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CCC Camp Ozone Native Grass Restoration

Environmental Assessment

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Forest Service

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INTRODUCTION

Purpose and Need for Action

The purpose of this initiative is to; Transition the current condition of the CCC Camp Ozone toward the desired future conditions described in the 2005 Revised Land and Resource Management Plan (RLRMP). The following website will direct you to the 2005 RLRMP: (http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fsm8_042809.pdf)

This action would specifically respond to the goals and objectives outlined in the 2005 RLRMP for the **2.C Developed Recreation Area.** The priorities described in the Forest Plan are as follow:

1. Control undesirable Species
2. Reduce fuel build-up
3. Integrate pest management to eradicate or suppress insects, diseases, and Non-Native Invasive Species (NNIS)
4. Improve/Establish native grasses in the project area
5. Increase opportunity to interpret historical features of the CCC Camp Ozone Trail.
6. Improve aesthetic values
7. Implement low-intensity management practices to enhance Ozark Highlands Trail (OHT) environment.
8. Increase Forest visitor safety.

Proposed Action

The Forest Service proposes vegetative management including native grass restoration through combined use of prescribed fire, herbicide and pine/hardwood removal utilizing hand-tools and potentially limited mechanized removal. This would support the development of grasses and forbs. Soil disturbance would be minimal. Proposed treatments would maintain an open canopy consistent with the historical setting and remove encroaching woody vegetation that could potentially damage historic site features. It would also enable development of future interpretive opportunities of portions of the site not currently managed. At this time, the Forest Service proposes interpretation of site features along an approximately 50-ft section of the Ozark Highlands Trail and installation of a flagpole in its historical position at the entrance to the CCC camp. Other opportunities for interpretation are also currently under consideration.

Issues

The Forest Service received one letter from the Ozark Highlands Trail Association (OHTA) during the initial scoping period. Their concern was possible high intensity forest management near the Ozark Highlands Trail. The concerns were addressed by the Interdisciplinary Team (IDT) and mitigation measures would be implemented to alleviate the risk of high intensity forest management near the OHT. No other issues or concerns were brought forward from the public during this 30-day scoping period.

ALTERNATIVES, INCLUDING THE PROPOSED ACTION

Because no significant issues arose during the scoping process, it was decided by the IDT, that only the no action and proposed action alternatives would be required for this project. The no action alternative will be referred to as Alternative 1 throughout the document and the proposed action will be referred to as alternative 2.

Alternatives

The No Action (Alternative 1)

The present/existing level of management would continue in the project area.

The Proposed Action (Alternative 2)

As previously stated, the Forest Service proposes vegetative management including native grass restoration through combined use of prescribed fire, herbicide and pine/hardwood removal utilizing hand-tools and potentially limited mechanized removal. This would reduce the forest canopy and support the development of grasses and forbs. Proposed treatments would maintain an open canopy consistent with the historical setting and remove encroaching woody vegetation that could potentially damage historic site features. It would also enable development of future interpretive opportunities of portions of the site not currently managed. At this time, the Forest Service proposes interpretation of site features along an approximately 50-ft section of the Ozark Highlands Trail and installation of a flagpole in its historical position at the entrance to the CCC camp. Other opportunities for interpretation are also currently under consideration.

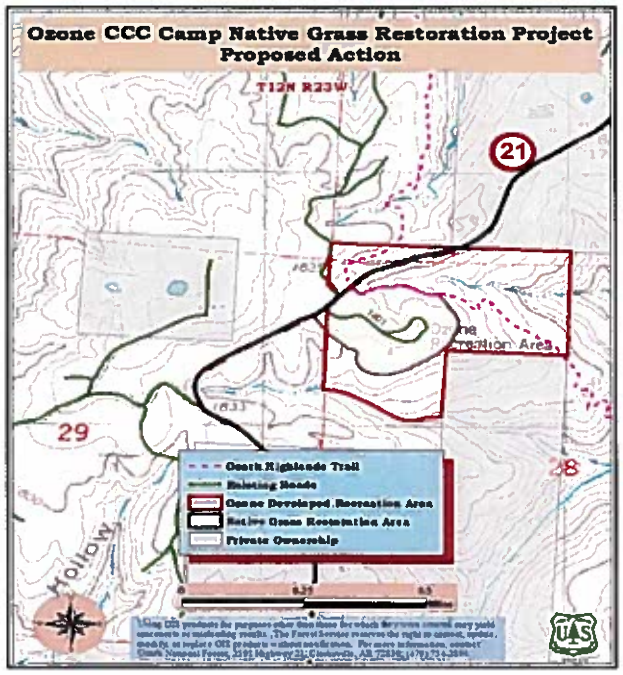


Figure 1. CCC Camp Ozone Native Grass Restoration.

Project Design Criteria

For the proposed action, all applicable standards in the 2005 RLRMP would be applied. The following standards and guidelines are incorporated by reference in this environmental assessment:

RLRMP – pages 3-1 to 3-21 (Forestwide Standards), page 3-31 to 3-33 (Management Area 2.C).

Appropriate mitigation measures from the Scenery Management Guide – Southern Regional National Forests, April 2008 (USDA 2008) will apply as standard mitigation measures.

Some of the more important of these mitigation measures and standards and guidelines are summarized below along with specific mitigation measures for this project. This list is not all-inclusive.

Recreation

FW101 – All dispersed and developed recreation management activities will be managed according to Recreation Opportunity Spectrum (ROS) classifications.

Scenery Management

FW105 – Projects will be designed to meet the assigned scenic integrity objectives (SIO).

FW106 – Resource management activities will be conducted in a manner that promotes SIO. Exceptions for short periods of time (one growing season or less) may be allowed to achieve important resource management goals.

Ozark Highlands Trail

MA2.A-1 – The OSFNFs designates a corridor at least three chains (198 feet) on either side of the centerline of the trail.

MA2.A-4 – Management activities in the corridor will be to improve or protect the trail, enhance the recreational experience, and provide for visitor safety.

MA2.A-7 – The OSFNFs will use control strategy for all wildfire. Prescribed burning through the trail corridor may occur with other fire management activities.

MA2.A-8 – Vegetation is managed to enhance the trail environment. Vegetation management activities are limited to:

- Control of insect and diseases
- Meet trail construction and maintenance needs
- Manage fuels
- Restore, enhance, or mimic historic fire regimes
- Control non-native invasive vegetation
- Provide for public safety or resource protection

MA2.A-10 – Wildland fire suppression and prescribed fire strategies will minimize impact on OHT values

MA2.A-11 – Implement restorative measures in areas damaged by fire suppression efforts

Developed Recreation Areas

MA2.C-3 – Maintenance methods may include cultivation, mowing, burning, and pesticide treatments. Improvements should appear natural and remain subordinate to the landscape.

Herbicide Use

1. Herbicides and application methods are chosen to minimize risk to human and wildlife health and the environment. Diesel oil will not be used as a carrier for herbicides, except as it may be a component of a formulated product when purchased from the manufacturer. Vegetable oils will be used as a carrier for herbicides when available and compatible with the application proposed. (RLRMP, p. 3-4).

2. Herbicides are applied at the lowest rate effective in meeting project objectives and according to guidelines for protecting human and wildlife health. Application rate and work time must not exceed levels that pose an unacceptable level of risk to human or wildlife health. If the rate or exposure time being evaluated causes the Margin of Safety or the Hazard Quotient computed for a proposed treatment to fail to achieve the current Forest Service Region 8 Standard for Acceptability (acceptability requires a MOS > 100 or, using the SERA Risk Assessments found on the Forest Service website, a HQ of < 1.0), additional risk management must be undertaken to reduce unacceptable risks to acceptable levels or an alternative method of treatment must be used. (RLRMP, p. 3-4).

3. Weather is monitored and the project is suspended if temperature, humidity, and/or wind meet the criteria shown below in Table 1. (RLRMP, p. 3-4).

Table 1. Comparison of Project Weather Monitoring

Application Techniques	Temperatures Higher Than	Humidity Less Than	Wind (at Target) Greater Than
Ground			
Hand (cut surface)	NA	NA	NA
Hand (other)	98°	20%	15 mph
Mechanical (liquid)	95°	30%	10 mph
Mechanical (granular)	NA	NA	10 ph

4. Application equipment, empty herbicide containers, clothes worn during treatment, and skin are not cleaned in open water or wells. Mixing and cleaning water must come from a public water supply and be transported in separate labeled containers. (RLRMP, p. 3-5).

5. Herbicide mixing, loading, or cleaning areas in the field are not located within 300 feet of private lands, open water or wells, or other sensitive areas. (RLRMP, p. 3-5).

Monitoring

All activities will be monitored to ensure mitigation measures are applied.

a. Applicable RLRMP monitoring and evaluation requirements will be implemented as directed within budgetary limitations. These requirements include measures to monitor current and past activities in terms and implementation, effectiveness, and validation monitoring levels.

ENVIRONMENTAL CONSEQUENCES

Project Issue Effects

Water Resources

Existing Condition

Watersheds in the United States are divided into progressively smaller units known as hydrologic units, recognized by the United States Geological Survey (USGS) - as regions, sub-regions, basin, and sub-basin units. This hierarchical division of watershed boundaries is useful for assigning address-like codes to drainage basins. This project area falls within the Arkansas-White-Red region (11), the Lower Arkansas sub-region (1111), the Lower Arkansas-Fourche La Fave basin (111102), and the Dardanelle Reservoir sub-basin unit (11110201). The Ozark-St. Francis National Forests further classify land areas into progressively smaller units: watersheds and sub-watersheds. The proposed project area falls within the Little Piney Creek watershed (1111020207). At the smallest scale, the proposed project is in the western portion of the Upper Little Piney Creek sub-watershed (111102020702). This sub-watershed, or 6th level Hydrologic Unit Code (referred to as a watershed), will serve as the analysis boundary for the proposed project with respect to water resources. The project area and analysis area are illustrated on the map below. The proposed project area as discussed in this section of the document will consist of the compartment boundaries where activities are proposed.

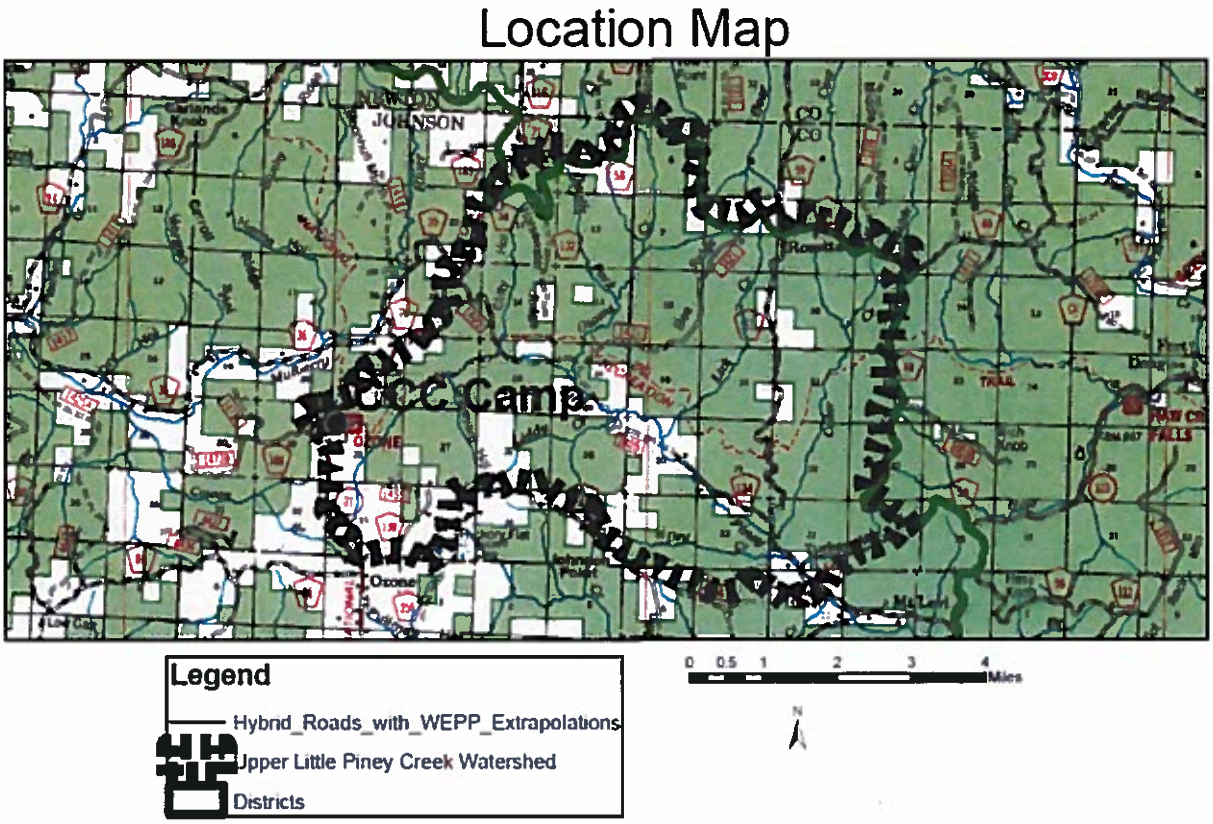
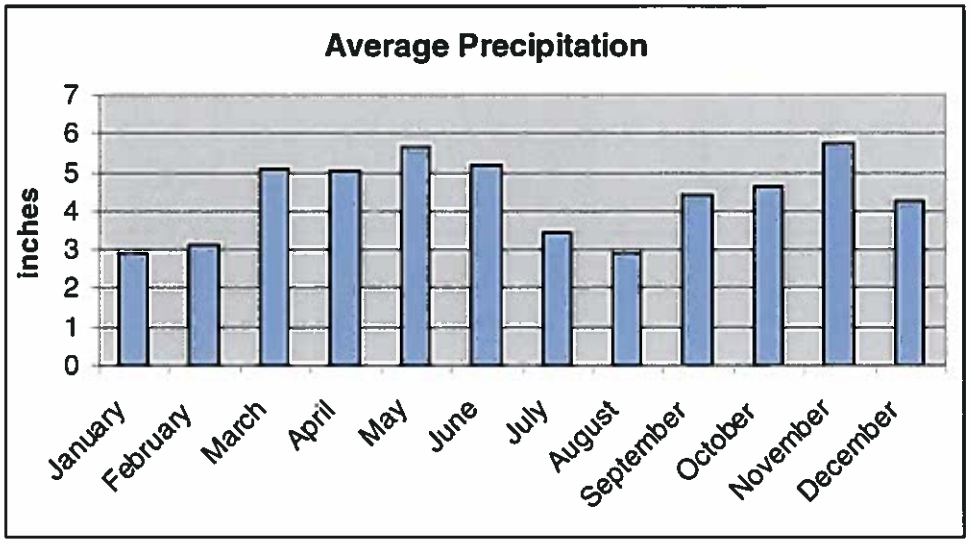


Fig 2 - Vicinity Map

The project area and the sub-watershed analysis area support streams and rivers that have a dendritic drainage pattern. Dendritic drainage patterns typically have branching tributaries, which can concentrate precipitation across a wide area into one main stream channel. The primary streams that are found in the vicinity of the project area include a tributary to Little Piney Creek approximately 0.6 miles southeast of the site and Mulberry River approximately 0.8 miles northwest of the site. The Mulberry River is a designated Wild and Scenic River but is in a different watershed that the project area. The creeks and tributaries flow south and join Big Piney Creek approximately 23 miles downstream of the proposed project area. Big Piney Creek then flows into Piney Bay where the city of Clarksville has a municipal water intake.

Table 2 – Average Precipitation



Climate information obtained for the project area was derived from information for the town of Ozone, AR (NRCS-Climate Product). The bars on the above graph indicate average precipitation over a thirty year data period or climatic norm. Mid-winter and late summer are found to be the driest portions of the year; this suggests that stream flow will most likely be the lowest during the late summer.

Runoff should be expected to occur every month except for the driest summer months, and the precipitation required to initiate channel flow is between 12-40 mm (.47-1.5 in). Small stream channels known as ephemeral streams and headwater streams commonly carry storm-flows especially during the spring when there is little evapotranspiration and often drenching precipitation.

Within the watershed analysis area approximately 78% (or 16,517 acres) of the analysis area is administered by the Forest Service. This leaves a sizable area of the land within the watershed as privately owned, roughly 22% or 4,661 acres. Land use within the analysis area is approximately 97% forested. The balance of the watershed land uses are mainly agricultural type land uses.

Direct and Indirect Effects

Alternative 1

Selection of the No Action Alternative would result in no direct effects because no activities would be conducted for this project. The current trends and conditions are expected to continue. Indirect effects would continue to result from the existing conditions of the project area. The effects of vegetation on water yield within the watershed would continue through evapotranspiration processes.

Alternative 2

The main issue with respect to forest management activities and water quality is effects to water quality that may result from the proposed project. The activities which may elicit direct and indirect effects are those of trail construction, vegetation management, silvicultural site preparation and prescribed burning.

Forest management options typically include the use of chemical pesticides in the form of herbicides to control unwanted or inappropriate vegetation growth. The use of chemicals may affect stream habitats directly (through acute or chronic toxic effects) or indirectly (as a result of changes to the composition of plant communities). Direct effects depend on two factors; the toxicity of the herbicide and the level of exposure. Toxicity varies among the products used, where common chemicals such as glyphosate are only slightly to non-toxic to aquatic organisms to chemicals such as triclopyr ester which pose a greater risk to fish and invertebrate toxicity.

Herbicide application to control competing or nuisance vegetation does not disturb the nutrient rich topsoil layer, does not create additional bare soil, and does not adversely affect watershed condition when used responsibly (Neary and Michael, 1996). By utilizing herbicides, the organic matter is left in place and off-site soil movement does not increase the loss of nutrients following ground disturbing activities compared to the other types of management practices. Maxwell and Neary (1991) concluded in a review that the impact of vegetation management techniques on erosion and sedimentation of water resources occurs in this order, herbicides < fire < mechanical. They also concluded that sediment losses during inter-rotation vegetation management could be sharply reduced by using herbicides and moderate burning instead of mechanical methods and heavy burning.

When herbicide fate is measured in runoff water, two common outcomes are apparent. First, measured peak concentrations are of short duration. Second, the highest concentrations occur when buffer strips are not used on streams or where the streams were accidentally over flown during aerial application (Neary and Michael, 1996). No aerial applications are planned for this project. As seen with other herbicide data, the highest glyphosate peak concentrations occur when buffer strips are not used as a best management practice (Neary and Michael, 1996). Picloram and Triclopyr are also common herbicides used in forestry applications. In a review of studies looking at stream flow fate of these herbicides, a similar pattern is noted as with other herbicides, that the highest peak concentrations are found when buffer strips are not utilized as BMPs. When buffer strips are employed as a mitigation measure, peak concentrations of these chemicals have not been found to exceed 40 mg/m^3, below the Reference Dose (RfD) of both Triclopyr and Picloram. Where buffer strips are used or other mitigation techniques are employed, forestry herbicides generally do not pose a threat to water quality. Peak concentrations are usually low (< 100 mg/m^3) and do not persist for long periods of time (<6 mos.) (Neary and Michael, 1996).

From a review of literature surrounding herbicide application and use on forest lands, and monitoring conducted on the Ozark-St. Francis NF, it has been determined that the selection of this alternative could potentially result in low levels of herbicide residues entering waterbodies within the project area (SO unpublished reports). However, the levels found in the past and those anticipated for the future, are expected to be very small, and not in excess of the levels of concern

established by the EPA. The OSFNF utilizes standards for herbicide application which require buffers between treated vegetation and waterbodies, as well as standards to ensure that drift and direct application to waterbodies do not occur. This alternative includes the use of BMP practices and monitoring to ensure environmental quality is maintained.

The main effect of burning on water quality is the potential for increased runoff of rainfall. Runoff may carry suspended soil particles, dissolved inorganic nutrients, and other materials into adjacent streams and lakes, reducing water quality and degrading fish habitat (Wade and Lundsford, 1989). However, most studies in the south indicate that effects of prescribed fire on water quality are minor and of short duration when compared with effects of other forest management practices. Rapid vegetation regrowth in this part of the country quickly protects any disturbances to the landscape.

The direct and indirect impacts from this project are not expected to contribute to degradation of the current water quality. Implementation of the activities associated with these alternatives may result in some of the above mentioned effects to water quantity and quality; these effects have been shown from past research to be minimal and short-lived in this part of Arkansas. With the application of the Arkansas Forestry Commission's Best Management Practices for Silviculture, current Forest Plan standards, and any other mitigation measures noted in this EA, the activities of this alternative should not result in detrimental effects to the water resources or compliance with water quality regulations.

Cumulative Effects

For this analysis, the cumulative effects to water resources will be bound by the 6th level watershed in which the project is located (see current conditions). Cumulative effects result from practices which occur throughout the watershed, on both private and public lands. Activities and land uses identified for areas not administered by the Forest Service were determined from publicly available data. The major non-point source pollution concern that arises from Forest Service activities is that of soil erosion which can potentially result in increased sedimentation of aquatic habitats or threaten water quality as turbidity.

The cumulative effects analysis estimates sediment yield from both public and private lands, the existing road network, and from expected current and future activities. Current and future sediment yield is compared to estimates of an undisturbed landscape (or past condition). An undisturbed landscape is described as an entirely forested watershed without roads. Sediment increases are then calculated as a percent above the undisturbed amount. This value is compared to potential risk values for identifying levels of concern for watershed conditions. These risk indicator values were empirically determined using a relationship between sediment values and the condition of the fisheries from select locations across the area.

The cumulative effects analysis assumes that particular activities occur on public and private lands. The assumption is made that all the activities on public lands as described under each alternative, will occur during a one year time frame, or as an instantaneous event. In practice these activities are usually spread over a number of years, thus amortizing the potential effects over the life of any resulting projects. Assumptions are included in the determination of the potential risk indicator

values; these values were determined on a smaller-scale, ecoregion basis, using community-based fish information. Different guilds within the fish communities were analyzed for predictive patterns of response to sediment loading. The most responsive patterns were used to set the risk level values. This allows for a determination of the 'worst case' scenario, providing a conservative understanding of effects to the water resources and designated use fisheries.

The water resource cumulative effects analysis was completed based on the activities described in this document. All supporting material for this model has been included in the project planning files. The results of this analysis are displayed in the following table. This analysis indicates that the watershed analysis area currently has a low concern level. As a result of the No Action alternative, sediment increases slightly but the concern level remains Low as shown in Table 2.

Table 3. Results of the Water Resources Cumulative Effects Analysis

	Future			
	No Action		Proposed	
6th level Watershed Analysis Area	Tons of Sediment	Concern Level	Tons of Sediment	Concern Level
111102020702 Upper Little Piney Creek	14.58	Low	15.85	Low

The cumulative effects analysis indicates minimal risks to the water resource's current condition. Additionally, it should be possible to schedule these activities over time instead of instantaneously as predicted by the analysis, thus further reducing the possibility of acute effects. Through the use of forest plan standards and the use of Arkansas Silviculture BMPs, the activities scheduled for implementation should not pose additional risks to water quality or designated uses. Monitoring in the form of subsequent BMP compliance checks should be adequate to discern any adverse effects which may result from the implementation of the proposed action.

Soils

Existing Condition

The analysis area for soils will be the project area in compartment 326 stands 24 and 27. The Project Area is located on the southern side of the Ozark Plateau in a heavily dissected section called the Boston Mountains. Project Area elevation varies from about 1840 feet on the ridgetop in the center of the project area to 1800 feet on the upper slope on the edges of the project area.

Soils are well drained and range from shallow to deep. Soils have mostly recovered from past disturbances except the areas under roads and trails. The soils are well covered with vegetation, duff, stones, and limbs.

The hazard of erosion off of roads and trails on the ridgetop is slight. The soil loss is caused by sheet or rill erosion in off-road or off-trail areas where 50% to 75% of the surface has been exposed by disturbance. A rating of slight indicates that erosion is unlikely under ordinary climatic conditions.

The hazard of erosion off of roads and trails on the upper slopes adjacent to the ridgetop is moderate. A rating of moderate indicates that some erosion is likely and that erosion control measures may be needed.

The potential for damage to soils by fire on the ridgetop is moderate. Soils on the ridgetop occupy 20 acres. Moderate indicates that the soil has features that result in a moderate susceptibility to damage by fire. The rating is based on the texture of the surface soil layer, content of rock fragments, organic matter in the surface layer, thickness of the surface layer and slope. The rating indicates an evaluation of the potential impact of prescribed fires or wildfires that are intense enough to remove the duff layer and consume organic matter in the surface layer.

The potential for damage to soils by fire on the upper slopes adjacent to the ridgetop is low for the deep soils (55% of the map unit, 4 acres) and moderate for the shallow soils (30% of the map unit, 2 acres). Low indicates that the soil has features that reduce its susceptibility to damage by fire.

Direct and Indirect Effects

Alternative 1

Current activities and trends would continue.

Alternative 2

Soil disturbance due to pine and hardwood removal would be minimal because hand tools would be used most of the time. Some limited mechanized removal of logs would occur. Minimal soil disturbance would consist of scattered small areas of topsoil displacement, compaction, and rutting occupying less than 5% of the project area (1.4 acres).

The use of herbicides would have no impact on soil disturbance because stems and roots of treated plants would remain in place until they decay. Soil microbes will break down any herbicide residue that reaches the soil.

The herbicides that are to be used are not expected to have any negative impacts on the soils. A brief summary of each of the herbicides characteristics relating to soils is given below.

Glyphosate is readily absorbed by foliage. It had practically no leaching characteristics because it binds tightly to the soil((e.g., Alex et al. 2008; Landry et al. 2005; Mamy and Burrisuso et al. 2005) cited in SERA 2011). Soil binding of glyphosate is directly proportional to the organic carbon in the soil (e.g.; Winegardner 1996 cited in SERA 2011). In soil, it is highly susceptible to degradation by microorganisms, being converted to natural products such as carbon dioxide and water. Many species of soil microorganisms can use glyphosate as their sole carbon source ((Dick and Quinn

1995a; dick and Quinn 1995b; Dotson et al. 1996; Wardle and Parkinson 1992a) cited in SERA 2011). Microorganisms like higher plants, use the shikimate pathway to produce aromatic amino acids. Since glyphosate inhibits this pathway, it is potentially toxic to microorganisms ((Cox 2002; Issa 1999) cited in SERA 2011). Nonetheless, there is very little information suggesting that glyphosate will be harmful to soil microorganisms under field conditions and a substantial body of information indicating that glyphosate is likely to enhance or have no effect on soil microorganisms ((Busse et al. 2001; Wardle and Parkinson 1990a; Wardle and Parkinson 1991) cited in SERA 2011). Persistence in soils is about two months or less.

Triclopyr is absorbed by plant roots, but it is not considered effective as a soil-applied herbicide. Triclopyr is adsorbed primarily to organic matter particles in soil. The organic matter content is the primary factor in the degree of soil adsorption. Long-term forest and pasture field studies found very little indication that triclopyr will leach substantially either horizontally or vertically in loamy soils (SERA, Inc. 1996c cited in USFS PNW Region 1996). Microorganisms degrade triclopyr readily. It degrades more rapidly underwarm, moist conditions which favor microbial activity. Average soil half lifes for triclopyr formulations are 0.2 days for triclopyr butoxyethyl ester (BEE), 14 days for triclopyr acid, and 69 days for 3,5,6-tricloro-2-pyridinol (TCP) one of the major metabolites of triclopyr (SERA 2011b). Several diverse studies are available on the toxicity of triclopyr to terrestrial microorganisms. None of these studies suggests that triclopyr is likely to have an impact on soil organisms (SERA 2011b). There are numerous field studies suggesting that effects on terrestrial invertebrates are most likely to be associated with changes in habitat and food availability rather than direct toxic effects from triclopyr (SERA 2011b). The warm temperatures at the time of application and the high density of plant roots are expected to rapidly degrade triclopyr.

The site has been maintained with prescribed burning and the soils show no signs of negative impacts from burning. Impacts to the soil from the proposed burning are not expected to negatively impact the soils because burns would be low to moderate intensity. Burns would be done so that the duff layer would be present on a minimum of 80 percent of the burn area (RLRMP FW155). Burns would be of short duration and there would be little to no heating of the mineral soil due to adequate soil moisture.

During best management practice reviews on the Forest from 2006 – 2011 the Forest Service observed 29 prescribed burned areas. On all of these burned areas, an adequate duff layer and surface root mat, substantial re-vegetation of the areas after the burns, and no erosion was observed within the burned areas. The prescribed burning that is proposed for this project would be expected to leave an adequate duff layer and surface root mat, revegetate well, and result in little to no erosion after the burning is completed. An adequate duff layer consists of unburned partially decomposed and decomposed organic matter two to five centimeters thick.

Cumulative Effects

The area that is proposed for native grass restoration shows little to no evidence of detrimental soil disturbance consisting of rutting, displacement of the top soil, compaction, erosion, or severe burning. There are no known future activities in addition to the proposed activities that would impact soils. Disturbed areas will be seeded with native grasses. Soil disturbance that would potentially result from the proposed activities are expected to be within the RLRMP standard that

requires soils dedicated to growing vegetation, the organic layers, topsoil, and root mat will be left intact over 85% of activity areas.

Vegetation Resources and Vegetation Diversity

Existing Conditions

The four forest stands for which vegetation was analyzed contain approximately 28 acres of National Forest land, all of which are classified as unsuitable for commercial timber production. The project area consists of pine timber types (75%) and hardwood timber types (25%). All of these stands are over 90 years old and can be designated as old-growth.

Direct and Indirect Effects

Alternative 1

Dense underbrush would continue to proliferate beneath the forest canopy and become further entrenched, making it progressively more difficult to control. Native grass species would be totally excluded and interpretation of heritage sites would be challenging.
This alternative would not meet the desired future condition as preferred in the Forest Plan and does not address the stated purpose and needs of this project.

There would be a cumulative effect of late-successional, shade-tolerant species (such as maple and beech) replacing the early-successional, more shade-intolerant species (such as oaks) at all canopy levels and in the understory. The old field that has been planted with pine by the CCC enrollees and the other naturally-occurring pine areas would eventually be replaced by hardwood that currently exists in the understory/midstory of these stands.

Alternative 2

This alternative would restore native grass species and allow the Ozone CCC Camp to be properly interpreted.

The effects of prescribed burning and other vegetation controls would improve visibility for more penetrating views from the highway, the OHT, and the CCC interpretive trail; more herbaceous vegetation would ensue for wildlife and flora species, benefiting quail, deer, and neo-tropical migratory birds and flowering plants.

Cumulative Effects

Implementation of this alternative is not expected to have a negative cumulative impact on vegetation. The forest condition would be improved and left in a more sustainable condition.

Wildlife Resources

Existing Condition

Wildlife, fish and plant species and their habitats in the project area are managed in cooperation with the Arkansas Game and Fish Commission (AG&F), and the Arkansas Natural Heritage Commission (ARNHC). The state wildlife management agencies main responsibilities are to set policy for hunting and fishing regulations and law enforcement programs. The Natural Heritage Commission is responsible for collecting and maintaining information on rare plants, animals and natural communities in Arkansas. The Forest Service is responsible for managing fish and wildlife habitat conditions on National Forest lands. The following discussion focuses on the habitat conditions that support wildlife populations and fisheries.

The proposed project area reflects conditions that are seen Forest wide in relation to age classes of forest stands. The project analysis area contains a high proportion of late seral wildlife habitat, and lacks open woodland capable of supporting diverse understory grass and herbaceous vegetation.

Under the National Forest Management Act (NFMA) regulations, adopted in 1982, selection of management indicator species (MIS) during development of forest plans is required (36 CFR 219.19 [a]). Management Indicator Species (MIS) are selected "because their population changes are believed to indicate the effects of management activities" (36 CFR 219.19 [a] [1]). They are used during planning to help compare effects of alternatives (36 CFR 219.19 [a] [2]) and as a focus for monitoring.

Table 4. MIS Species, Habitat Requirements and Population Trends (summary)

Species	MIS Type	Habitat Requirements	Population Trend
Northern bobwhite	ecological indicator	pine and oak woodland and native grasslands (early successional habitat)	decreasing
Whitetail deer	demand	mosaic of forest age classes	stable to increasing*
Black bear	demand	remote habitat with mature forest component with intermixed 0-5 year old regeneration	stable to increasing*
Wild turkey	demand	mature forest with open areas containing grasses/forbs/soft mast	stable to decreasing* (increased poults 2012)
Prairie warbler	ecological indicator	regenerating forest communities, old fields, oak woodland (early successional habitat)	decreasing
Brown-headed nuthatch	ecological indicator	pine woodland habitat	R8Bird Ozark NF (increasing) BBS (decreasing)
Cerulean warbler	ecological indicator	mature and over-mature forest habitat	R8Bird Ozark NF (stable-

			increasing) BBS (decreasing)
Northern parula	ecological indicator	riparian forest habitat	R8Bird Ozark NF (increasing) BBS (decreasing)
Ovenbird	ecological indicator	dry oak & dry-mesic oak forest habitat	decreasing
Red-headed woodpecker	ecological indicator	dry oak & dry-mesic oak forest habitat	R8Bird Ozark NF (increasing) BBS (decreasing)
Pileated woodpecker	ecological indicator	large snags & older forest habitat	decreasing
Scarlet tanager	ecological indicator	dry oak & dry-mesic oak forest habitat	R8Bird Ozark NF (increasing) BBS (decreasing)
Acadian flycatcher	ecological indicator	mid-aged to mature hardwood forest habitat	increasing

* information from AGFC harvest and monitoring data

Sixteen species were selected as MIS for the Ozark National Forest. These 16 species resulted from the Planning Team's review of the list of vertebrate species dependent upon forest habitats.

A MIS Report on population data including population trends was completed on July 6, 2001 (amended August 15, 2001) for the Ozark – St. Francis National Forest. This document is part of the analysis file and was used for analysis of effects to MIS species associated with implementation of project alternatives. The 2001 MIS Report contains some but not all of the current MIS as selected for the RLRMP. Data from this report (USDA, 2001) was compared to AGFC harvest and survey information for game species, breeding bird survey data, and population trend data from the NatureServe database for MIS species (AGFC 2001, 2006, 2007, 2009, 2011, 2012, USDA 2001, USDA 2007 and NatureServe 2013).

Table 3 shows Ozark National Forest MIS species pertinent to the Pleasant Hill Ranger District, the habitat type they represent and population trends (AGFC 2001, 2006, 2007, 2009, 2011, 2012, USDA 2001, USDA 2007 and NatureServe 2013). From the Forest MIS list, 13 species have potential habitat within the CCC Camp Ozone activity area. Many of these species have documented occurrences on the District, others which have not been documented, have potential habitat existing on the District. All 13 MIS species shown in table 3 will be addressed further in this document.

In 1996, the Southern Region of the USDA Forest Service adopted "The Southern National Forest's Migrant and Resident Landbird Conservation Strategy" (Gaines and Morris 1996) to improve monitoring, research, and management programs affecting forest birds and their habitats. A region-wide program of monitoring avian populations based on point-counts was initiated as part of this

strategy. The results of this monitoring effort are reported in General Technical Report – NRS-9, and summarized in table 3 (Taylor, 2013) for MIS avian species on the Ozark National Forest (USDA, 2007). Data collected from 1992 to 2004 is utilized. Sampling strategy and point-count methodology is described in detail in Gaines and Morris (1996).

Direct and Indirect Effects

Alternative 1

Currently approved management actions would be maintained under this alternative.

Effects to wildlife and MIS from implementation of the no action alternative are analyzed in detail in a reference paper compiled by the Pleasant Hill Ranger District (Taylor, 2013). This paper is part of the project analysis file. Findings of this paper are summarized here.

Timber Harvest and Wildlife Habitat Improvement.

Effects of implementation of the no action alternative are described in Taylor (2013), in relation to the subsections Early Successional Habitat, Soft Mast Production, and Hard Mast Production. Indirect beneficial effects to wildlife species dependent upon older seral stages, and habitat requirements associated with closed-canopy conditions would occur. Thinning to help restore woodland conditions and to improve herbaceous diversity would not occur. Restoration of woodland conditions and increased herbaceous species diversity would not occur, thereby causing negative indirect effects to disturbance-dependent and early successional obligate wildlife species. Lack of thinning would not allow for improved production of soft mast. Increases in abundance of soft mast, utilized by a variety of wildlife species as a reliable seasonal food source would not occur. Oak/pine woodland with abundant herbaceous understory would not be created/maintained. This alternative would cause negative indirect impacts to wildlife species. Forest Plan (USDA, 2005) recommendations of diverse, high quality habitats supporting well-distributed and viable populations of all native and desired non-native plants and animals would not be met. Natural disturbance regimes within terrestrial habitats providing a stable and sustained flow of both early- and late-successional habitats over time would not meet desired conditions for fish and wildlife habitat.

Prescribed Fire

Prescribed fire would not be implemented in the project activity area with adoption of this alternative. Benefits to wildlife from: sustaining oak in the ecosystem for hard mast production; restoring woodlands for increased herbaceous diversity and density; maintaining pine as a significant component in the ecosystem; and maintaining other fire-dependent or adapted species and habitats would not occur. Lack of prescribed fire would not allow for improved production of soft mast. Increases in abundance of soft mast utilized by a variety of wildlife species as a reliable seasonal food source would not occur. This would cause negative indirect impacts to wildlife species. Forest Plan (USDA, 2005) recommendations of diverse, high quality habitats supporting well-distributed and viable populations of all native and desired non-native plants and animals would not be met. Natural disturbance regimes within terrestrial habitats providing a stable and sustained flow of both early- and late-successional habitats over time would not meet desired conditions for fish and wildlife habitat.

Herbicide Use

Without use of this tool, benefits to wildlife from pine woodland, wildlife openings and grass/forb habitat would be reduced. Herbicide use, either foliar, hack and squirt, or cut stump treatment provides longer lasting beneficial impacts to creating and maintaining early-successional habitat, than can be expected with use of only mechanical means and prescribed fire. Benefits to species requiring early-successional habitat through use of herbicide would not occur. Without use of this tool, quality of oak/pine woodland and grass/forb habitat for wildlife would be reduced.

There would be no change short term in the amount of closed-canopy forest habitat from current levels under the No Action Alternative. Species requiring interior/closed canopy forest habitat would be expected to remain stable or increase within the project analysis area. Species requiring forest openings, edges between different successional stages, and herbaceous/shrub browse would be expected to remain stable or decrease long term within the project analysis area.

Habitat components would continue to be less than specified in the Forest Plan within the project analysis area. Objectives as described in the Forest Plan (USDA, 2005) for bobwhite quail, whitetail deer, eastern wild turkey and black bear (OBJ.10, OBJ.11, OBJ. 12, and OBJ. 13 respectively) would not be met in the project analysis area with implementation of the no action alternative.

Alternative 2

Effects to wildlife and MIS from implementation of the action alternative are analyzed in detail in a reference paper compiled by the Pleasant Hill Ranger District (Taylor, 2013). This paper is part of the project analysis file. Findings of this paper are summarized here.

Timber Harvest and Wildlife Habitat Improvement.

Effects of implementation of the proposed action are described in Taylor (2013), in relation to the subsections Early Successional Habitat, Soft Mast Production, and Hard Mast Production. Indirect negative effects to wildlife species dependent upon older seral stages and habitat requirements associated with closed canopy conditions would occur. Thinning to help restore woodland conditions and to improve herbaceous diversity would cause positive indirect impacts to wildlife. Use of thinning would improve production of soft mast. Increases in abundance of soft mast utilized by a variety of wildlife species as a reliable seasonal food source would occur. Oak species and shortleaf pine would be expected to be maintained as a component of the forest ecosystem in the long term. This alternative would cause positive indirect impacts to wildlife species. Diverse and high quality habitats supporting well-distributed and viable populations of all native and desired non-native plants and animals would meet desired conditions for fish and wildlife as specified in the Forest Plan (USDA, 2005). Disturbance regimes within terrestrial habitats providing a stable and sustained flow of both early and late-successional habitats over time would meet desired conditions for fish and wildlife habitat as specified in the Forest Plan (USDA, 2005).

Prescribed Fire

Implementation of prescribed fire may cause some direct mortality to small mammals and herpetofauna in the short-term. However, Kirkland et al. (1997) found that fire effects upon small mammals in oak-dominated forests are transitory. Quantitative differences between burned and unburned habitats were found to disappear within 8 months following the burn. Rapid recovery of populations of small mammals in burned forests may be due to the rapid regrowth of ground cover from surviving rootstocks. Research found there were few discernible differences in small mammal,

reptile and amphibian populations between burned and control areas, supporting the contention that prescribed fire in the project area had little overall impact on the terrestrial vertebrate fauna. In addition, immediate impacts of the burn on small mammals are slight as many species exhibit varying degrees of fossorial habits (Ford et al., 1999). In a study within the upper piedmont of South Carolina, Kilpatrick (et. al. 2004) found that prescribed burning and thinning for fuel reduction had minimal effects on herpetofauna in upland pine plantations. Prescribed burning has been found to change the composition of woody species seedlings. Due to reduction in the number of shade-tolerant species from prescribed burning, greater equitability among tolerant and intolerant species seedlings occurred. Mechanical removal of understory vegetation followed by prescribed fire provided both greater equitability among species and higher levels of photosynthetically active radiation reaching the forest floor (Dolan, 2004). Prescribed burning and sub-canopy removal are important tools in improving conditions for pine seedling establishment while reducing competition from shade-tolerant species.

Short term, negative, direct effects to wildlife may occur through use of prescribed fire. However, long term, positive direct effects would be realized through habitat improvement for a variety of wildlife species.

Herbicide Use

Herbicide use is an important tool often used in woodland restoration thinning to prevent sprouting of woody species and therefore allowing for greater understory herbaceous vegetation abundance and diversity. In addition, herbicide is a tool of great importance creating/maintaining grass and forb habitat for wildlife. Woodland restoration thinning and creation of grass/forb habitat would produce greater vegetation diversity and associated positive effects to wildlife with use of herbicide.

Cumulative Effects

In summary, the proposed action is predicted to have negative short term impacts on 8 of 13 management indicator species analyzed. Negative impacts would be primarily short term disturbance of individual animals and potential loss of nests. Viability of populations as a whole would not be reduced (Taylor, 2013).

The use of proposed management actions as described in this Environmental Assessment would be of long term benefit to MIS that rely upon forest ecosystems, particularly oak/pine ecosystems, for habitat. In summary, the proposed action is predicted to have positive long term effects on 13 of 13 management indicator species analyzed. Although some individual negative long term effects are predicted, populations of all MIS would be expected to remain viable in the Ozark Highlands and on the National Forest (Taylor, 2013).

Public Health or Safety

Existing Condition

Currently, there is a risk of wildfire in the project area which potentially could affect human health factors. There are other human health risks for forest workers and visitors, primarily dead, dying or aging trees that create risk to human health from falling material. Falling trees and limbs on public

lands can cause injury to National Forest visitors and can cause damage to personal property. Furthermore, portions of the project area have been affected by ice storm damage.

Direct and Indirect Effects

Alternative 1

There would be no change from the existing condition regarding risks to worker health from the use of herbicides, manual/mechanical vegetation treatments or prescribed fire. Risks to human health and safety from falling limbs and trees associated with oak decline and storm damage would increase due to rot, decay, and wind-throw. Currently, herbicide use is authorized in the project area for use in reduction/eradication of non-native invasive plant species (NNIS) and maintenance of established wildlife openings.

Potential accidents to workers completing manual/mechanical vegetation treatments and prescribed fire would be less with implementation of Alternative 1.

Without the use of prescribed burning, the chances of a large wildfire would increase over time. In areas of moderate to heavy fuel accumlations it is more likely that a wildfire would result in severe fire intensity, thus eliciting more adverse effects than the slight to moderate intensity fire associated with intentional prescribed burning. Therefore, potential negative impacts to public human health would be greater with implementation of Alternative 1.

Alternative 2

All herbicide application mitigation measures (as specified in this EA) and forest-wide standards for herbicide application would be applied. These mitigation measures will greatly reduce the chance of workers being exposed and very slight risk for any public exposure to these compounds.

Glyphosate typical hazard quotients associated with both foliar and cut surface application of this chemical at an application rate of 1.0 lbs/acre for humans are less than 1.0.

Hexazinone typical hazard quotients associated with ground application of this chemical at an application rate of 2.0 lbs/acre for humans are less than 1.0, with the exception of chronic/longer term exposure related to an adult female ingesting contaminated fruit, or coming into contact with contaminated vegetation – both from foliar application (see process record for specific numbers). These upper bound HQ's are not a concern because:

- Herbicide application areas are signed.
- Hexazinone has a moderate half-life of approximately 90 days
- The risk assessment scenario assumes that contaminated fruit is eaten 90 days in a row.
- Blackberries, the only types of fruit likely to be available in any substantial quantity within treatment areas, are not ripe for such a long period.
- The risk assessment scenario assumes that the person remains within a treatment area for 90 days in direct contact with the chemical.
- Hexazinone will be applied in a spot grid pattern on the soil, not applied as a foliar spray.

For Imazapic and Imazapyr, none of the hazard quotients calculated for risk scenarios to workers or the general public were above 1.0

Triclopyr Amine and Triclopyr Ester have low bioconcentration potential and single dose toxicity to mammals is low although prolonged or repeated exposure may cause skin irritation in mammals (MSDS dated 1/17/2001). Typical hazard quotients associated with both foliar and cut surface application of triclopyr applied at a rate of .36 to .48 lb/acre for humans are less than 1.0, with the exception of acute exposures related to a child drinking contaminated water from a chemical spill, an adult female consuming contaminated vegetation or fruit, as well as chronic/longer term exposure related to an adult female ingesting contaminated vegetation for 90 days (see process record for specific numbers). These upper bound HQ's are not a concern because:

- Herbicide application areas are signed.
- Triclopyr will be applied by hand application on cut surfaces or specific foliage
- Triclopyr has a moderately short half-life on average of 30 days
- The risk assessment scenario assumes that the person remains within a treatment area for 90 days in direct contact with the chemical.
- The amount of non-target vegetation subject to spray deposition is very small and humans are less likely to come in contact with targeted treated vegetation, and even less likely to come in contact with chemical from cut surface application in woodland restoration areas.
- Adherence to Forest-Wide Standards, mitigation measures, chemical label application and handling guidelines and BMP's will severely limit the possibility of spills of concentrated chemical into surface water.

There is a risk of worker injury during the completion of manual/mechanical vegetation treatments, and prescribed fire. Proper use of PPE, adherence to job hazard analyses and safety practices mitigate this risk. Risk to the public from these types of work is minimal. However, with proper handling/transport methods, use of signing in application areas (where required), use of proper application methods and equipment, and use of required PPE, risk of herbicide exposure to workers and the public is mitigated.

Removal of dead and/or aging trees through thinning operations and fireline preparation would make the forest safer for forest visitors, through reducing the incidence of falling snags and limbs.

Use of prescribed burning would lessen potential wildland fire occurrence, wildland fire severity and unplanned smoke emissions. Strict adherence to FEIS and LMRP guidelines, a site-specific burning plan and Arkansas Voluntary Smoke Management Guidelines will limit the area where EPA standards are exceeded to a location very close in proximity to the flaming front. Site specific burn plans, and Arkansas Voluntary Smoke Management Guidelines ensure that smoke or other combustion products do not reach, or significantly affect, smoke sensitive areas. Smoke monitoring during and after prescribed burns would be conducted to determine compliance with smoke management guidelines, and for potential future mitigation required for downwind smoke sensitive areas. These actions would ensure that the requirements of the Clean Air Act, EPA air standards, and state requirements will be met and there should be no smoke related long-term or cumulative effects from implementation of prescribed fire.

Downwind effects of reduced air quality would be short-term in nature. Impacting large population centers would be avoided.

Cumulative Effects

Based upon the analysis, there should be no significant long-term cumulative effects on Human Health from implementation of herbicide use, manual/mechanical vegetation treatments, and/or prescribed fire.
Cumulative effects from using herbicides as proposed also pose no significant risk of causing unintended negative cumulative effects due to their short half-lives and the selectivity of the proposed treatment methods.

Unique Characteristics of the Geographic Area

The Ozone CCC Camp project area is situated within the Boston Mountain eco-region located in the central part of the Ozark National Forest. Historically, the lands that are now the Ozark National Forest consisted of fire-dependent woodland and forest ecosystems with well-developed herbaceous understories. There was a more frequent regime of vegetation disturbance from anthropogenic fire than what has been common since the early 1900's. Early travelers in the Ozarks reported that Native Americans burned the woods on a regular basis. Frequent fire in forest/woodland ecosystems would invariably have produced open, less dense stands with a higher proportion of vegetation adapted to fire.

Quality of the Human Environment

There is a perception by the public that any use of herbicides on the Forest is unsafe. Herbicide is used in accordance with Forest-Wide Standards as described in the Revised Land and Resource Management Plan and in accordance with herbicide label requirements. The routine adherence to these standards and requirements minimizes potential risk to human health and the environment. Syracuse Environmental Research Associates, Inc. (SERA) Risk Assessments for herbicides evaluate 2,4-D, imazapic, imazapyr, triclopyr, hexazinone, and glyphosate from a human safety viewpoint, evaluating risks, short term effects and cumulative effects. All information contained in these Herbicide Risk Assessments (RA's) is incorporated by reference into this analysis (Refer to Herbicide Section). Risk assessments for these chemicals are documented in the project analysis file. Risk to the public from herbicide use is low and this is mitigated by use of Forest-Wide standards and compliance with herbicide label requirements. The primary risk regarding herbicide use is related to herbicide applicators (either Forest Service employees or contractors). With proper handling/transport of herbicides, proper application equipment and methods and use of required protective personal equipment (PPE), risk of herbicide use to workers is mitigated.

According to SERA RA's, a hazard quotient of 1 or less is considered as low-risk. A hazard quotient of 2-10 requires extended mitigation measures. Herbicide use proposed within all watersheds will be well-buffered from streams. Application of mitigation measures shown previously in this document, adherence to Forest Standards for herbicide use and chemical labels for

application, as well as proper worker PPE and cleaning practices will negate hazard quotients > 1.0 related to drift, accidental spills, worker exposure and run-off.

Uncertainty

There are no negative effects anticipated for this project.

Precedent for Future Actions

No precedence for future action is anticipated.

Cultural Resources

Existing Conditions

The National Historic Preservation Act of 1966, as amended (NHPA), requires federal agencies to take into account the effects of federal undertakings on historic properties and afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on such undertakings. Additionally, federal agencies are required to follow the implementing regulations of the ACHP set forth in 36 CFR Part 800. Specifically, 36 CFR Part 800 requires that State Historic Preservation Offices and federally-recognized Tribes be consulted about any undertaking that has the potential to affect historic properties and/or properties of religious or cultural significance at the earliest possible stage in the planning process. Protocols for cultural resource reviews, surveys, and reporting are specified by a Programmatic Agreement (PA) between the U.S. Forest Service, relevant federally-recognized Tribes, and State Historic Preservation Offices (SHPO) of Arkansas and Oklahoma, signed in 2006 and extended in 2011, 2012, and 2013.

A cultural resource review was conducted during the planning process for this proposed project to identify and assess effects on historic properties. The findings are currently being compiled and reported to the Arkansas SHPO and relevant-federally recognized Tribes as Project No. 16-10-04-01.

Known Cultural Resources

The area proposed for management includes boundaries and features associated with Camp Ozone, a Civilian Conservation Corps (CCC) camp in operation from 1935-1942. The CCC was one of the New Deal programs set into action in 1933 during President Franklin D. Roosevelt's first 100 days in office. Created under the Emergency Conservation Work (ECW) Act of 1933, the ECW program (popularly known as the CCC, name officially changed to Civilian Conservation Corp in 1937) proposed to put 300,000 unemployed young men to work nationally in forests. The Labor Department recruited men, and the War Department administered and directed camps and camp activities. The Departments of Agriculture and Interior organized and supervised work projects. Men who applied had to have been unemployed for at least six months and were to represent families on public relief rolls with dependents to which proper allotments could be made. The monthly salary was $30; out of this amount, $25 was sent to a designated family member and home and enrollees were given $5 to spend as he chose. Enrollees were provided with living quarters, food and clothing, medical care, and hospitalization. The first man was selected and enrolled in the program on April 7, 1933. By July 1933, more than 250,000 young men had been enrolled and placed in 1,468 forest and park camps across the U.S., Puerto Rico, Alaska, and the Virgin Islands. By 1935, enrollment included more than 618,000 (young men, war veterans, American Indians, Puerto Ricans, Hawaiians, Alaskans, and in the Virgin Islands) (Smith 1991)

In Arkansas, the CCC was in the forefront of the New Deal programs, providing immediate relief to the state's citizens and economy. As the program intended, benefits of economic and employment was equaled by its preservation and development of the state's natural resources. Conservation work accomplished in Arkansas by the CCC was particularly significant because it stopped the potential loss of vast areas of the state covered in forest. Arkansas in the 19th century included approximately 32 acres of timberland, but by 1930, forests had been depleted to 22 million acres. CCC projects completed in Arkansas included forest camps, foot and truck trails, picnic areas, camp grounds, telephone lines, and fire observation towers. CCC enrollees worked thousands of man-hours fighting fires and planting trees in abandoned or acquired agricultural fields and cut over timber land. The CCC is credited with the establishment of tree nurseries and mapping of timber stands found in the state, providing both the U.S. Forest Service and Arkansas Forestry Commission with accurate maps of timber types. In Arkansas, the CCC erected 446 buildings, constructed 6,400 miles of road, built eight dams, laid 250 miles of fence, erected 86 forest lookout towers, planted approximately 19.5 million trees, and strung 8,600 miles of telephone line (Smith 1991).

CCC Camp Ozone was established to house approximately 200 men. Under the direction of regular Army officers, in 1935 enrollees cleared the camp site and lived in tents until it was possible to construct more permanent buildings. Although site plans differed for each camp, some elements were consistent. The flagpole and administration office were usually the first visible camp structures. Officers' barracks were aligned in straight rows in front of enrollees' tents or barracks. Other buildings included latrines, showers and washrooms, hospital and infirmary, kitchen and mess hall, administrative office, education or recreation building, garage and shop. Many camps include landscaping or other decorative elements particular to that camp. At Camp Ozone, for example, CCC enrollees constructed a goldfish pond in the shape of the state of Arkansas (Smith 1991).

Photo 1. Camp Ozone goldfish pond. Photo by Mary Brennan (2010).

Camp Ozone was home to two CCC companies. Company 1708 was organized in June 1933 at Camp Pike, Arkansas. It moved to Camp Frazier in Franklin County in June 1933. In October 1935, the company was moved to Camp Ozone where it stayed until 1938. Company 3742 was assembled at Oark in July 1935. It was moved to Camp Ozone in April 1939, where it was located until 1942. In additional to the economic benefits provided by the program, the CCC had dramatic social and educational impacts on enrollees. A 1935 report of the Department of Labor indicated that "CCC men returned to their homes definitely benefited physically and mentally; their out-look toward the future brighter" (Smith 1991:11). The War Department estimated an average weight gain of 12 pounds per enrollee, attributed to exposure to outdoor life, healthy food, and regular habits. Arkansas was nationally noted for the educational programs provided by the CCC. More than 2,000 Arkansas enrollees learned to read and write, many earning eighth grade diplomas. Camps provided opportunities to earn high school and college credits, as well as technical skills in land conservation, forestry, construction, woodworking and surveying (Miller 1991).

Photo 2. Camp Ozone work crew. Photo courtesy of Lois Best Yates.

The remains of Camp Ozone were recorded as archeological site 3JO0362 in 1993 during planning for the Ozone Campground Interpretive Development project (PN 93-10-04-03). A total of 29 site features were documented as well as three walkways and areas of domestic vegetation (iris, daffodils, yucca). In 1996, an additional feature – the powder magazine – was documented and added to the site form. The Camp is eligible for nomination to the National Register. In 2008-2009, the CCC Camp Ozone Interpretive Trail was constructed and opened to the public, with an approximately 0.25 mile handicap-accessible trail and signage interpreting camp history.

No other archeological sites have been recorded within the proposed project area.

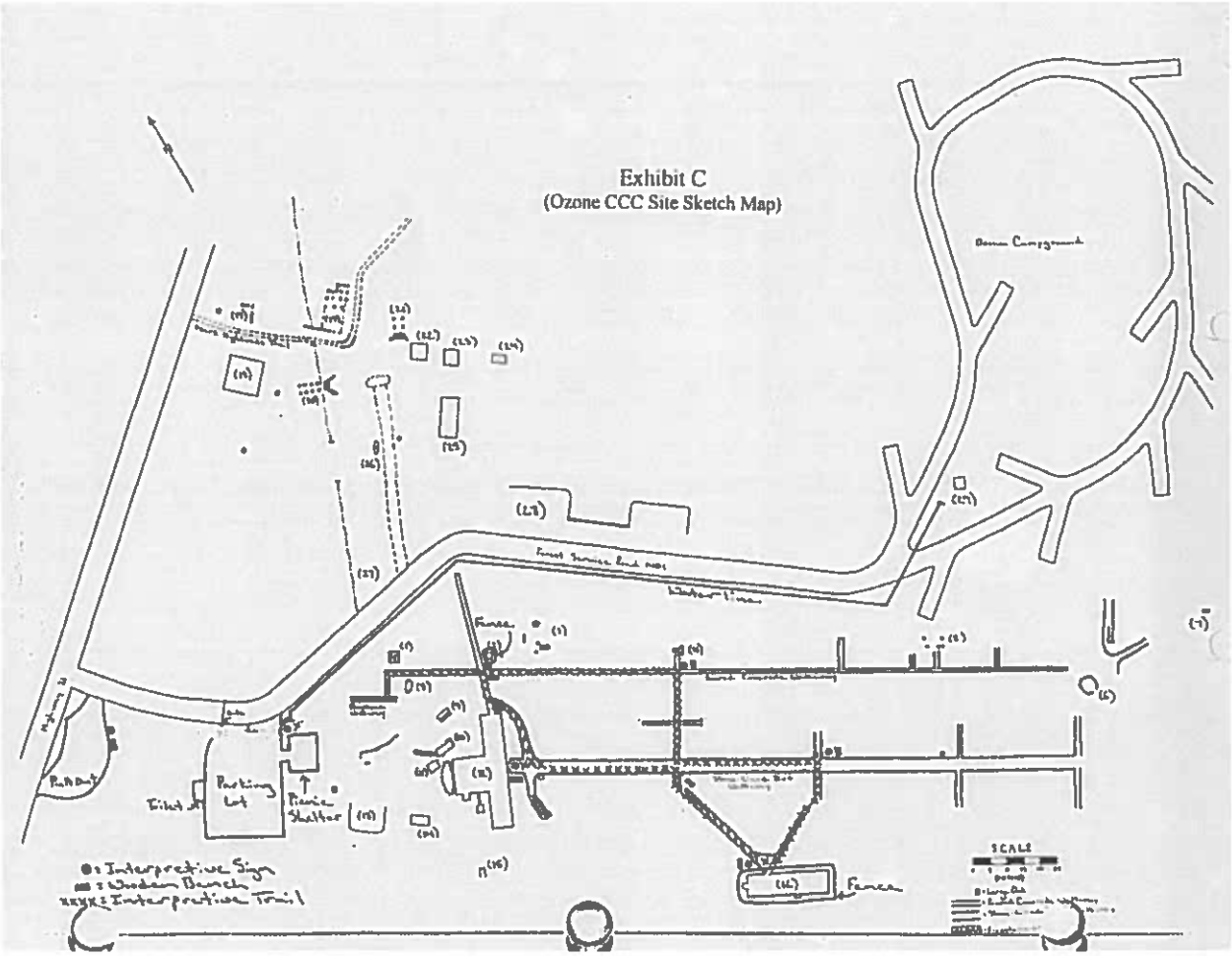


Figure 3 - CCC CAMP OZONE (3JO362)
SITE FEATURES

Site dimensions:	250 x 360 meters
Site features:	3 types of walkways
	29 site features recorded in 1993
	1 additional feature documented in 1996

3 types of walkways (all located south of FR 1401): 1) poured concrete
2) laid stone
3) dirt with stone lining

Features:
1) Concrete/fieldstone foundation -- Flag pole base
2) Fish pond
3) Concrete/fieldstone foundations
4) Fieldstone foundation
5) Foundations – Library/Education Building
6) Rock-lined flower bed
7) Concrete vat associated with the infirmary
8) Concrete/fieldstone foundation -- Camp bulletin board
9) Concrete slab and steps
10) Concrete structure partially standing – supply/storage building
11) Concrete structure still standing – ice house and storage
12) Concrete foundation -- Kitchen and mess hall
13) Dirt foundation
14) Concrete slab
15) Concrete vat – possible incinerator
16) Concrete foundations – latrine and showers
17) Fieldstone foundation
18) Concrete foundation – Forest Service office
19) Fieldstone foundation – Machine shop
20) Fieldstone foundation – Walking bridge
21) Fieldstone pillars – Vehicle oil-changing area
22) Concrete/fieldstone foundation
23) Dirt foundation
24) Concrete/fieldstone foundation
25) Concrete foundation -- Garage
26) Concrete foundation – Gas pump
27) Constructed drainage with 4 culverts
28) Dirt foundation/rock retaining wall
29) Concrete foundation – Water pump
30) Concrete foundation
31) Trash midden – possibly associated with incinerator (#15)
32) Fieldstone foundation partially standing

Features 1-16 and 30-32 are located south of FR 1401
Features 17-19 are located north and west of FR 1401

Photo 3- Camp Ozone bulletin board and flagpole base, at entrance to the interpretive trail. Note the paper whites still blooming after 75 years. Photo by Mary Brennan (2015).

Site Locations Not Yet Known. Cultural resource surveys may not be complete for certain activities because additional planning may be required prior to implementation. For this project, these activities may include burn boundary and fireline construction. Any new proposed ground disturbance will be inspected and, as necessary, additional consultation will occur prior to implementation.

There may be American Indian sacred sites or landscapes currently unknown to the Forest. The Ozark-St. Francis National Forests are carved out of ancestral American Indian lands. American Indians' historical and spiritual connections to the land have not been extinguished despite changes in title. Respecting, honoring, accommodating, and protecting American Indian Sacred Sites is part of our commitment to restore forests and reserves. The Forest will continue to consult with our Tribal partners to ensure that American Indian sacred sites and landscapes are identified, assessed, and considered in project planning and implementation.

Effects Analysis

The scope of the analysis for potential effects to cultural resources includes the entire project area and considers the proposed activities within treatment areas, as well as access to these areas.

An effect to a cultural resource is the "...alteration to the characteristics of a historic property qualifying it for inclusion in or eligibility for the National Register." (36 CFR 800.16(i)) Any project implementation activity that has potential to disturb the ground has potential to directly affect archeological sites, as does the use of fire as a management tool. Activities included in this proposal are generally low to no risk of damage to features associated with CCC Camp Ozone. Prescribed burning has been conducted in this area in the past, and site features are protected from any effects by raking any ground litter or fuel load away from protected areas. Removal of any wood understory within site boundaries will be accomplished through use of fire, herbicide, and/or removal utilizing hand tools. Any mechanized removal of pine/hardwood will be restricted to areas outside site boundaries. If skidding of timber is required, it will be accomplished through selective use of mules and only in areas where no site features are located.

In general, proposed project activities have the potential to affect cultural resources by encouraging increased visitor use to those areas of the Forest in which cultural resources are located. Increased visitor use of an area in which archeological sites are located can render the sites vulnerable to both intentional and unintentional damage. Intentional damage can occur through unauthorized digging in archeological sites and unauthorized collecting of artifacts from sites. Unintentional damage can result from such activities as driving motorized vehicles across archeological sites, as well as from other activities, principally related to dispersed recreation, that lead to ground disturbance. Effects may also include increased or decreased vegetation on protected sites due to increased light with canopy layer reduction outside of the protected buffer. For this project, however, native grass restoration and future expansion of the interpretive trail to unmanaged parts of the site should mitigate these risks.

Direct and Indirect Effects

Alternative 1

In general, archeological surface and subsurface site integrity is subject to adverse effects that may result from the buildup of hazardous fuels and lack of forest management. These increase the potential for wildfire occurrence, intensity, and tree mortality. Fires occurring in areas with dense concentrations of combustible material have the potential to burn with greater than normal intensity and duration, potentially altering the physical integrity and/or research value of the archeological record. Resulting soil exposure can lead to increased erosion, potentially disturbing or resulting in a loss of archeological soil matrices and/or site components. With the No Action alternative, historic properties would continue to degrade.

Alternative 2

Improved access and visibility to cultural sites and features increases the potential for damage from natural and human action (i.e. impacts of illegal or inappropriate OHV usage, and looting). Project components with potential to directly affect archeological sites primarily include vegetative management (prescribed burning, removal of woody vegetation). Any mechanized pine/hardwood removal would be restricted to areas outside site boundaries/features. If the prescribed mitigation measures discussed above are properly implemented, project activities would not be expected to adversely affect cultural resources.

Cumulative Effects

Although the no action alternative would eliminate risk of inadvertent effects to cultural resources from planned activities, it would result in a marked increase in potential damage from unmanaged and unmonitored resources. Intrusive vegetation would not be controlled. Fuel load would accumulate, and the risk of uncontrolled fires, potentially damaging to cultural resources, would increase. The lack of federal presence in the area could be expected to increase the potential for damage to cultural resources from looting, vandalism, and other illegal or unmanaged use of the Forest.

Management Areas, Scenery Management, and Recreation

Existing Condition

The CCC Camp Ozone (Site 3JO0362) is a historic site that provides an excellent opportunity to educate the public about the role of the CCC in the history of Arkansas. This area is a designated recreation area that provides day use and overnight camping and hiking opportunities to the public. The project area is currently maintained through prescribed burning, limited herbicide use, and weedeating. These activities have not been sufficient for controlling the woody vegetation adjacent to site features.

Approximately 1,150 feet of the Ozark Highlands Trail (OHT) borders the project area to the north. Mitigation measures mentioned in this document would be implemented to protect the integrity of the trail. Project work and land management would only be implemented to enhance the visuals of the surrounding area, reduce fuel loading to help protect and preserve CCC features, and further interpret specific CCC features that exist near the OHT. Only vegetation management such as fire would be implemented along the OHT corridor of the project area and when necessary, dead trees posing a threat to public safety would be felled to prevent injury or death to hikers passing through.

Recreation

The project area consists of a Developed Recreation Area and is classified as "Roaded Natural". Roaded Natural settings are located within a half mile of a road and usually provide higher levels of development such as campgrounds, picnic areas, and access points.

Scenery Management

The Forest Plan states that the desired condition for scenery management as the biological, physical, and cultural features of landscapes that provide for a "sense of place" as defined in the Landscape Character descriptions are intact. Landscapes possess a vegetation pattern and species mix that is natural in appearance. Built elements and landscape alterations complement the lines, forms, colors, and textures found in the landscape.

Definition of Scenic Integrity Objective for the Ozone Developed Recreation Area is:

High — **H:** (Appears Unaltered-Retention) Scenic integrity refers to landscapes where the valued landscape character "**appears**" intact. Deviations may be present but must repeat the form, line, color, texture, and pattern common to the landscape character so completely and at such scale that they are not evident.

The project area is considered to be in the Scenic Class 1 category, meaning the area has high public value as this is a Developed Recreation Area.

Ozark Highlands National Scenic Trail

The OHT is designated as a National Recreation Trail and is the only National Recreation Trail on the OSFNFs. Management practices are designed to protect the OHT experience; provide opportunities for high-quality outdoor recreation experiences, and provide for the conservation and enjoyment of the nationally-significant scenic, historic, natural, and cultural qualities of the land through which the OHT passes.

Direct and Indirect Effects

Alternative 1

There would be some short-term changes as ecosystems in the project area progresses. Pine regeneration would be expected to continually increase throughout the area, especially in the vicinity of the CCC camp trail.

The outcome of the no action alternative would not allow for the removal of pine regeneration as needed. Long-term effects would be potential loss of historic CCC structures as the trees advance through the project area. The pine will also out-compete and take over the desired native grasses and other vegetation in the project area.

Alternative 2

Vegetation treatment such as thinning, herbicide application, and prescribed burning would be implemented in a timely manner to help alleviate the rapid outbreak of pine regeneration in the project area, thus allowing native grasses to become established and thrive.

Recreational campers and hikers would notice more browning of vegetation from herbicide use and burning activities during the initial work and first growing season. However, long-term benefits are numerous as these activities would increase visuals and help create lush habitat for wildlife.

All proposed actions are consistent with the Forest Plan's scenery management and desired conditions and no long-term adverse effects are anticipated.

During prescribed burning, temporary area closures would be implemented to improve visitor safety. A map and tentative dates of the prescribed burning would be posted on each OHT trailhead and campground bulletin board.

The proposed activities for this project area would improve aesthetic value of the historical CCC camp while also establishing native grasses that are beneficial to wildlife.

Cumulative Effects

Based on the analysis, the proposed action would not significantly affect any attributes of developed recreation or the historic CCC Camp Interpretive Trail. The proposed action complies with the 2005 RLRMP.

Threatened, Endangered, and Sensitive Species

Forest Service Manual (FSM) Section 2672.41 requires a biological evaluation (BE) and/or biological assessment (BA) for all Forest Service planned, funded, executed, or permitted programs and activities. The objectives of this BE/BA are to: 1) ensure that Forest Service actions do not contribute to loss of viability of any native or desired non-native species or contribute to trends toward federal listing, 2) comply with the requirements of the Endangered Species Act (ESA) so that federal agencies do not jeopardize or adversely modify critical habitat (as defined in ESA) of federally listed species, and 3) provide a process and standard to ensure that threatened, endangered, proposed, and sensitive species receive full consideration in the decision-making process.

Federally listed threatened and endangered species, species proposed for federal listing, and Southern Region sensitive species that may potentially be affected by this project were examined using the following existing available information:

1. Reviewing the list of TES plant and animal species known or likely to occur on the Ozark – St. Francis National Forest, and their habitat preferences. This review included U.S. Fish and Wildlife Service current list of endangered, threatened, and proposed species for Arkansas as of July 29, 2014 (USDI 2014), recent changes to the status of the Northern long-eared bat (USDI 2015), the forest-wide list as of February 7, 2013 and the current Southern Region Sensitive Species list for the Forest, dated August 8, 2007 (list attached as Appendix A in BE).

2. Consulting element occurrence records (EOR's) for TES species as maintained by the Arkansas Natural Heritage Program (ARNHP).

3. Consulting with individuals in the private and public sector who are knowledgeable about the area and its flora and/or fauna.

4. Reviewing sources listed in the reference portion of this report.

5. Reviewing the results of field surveys that have been conducted in the area.

Most TES species known to occur on the Forest have unique habitat requirements, such as glades, barrens, rock outcrops, bogs, caves, and natural ponds. Appendix A of the BE/BA lists all 67 TES species currently known or expected to occur on or near the Ozark – St. Francis National Forest. All species on the list were considered during the analysis for this project.

A "step down" process was followed to eliminate species from further analysis and focus on those species that may be affected by proposed project activities. Species not eliminated are then analyzed in greater detail. Results of this "step down" analysis process are displayed in the Occurrence Analysis Results (OAR) column of the table in Appendix A. First, the range of a species was considered. Species' ranges on the Forest are based on county records contained in such documents as An Atlas and Annotated List of the Vascular Plants of Arkansas, and NatureServe Explorer, but are refined further when additional information is available, such as more recent occurrences documented in scientific literature or in Natural Heritage databases. Many times, historic range information clearly indicates a species will not occur in the analysis area due to the restricted geographic distribution of most TES species. When the analysis area is outside a known species range, that species is eliminated from further consideration by being coded as OAR code "1" in the Appendix A table. For the remaining species, after this first step, results from past surveys, knowledge of the analysis area and potential for suitable habitat were considered.

These resources and information were compiled to produce a site-specific biological evaluation for this project (Taylor, 2015), and is part of the NEPA process file.

Species Identified as Being in the Action Area or Potentially Affected by the Action

From past field surveys and knowledge of the area, and given the proposed action, those species which are analyzed and discussed further in this document are those that: a) occur in the analysis area, but outside of the activity area (OAR code "4") – 2 species; b) are found to be located in the activity area (OAR code "5") – 1 species; c) were not seen during the survey(s), but possibly occur in the activity area based on habitat observed during the survey(s) or field survey was not conducted when species is recognizable (OAR code "6") – 11 species; and d) aquatic species known or suspected downstream of the project/activity area, but where project effects will be immeasurable or insignificant (OAR code "7") – 1 species.

As a result of this process, the following species occur in the activity area as documented by field surveys or may potentially occur in the activity area and larger analysis area based on habitat observations:

Table 5. OAR

OAR Code	Scientific Name	Common Name	Taxa	Status
7	*Percina nasuta*	Longnose darter	Fish	Sensitive
6	*Haliaeetus leucocephalus*	Bald eagle	Bird	Sensitive
6	*Corynorhinus townsendii ingens*	Ozark big-eared bat	Mammal	Endangered
6	*Myotis grisescens*	Gray bat	Mammal	Endangered
6	*Myotis leibii*	Eastern small- footed bat	Mammal	Sensitive
6	*Myotis septentrionalis*	Northern long-eared bat	Mammal	Threatened
6	*Myotis sodalis*	Indiana bat	Mammal	Endangered
6	*Lirceus bicuspicatus*	An isopod	Isopod	Sensitive
6	*Amorpha Ouachitensis*	Ouachita leadplant	Plant	Sensitive
6	*Callirhoe bushii*	Bush's poppymallow	Plant	Sensitive
5	*Castanea pumila var. ozarkensis*	Ozark chinquapin	Plant	Sensitive
4	*Cypripedium kentuckiense*	Southern lady's slipper	Plant	Sensitive
6	*Delphinium newtonianum*	Moore's larkspur	Plant	Sensitive
4	*Eriocaulon koernickianum*	Small-headed pipewort	Plant	Sensitive
6	*Tradescantia ozarkana*	Ozark Spiderwort	Plant	Sensitive

Eleven species were not seen during field surveys, but possibly occur in the activity area based on habitat observed or the field surveys were conducted when the species is not recognizable (OAR "6"); 1 bird species (bald eagle), 5 mammal species (Ozark big-eared bat, gray bat, Eastern small-

footed bat, Northern long-eared bat and Indiana bat), 1 isopod species (*Lirceus* isopod), and 4 plant species (Ouachita leadplant, Bush's poppymallow, Moore's larkspur, and Ozark spiderwort).

The occurrence analysis results table shows one plant species (Ozark chinquapin), was identified within the activity area (OAR "5").

Direct, Indirect & Cumulative Effects of Proposed Management Action on Each Identified Species

The analysis of possible effects to species identified as known or expected to occur in the vicinity of the proposed project, or likely to be affected by the action, includes the following existing information:

1. Data on species/habitat relationships.
2. Species range distribution.
3. Occurrences developed from past field surveys or field observations.
4. The amount, condition, and distribution of suitable habitat.

Effects to species include anticipated effects from implementation of the proposed action. Predicted effects to species shown in the table above are described in the Biological Evaluation for the CCC Camp Ozone Native Grass Restoration project (Taylor, 2015).
A site specific water quality analysis was completed for the Thompson Knob and Seven Devils Project area (Crump, 2005). This larger, landscape scale analysis includes the area comprising the CCC Camp Ozone proposal. This water quality analysis was based on modeling developed for use on the Forest (Klingenpeel & Crump, 2005) and were applied to all proposed management actions associated with the Thompson Knob and Seven Devils project area. This modeling and sedimentation analysis was utilized for determination of effects to aquatic resources from implementation of the proposed projects. The cumulative effects analysis indicates minimal (low) risks to the water resource's current condition. The activities proposed by the Forest Service for the proposed action will result in additional sediment production from the landscape, but from a watershed perspective, contribute only a small (if any) increase to the overall estimated sediment yield of project area streams. The proposal would result in a slight increase in the percentage of possible sediment contributions to streams but result in no change in the concern level. Through the use of forest plan standards and the use of Arkansas Silviculture BMPs, the activities scheduled for implementation with the much larger Thompson Knob and Seven Devils were found to not pose additional risks to water quality or aquatic beneficial uses (Crump, 2005).

Based upon the site specific water quality analysis for the Thompson Knob and Seven Devils Projects - the minor sediment increase associated with implementing the CCC Camp Ozone project is expected to be insignificant in comparison to the existing sediment load of Little Piney Creek and its tributaries, and will not have significant effect on habitat for fish or other aquatic life. There will be no negative direct, indirect or cumulative effects to aquatic species from implementation of management activities associated with this project proposal. No significant impacts (from loss of water quality) would result from implementation of this project that would push aquatic species closer towards federal listing under the Endangered Species Act, or cause loss of viability for these species. There are no foreseeable activities in the area that would directly or indirectly affect water quality needs for longnose darter and *Lirceus biscuspicatus* or cause additive or synergistic adverse cumulative impacts in conjunction with the proposed action– due to sedimentation. Therefore there

will be no negative direct, indirect or cumulative effects to these species as a whole from management activities associated with this project due to sedimentation.

Determination of Effects –Proposed Action (TES species)

Ozark big-eared bat

The proposed action was designed to totally incorporate all Forest-wide standards, and direction provided by the USFWS related to the conservation of all listed bat species.

There are no foreseeable, additional management activities in the area (not associated with this project) that would directly or indirectly affect the Ozark big-eared bat, or cause additive or synergistic adverse cumulative impacts in conjunction with the proposed action.

With implementation of Forest-wide standards from the Revised LRMP which were developed in coordination with the USFWS during the revision process, the determination of effect for the Ozark big-eared bat related to this proposed project is: "may affect – not likely to adversely affect."

Gray bat

There are no foreseeable, additional management activities in the area (not associated with this project) that would directly or indirectly affect the gray bat, or cause additive or synergistic adverse cumulative impacts in conjunction with the proposed action.

With implementation of Forest-wide standards from the Revised LRMP which were developed in coordination with the USFWS during the revision process, the determination of effect for the Gray bat related to this proposed project is: "may affect – not likely to adversely affect."

Indiana bat

There are no foreseeable, additional management activities in the area (not associated with this project) that would directly or indirectly affect the Indiana bat, or cause additive or synergistic adverse cumulative impacts in conjunction with the proposed action. With implementation of Forest-wide standards from the Revised LRMP which were developed in coordination with the USFWS during the revision process, the determination of effect for the Indiana bat related to this proposed project is: "may affect – not likely to adversely affect."

Northern long-eared bat

There are no foreseeable, additional management activities in the area (not associated with this project) that would directly or indirectly affect the northern long-eared bat, or cause additive or synergistic adverse cumulative impacts in conjunction with the proposed action.

This project is likely to adversely affect the northern long-eared bat; however, there are no effects beyond those previously disclosed in the programmatic biological opinion dated August 5, 2015 (FWS Log #04E00000-2015-F-0003). Any taking that may occur incidental to this project is excepted from the prohibitions for taking threatened species under 50 CFR 17.31 and 17.32. This project is consistent with the forest plan, the description of the proposed action in the programmatic biological opinion, and activities excepted from taking prohibitions under the ESA

section 4(d) rule applicable to the northern long-eared bat; therefore, the programmatic biological opinion satisfies the Forest Service's responsibilities under ESA section 7(a)(2) relative to the northern long-eared bat for this project.

Implementation of this proposed project may benefit Ozark big-eared bat, gray bat, Northern long-eared bat and Indiana bat by providing habitat improvement.

Because there are no other threatened or endangered species or associated habitat present the proposed project will have no effect on any other listed or proposed species (Taylor, 2015).

Sensitive Species

For the sensitive species long-nose darter, there will be no negative impacts from implementation of the proposal. The project is not likely to cause a trend to the federal listing of these species under the Endangered Species Act. Furthermore, there will be no loss of population viability for these species due to implementation of this project.

For sensitive species bald eagle, Eastern small-footed bat, *Lirceus bicuspicatus*, Ouachita leadplant, Bush's poppymallow, Ozark chinquapin, Southern lady's slipper, Moore's larkspur, small-headed pipewort, and Ozark spiderwort direct negative impacts to individuals of these species may occur through implementation of the project. However, the project is not likely to cause a trend to the federal listing of these species under the Endangered Species Act. Furthermore, there will be no loss of population viability for these species due to implementation of this project.

Implementation of the CCC Camp Ozone project would benefit sensitive species which require open (unshaded) and/or fire dependent habitats. These sensitive species include Ouachita leadplant, Bush's poppymallow, Ozark chinquapin, Moore's larkspur, small-headed pipewort, and Ozark spiderwort.

Because there were no other sensitive species or habitat for such species present, the project will have no impact on any other Southern Region sensitive species (Taylor, 2015).

Federal, State, or Local Laws

All proposals within this EA meet all conditions of the RLRMP and Amendments and other applicable State and Federal Laws and Regulations.

CONSULTATION AND COORDINATION

The Forest Service consulted the following individuals, Federal, State, and local agencies, tribes and non-Forest Service persons during the development of this environmental assessment:

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TRIBES:

Name	Location
Caddo Indian Tribe of Oklahoma	Binger, Oklahoma
Cherokee Nation of Oklahoma	Tahlequah, Oklahoma
Osage Nation	Pawhuska, Oklahoma
Quapaw Tribe of Oklahoma	Quapaw, Oklahoma
United Keetoowah Band of Cherokee Indians	Tahlequah, Oklahoma

References:

Arkansas Game and Fish Commission (AGFC). 2001. 2000-2001 AGFC Deer Harvest Data. [Online] Available: http://www.agfc.com/data-facts-maps/reports.aspx. (Accessed: Sept. 19, 2007).

Arkansas Game and Fish Commission. 2006. 2006 Black Bear Harvest Report. [Online] Available: http://www.agfc.com/data-facts-maps/reports.aspx. (Accessed: March 18, 2010).

Arkansas Game and Fish Commission. 2007. 2006-07 Deer Season Summary. [Online] Available: http://www.agfc.com/data-facts-maps/reports.aspx. (Accessed: March 18, 2010).

Arkansas Game and Fish Commission. 2007. Arkansas Wildl Turkey Harvest Summary – 2007 Spring Season. [Online] Available: http://www.agfc.com/data-facts-maps/reports.aspx. (Accessed: March 18, 2010).

Arkansas Game and Fish Commission. 2009. 2008-2009 Annual Harvest Report. [Online] Available: http://www.agfc.com/resources/Publications/08-09_harvest_report.pdf. (Accessed Nov. 22, 2010).

Arkansas Game and Fish Commission. 2009. Arkansas Wild Turkey Brood Survey. [Online] Available: http://www.agfc.com/resources/Pages/ResourcesScientificReports.aspx. (Accessed: Nov. 22, 2010).

Arkansas Game and Fish Commission. 2009. Piney Creek Spotlight Survey Results – Years 1986-1995 and 2002-2009. Excel spreadsheets provided by AGFC (On file – Pleasant Hill R.D. office, Clarksville, AR).

Crump, M.A. 2005. Site Specific Water Resources Analysis for the Thompson Knob and Seven Devils Project Area. On file – Pleasant Hill Ranger District, Clarksville, AR.

Dolan, B.J., and G.R. Parker. 2004. Understory response to disturbance: an investigation of prescribed burning and understory removal treatements. Gen. Tech. Rep. SRS-73. Asheville, NC. USDA Forest Service, Southern Research Station. pp. 285-291.

Ford, W.M., A.M. Menzel, D.W. McGill, J. Laerm, and T.S. McCay. 1999. Effects of a community restoration fire on small mammals and herpetofauna in the southern Appalachians. Forest Ecology and Management 114: 233-243.

Gaines, D.: Morris, E. 1996. The Southern National Forest's migratory and resident landbird conservation strategy. Atlanta, GA. Department of Agriculture, Forest Service, Southern Region.

Kirkland, G.L., H.W. Snoddy, and T.L. Amsler. 1997. Impact of fire on small mammals and amphibians in a central Appalachian deciduous forest. The American Midland Naturalist 135: 253-260.

Kilpatrick, E.S., D.B. Kubacz, D.C. Guynn, J.D. Lanham, T.A. Waldrop. 2004. The effects of prescribed burning and thinning on herpetofauna and small mammals in the Upper Piedmont of South Carolina: preliminary results of the National Fire and Fire Surrogate Study. Gen. Tech. Rep. SRS-71. Asheville, NC. U.S. Department of Agriculture, Forest Service, Southern Research Station. pp. 18-22.

Klingenpeel, A. and M.A. Crump. 2005. Sedimentation Model for the Boston Mountains/Ozark Highlands. Unpublished. Ozark-St. Francis National Forests, Supervisors Office, Russellville, AR.

NatureServe Explorer: An online encyclopedia of life [web application]. 2013. Version 1.6. Arlington Virginia, USA: NatureServe. [Online] Available: http:www.natureserve.org/explorer. (Accessed: February 2005, May 2006, April 2007, February 2009, March 2010, December 2013).

Taylor, G.J. 2013. Wildlife and MIS Environmental Assessment Reference Paper. USDA Forest Service, Ozark – St. Francis National Forests, Pleasant Hill Ranger District. 70 pp. (On file – Pleasant Hill R.D. office, Clarksville, AR).

Taylor, G.J. 2015. Biological Evaluation for the CCC Camp Ozone projects. On file: USDA Forest Service, Ozark National Forest, Pleasant Hill Ranger District, Clarksville Arkansas. 31 pp. (On file – Pleasant Hill R.D. office, Clarksville, AR).

USDA Forest Service. 2001. Management Indicator Species Population and Habitat Trends. Ozark-St. Francis National Forests. 54 pp. (On file – Pleasant Hill R.D. office, Clarksville, AR).

USDA Forest Service. 2007. General Tech. Report NRS-9. Population Trends and Habitat Occurrence of Forest Birds on Southern National Forests, 1992-2004. 260 pp.

USDA Forest Service. 2005. Revised Land and Resources Management Plan. Ozark-St. Francis National Forests.

USDI, Fish and Wildlife Service. 2014. ECOS – Environmental Conservation Online System. Current list of Threatened and Endangered Species in Arkansas. [Online] Available: http://ecos.fws.gov/tess_public/pub/sateListingsAndOccurrenceIndividual.jsp?state=AR

USDI, Fish and Wildlife Service. 2015. Northern long-eared bat Species Profile – including revised species status and Federal Register Documents regarding listing of species as Threatened. [Online] Available: http://ecos.fws.gov/speciesProfile

Van Lear, D.H. 2000. Recent advances in the silvicultural use of prescribed fire. In: Moser, W.K., and C.F. Moser (eds.). Fire and forest ecology; innovative silviculture and vegetation management. Tall Timbers Fire Ecology Conference Proceedings, No. 21. Tall Timbers Research Station, Tallahassee, FL. pp. 183-189.