Forest Stewardship Plan

for

Quivira Council, BSA

c/o Warren McCoskey

For property located at:

NE Diagonal ½ of NE¼ S20-T32S-R11E

S21-T32S-R11E

S22-T32S-R11E

W½ S23-T32S-R11E

N½ NW¼ & SW¼ SW¼ S26-T32S-R11E

S27-T32S-R11E

N½ & SE¼ S28-T32S-R11E

In Chautauqua County

Prepared by:
Howard Freerksen
District Forester

February 8, 2024

INTRODUCTION

The purpose of this plan is to provide you with professional forestry advice for your property. I invite you to read the plan and edit it so that it accurately reflects what you want to accomplish on your property. When you have edited the plan, please contact me so I can incorporate your suggestions. I will then provide a final copy of the plan to you. This plan should be updated at least every ten years. Some information in this plan is included for foresters and other natural resource professionals. Recommendations have been made by areas described on the enclosed map found in Appendix A.

Signing your name below indicates that you have read the plan and that you will make a good faith effort to implement the management recommendations for the woodlands on your property.

This Forest Stewardship Plan has been prepared at my request to assist in the management and protection of all natural resources on the property described in the plan. I believe that the recommendations in the plan will help me achieve my objectives and be a good steward of the land.

Landowner(s)

_____ _____

Signature Date

_____ _____

Signature Date

Plan Prepared By:

Howard Freerksen 2/12/2024

Howard Freerksen, Forester, Kansas Forest Service Date

The landowner has been involved with the development of the enclosed Forest Stewardship Plan. I have discussed the completed plan with the landowner and the landowner understands his/her Forest Stewardship Plan.

GENERAL INFORMATION

Landowner:	Quivira Council, BSA c/o Warren McCloskey 3247 N. Oliver Wichita, KS 67220
Phone:	316-260-1119
Email:	wlmccoskey@gmail.com
Prepared by:	Howard Freerksen 2272 Road 250 Reading, Kansas 66868
Phone:	785-473-6037
Email:	hfreerksen@ksu.edu
Date of plan:	February 20, 2024
Expiration date:	February 20, 2034
County:	Chautauqua
HUC 14 Watershed:	11070106050010 – North Caney Creek
Legal Description:	NE Diagonal ½ of NE¼ S20-T32S-R11E S21-T32S-R11E S22-T32S-R11E W½ S23-T32S-R11E N½ NW¼ & SW¼ SW¼ S26-T32S-R11E S27-T32S-R11E N½ & SE¼ S28-T32S-R11E
Total Property:	2953 acres
Forested:	2007 acres
Plan acres:	Forest Stand Improvement – 1230.1 acres Oak Savanna – 459.9 acres Open woodlands – 554.0 acres Recreational use – 216.2 acres

Location of Property: From Sedan, Kansas travel north on Hwy 99 to Quivira Road, then travel east for 2 miles to County Road 19. The property lies north and east of the 19th and Quivira Road intersection.

LANDOWNER GOALS AND OBJECTIVES

Primary: Maintain healthy, sustainable woodlands by thinning to release desirable tree species.

Secondary: Manage the property for wildlife habitat, forage, and recreational use.

General Property Description: The property is the Quivira Boy Scout Ranch. It utilizes multiple use management for recreation (camping, hunting) and well as agriculture (hay, grazing), and wildlife. It consists of about 3,000 acres with 2/3 woodlands and a 400+ acre lake located in the southern portion. The camping areas and associated structures are located on the north shore and uphill from the lake. Some administrative buildings are located along Road 19 on the south side of the lake.

The woodlands are comprised of predominantly post oak, hickory, and blackjack oak, which is typical of the Cross Timbers region. The riparian areas also contain black walnut, mulberry, hackberry, and red oak. The woodlands were logged over 100 years ago and some additional clearing was used to increase agricultural use - mostly grazing. After burning was suspended as a management tool, much of the land once used for range was reclaimed by the woodlands.

The woodlands are patchy due to mortality from moisture stress and a recent wildfire, and stocking is varied with basal areas often exceeding 120 square feet per acre. However, most of the wooded areas have little encroachment from undesirable species.

Proposed Projects: Forest stand improvement is recommended to increase grass and forb production. Thinning will reduce competition from less desirable trees and species for soil moisture and nutrients, and allow sunlight to the forest floor to stimulate the growth of grasses, forbs, and mast seedlings.

In the woodlands of the Pioneer Camp Area there are many dead, dying, or damaged trees that pose a safety threat to recreational users. This threat can be reduced by thinning the stand to improve the overall health and quality of the woodlands and removing the dangerous trees from the area.

General Resource Description and Condition

Historical Information/Past Management: This property was acquired in the 1961 and the current scout camp was built in 1985. Many years ago the land was logged when crossties were needed for the railroads and afterwards was cleared for pasture and possibly for other agricultural use. Fire scars and the prevalence of oak sprouting indicate that burning was utilized to manage the property by reducing woody plant encroachment and the invasion of shade tolerant species into the woodlands. Later the reduced use of fire as a management tool resulted in an abundance of post oak sprouting that has caused overcrowded condition and a closed canopy in much of the woodlands. This is preventing sunlight from reaching the forest floor to stimulate grasses and forbs that are utilized for forage and wildlife habitat.

Archeological, Cultural, and Historical Resources: There were cultural resource sites identified in the Kansas Historical Society Archaeological Inventory database in Section 26 & 27 of T32S, R11E. Care will be taken during treatments to identify and protect any sites that may be discovered.

Threatened and Endangered Species: The Kansas Department of Wildlife, Parks, and Tourism was consulted for Threatened and Endangered Species. Two rare species or threatened and endangered species (Prairie Mole Cricket and Bearded Skeleton Grass) have been recorded on or near this property. Kansas Department of Wildlife, Parks, and Tourism's list of threatened and endangered species, and Species of Concern for Chautauqua County is located in Appendix C.

Water/Riparian Area: The highest elevations of the property are located in the northern portions and slope south and east along the North Caney Creek drainage. Vegetation is present along the drainages where the flow of water is concentrated, providing many benefits including improved water quality through soil stabilization and natural filtering aspects. There are two ponds on the property for available water to supplement the drainages and lake.

Wetlands: No wetland determinations have been completed on this property.

Fish and Wildlife: The diversity of the woodlands provide habitat and cover for many species including bobcat, deer, turkey, squirrel, rabbit, coyote, raccoon, and songbirds. The drainages that pass through the property provide added wildlife and aquatic benefits for a limited period after heavy precipitation.

Recreation: The woodland species composition provides for wildlife habitat and general outdoor recreation opportunities, such as camping, hunting and nature watching. The scout camp provides camping, canoeing, swimming, archery, and other recreation activities for scouts in the summer and hunting leases are provided during the rest of the year.

Aesthetic Quality: The aesthetic quality of this woodland is good in much of the area, with open woods and large timber scattered throughout the property. However the viewshed is restricted in those areas with heavy underbrush or high stocking. The proposed timber stand improvement practice will enhance the future woodland quality.

Fire: The original policy of the Quivira Scout Ranch prior to 1985 was to restrict all burning. That was amended in 1985 to control the tick population through burning. In 2016, this policy was reconsidered and prescribed burning was no longer carried out for the next 3 years. In 2016 an escaped prescribed fire on the neighbor's property killed or damaged an unestimated number of trees in the northeastern portion of the Scout Ranch, however, over 15,000 dead and hazardous trees have been removed. The increase in the invasion of sericea lespedeza led to another burn policy change with the consideration that late summer burns would help to control this species. In 2018 the ranch burned 30 acres and this increased each year to 580 acres in 2022, however the drought has caused a burn ban in Chautauqua County that may continue into the next year. A continued burn policy will be needed to promote grasses and forbs for grazing and wildlife, reduction of woody underbrush, and control of the sericea lespedeza.

Woodland Health: The woodland is in fair health with many trees showing signs of hypoxylon canker and moisture stress from the past drought, as well as many standing dead trees due to a wildfire in the northern portions of the Ranch. There is scattered mortality and dieback that poses a risk to visitors to the area. The stocking is high in much of the woodlands where mortality has not been an issue and often exceeds 120 square feet of basal area per acre. Post oak and blackjack oak are especially prevalent and coppice sprouting that resulted from past timber harvests is causing much of the heavy stocking and overcrowding in portions of the woodland. A thinning to remove poor quality trees and undesirable species would reduce the stress from limited soil moisture, soil nutrients, and sunlight resulting from the overstocked condition.

Damage from the campers/visitors is extensive and some animal damage, such as beavers and deer rubs, was observed on the property, which will naturally occur to some extent, and does not appear to be a serious or limiting problem for the larger trees. If wildlife damage becomes a serious problem, the landowner should contact the Kansas Department of Wildlife, Parks, and Tourism for more information on controlling wildlife damage (see Appendix D for contact information).

Johnsongrass and sericea lespedeza were observed on the property. Annual inspections of the property should take place to identify and control any noxious weeds that might develop. If there are any questions concerning noxious weeds and control options, the Chautauqua County Noxious Weed Department, or the Chautauqua County Extension Service should be contacted (see Appendix D for contact information). Chemicals for control of noxious weeds can often be purchased through the Noxious Weed Division at subsidized, reduced rates.

Soils: Soils that exist on the property in the treatment areas include Sogn silty clay loam (4750); Sogn (4751); Clime-Sogn complex (4590); Niotaze-Darnell complex (6951); Steedman stony clay loam (6971); and Stephenville-Darnell fine sandy loam (6981); Stephenville fine sandy loam (6980); Stephenville-Darnell fine sandy loam (6981); Dennis silt loam (8683); Eram silty clay loam (8733); and Eram-Collinsville complex (8747).

The Steedman, Eram, and Dennis soils are tree suitability group 4 soils. These are moderately well drained, moderately deep soils over clay residuum on hillslopes. These soils have low available water capacity but are suitable for planting upland mast species such as oak and hickory.

The Stephenville and Niotaze soils are tree suitability group 6 soils. These are moderate to poorly drained, moderately deep soils over sand, gravel, bedrock, and other layers that can severely restrict root growth. These soils have very low available water capacity and are suitable for growing drought resistant upland mast species such as post oak and hickory.

Clime soils are moderately deep, well drained soils derived from shale on uplands. They are Tree Suitability Group 8 soils with low available water capacity and are suitable for planting drought hardy species such as bur oak, choke cherry and American plum.

The Darnell, Collinsville, and Sogn soils are tree suitability group 10 and have limited soil depth to the root restrictive layer, as well as excessive drainage that limits water availability. These soils are not recommended for planting seedlings, however seed or nut planting of hardy species, such as bur oak, may be appropriate.

(See Appendix B for the location and description of all soil types located on the property).

Surrounding Properties and Neighbors: The surrounding private properties are mostly similar in composition, consisting of mainly woodlands and pastures.

Protection: The woodland should be protected from wildfires and periodically monitored for insect and disease related problems. Monitor the property for noxious weeds and take control actions if any are found.

Area Management Prescriptions

Woodland Management: Forest Stand Improvement – Oak Savanna.

Total size: 459.9 acres	Soils:
Area 3 – 63.8 acres	4751, 6951, 6981
Area 5 – 190.7 acres	6951, 6981, 8683, 8733, 8747
Area 8 – 130.3 acres	6951, 6980, 6981, 8733
Area 10 – 37.3 acres	4590, 6951, 6971
Area 11 – 21.3 acres	4590, 6951, 6981
Area 12 – 14.5 acres	6951

Objective: Restore the oak savanna ecosystem in the uplands to establish forage and diversity.

Desired Future Condition: Provide healthy, sustainable oak savanna woodlands that offer livestock forage and species diversity for wildlife.

Description: These woodlands are located in the Cross Timbers Region of the North Caney Creek watershed. Reduced burning has allowed the post oak and blackjack oak to dominate the overstory, shading out native grasses and forbs. A recent wildfire in the northern section (Area 8) has caused severe mortality resulting in pockets of open woodlands that are within the 10% to 50% canopy cover desired for a savanna ecosystem, but in most of the woodland the stocking is with basal areas over 130 square feet per acre and a canopy cover of 70% to 95%. This overcrowded condition has produced a closed canopy in many portions of the woodland. The fire damaged pockets have become overgrown with woody vegetation (mostly post oak) and will need to be controlled with fire or herbicides.

Recommendations:
Short Term: A forest stand improvement thinning, also called timber stand improvement (TSI) should be implemented to reduce the stocking level, and open the canopy to allow sunlight to the forest floor. This removal eliminates competition between the trees for light, moisture, and nutrients and allows native grasses and forbs to spread throughout the understory. In the upland

savanna areas, the canopy cover should be reduced to no less than 10% and as much as 50% cover by killing or removing the severely damaged hardwoods, in addition to any designated hardwood trees. The result should leave approximately 50 to 100 trees per acre with the current 8-10 inch diameter trees (measured at 4.5 feet above the ground). The trees should be left in clusters where appropriate to benefit habitat for wildlife and produce a more natural landscape.

Woodland Management: Forest Stand Improvement – Open Woodlands.

Total size: 554.0 acres	Soils:
Area 1 – 58.2 acres	6951, 6971, 6981
Area 2 – 83.9 acres	4751, 6951, 6980, 6981
Area 4 – 57.7 acres	6951, 6981
Area 6 – 85.2 acres	6951, 6980, 6981, 8683
Area 9 – 269.0 acres	4751, 6951, 6971, 6981, 8733

Objective: Thin around desired oak, hickory, and other mast trees to increase forage and maintain the health and enhance growth of these wildlife and timber species.

Desired Future Condition: Provide a healthy, sustainable woodland that offers species diversity for wildlife and commercial forest products.

Description: The woodlands are located on uplands in sandy loam and clay soils. The species type is predominantly post oak due to coppice sprouting from stumps as a result of past timber harvest activities. Most of the trees are small diameter sawtimber down to saplings. The stocking rate is patchy, especially in Area 9 due to a recent wildfire, where the burned areas are assuming savanna characteristics. The unburned areas often exceed 130 square feet per acre (sfa) of basal area, mostly due to the multi-stem characteristics of the coppice sprouting of logged oak trees. The overcrowded conditions of 80 to 95% canopy closure are causing dieback and mortality due to moisture stress during drought conditions. Tree species include post oak, blackjack oak, red oak, hickory, elm, eastern redcedar, and an occasional walnut and osage orange.

Recommendations:
Short Term: Forest stand improvement, also called timber stand improvement (TSI) should be conducted to reduce the stocking and open the canopy to allow sunlight to the forest floor. This removal eliminates the competition between the species for light, moisture, and nutrients and allows native grasses and forbs to spread throughout the understory. The stocking should be reduced to allow sunlight to the forest floor to promote the growth of grasses and forbs for wildlife habitat and to reduce the moisture stress of the trees. This can be implemented through a combination of crown thinning and low thinning to a stocking level of 40 to 80 sfa of basal area.

Crown thinning consists of removing trees whose crowns are competing with the desired crop tree. The suggested minimum area between the crop tree's crown and surrounding trees is 3-5 feet on at least 3 sides. This will leave an average spacing of about 25 feet between trees,

depending on the size of each individual tree being released. Larger diameter trees that are competing with smaller desirable species could be harvested to reduce crown competition. Undesirable trees over 6 inches in diameter can be girdled instead of felled to reduce damage to residual trees. Girdled trees will die allowing the branches, and ultimately the entire tree, to slowly deteriorate over an extended period of time and come down in a gradual manner. Until these large trees come down, they are beneficial as snag trees for wildlife. Caution should be used when working in and near areas where trees have been girdled, or if hiking trails are in the area.

Low thinning consists of removing trees that are competing with, and are detrimental to, healthy crop trees at the ground level. Examples of this are trees whose branches are rubbing on the stem of the crop tree or are growing right beside the target tree and will eventually grow around or have branches growing against the crop tree. Getting broken, split, or otherwise damaged trees on the ground will increase the rate at which they decay. Fell and stump spray these trees, as they are usually less than 6" in diameter. The trees that are felled can be used for firewood or wildlife brush piles.

Cutting down small diameter (4-8"), poorly formed oak trees allows the tree to start over via stump sprouting (coppicing) to form a better quality tree. Make sure that the canopy is open overhead to allow sunlight to the new sprouts. When the stump produces sprouts, allow all of them to grow for a year, then start thinning the less desirable sprouts (e.g., those growing on the side of the stump, growing out of the top of the stump, those that are crooked). Desirable sprouts are those coming out of the soil near the base of the stump that are straight. Do not thin all of the undesirable sprouts at the end of the first growing season in areas where the potential for deer browse, rubbing, or other chances for increased wildlife damage exists. In such areas, the thinning process can occur over multiple years, allowing for natural protection and greater selection opportunities during the period when such sprouts are smaller and more vulnerable to damage. During the final thinning, select the one sprout that has the best form and remove all others.

When cutting out undesirable trees, it may be necessary to use a combination of cut stump and girdling with herbicide treatments to prevent them from sprouting and growing back. Many chemicals are available that kill trees, and new and improved products are studied and developed over time. Visiting with your local chemical dealer at the time of application to determine what is most readily available for the least expense is advised. Glyphosate (Round Up, Accord, etc.) is a good chemical to use in areas associated with rivers and streams because it binds with soil particles quickly and becomes inactive. Garlon 4 is a good herbicide to use as a basal spray on honeylocust and hedge. The two most common chemicals used in Kansas for killing trees are triclopyr (Remedy, Crossbow, Garlon) and picloram (Tordon, Pathway). Always follow label recommendations.

Cut Stump herbicide treatments allow for rapid uptake of herbicide. Treat the stump with herbicide as quickly as possible after cutting (best done within minutes of cutting). Treatment of the area within 3 inches of the bark is all that is needed. You do not need to waste chemical or time in treating the entire surface of the stump. Avoid treating in late winter/early spring when positive sap flow reduces the absorption/uptake of the herbicide.

Girdling treatments are usually used on trees larger than 6" in diameter. Use a chainsaw to cut 1 or 2 rings into the bark completely encircling the tree. Double girdling is much more effective if chemical is not applied. Make sure that the ring is entirely connected around the tree. Girdling can be done near the ground or at waist height. The cut should be done deep enough (1 to 2 inch depth) to get through the cambium layer of the tree to prevent the flow of water and nutrients through the tree. Chemical can be applied within the girdle cuts to increase the effectiveness of killing the tree and to prevent sprouting from roots and the stump below the girdle point. Girdling is not recommended in areas that will be used by visitors to the forest (hikers, hunters, wildlife enthusiasts, etc.).

Vines growing on trees will inhibit tree growth by growing up into the canopy and causing breakage of the tree crown or shading out the leaf area of the tree. Some vines are beneficial to wildlife and can be left on undesirable species that are not severed. Vines that are on desirable timber species should be cut to prevent damage or dieback on these trees. Vines most common in Kansas woodlands are poison ivy, Virginia creeper, and wild grape. These vines should have a 3-6" section cut out of the vine near the base of the tree. Cut hanging vines approximately 3 feet from the ground to prevent the vines from touching the ground and re-rooting. Since cutting vines will kill the vines in the top of the tree, there is no need to pull the vine out of the canopy. Herbicide can be applied to the vine still connected to the ground, if desired.

Implementation Schedule:
September - December: Conducting Forest Stand Improvement activities during these months is the physiologically best time for trees, and more enjoyable for people as well. It is easier to see and maneuver throughout the woodland during this time period and the hazards of working with ticks, chiggers, snakes, etc. are lessened.

Firewood harvests can be implemented in conjunction with timber stand improvement operations as a way to utilize undesired or poorer quality trees to be removed. A commercial harvest could be used to create openings in which desirable regeneration could be established. Conduct selective harvests of trees as they mature.

Woodland Management: Forest Stand Improvement – Recreational Use.

Total size:	Soils:
Area 7 – 216.2 acres	4751, 6951, 6971, 6981, 8733

Objective: Improve forest health and visitor safety by removing damaged trees, undesired species, and poor quality trees that are, or will likely become a hazard to visitors of the Quivira Scout Ranch.

Desired Future Condition: Provide a healthy and safe woodland that offers a pleasant and enjoyable outdoor experience to users of the property.

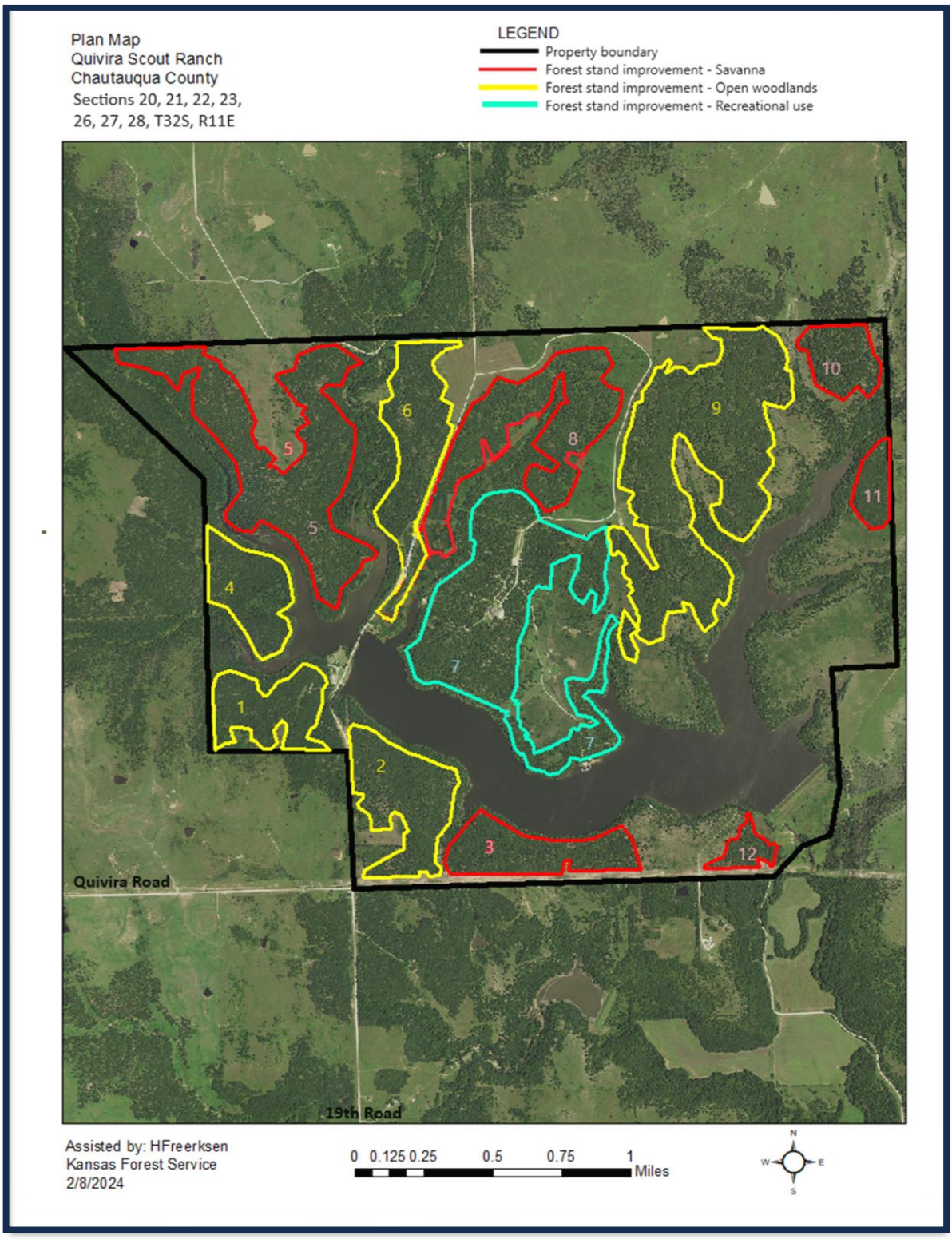
Description: The woodlands are located on upland soils with low available water capacity. The species type is predominantly post oak due to coppice sprouting from stumps created by past timber harvest activities. The stocking rate is good, but patchy due to past burning practices. The past fire use has created basal damage to many of the trees that have become hollow and are in danger of falling. Other trees are suffering from moisture stress, as well as root compaction due to the concentration of campers/visitors throughout the years, and have several dead branches that pose a threat to people camping or picnicking underneath. Most of the trees are small diameter sawtimber down to saplings, however occasional open grown oaks are large diameter trees with large limbs. Tree species include post oak, blackjack oak, red oak, hickory, mulberry, hackberry, ash, elm, black walnut, and eastern redcedar.

Recommendations:
Short Term: Forest stand improvement, also called timber stand improvement (TSI) should be conducted to remove dead or dying trees, damaged trees, undesirable species, and poor quality trees from around healthy trees and more desirable species. Tree removal should be based on a desirable viewshed, shading for users, and the safety of visitors to the area.

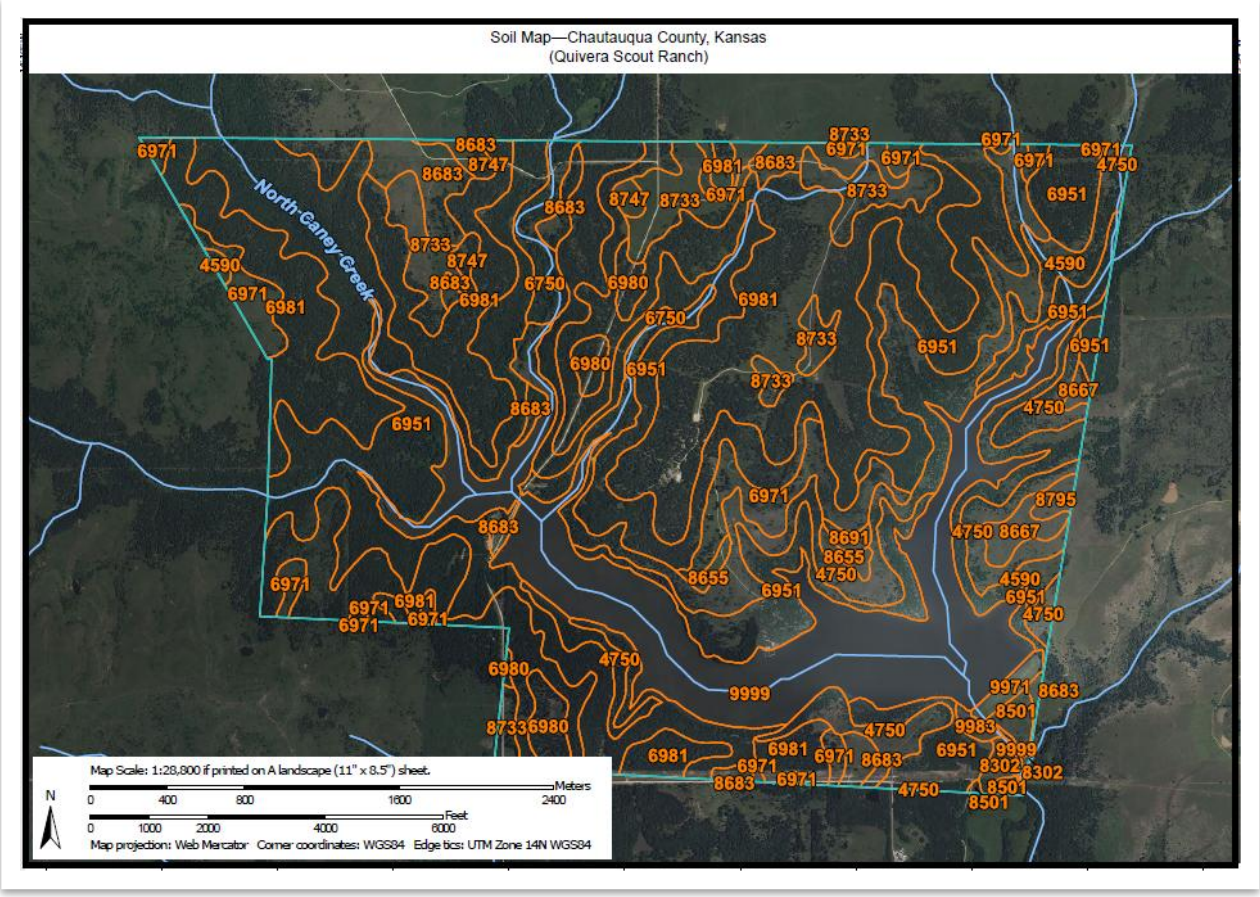
Stocking should not exceed 80 square feet of basal area per acre to reduce mortality and promote growth of the desired mast trees such as oaks that have the stoutest limbs and well as the low propensity for interior rot, as well as the greatest value for wildlife habitat. Focus efforts on the areas in proximity to campers and hikers first to reduce any hazard trees, then progress to the areas with less recreational contact as time and resources allow. TSI includes crown thinning and low thinning. See the previous section **Woodland Management: Forest Stand Improvement – Open Woodlands, Recommendations** for instructions on implementing TSI activities.

See Appendix A for the locations of each treatment area.

Appendix A – Treatment Areas



Appendix B – Soil Resources



Map Unit Legend

Map Unit Symbol	Map Unit Name	Map Unit Symbol	Map Unit Name
4590	Clime-Sogn complex, 3 to 20 percent slopes	8655	Clareson silty clay loam, 0 to 2 percent slopes
4750	Sogn silty clay loam, 0 to 10 percent slopes	8667	Clareson-Sogn complex, 1 to 3 percent slopes
6750	Cleora fine sandy loam, occasionally flooded	8683	Dennis silt loam, 3 to 7 percent slopes
6951	Niotaze-Darnell complex, 6 to 35 percent slopes	8691	Dennis silty clay loam, 3 to 7 percent slopes, eroded
6971	Steedman stony clay loam, 8 to 20 percent slopes	8733	Eram silty clay loam, 1 to 3 percent slopes
6980	Stephenville fine sandy loam, 1 to 3 percent slopes	8747	Eram-Collinsville complex, 1 to 5 percent slopes
6981	Stephenville-Darnell fine sandy loams, 1 to 6 percent slopes	8795	Lula silt loam, 0 to 1 percent slopes
8302	Verdigris silt loam, 0 to 1 percent slopes, occasionally flooded	9971	Arents, earthen dam
		9983	Gravel pits and quarries
8501	Mason silt loam, 0 to 1 percent slopes, rarely flooded	9999	Water

Soil Descriptions

The map units delineated on the soil maps represent the soils or miscellaneous areas on the property. The map unit descriptions in this report, along with the maps, provide information on the composition of map units and properties of their components.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Sections 20, 21, 22, 23, 26, 27 & 28, T32S, R11E - Chautauqua County, Kansas

Map Unit: 4590—Clime-Sogn complex, 3 to 20 percent slopes.

The Clime component makes up 60 percent of the map unit. Slopes are 3 to 20 percent. This component is on hillslopes on uplands. The parent material consists of residuum weathered from shale. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 10 percent. There are no saline horizons within 30 inches of the soil surface.

The Sogn component makes up 25 percent of the map unit. Slopes are 3 to 20 percent. This component is on hillslopes on uplands. The parent material consists of residuum weathered from limestone. Depth to a root restrictive layer, bedrock, lithic, is 4 to 19 inches. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 5 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 4750—The Sogn component makes up 90 percent of the map unit. Slopes are 0 to 10 percent. This component is on hillslopes on uplands. The parent material consists of residuum weathered from limestone. Depth to a root restrictive layer, bedrock, lithic, is 6 to 19 inches. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 4 percent. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 5 percent. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 6750—The Cleora, occasionally flooded component makes up 89 percent of the map unit. Slopes are 0 to 2 percent. This component is on flood plains on river valleys. The parent material consists of loamy alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is high. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is low. This soil is occasionally flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This soil does not meet hydric criteria.

Map Unit: 6951—Niotaze-Darnell complex, 6 to 35 percent slopes.

The Niotaze component makes up 65 percent of the map unit. Slopes are 8 to 20 percent. This component is on hillslopes on uplands. The parent material consists of clayey residuum weathered from sandstone and shale. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 18 inches during January, February, March, April, May, June, November, and December. Organic matter content in the surface horizon is about 3 percent. This soil does not meet hydric criteria.

The Darnell component makes up 20 percent of the map unit. Slopes are 8 to 20 percent. This component is on hillslopes on uplands. The parent material consists of loamy material weathered from sandstone. Depth to a root restrictive layer, bedrock, paralithic, is 10 to 20 inches. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This soil does not meet hydric criteria.

Map Unit: 6971—The Steedman component makes up 100 percent of the map unit. Slopes are 8 to 20 percent. This component is on hillslopes on hills. The parent material consists of clayey residuum weathered from clayey shale. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 18 inches during January, February, March, April, November, and December. Organic matter content in the surface horizon is about 2 percent. This soil does not meet hydric criteria. The calcium carbonate equivalent within 40 inches, typically, does not exceed 1 percent.

Map Unit: 6980—The Stephenville component makes up 80 percent of the map unit. Slopes are 1 to 3 percent. This component is on hillslopes on low hills. The parent material consists of loamy residuum weathered from sandstone. Depth to a root restrictive layer, bedrock, paralithic, is 31 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This soil does not meet hydric criteria. There are no saline horizons within 30 inches of

the soil surface. The soil has a maximum sodium adsorption ratio of 2 within 30 inches of the soil surface.

Map Unit: 6981—Stephenville-Darnell fine sandy loams, 1 to 6 percent slopes.

The Stephenville component makes up 60 percent of the map unit. Slopes are 1 to 5 percent. This component is on hillslopes on uplands. The parent material consists of loamy residuum weathered from sandstone. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This soil does not meet hydric criteria.

The Darnell component makes up 25 percent of the map unit. Slopes are 1 to 5 percent. This component is on hillslopes on uplands. The parent material consists of loamy material weathered from sandstone. Depth to a root restrictive layer, bedrock, paralithic, is 10 to 20 inches. The natural drainage class is somewhat excessively drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This soil does not meet hydric criteria.

Map Unit: 8302—The Verdigris component makes up 82 percent of the map unit. Slopes are 0 to 1 percent. This component is on flood plains on river valleys. The parent material consists of silty alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is very high. Shrink-swell potential is moderate. This soil is occasionally flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. This soil does not meet hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 8501—The Mason component makes up 90 percent of the map unit. Slopes are 0 to 1 percent. This component is on stream terraces on river valleys. The parent material consists of silty alluvium. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is moderately high. Available water to a depth of 60 inches (or restricted depth) is high. Shrink-swell potential is moderate. This soil is rarely flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. This soil does not meet hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 8655—The Clareson component makes up 85 percent of the map unit. Slopes are 0 to 2 percent. This component is on hillslopes on uplands. The parent material consists of silty and clayey residuum weathered from limestone, unspecified. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 6 percent. This soil does not meet hydric criteria.

Map Unit: 8667—Clareson-Sogn complex, 1 to 3 percent slopes.

The Clareson component makes up 65 percent of the map unit. Slopes are 1 to 3 percent. This component is on hillslopes on uplands. The parent material consists of silty and clayey residuum weathered from limestone, unspecified. Depth to a root restrictive layer, bedrock, lithic, is 20 to 40 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches (or restricted depth) is low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 6 percent. This soil does not meet hydric criteria.

The Sogn component makes up 35 percent of the map unit. Slopes are 1 to 3 percent. This component is on hillslopes on uplands. The parent material consists of loamy residuum weathered from limestone, unspecified. Depth to a root restrictive layer, bedrock, lithic, is 4 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This soil does not meet hydric criteria.

Map Unit: 8683—The Dennis component makes up 92 percent of the map unit. Slopes are 3 to 7 percent. This component is on hillslopes on plains. The parent material consists of silty and clayey residuum weathered from shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is moderate. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 20 inches during March. Organic matter content in the surface horizon is about 3 percent. This soil does not meet hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 8691—The Dennis component makes up 92 percent of the map unit. Slopes are 3 to 7 percent. This component is on hillslopes on plains. The parent material consists of silty and clayey residuum weathered from shale. Depth to a root restrictive layer is greater than 60 inches. The natural drainage class is somewhat poorly drained. Water movement in the most restrictive layer is moderately low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is high. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 20 inches during March. Organic matter content in the surface horizon is about 1 percent. This soil does not meet hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 8733—The Eram component makes up 90 percent of the map unit. Slopes are 1 to 3 percent. This component is on interfluves on plains. The parent material consists of clayey residuum weathered from sandstone and shale. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 40 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is low. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 18 inches during January, February, March, April, November, and December. Organic matter content in the surface horizon is about 3 percent. This soil does not meet hydric criteria. There are no saline horizons within 30 inches of the soil surface.

Map Unit: 8747—Eram-Collinsville complex, 1 to 5 percent slopes.

The Eram component makes up 70 percent of the map unit. Slopes are 1 to 7 percent. This component is on interfluves on plains. The parent material consists of silty and clayey residuum weathered from shale, unspecified. Depth to a root restrictive layer, bedrock, paralithic, is 20 to 39 inches. The natural drainage class is moderately well drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is high. This soil is not flooded. It is not ponded. A seasonal zone of water saturation is at 12 inches during January, February, March, April, November, and December. Organic matter content in the surface horizon is about 2 percent. This soil does not meet hydric criteria.

The Collinsville component makes up 20 percent of the map unit. Slopes are 1 to 7 percent. This component is on interfluves on plains. The parent material consists of residuum weathered from sandstone. Depth to a root restrictive layer, bedrock, lithic, is 4 to 20 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches (or restricted depth) is very low. Shrink-swell potential is low. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 2 percent. This soil does not meet hydric criteria.

Map Unit: 8795—The Lula component makes up 90 percent of the map unit. Slopes are 0 to 2 percent. This component is on hillslopes on uplands. The parent material consists of residuum weathered from limestone, unspecified. Depth to a root restrictive layer, bedrock, lithic, is 39 to 59 inches. The natural drainage class is well drained. Water movement in the most restrictive layer is very low. Available water to a depth of 60 inches (or restricted depth) is moderate. Shrink-swell potential is high. This soil is not flooded. It is not ponded. There is no zone of water saturation within a depth of 72 inches. Organic matter content in the surface horizon is about 3 percent. This soil does not meet hydric criteria.

Appendix C - Chautauqua County Threatened, Endangered, and Conservation Concern Species

Threatened and Endangered

Critical Habitat

Ouachita Kidneyshell Mussel
Ptychobranchus occidentalis

Neosho Mucket Mussel
Lampsilis rafinesqueana

Eastern Spotted Skunk
Spilogale putorius

American Burying Beetle
Necrophorus americana

Non-Critical Habitat

Least Tern *Sterna antillarum*

Piping Plover *Charadrius melodus*

Snowy Plover *Charadrius alexandrinus*

Fluted shell Mussel *Lasmigona costata*

Bearded Skeleton Grass *Gymnopogon ambiguus*

Species In Need of Conservation (SINC)

Critical Habitat

There are no SINC species with critical habitat in Chautauqua County.

Species In Need of Conservation (SINC)

Non-Critical Habitat

Brindled Madtom *Noturus miurus*

Prairie Mole Cricket *Gryllotalpa major*

Slough Darter *Etheostoma gracile*

Redfin Darter *Etheostoma whipplei*

Spotted Sucker *Minytrema melanops*

Texas Mouse *Peromyscus attwateri*

Western Hognose Snake *Heterodon nasicus*

Short-eared Owl *Asio flammeus*

Deertoe Mussel *Truncilla truncata*

Golden Eagle *Aquila chrysaetos*

Gray Petaltail Dragonfly *Tachopteryx thoreyi*

Rough Earth Snake *Virginia striatula*

Yellow Sandshell Mussel *Lampsilis teres*

Timber Rattlesnake *Crotalus horridus*

Southern Flying Squirrel *Glaucomys volans*

Bigeye Shiner *Notropis boops*

Creeper Mussel *Strophitus undulatus*

Bobolink *Dolichonyx oryzivorus*

Yellow-throated Warbler *Setophaga dominica*

Crawfish Frog *Lithobates areolata*

Eastern Whip-poor-will *Antrostomas vociferus*

Fatmucket Mussel *Lampsilis siliquoidea*

For more information, contact the Kansas Department of Wildlife, Parks, and Tourism,

512 SE 25th Ave., Pratt KS 67124 (phone: 620-672-0788).

Appendix D - Contact Information

Chautauqua County Noxious Weed Department,
215 North Chautauqua Street, Sedan, KS 67361 (phone: 620-725-5863).

Chautauqua County Extension Service,
215 North Chautauqua Street, Sedan, KS 67361 (phone: 620-725-5890).

Kansas Department of Wildlife, Parks, and Tourism,
512 SE 25th Ave., Pratt KS 67124 (phone: 620-672-0788).

Natural Resource Conservation Service – Howard Service Center,
133 North Wabash Street, Howard, KS 67349 (phone: 620-374-2410).

Kansas Forest Service (conservation tree nursery), *www.kansasforests.org*,
2610 Claflin Road, Manhattan, KS 66502 (phone: 620-672-0788).