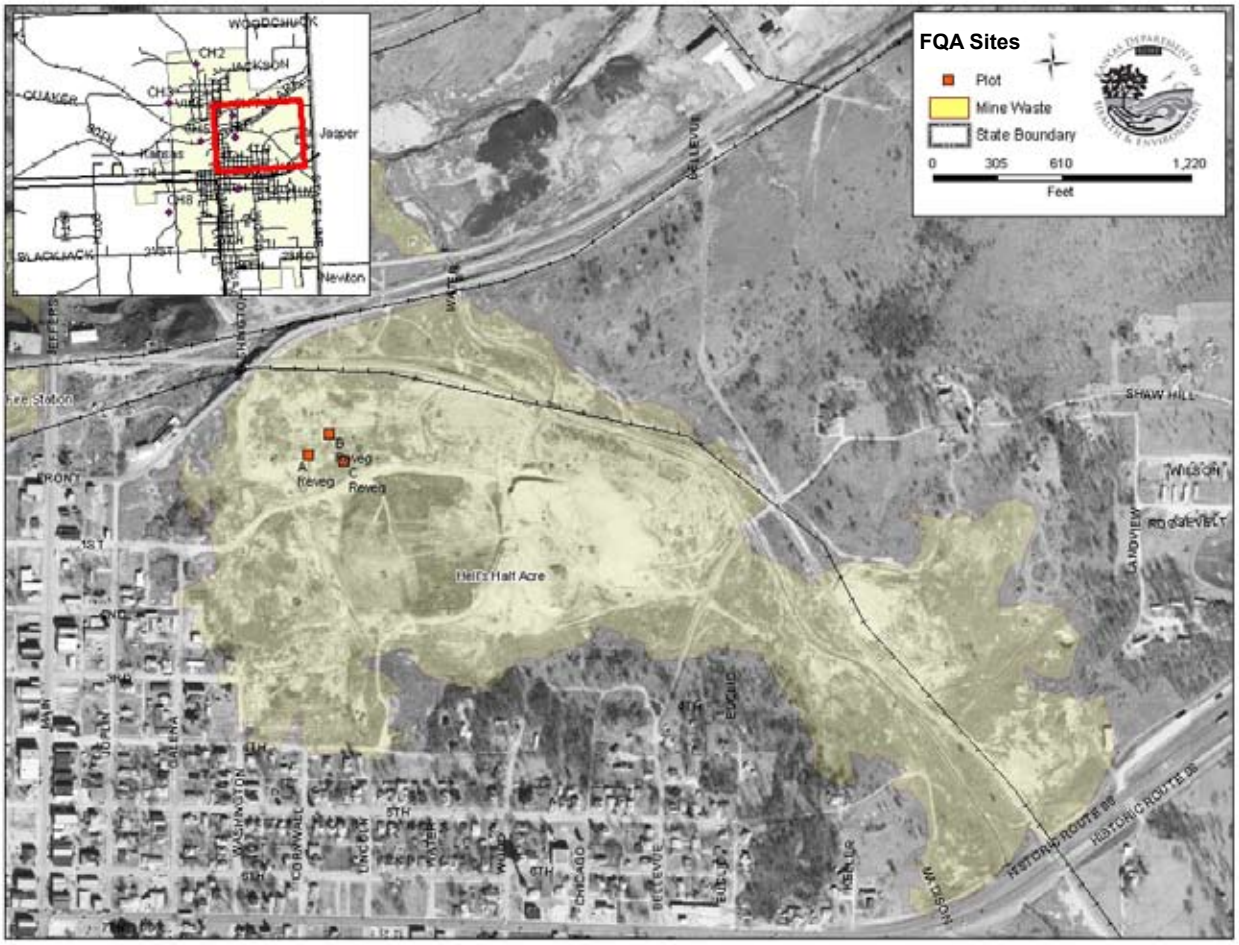
Blue Hole Low-Quality Revegetated site, Cherokee County, Kansas



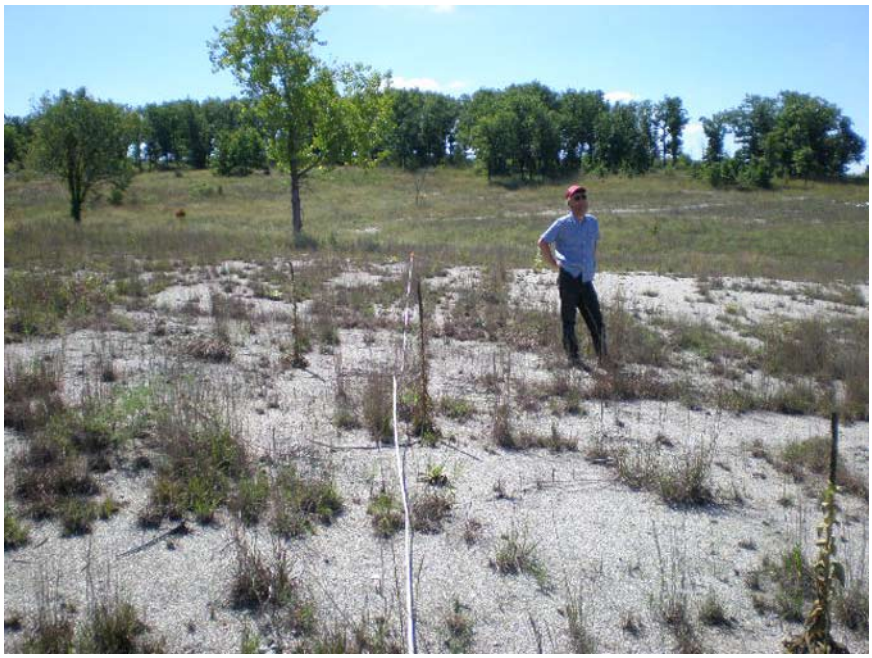
Galena Repair Low-Quality Revegetated site, Cherokee County, Kansas

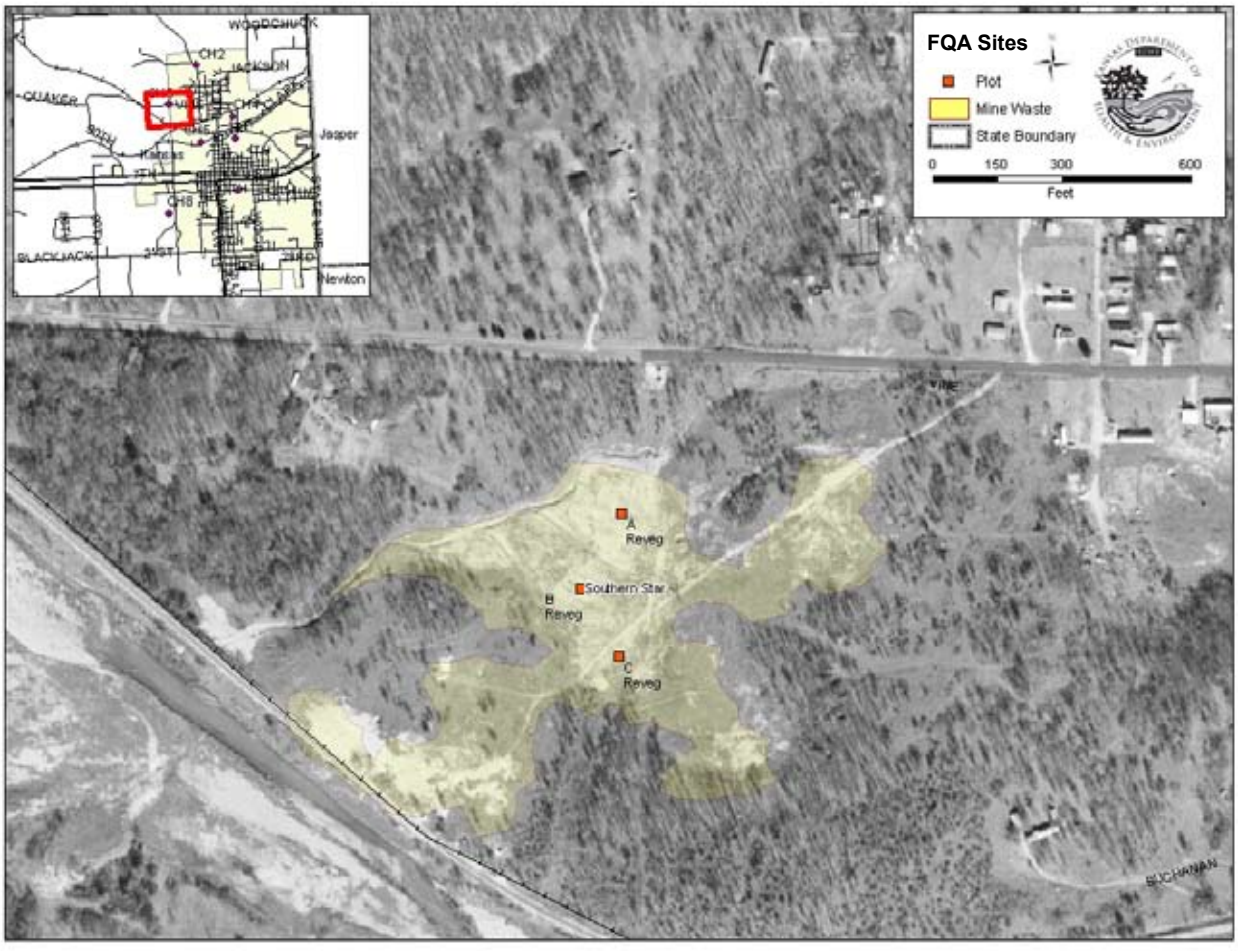


Hell's Half-Acre Low-Quality Revegetated site, Cherokee County, Kansas

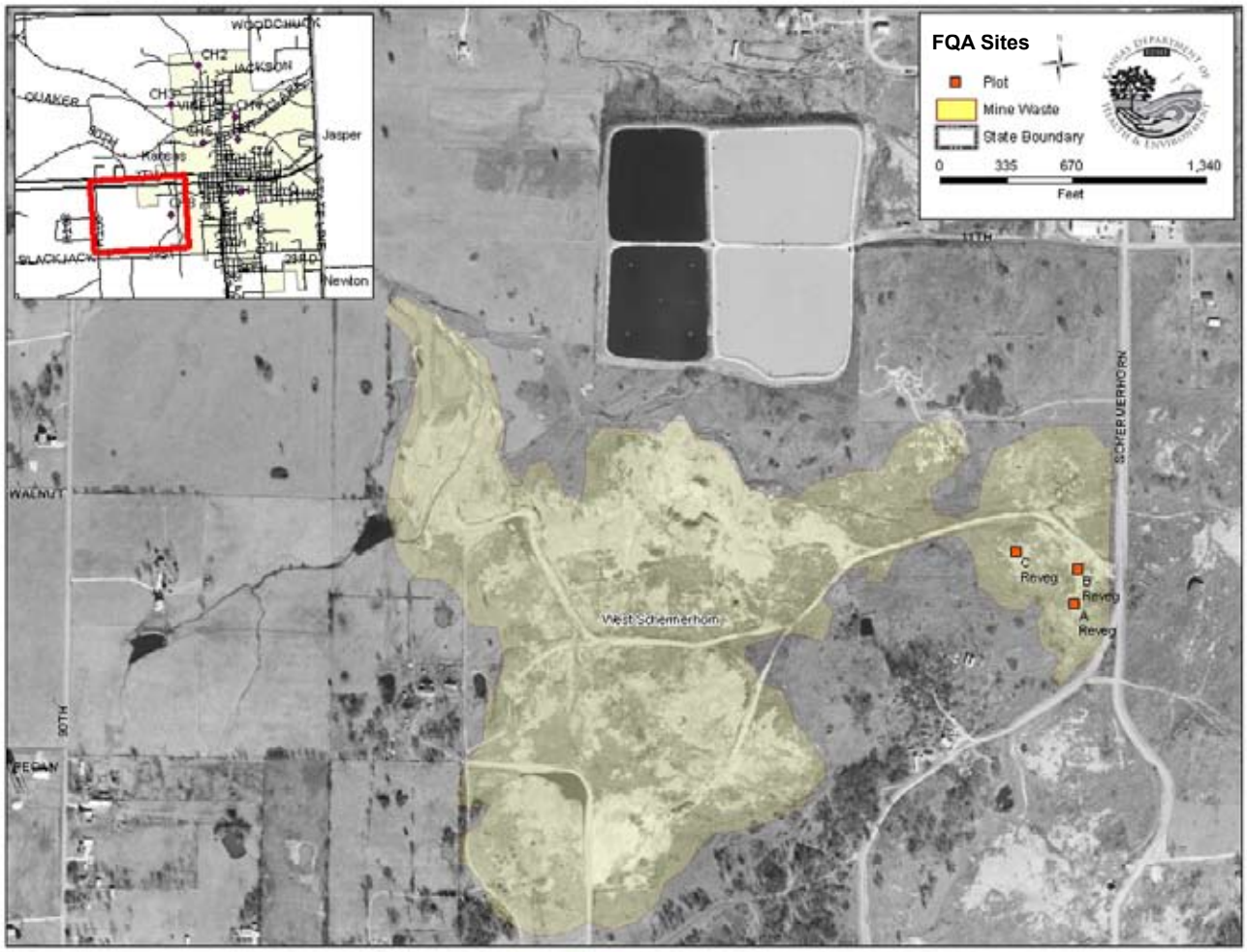


Southern Star Low-Quality Revegetated site, Cherokee County, Kansas

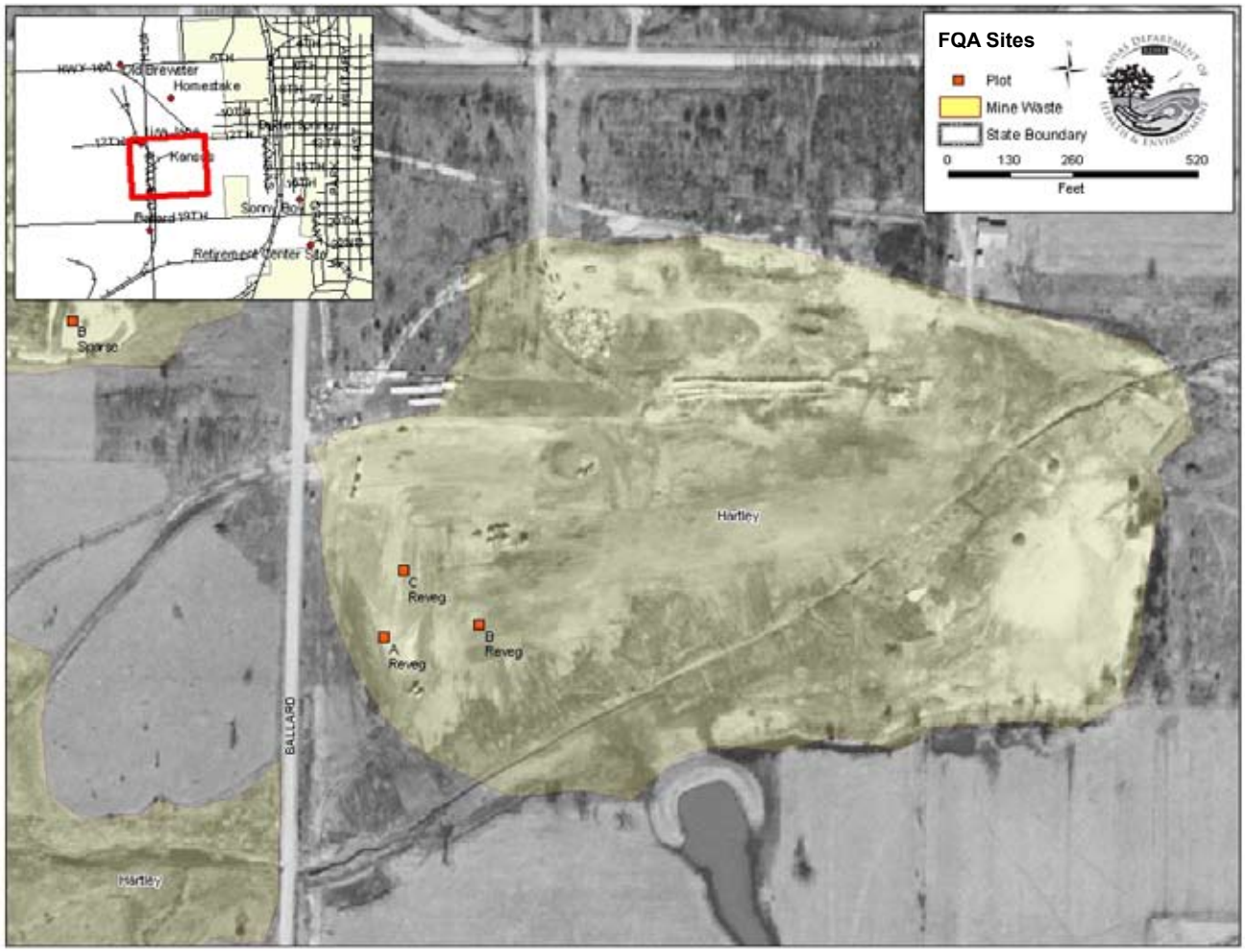




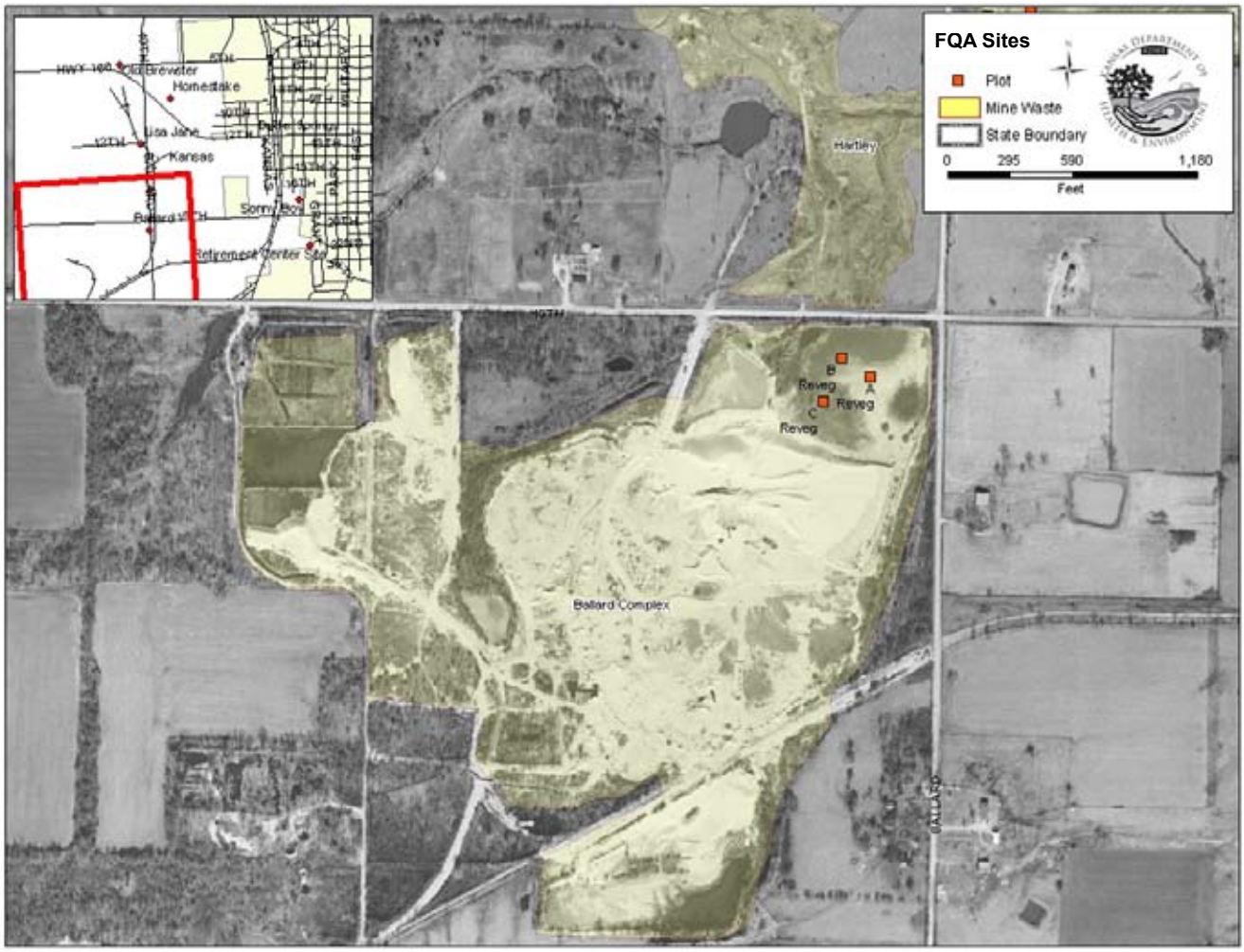
West Schermerhorn Low-Quality Revegetated site, Cherokee County, Kansas



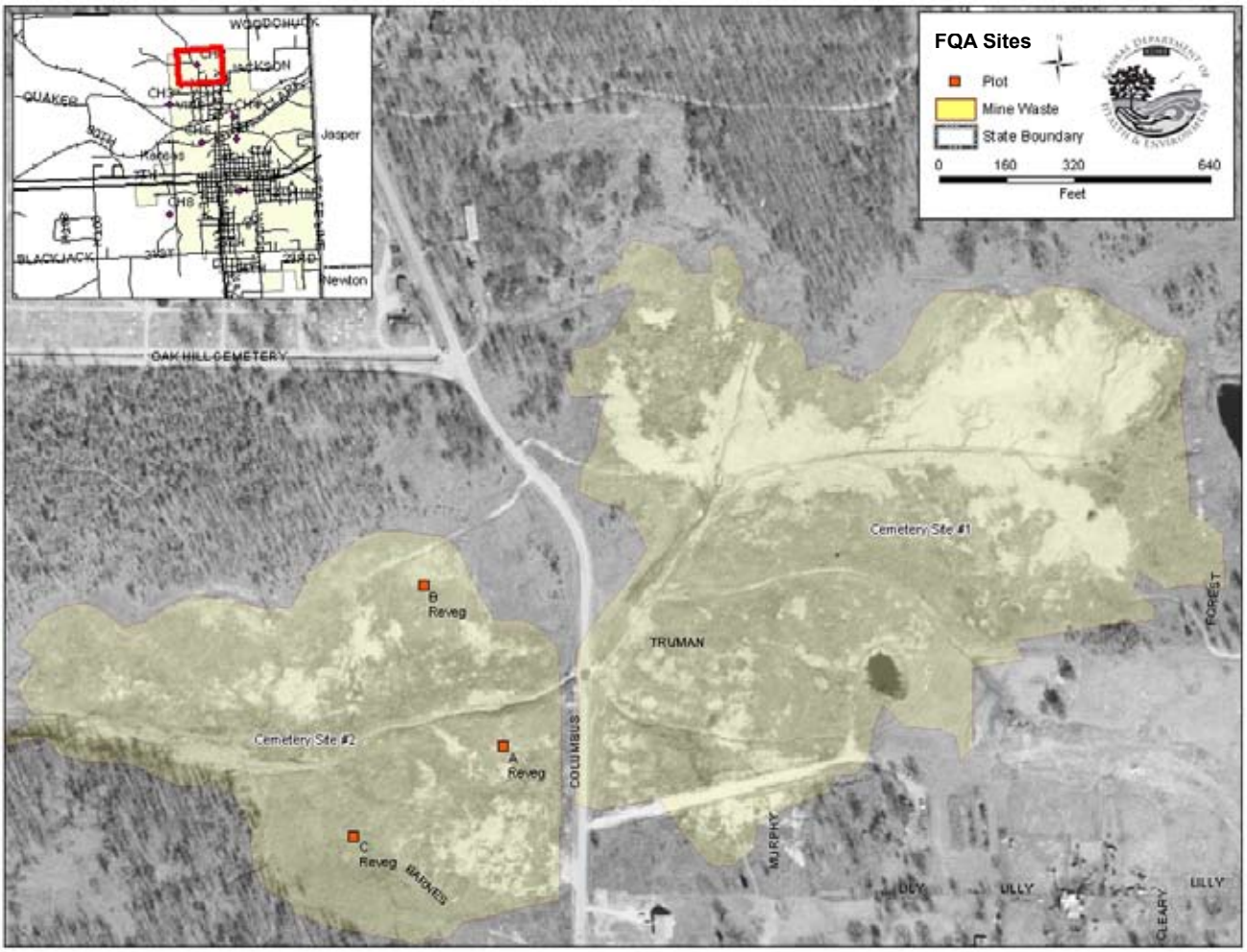
Hartley High-Quality Revegetated site, Cherokee County, Kansas



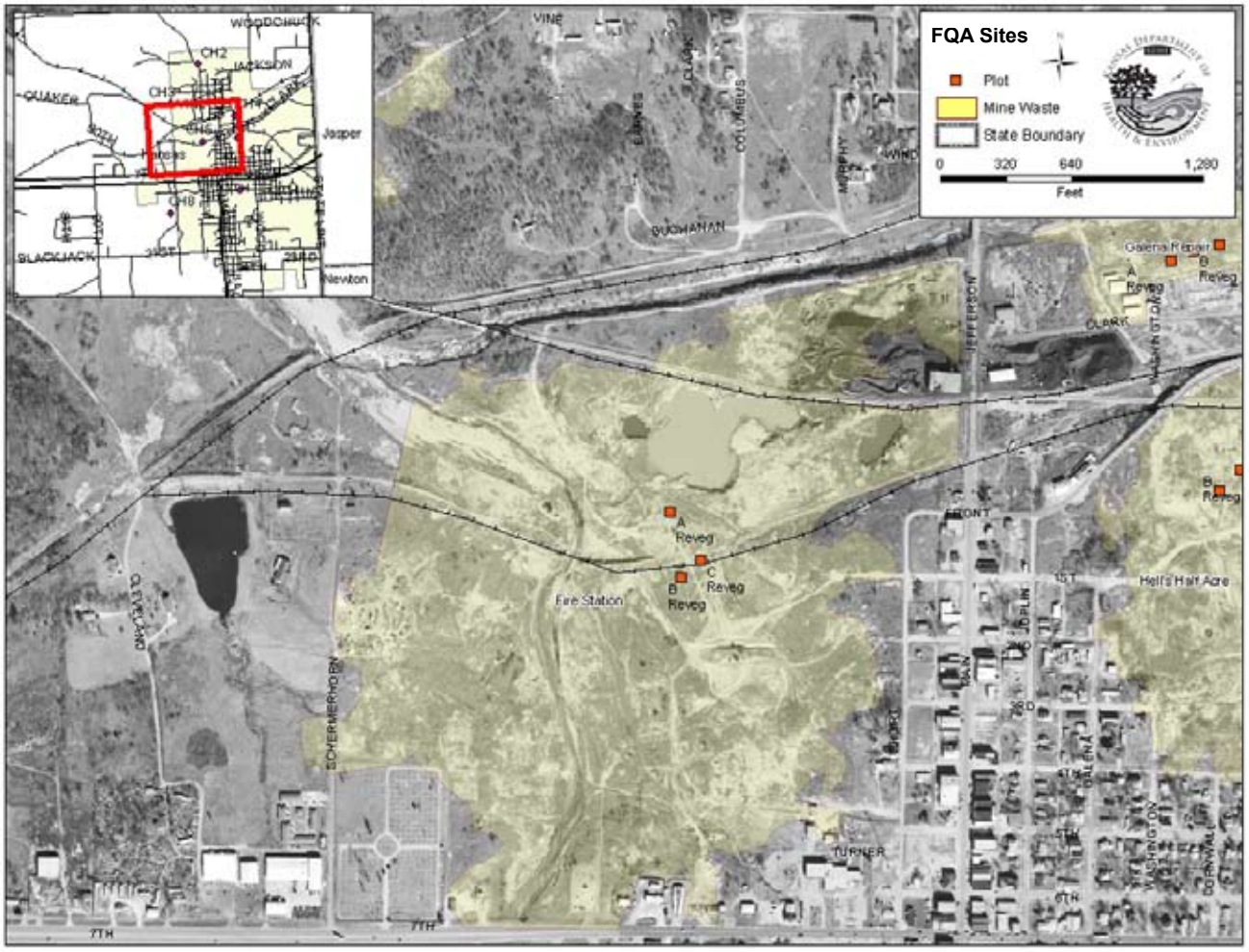
Ballard High-Quality Revegetated site, Cherokee County, Kansas



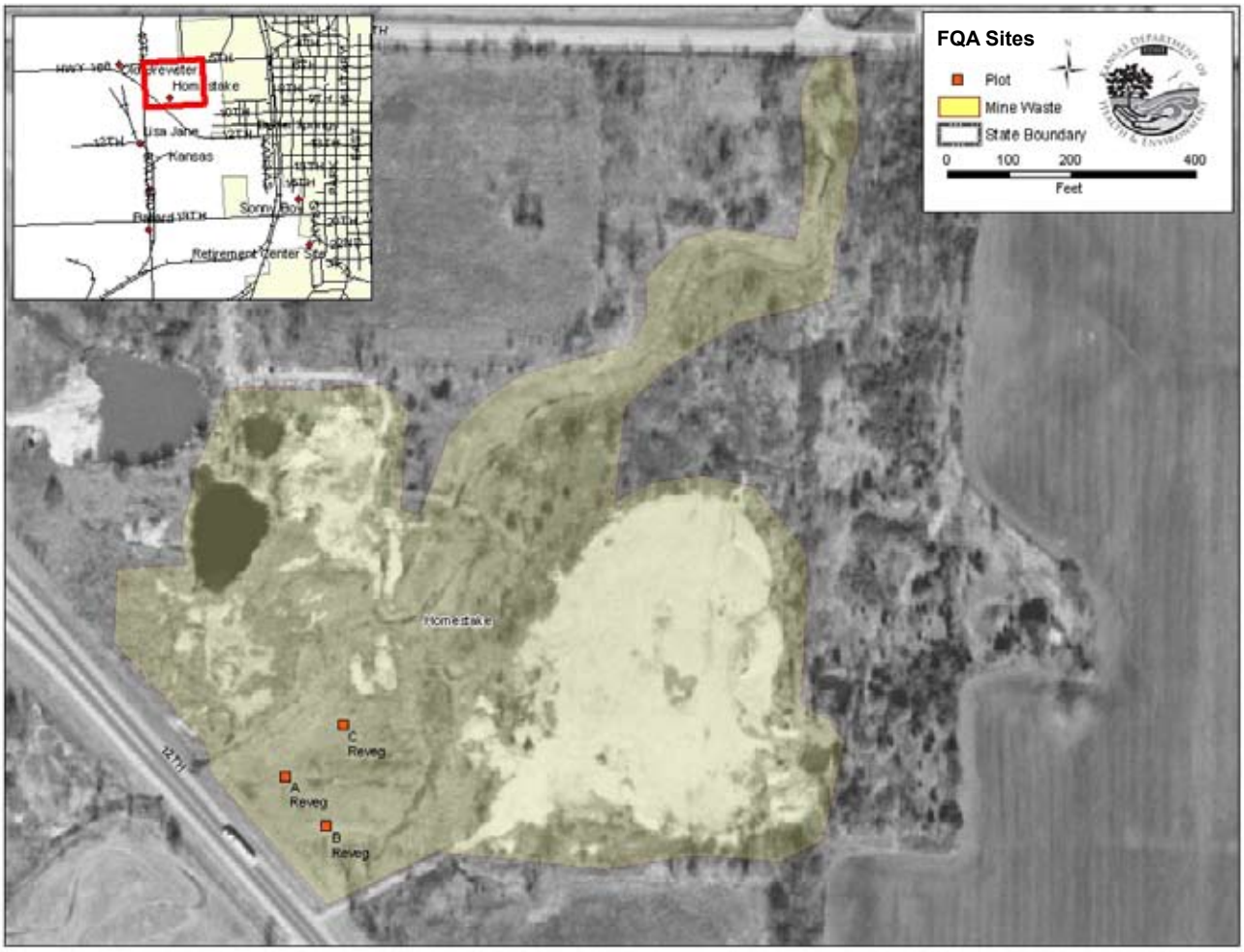
Cemetery High-Quality Revegetated site, Cherokee County, Kansas



Fire Station High-Quality Revegetated site, Cherokee County, Kansas



Homestake High-Quality Revegetated site, Cherokee County, Kansas



Appendix 4: Percent Bare Ground, Number of Native Species, and Kansas FQI by Site Name and Type

Site Name and Type	% Bare Ground	# Native Species	Kansas FQI
Hartley Revegetated C	3.0	37	16.77
Hartley Revegetated A	10.0	37	16.28
Hartley Revegetated B	5.0	29	15.78
Muncie Complex Transition Zone B	35.0	38	13.46
Ballard Revegetated A	38.0	25	12.20
Ballard Revegetated B	45.0	23	12.09
Homestake Revegetated A	22.0	23	10.22
Big Elk Transition Zone B	75.0	17	10.19
Muncie Complex Transition Zone A	40.0	23	9.80
Cemetery Revegetated C	3.0	25	9.60
Cemetery Revegetated A	15.0	18	9.43
Lisa Jane Transition Zone C	82.0	22	9.38
Southern Star Revegetated A	80.0	12	8.66
Southern Star Revegetated B	75.0	12	8.66
Galena Repair Revegetated A	60.0	14	8.55
Homestake Revegetated B	2.0	14	8.55
Firestation Revegetated C	15.0	10	8.54
Firestation Revegetated A	7.0	15	8.52
Firestation Revegetated B	20.0	21	8.29
West Schermerhorn Revegetated A	50.0	21	7.86
King Brand Transition Zone B	90.0	14	7.75
Galena Repair Revegetated C	65.0	10	7.59
Ballard Revegetated C	47.0	16	7.00
Southern Star Revegetated C	45.0	10	6.96
Lisa Jane Transition Zone A	35.0	14	6.95
King Brand Transition Zone A	80.0	22	6.82
Hell's Half Acre Revegated C	60.0	15	6.71
Cemetery Revegetated B	40.0	18	6.36
Sonny Boy Transition Zone C	80.0	16	6.25
Hell's Half Acre Revegated B	65.0	12	6.06
West Schermerhorn Revegetated B	80.0	12	6.06
Hell's Half Acre Revegetated A	62.0	13	5.82
Blue Hole Revegetated B	72.5	12	5.77
West Schermerhorn Revegetated C	60.0	8	5.66
Blue Hole Revegetated A	45.0	18	5.42
Blue Hole Revegetated C	90.0	14	5.35
Sonny Boy Transition Zone B	95.0	13	5.27
Homestake Revegetated C	30.0	11	5.13
Big Elk Transition Zone C	60.0	10	5.06
Galena Repair Revegetated B	65.0	9	5.00
Sonny Boy Transition Zone A	90.0	10	4.74
Muncie Complex Transition Zone C	95.0	7	4.54

Table 1: Site Name and Type, % Bare Ground, # Native Species and Floristic Quality Index for Kansas (ordered from highest to lowest).

Appendix 4: Percent Bare Ground, Number of Species, and Kansas FQI by Site Name and Type

Site Name and Type	% Bare Ground	# Native Species	Kansas FQI
King Brand Transition Zone C	95.0	16	4.50
Lisa Jane Transition Zone B	92.0	7	3.78
King Brand Chat/Mine Waste C	100.0	7	3.40
Big Elk Transition Zone A	65.0	4	0.50
Diamond Chat/Mine Waste A	99.9	1	0.00
Diamond Chat/Mine Waste B	100.0	0	0.00
Diamond Chat/Mine Waste C	100.0	0	0.00
King Brand Chat/Mine Waste A	100.0	0	0.00
King Brand Chat/Mine Waste B	100.0	0	0.00
Muncie Complex Chat/Mine Waste A	99.9	1	0.00
Muncie Complex Chat/Mine Waste B	99.9	3	0.00
Muncie Complex Chat/Mine Waste C	100.0	0	0.00
Retirement Center Chat/Mine Waste A	100.0	0	0.00
Retirement Center Chat/Mine Waste B	100.0	0	0.00
Retirement Center Chat/Mine Waste C	100.0	0	0.00
Sonny Boy Chat/Mine Waste A	99.9	1	0.00
Sonny Boy Chat/Mine Waste B	99.9	1	0.00
Sonny Boy Chat/Mine Waste C	100.0	0	0.00

Table 1: Site Name and Type, % Bare Ground, # Native Species and Floristic Quality Index for Kansas (ordered from highest to lowest).

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

King Brand Chat/Mine Waste Site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Ambrosia artemisiifolia	common ragweed	0			Trace
Andropogon virginicus	broom-sedge bluestem	0			Trace
Cerastium brachypodum	mouse's-ear-chickweed	2			Trace
Chamaesyce humistrata	spreading sandmat	3			Trace
Cyperus bipartitus	brook flat-sedge	4			Trace
Cyperus esculentus	yellow nut-sedge	0			Trace
Digitaria sanguinalis	crab grass	*			Trace
Symphyotrichum pilosum	hairy aster	0			Trace
Verbascum blattaria	moth mullein	*			Trace
Verbascum thapsus	flannel mullein	*			Trace
Bare Ground	Bare Ground	-	100.0	100.0	100.0
	Total:		**100.0**	**100.0**	**100.0**

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

Muncie Complex Chat/Mine Waste Site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Amaranthus tuberculatus	tall water-hemp	0		Trace	
Ambrosia artemisiifolia	common ragweed	0		Trace	
Polanisia dodecandra	rough-seed clammyweed	0	Trace		
Symphyotrichum pilosum	hairy aster	0		Trace	
Bare Ground	Bare Ground	-	100.0	100.0	100.0
	Total:		**100.0**	**100.0**	**100.0**

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

Retirement Center Chat/Mine Waste Site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Bare Ground	Bare Ground	-	100.0	100.0	100.0
	Total:		**100.0**	**100.0**	**100.0**

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

Sonny Boy Chat/Mine Waste Site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Amaranthus tuberculatus	tall water-hemp	0		Trace	
Cyperus esculentus	yellow nut-sedge	0	Trace		
Bare Ground	Bare Ground	-	100.0	100.0	100.0
	Total:		**100.0**	**100.0**	**100.0**

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

Big Elk Transition Zone site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Agalinis heterophylla	prairie false foxglove	8		Trace	Trace
Amaranthus tuberculatus	tall water-hemp	0	25.0	2.0	1.0
Ambrosia artemisiifolia	common ragweed	0		15.0	32.0
Andropogon virginicus	broom-sedge bluestem	0	Trace	1.0	Trace
Asparagus officinalis	asparagus	*		Trace	
Bidens polylepis	coreopsis beggar-ticks	1	4.0	2.0	6.0
Carex sp.	sedge	-		Trace	Trace
Cerastium brachypodum	mouse's-ear-chickweed	2		Trace	
Dichanthelium acuminatum	pointed dichanthelium	3		Trace	
Fraxinus pennsylvanica	green ash	0		Trace	Trace
Juniperus virginiana	eastern red-cedar	1		Trace	Trace
Panicum capillare	witch grass	0	6.0	Trace	Trace
Penstemon digitalis	smooth beardtongue	4		Trace	Trace
Poa pratensis	Kentucky blue grass	*			Trace
Prunus serotina	black cherry	3		Trace	
Rudbeckia hirta	black-eyed-Susan	2		Trace	
Sideroxylon lanuginosum	woolly jungle-plum	5		1.0	
Smilax bona-nox	saw greenbrier	5		Trace	
Spiranthes lacera	southern slender ladies'-tresses	6		Trace	
Triodanis perfoliata	Venus'-looking-glass	2		Trace	Trace
Ulmus pumila	Siberian elm	*		4.0	Trace
Bare Ground	Bare Ground	-	65.0	75.0	60.0
	Total:		**100.0**	**100.0**	**100.0**

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

King Brand Transition Zone site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Agalinis heterophylla	prairie false foxglove	8	Trace	Trace	
Amaranthus tuberculatus	tall water-hemp	0	Trace	1.0	Trace
Ambrosia artemisiifolia	common ragweed	0	11.0	2.0	Trace
Ampelopsis cordata	heart-leaf raccoon-grape	2			Trace
Andropogon virginicus	broom-sedge bluestem	0	Trace	Trace	Trace
Aristida oligantha	old-field threeawn	0	1.0		
Bromus japonicus	Japanese brome	*			Trace
Carex sp.	sedge	-		Trace	
Catalpa bignonioides	southern catalpa	*		1.0	Trace
Celtis occidentalis	common hackberry	1		Trace	Trace
Cerastium brachypodum	mouse's-ear-chickweed	2	Trace	Trace	
Chamaesyce maculata	spotted mat-spurge	0	Trace		Trace
Conyza canadensis	tall horseweed	0			Trace
Croton monanthogynus	one-seed croton	1			Trace
Cynodon dactylon	common bermuda grass	*			Trace
Cyperus esculentus	yellow nut-sedge	0	5.0	4.0	Trace
Dichanthelium acuminatum	pointed dichanthelium	3	Trace		
Digitaria sanguinalis	crab grass	*	Trace	1.0	3.0
Eupatorium serotinum	fall joe-pye-weed	2	Trace	Trace	
Fraxinus pennsylvanica	green ash	0	Trace		
Juniperus virginiana	eastern red-cedar	1	Trace	Trace	
Oenothera biennis	common evening-primrose	0	Trace		
Panicum capillare	witch grass	0	Trace	Trace	Trace
Panicum virgatum	switch grass	4		Trace	
Parthenocissus quinquefolia	Virginia creeper	1			Trace
Paspalum laeve	field paspalum	2			Trace
Penstemon digitalis	smooth beardtongue	4	Trace	Trace	
Persicaria punctata	dotted smartweed	3			Trace
Populus deltoides	plains cottonwood	0	Trace		
Potentilla recta	sulfur cinquefoil	*			Trace
Rhus glabra	smooth sumac	1	Trace		
Rudbeckia hirta	black-eyed-Susan	2	Trace		
Schedonorus arundinaceus	tall fescue	*			Trace
Setaria parviflora	bristlegrass	3			Trace
Solidago canadensis	Canadian goldenrod	2	Trace	Trace	
Symphyotrichum patens	sky-drop aster	5	2.0	Trace	Trace
Toxicodendron radicans	eastern poison ivy	0	Trace		Trace
Triodanis perfoliata	Venus'-looking-glass	2	Trace		
Triticum aestivum	wheat	*		Trace	
Ulmus pumila	Siberian elm	*	Trace	Trace	Trace
Verbascum blattaria	moth mullein	*	Trace	Trace	Trace
Verbascum thapsus	flannel mullein	*	Trace		2.0
Bare Ground	Bare Ground	-	80.0	90.0	95.0
	Total:		**100.0**	**100.0**	**100.0**

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

Lisa Jane Transition Zone site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Agalinis heterophylla	prairie false foxglove	8	Trace		Trace
Amaranthus tuberculatus	tall water-hemp	0	15.0	2.0	2.0
Ambrosia artemisiifolia	common ragweed	0	Trace	1.0	0.5
Andropogon gerardii	big bluestem	4	3.0	2.0	2.0
Andropogon virginicus	broom-sedge bluestem	0	2.0	2.0	1.0
Aristida oligantha	old-field threeawn	0			Trace
Bidens polylepis	coreopsis beggar-ticks	1	25.0	2.0	Trace
Cerastium brachypodum	mouse's-ear-chickweed	2			Trace
Cuscuta sp.	dodder	-	Trace	Trace	
Cyperus esculentus	yellow nut-sedge	0	Trace		0.5
Dichanthelium acuminatum	pointed dichanthelium	3	Trace		
Eupatorium serotinum	fall joe-pye-weed	2			Trace
Juncus interior	inland rush	2			Trace
Juniperus virginiana	eastern red-cedar	1			Trace
Leptochloa fusca	bearded sprangletop	0	Trace		
Morus alba	white mulberry	*	Trace		
Panicum capillare	witch grass	0	20.0	2.0	0.5
Panicum virgatum	switch grass	4			10.0
Penstemon digitalis	smooth beardtongue	4	Trace		
Plantago virginica	pale-seed plantain	1			Trace
Prunus serotina	black cherry	3			Trace
Rhus copallina	dwarf sumac	3	Trace		Trace
Rhus glabra	smooth sumac	1	Trace		
Schizachyrium scoparium	little bluestem	5		1.0	1.5
Sorghastrum nutans	yellow Indian grass	5			Trace
Symphyotrichum pilosum	hairy aster	0			Trace
Tridens flavus	purpletop	1			Trace
Triodanis perfoliata	Venus'-looking-glass	2	Trace		Trace
Verbascum blattaria	moth mullein	*	Trace		Trace
Verbascum thapsus	flannel mullein	*	Trace		
Bare Ground	Bare Ground	-	35.0	92.0	82.0
	Total:		**100.0**	**104.0**	**100.0**

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

Muncie Complex Transition Zone site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Acer saccharinum	silver maple	2	Trace		
Agalinis heterophylla	prairie false foxglove	8	Trace	Trace	Trace
Amaranthus tuberculatus	tall water-hemp	0	Trace	Trace	Trace
Ambrosia artemisiifolia	common ragweed	0	Trace	8.0	3.0
Ambrosia trifida	giant ragweed	0		Trace	
Andropogon gerardii	big bluestem	4	1.0	3.0	
Andropogon virginicus	broom-sedge bluestem	0	Trace	Trace	
Apocynum cannabinum	hemp dogbane	0		Trace	
Aristida oligantha	old-field threeawn	0	17.0	4.0	
Bidens polylepis	coreopsis beggar-ticks	1	Trace	Trace	
Carex blanda	woodland sedge	1		Trace	
Carex sp.	sedge	-	Trace	1.0	
Chamaesyce maculata	spotted mat-spurge	0	Trace		
Chasmanthium latifolium	broad-leaf wood-oat	4		Trace	
Cirsium altissimum	tall thistle	2		Trace	
Conyza canadensis	tall horseweed	0	Trace		
Cornus drummondii	roughleaf dogwood	1		Trace	
Cuscuta sp.	dodder	-		Trace	
Cynodon dactylon	common bermuda grass	*		Trace	
Cyperus bipartitus	brook flat-sedge	4	2.0		
Cyperus esculentus	yellow nut-sedge	0	1.0	4.0	2.0
Desmodium illinoense	Illinois tickclover	5		Trace	
Dichanthelium acuminatum	pointed dichanthelium	3		Trace	
Eleocharis sp.	spike-rush	-	4.0	Trace	
Erigeron annuus	annual fleabane	0		Trace	
Eupatorium serotinum	fall joe-pye-weed	2		Trace	
Fraxinus pennsylvanica	green ash	0		Trace	
Ilex decidua	deciduous holly	5		1.0	
Juncus interior	inland rush	2	Trace		
Juniperus virginiana	eastern red-cedar	1	Trace		
Lonicera japonica	Japanese honeysuckle	*		Trace	
Panicum anceps	beaked panicgrass	4		Trace	
Panicum capillare	witch grass	0	Trace	Trace	Trace
Panicum virgatum	switch grass	4	35.0	37.0	
Penstemon digitalis	smooth beardtongue	4	Trace	Trace	Trace
Persicaria punctata	dotted smartweed	3		Trace	
Populus deltoides	plains cottonwood	0		Trace	
Rhus copallina	dwarf sumac	3		Trace	
Rhus glabra	smooth sumac	1		Trace	
Rubus flagellaris	American dewberry	5		Trace	
Rudbeckia hirta	black-eyed-Susan	2	Trace	Trace	
Schizachyrium scoparium	little bluestem	5	Trace		
Schoenoplectus pungens	common threesquare	3	Trace		
Smilax bona-nox	saw greenbrier	5		Trace	

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

Muncie Complex Transition Zone site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Solidago canadensis	Canadian goldenrod	2	Trace	Trace	
Sorghastrum nutans	yellow Indian grass	5	Trace	2.0	
Sorghum halepense	Johnson grass	*		3.0	
Symphyotrichum pilosum	hairy aster	0	Trace	Trace	Trace
Toxicodendron radicans	eastern poison ivy	0		Trace	
Triodanis perfoliata	Venus'-looking-glass	2		Trace	
Ulmus pumila	Siberian elm	*		Trace	
Verbascum blattaria	moth mullein	*	Trace		
Verbascum thapsus	flannel mullein	*		Trace	
Vitis cinerea	graybark grape	5		Trace	
Vitis riparia	riverbank grape	2		Trace	
Bare Ground	Bare Ground	-	40.0	35.0	95.0
	Total:		**100.0**	**100.0**	**100.0**

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

Sonny Boy Transition Zone site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Agalinis heterophylla	prairie false foxglove	8	Trace		
Amaranthus tuberculatus	tall water-hemp	0	Trace	1.0	1.0
Ambrosia artemisiifolia	common ragweed	0	Trace	Trace	2.0
Andropogon virginicus	broom-sedge bluestem	0		Trace	Trace
Aristida oligantha	old-field threeawn	0	Trace	Trace	
Bidens polylepis	coreopsis beggar-ticks	1		Trace	4.0
Carex sp.	sedge	-			Trace
Clematis terniflora	virgins bower	*			Trace
Cuscuta sp.	dodder	-			Trace
Cyperus esculentus	yellow nut-sedge	0	2.0	2.0	2.0
Digitaria sanguinalis	crab grass	*	Trace		
Eleocharis obtusa	blunt spike-rush	3		Trace	
Elymus canadensis	Canada wildrye	5		Trace	
Eupatorium serotinum	fall joe-pye-weed	2			Trace
Fimbristylis autumnalis	slender fimbry	5		Trace	
Juncus diffusissimus	slimpod rush	5			Trace
Juncus effusus	common rush	2			Trace
Juncus interior	inland rush	2			Trace
Juniperus virginiana	eastern red-cedar	1	Trace	Trace	Trace
Kummerowia stipulacea	Korean low bush-clover	*			Trace
Leersia oryzoides	rice cutgrass	4			4.0
Panicum capillare	witch grass	0	Trace	Trace	
Panicum virgatum	switch grass	4	7.0	2.0	5.0
Populus deltoides	plains cottonwood	0			Trace
Salix nigra	black willow (shrub)	2			Trace
Solidago canadensis	Canadian goldenrod	2			Trace
Symphyotrichum pilosum	hairy aster	0	Trace	Trace	Trace
Trifolium repens	white clover	*			Trace
Triodanis perfoliata	Venus'-looking-glass	2	Trace		
Verbascum blattaria	moth mullein	*			Trace
Verbascum thapsus	flannel mullein	*			Trace
Yucca filamentosa	Adam's needle	*			Trace
Bare Ground	Bare Ground	-	90.0	95.0	80.0
	Total:		**100.0**	**100.0**	**100.0**

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

Blue Hole Revegetated Site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Amaranthus tuberculatus	tall water-hemp	0	Trace	Trace	Trace
Ambrosia artemisiifolia	common ragweed	0	Trace	1.0	Trace
Andropogon gerardii	big bluestem	4	Trace	Trace	Trace
Andropogon virginicus	broom-sedge bluestem	0	Trace	Trace	Trace
Aristida oligantha	old-field threeawn	0	3.0	2.0	2.0
Bidens polylepis	coreopsis beggar-ticks	1	Trace	Trace	
Chamaesyce maculata	spotted mat-spurge	0			Trace
Conyza canadensis	tall horseweed	0	Trace		
Digitaria sanguinalis	crab grass	*	Trace		
Erigeron annuus	annual fleabane	0	Trace	Trace	Trace
Juncus interior	inland rush	2	Trace		
Juniperus virginiana	eastern red-cedar	1	Trace		
Lepidium densiflorum	prairie pepper-grass	0	Trace		Trace
Lespedeza cuneata	sericea bush-clover	*			Trace
Melilotus albus	white sweet clover	*	Trace	Trace	Trace
Panicum capillare	witch grass	0	50.0	12.0	2.0
Panicum virgatum	switch grass	4	7.0	8.0	4.0
Plantago virginica	pale-seed plantain	1			Trace
Rhus copallina	dwarf sumac	3	Trace		
Rudbeckia hirta	black-eyed-Susan	2	Trace		
Schizachyrium scoparium	little bluestem	5	3.0	2.0	2.0
Sorghastrum nutans	yellow Indian grass	5		Trace	Trace
Symphyotrichum pilosum	hairy aster	0	Trace		
Tridens flavus	purpletop	1	Trace	2.0	Trace
Verbascum blattaria	moth mullein	*			Trace
Bare Ground	Bare Ground	-	45.0	72.5	90.0
	Total:		**108.0**	**100.0**	**100.0**

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

Galena Repair Revegetated Site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Amaranthus tuberculatus	tall water-hemp	0		1.0	Trace
Ambrosia artemisiifolia	common ragweed	0	2.0	Trace	Trace
Andropogon gerardii	big bluestem	4	Trace	Trace	1.0
Aristida oligantha	old-field threeawn	0	2.0	1.0	Trace
Bouteloua curtipendula	side-oats grama	5	Trace		Trace
Cerastium brachypodum	mouse's-ear-chickweed	2	Trace	Trace	
Conyza canadensis	tall horseweed	0	Trace		Trace
Dichanthelium acuminatum	pointed dichanthelium	3	Trace		
Digitaria sanguinalis	crab grass	*	Trace	Trace	Trace
Eragrostis trichodes	sand lovegrass	4	Trace		
Lepidium densiflorum	prairie pepper-grass	0	Trace	Trace	
Panicum capillare	witch grass	0	Trace	Trace	Trace
Panicum virgatum	switch grass	4	35.0	30.0	32.0
Schizachyrium scoparium	little bluestem	5	2.0	2.0	1.0
Sorghastrum nutans	yellow Indian grass	5	Trace		
Sporobolus clandestinus	rough dropseed	6			Trace
Symphyotrichum pilosum	hairy aster	0	Trace		
Verbascum blattaria	moth mullein	*	Trace		Trace
Bare Ground	Bare Ground	-	60.0	65.0	65.0
	Total:		**101.0**	**100.0**	**100.0**

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

Hell's Half Acre Revegetated Site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Amaranthus tuberculatus	tall water-hemp	0		Trace	Trace
Ambrosia artemisiifolia	common ragweed	0	2.0	Trace	2.0
Andropogon gerardii	big bluestem	4	Trace	1.0	Trace
Andropogon virginicus	broom-sedge bluestem	0	Trace		Trace
Aristida oligantha	old-field threeawn	0	Trace	4.0	3.0
Bidens polylepis	coreopsis beggar-ticks	1		Trace	Trace
Cerastium brachypodum	mouse's-ear-chickweed	2		Trace	Trace
Chamaesyce maculata	spotted mat-spurge	0	Trace		
Conyza canadensis	tall horseweed	0	Trace	Trace	
Cuscuta sp.	dodder	-	Trace		
Cyperus sp.	flatsedge	-	Trace		
Erigeron annuus	annual fleabane	0	Trace		
Froelichia gracilis	slender snakecotton	3	Trace		
Iris germanica	german iris	*			Trace
Kummerowia stipulacea	Korean low bush-clover	*	Trace		
Panicum capillare	witch grass	0	Trace	2.0	3.0
Panicum virgatum	switch grass	4	3.0	25.0	32.0
Plantago virginica	pale-seed plantain	1			Trace
Rudbeckia hirta	black-eyed-Susan	2			Trace
Schizachyrium scoparium	little bluestem	5	32.0	2.0	Trace
Solidago nemoralis	gray goldenrod	2			Trace
Sorghastrum nutans	yellow Indian grass	5	Trace	Trace	Trace
Symphyotrichum pilosum	hairy aster	0	Trace	Trace	Trace
Bare Ground	Bare Ground	-	62.0	65.0	60.0
	Total:		**100.0**	**100.0**	**100.0**

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

Southern Star Revegetated Site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Amaranthus tuberculatus	tall water-hemp	0		Trace	
Ambrosia artemisiifolia	common ragweed	0	Trace	Trace	Trace
Andropogon gerardii	big bluestem	4	Trace	Trace	Trace
Bouteloua curtipendula	side-oats grama	5	Trace	Trace	Trace
Brickellia eupatorioides	false boneset	2		Trace	
Cerastium brachypodum	mouse's-ear-chickweed	2	Trace	Trace	
Chamaesyce maculata	spotted mat-spurge	0	Trace		
Conyza canadensis	tall horseweed	0			Trace
Elymus canadensis	Canada wildrye	5		Trace	
Lepidium densiflorum	prairie pepper-grass	0	Trace		
Opuntia macrorhiza	bigroot prickly pear	3	Trace		
Panicum capillare	witch grass	0		Trace	Trace
Panicum virgatum	switch grass	4	Trace	Trace	2.0
Rhus glabra	smooth sumac	1		Trace	
Rudbeckia hirta	black-eyed-Susan	2			Trace
Schizachyrium scoparium	little bluestem	5	20.0	25.0	52.0
Sporobolus clandestinus	rough dropseed	6	Trace		
Symphoricarpos orbiculatus	buckbrush	1	Trace		
Symphyotrichum pilosum	hairy aster	0	Trace		Trace
Triodanis perfoliata	Venus'-looking-glass	2		Trace	Trace
Verbascum blattaria	moth mullein	*	Trace	Trace	Trace
Verbascum thapsus	flannel mullein	*	Trace	Trace	
Bare Ground	Bare Ground	-	80.0	75.0	45.0
	Total:		**100.0**	**100.0**	**100.0**

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

West Schermerhorn Revegetated Site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Acalypha virginica	Virginia copperleaf	0	Trace		
Achillea millefolium	yarrow	1	Trace		
Amaranthus tuberculatus	tall water-hemp	0	1.0	Trace	Trace
Ambrosia artemisiifolia	common ragweed	0	1.0	1.0	
Andropogon gerardii	big bluestem	4	Trace	Trace	1.0
Andropogon virginicus	broom-sedge bluestem	0		1.0	
Aristida oligantha	old-field threeawn	0	2.0	Trace	Trace
Bidens polylepis	coreopsis beggar-ticks	1		Trace	
Bradburia pilosa	soft goldenaster	4	Trace		
Cerastium brachypodum	mouse's-ear-chickweed	2	Trace		
Chamaecrista fasciculata	showy partridge pea	2	Trace		
Chamaesyce maculata	spotted mat-spurge	0	Trace		
Erigeron annuus	annual fleabane	0	Trace		
Lepidium densiflorum	prairie pepper-grass	0		Trace	
Lespedeza cuneata	sericea bush-clover	*	Trace	Trace	
Melilotus albus	white sweet clover	*	Trace		
Opuntia macrorhiza	bigroot prickly pear	3	Trace		
Panicum capillare	witch grass	0	4.0	5.0	12.0
Panicum virgatum	switch grass	4	40.0	13.0	27.0
Plantago virginica	pale-seed plantain	1	Trace		
Rumex crispus	curly dock	*	Trace		
Schedonorus arundinaceus	tall fescue	*		Trace	
Schizachyrium scoparium	little bluestem	5	2.0	Trace	
Solidago nemoralis	gray goldenrod	2	Trace		
Sorghastrum nutans	yellow Indian grass	5	Trace	Trace	Trace
Symphyotrichum pilosum	hairy aster	0	Trace		
Tridens flavus	purpletop	1	Trace		Trace
Triodanis perfoliata	Venus'-looking-glass	2	Trace	Trace	Trace
Bare Ground	Bare Ground	-	50.0	80.0	60.0
	Total:		**100.0**	**100.0**	**100.0**

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

Hartley Revegetated Site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Acalypha virginica	Virginia copperleaf	0	Trace	Trace	Trace
Achillea millefolium	yarrow	1			Trace
Agalinis heterophylla	prairie false foxglove	8	Trace	Trace	Trace
Ambrosia artemisiifolia	common ragweed	0	13.0	30.0	35.0
Andropogon gerardii	big bluestem	4	25.0	16.0	10.0
Andropogon virginicus	broom-sedge bluestem	0	8.0	3.0	1.0
Apocynum cannabinum	hemp dogbane	0	Trace		
Aristida oligantha	old-field threeawn	0	Trace	8.0	15.0
Bidens polylepis	coreopsis beggar-ticks	1	Trace	Trace	1.0
Bidens sp.	beggarticks	-	Trace		Trace
Bromus japonicus	Japanese brome	*		Trace	Trace
Carex sp.	sedge	-	Trace	1.0	Trace
Cerastium brachypodum	mouse's-ear-chickweed	2	Trace	Trace	Trace
Chamaecrista fasciculata	showy partridge pea	2	Trace	Trace	Trace
Conyza canadensis	tall horseweed	0	Trace		
Cynodon dactylon	common bermuda grass	*		8.0	1.0
Dactylis glomerata	orchardgrass	*		Trace	Trace
Daucus carota	Queen-Anne's-lace	*	1.0	1.0	Trace
Desmodium illinoense	Illinois tickclover	5	Trace		
Dichanthelium acuminatum	pointed dichanthelium	3	1.0	2.0	4.0
Dichanthelium scoparium	velvet panicum	7	Trace	2.0	Trace
Eragrostis spectabilis	purple love grass	3	Trace	Trace	Trace
Erigeron annuus	annual fleabane	0	Trace		Trace
Erigeron strigosus	daisy fleabane	4		Trace	
Eupatorium serotinum	fall joe-pye-weed	2	Trace		
Hemerocallis sp.	Day lily	-	Trace	Trace	Trace
Juncus interior	inland rush	2		Trace	Trace
Kummerowia stipulacea	Korean low bush-clover	*	Trace	Trace	Trace
Lepidium densiflorum	prairie pepper-grass	0	Trace		
Lespedeza cuneata	sericea bush-clover	*	Trace		Trace
Liatris pycnostachya	thick-spike gayfeather	7	Trace	Trace	Trace
Oxalis dillenii	gray-green wood-sorrel	0	Trace		Trace
Panicum anceps	beaked panicgrass	4	32.0	3.0	7.0
Panicum virgatum	switch grass	4	Trace	3.0	1.0
Pascopyrum smithii	western wheat grass	2		Trace	Trace
Paspalum laeve	field paspalum	2	Trace		Trace
Penstemon digitalis	smooth beardtongue	4	Trace		Trace
Plantago virginica	pale-seed plantain	1		Trace	Trace
Pycnanthemum tenuifolium	narrow-leaf mountain-mint	4			Trace
Rubus flagellaris	American dewberry	5	Trace	Trace	Trace
Rudbeckia hirta	black-eyed-Susan	2	Trace	Trace	Trace
Rumex crispus	curly dock	*			Trace
Sabatia campestris	Texas star	6	Trace		

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

Hartley Revegetated Site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Schedonorus arundinaceus	tall fescue	*	Trace	Trace	Trace
Schizachyrium scoparium	little bluestem	5	16.0	12.0	15.0
Setaria parviflora	bristlegrass	3	1.0	1.0	1.0
Solanum carolinense	Carolina horse nettle	1		Trace	Trace
Solidago canadensis	Canadian goldenrod	2	Trace	Trace	Trace
Sorghastrum nutans	yellow Indian grass	5	3.0	Trace	3.0
Sorghum halepense	Johnson grass	*		Trace	
Sporobolus clandestinus	rough dropseed	6			Trace
Strophostyles leiosperma	slick-seed wildbean	3	Trace		
Symphoricarpos orbiculatus	buckbrush	1		Trace	
Symphyotrichum novae-angliae	New England aster	3	Trace		Trace
Symphyotrichum pilosum	hairy aster	0	1.0		Trace
Tridens flavus	purpletop	1	Trace	Trace	Trace
Tridens strictus	longspike tridens	6		Trace	Trace
Triodanis perfoliata	Venus'-looking-glass	2	Trace		Trace
Ulmus pumila	Siberian elm	*		Trace	
Verbena hastata	blue verbena	4	Trace		
Viola sp.	violet	-			Trace
Yucca filamentosa	Adam's needle	*		Trace	
Bare Ground	Bare Ground	-	3.0	10.0	5.0
	Total:		**104.0**	**100.0**	**100.0**

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

Ballard Revegetated Site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Achillea millefolium	yarrow	1	Trace	Trace	Trace
Agalinis fascicularis	false foxglove	6	Trace		
Ambrosia artemisiifolia	common ragweed	0	Trace	2.0	Trace
Andropogon gerardii	big bluestem	4	2.0	1.0	1.0
Apocynum cannabinum	hemp dogbane	0			Trace
Aristida oligantha	old-field threeawn	0	Trace	2.0	Trace
Bidens polylepis	coreopsis beggar-ticks	1	Trace	Trace	
Carex sp.	sedge	-	Trace	Trace	Trace
Cerastium brachypodum	mouse's-ear-chickweed	2		Trace	
Chamaesyce maculata	spotted mat-spurge	0			Trace
Clematis pitcheri	Pitcher's clematis	4	Trace	Trace	
Conyza canadensis	tall horseweed	0	Trace	Trace	
Cyperus sp.	flatsedge	-	Trace		Trace
Desmodium illinoense	Illinois tickclover	5	Trace		
Dichanthelium acuminatum	pointed dichanthelium	3	Trace	Trace	Trace
Digitaria sanguinalis	crab grass	*	Trace	Trace	Trace
Diodia teres	rough buttonweed	2			Trace
Erigeron annuus	annual fleabane	0	Trace		Trace
Galium sp.	bedstraw	-	Trace	Trace	
Humulus japonica	Japanese hop	*		Trace	
Ipomoea lacunosa	white morning-glory	0		Trace	
Iva annua	annual sumpweed	0	Trace	Trace	Trace
Kummerowia stipulacea	Korean low bush-clover	*	Trace		
Lespedeza capitata	round-head bush-clover	6		Trace	
Panicum capillare	witch grass	0	Trace		
Panicum virgatum	switch grass	4	3.0	2.0	20.0
Pascopyrum smithii	western wheat grass	2	Trace		
Paspalum setaceum	sand paspalum	2		Trace	
Penstemon digitalis	smooth beardtongue	4	Trace	Trace	
Phlox pilosa	prairie phlox	7		Trace	
Plantago virginica	pale-seed plantain	1	Trace	1.0	
Polygonum sp.	knotweed	-	Trace		Trace
Rhus glabra	smooth sumac	1			Trace
Rudbeckia hirta	black-eyed-Susan	2	Trace		
Rumex acetosella	sheep sorrel	*	Trace	Trace	Trace
Rumex crispus	curly dock	*		Trace	Trace
Sabatia campestris	Texas star	6	Trace		
Schedonorus arundinaceus	tall fescue	*	Trace	Trace	Trace
Schizachyrium scoparium	little bluestem	5	33.0	30.0	22.0
Setaria parviflora	bristlegrass	3	Trace	Trace	
Solidago canadensis	Canadian goldenrod	2	Trace		
Sorghastrum nutans	yellow Indian grass	5	24.0	17.0	10.0
Strophostyles leiosperma	slick-seed wildbean	3	Trace	Trace	
Symphyotrichum pilosum	hairy aster	0	Trace	Trace	Trace

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

Ballard Revegetated Site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Symphyotrichum praealtum	willow-leaf aster	3		Trace	Trace
Trifolium pratense	red clover	*			Trace
Bare Ground	Bare Ground	-	38.0	45.0	47.0
	Total:		**100.0**	**100.0**	**100.0**

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

Cemetery Revegetated Site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Acalypha virginica	Virginia copperleaf	0			Trace
Achillea millefolium	yarrow	1		Trace	
Agalinis heterophylla	prairie false foxglove	8	Trace		Trace
Amaranthus tuberculatus	tall water-hemp	0		Trace	
Ambrosia artemisiifolia	common ragweed	0	7.5	Trace	15.0
Andropogon gerardii	big bluestem	4	1.0	10.0	35.0
Andropogon virginicus	broom-sedge bluestem	0	15.0	Trace	
Aristida oligantha	old-field threeawn	0	4.0	Trace	Trace
Bidens polylepis	coreopsis beggar-ticks	1	Trace		Trace
Bradburia pilosa	soft goldenaster	4		Trace	
Carex brevior	short-beak sedge	5			Trace
Carex sp.	sedge	-			Trace
Cerastium brachypodum	mouse's-ear-chickweed	2			Trace
Conyza canadensis	tall horseweed	0			Trace
Croton capitatus	woolly croton	1	Trace		Trace
Cyperus esculentus	yellow nut-sedge	0		Trace	Trace
Dichanthelium acuminatum	pointed dichanthelium	3			Trace
Erigeron annuus	annual fleabane	0		Trace	Trace
Hedeoma hispida	rough false-penny-royal	1	Trace		
Iva annua	annual sumpweed	0		Trace	Trace
Juniperus virginiana	eastern red-cedar	1	Trace	Trace	
Kummerowia stipulacea	Korean low bush-clover	*		Trace	Trace
Lactuca serriola	prickly lettuce	*			Trace
Lepidium densiflorum	prairie pepper-grass	0			Trace
Lespedeza cuneata	sericea bush-clover	*		Trace	Trace
Melilotus albus	white sweet clover	*	Trace		
Panicum capillare	witch grass	0		Trace	Trace
Panicum virgatum	switch grass	4	50.0	40.0	25.0
Paspalum laeve	field paspalum	2	Trace		Trace
Plantago virginica	pale-seed plantain	1	Trace	Trace	Trace
Rudbeckia hirta	black-eyed-Susan	2	Trace	Trace	Trace
Schizachyrium scoparium	little bluestem	5	2.5	8.0	20.0
Setaria parviflora	bristlegrass	3	Trace		Trace
Sorghastrum nutans	yellow Indian grass	5	5.0	2.0	2.0
Strophostyles sp.	fuzzybean	-		Trace	Trace
Symphyotrichum pilosum	hairy aster	0	Trace	Trace	Trace
Triodanis perfoliata	Venus'-looking-glass	2	Trace		Trace
Ulmus pumila	Siberian elm	*			Trace
Verbascum blattaria	moth mullein	*		Trace	
Bare Ground	Bare Ground	-	15.0	40.0	3.0
	Total:		**100.0**	**100.0**	**100.0**

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

Fire Station Revegetated Site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Ambrosia artemisiifolia	common ragweed	0	1.0	Trace	1.0
Andropogon gerardii	big bluestem	4	3.0	20.0	5.0
Aristida oligantha	old-field threeawn	0	Trace	Trace	Trace
Panicum virgatum	switch grass	4	34.0	50.0	55.0
Schizachyrium scoparium	little bluestem	5	55.0	7.0	3.0
Bouteloua curtipendula	side-oats grama	5	Trace	Trace	Trace
Cerastium brachypodum	mouse's-ear-chickweed	2	Trace	Trace	1.0
Sorghastrum nutans	yellow Indian grass	5	Trace	Trace	Trace
Panicum capillare	witch grass	0	Trace	Trace	
Conyza canadensis	tall horseweed	0		Trace	Trace
Lepidium densiflorum	prairie pepper-grass	0	Trace	Trace	
Symphyotrichum pilosum	hairy aster	0	Trace	Trace	
Juncus interior	inland rush	2	Trace	Trace	
Rhus copallina	dwarf sumac	3	Trace	3.0	
Rudbeckia hirta	black-eyed-Susan	2	Trace	Trace	
Amaranthus tuberculatus	tall water-hemp	0		Trace	
Verbascum blattaria	moth mullein	*		Trace	
Achillea millefolium	yarrow	1		Trace	
Brickellia eupatorioides	false boneset	2		Trace	
Daucus carota	Queen-Anne's-lace	*	Trace		
Kummerowia stipulacea	Korean low bush-clover	*	Trace		
Lactuca serriola	prickly lettuce	*	Trace		
Lespedeza cuneata	sericea bush-clover	*		Trace	
Oxalis dillenii	gray-green wood-sorrel	0		Trace	
Pascopyrum smithii	western wheat grass	2			20.0
Plantago virginica	pale-seed plantain	1	Trace		
Rumex crispus	curly dock	*			Trace
Solanum carolinense	Carolina horse nettle	1		Trace	
Triodanis perfoliata	Venus'-looking-glass	2		Trace	
Bare Ground	Bare Ground	-	7.0	20.0	15.0
	Total:		**100.0**	**100.0**	**100.0**

Appendix 5: Plant Species percent cover and Kansas Coefficients of Conservatism, where no score is given for exotic species, designated with *.

Homestake Revegetated Site					
Scientific Name	**Common Name**	**KS CoC**	**Plot A**	**Plot B**	**Plot C**
Agalinis heterophylla	prairie false foxglove	8	Trace		
Amaranthus tuberculatus	tall water-hemp	0	Trace		Trace
Ambrosia artemisiifolia	common ragweed	0	23.0		1.0
Andropogon gerardii	big bluestem	4	5.0	14.0	6.0
Andropogon virginicus	broom-sedge bluestem	0	4.0	10.0	3.0
Aristida oligantha	old-field threeawn	0	Trace	Trace	Trace
Bidens polylepis	coreopsis beggar-ticks	1	15.0	5.0	18.0
Brickellia eupatorioides	false boneset	2	Trace		
Carex sp.	sedge	-	Trace		
Cyperus esculentus	yellow nut-sedge	0	Trace	Trace	
Dichanthelium acuminatum	pointed dichanthelium	3	Trace	Trace	
Muhlenbergia mexicana	Mexican wire-stem muhly	4		Trace	
Panicum capillare	witch grass	0	Trace	Trace	Trace
Panicum virgatum	switch grass	4	30.0	65.0	42.0
Penstemon tubaeflorus	tube beardtongue	3	Trace		
Persicaria punctata	dotted smartweed	3	Trace		
Plantago virginica	pale-seed plantain	1	Trace		
Populus deltoides	plains cottonwood	0	Trace		
Rhus copallina	dwarf sumac	3	Trace	Trace	
Rhus glabra	smooth sumac	1		Trace	
Sassafras albidum	white sassafras	2	Trace	Trace	
Schizachyrium scoparium	little bluestem	5	1.0	2.0	Trace
Setaria parviflora	bristlegrass	3	Trace		
Solidago canadensis	Canadian goldenrod	2	Trace		
Sorghastrum nutans	yellow Indian grass	5	Trace	2.0	
Symphyotrichum pilosum	hairy aster	0	Trace		
Tridens flavus	purpletop	1			Trace
Triodanis perfoliata	Venus'-looking-glass	2			Trace
Ulmus pumila	Siberian elm	*	Trace	Trace	
Bare Ground	Bare Ground	-	22.0	2.0	30.0
	Total:		**100.0**	**100.0**	**100.0**