Programmatic Environmental Assessment for System-wide Operations and Maintenance Activities and Integrated Vegetation Management Program

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FINDING OF NO SIGNIFICANT IMPACT

SYSTEM-WIDE OPERATIONS AND MAINTENANCE ACTIVITIES AND INTEGRATED VEGETATION MANAGEMENT PROGRAM

LEAD AGENCY: United States Department of Energy (DOE), Southwestern Power Administration (Southwestern)

This Finding of No Significant Impact (FONSI) has been prepared in accordance with the National Environmental Policy Act (NEPA); the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (1978); 40 *Code of Federal Regulations* (CFR) Parts 1500 through 1508; and 10 CFR Part 1021, DOE NEPA Implementing Procedures (2011). The FONSI is the decision document for the attached *Programmatic Environmental Assessment for System-wide Operations and Maintenance Activities and Integrated Vegetation Management Program.*

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This Programmatic Environmental Assessment (PEA) focuses on Southwestern's operations in Arkansas, Missouri, and Oklahoma which include high-voltage transmission lines, electrical substations, and a communications system that includes microwave, mobile radio, and fiber optics. The Proposed Action encompasses operations and maintenance (O&M) activities, which also include the component of integrated vegetation management activities.

Proposed Action. Southwestern proposes to continue O&M and perform vegetation management activities under a new management framework designed to provide maximum operational flexibility and enhance safety. Proposed O&M activities include continued aerial and ground patrols of line structures, lines, line hardware, and access roads to locate and correct problems along the transmission line rights-of-way (ROWs), regular and preventive maintenance, inspections, repairs, upgrades, rebuilds, and replacements. Proposed O&M activities would occur at existing substations, transmission lines, communication system facilities, and maintenance or office-type facilities. O&M activities are physical controls and repairs; geography has little bearing on these activities and they are performed routinely.

The proposed Integrated Vegetation Management Program would include a combination of manual and mechanical control and herbicide treatments. As part of the Proposed Action, Southwestern has developed a management framework for evaluating and selecting herbicides on an ongoing basis to improve the range of herbicides used based on geographic regions and to increase control of undesirable vegetation over longer periods of time. The goal of the Integrated Vegetation Management Program is to develop site-specific, environmentally sensitive, cost effective and socially responsible solutions to vegetation control. Due to the complexity of vegetation control, the proposed management framework for herbicide use considers numerous factors, such as special geographic concerns, the type of vegetation to control, and the arrival of new herbicides coming on the market.

HERBICIDE EVALUATION CRITERIA

Under the Proposed Action, the current Southwestern approved herbicides, as well as other potential herbicides, were evaluated with the criteria shown below. Consideration was focused on the factors that indicate the greatest likelihood of groundwater contamination.

Approval Criteria for New Herbicides

1. Herbicide must be labeled for the specific site of application (Range Land, Aquatic, ROW/Bare Ground).
2. Herbicide must be a proven herbicide with documented acceptable results.
3. Herbicide must be safe for wildlife.
4. Based on the Groundwater Ubiquity Score value, the pesticide movement rating must be low to moderate. If the rating is high or very high, the herbicide must be nontoxic or exhibit low toxicity to aquatic species.

The table below identifies the approved list of herbicides selected for use under the Proposed Action, as well as their characteristics, target vegetation, and types of facilities where they could be used. Herbicides' availability and formulation are constantly changing. When an applicator wishes to use an herbicide not on the currently approved list, the applicator will need to complete a request for a new herbicide (form is provided in Appendix B of the PEA). Southwestern would then evaluate the requested herbicide using the PEA and the criteria shown above to determine whether or not the herbicide can be added to the approved list.

No Action. Under the No Action Alternative, Southwestern would continue its O&M activities and integrated vegetation management as it currently does, as defined under its Office of Corporate Facilities Maintenance Standards, *Vegetation Maintenance Program* (No. MA-23) and would adhere to requirements cited in its two 1995 environmental assessments (EAs). As with the Proposed Action, aerial and ground patrols of line structures, lines, line hardware, and access roads to locate and correct problems along the transmission line ROWs, regular and preventive maintenance, inspections, repairs, upgrades, rebuilds, and replacements would continue. Southwestern would use selection criteria for herbicides in the 1995 EAs that are based on Southwestern's most sensitive ecoregion receptor area and therefore are overly restrictive.

Herbicides Approved for Use Under the Proposed Action

Trade Name	Active Ingredient	Herbicide Characteristic and Target Vegetation	Pesticide Movement Rating	Wetland/ Aquatic Use (Yes/No)[2]	Bare Ground Only	ROW Only	Bare Ground or ROW
4 # Amine	47.3% dimethylamine salt of 2,4-dichlorophenoxyactic acid	Selective post emergent for broadleaf weeds in desirable grasses and gravel/rock areas	Moderate	Yes			X
Accord XRT[1]	53.6% glyphosate	Non-selective broad-spectrum systemic herbicide for control of annual/perennial weeds and woody plants.	Extremely Low	No			X
Arsenal Powerline[1]	27.8% imazapyr	Controls a broad-spectrum of troublesome vines and brambles, brush and tree species, and grasses and broadleaf weeds	High	No			X
Arsenal[1]	27.8% isopropylamine salt of imazapyr	Non-selective control most annual and perennial grass and broadleaf weeds in addition to many brush and vine species. Readily absorbed through emergent leaves and stems.	High	Yes			X
Cleantraxx	40.3% oxyfluorfen 0.85% penoxsulam	Pre-emergent broadleaf and grass weeds for hard surface/gravel areas	Extremely Low	No	X		
Credit Systemic Extra[1]	41% glyphosate	Non-selective	Extremely Low	No			X
Diuron 4L	40.7% diuron	Pre-emergence control of broadleaf weeds and annual grasses, as well as certain woody brush seedlings	Moderate	No	X		
Endurance[1]	65% prodiamine	Pre-emergence control of broadleaf weeds and annual grasses, as well as certain woody brush seedlings	Extremely Low	No	X		

Trade Name	Active Ingredient	Herbicide Characteristic and Target Vegetation	Pesticide Movement Rating	Wetland/ Aquatic Use (Yes/No)[2]	Bare Ground Only	ROW Only	Bare Ground or ROW
Escort XP[1]	60% metsulfuron methyl	Selective post emergent for broadleaf and woody plants in desirable grasses	High	No		X	
Garlon 3A[1]	44.4% triclopyr (salt)	Selective post emergent for broadleaf and woody plants in desirable grasses	Moderate	No			X
Garlon 4[1]	61.6% triclopyr (ester)	Selective post emergent for broadleaf and woody plants in desirable grasses	Moderate	No			X
Karmex-DF[1]	80% diuron	Long-term non-selective herbicide for control of most annual and some perennial weeds	Moderate	No			X
Krenite S[1]	41.5% ammonium salt of fosamine	Selective for woody species	Low	No		X	
Mastiff PGR[1]	48.1% flurprimidol	Growth regulator on established trees. Injected into individual trees.	Very High	No		X	
Method 240SL	25% potassium salt of aminocyclopyrachlor	Selective pre and post emergent for broadleaf and woody plants, can be used near water. Works best with Esplanade.	Very High	No	X		
Milestone VM	40.6% triisopropanolammonium salt of 2-pyridine carboxylic acid, 4-amino-3,6-dichloro	Selective post emergent broadleaf weed and some woody, no grazing restrictions; good for desirable grasses under power lines.	Low	No		X	
Mojave 70 EG	7.78% imazapyr 32.2% diuron	Pre-emergent use for broadleaf weeds and grasses. Can be used near water.	High Moderate	No	X		

Trade Name	Active Ingredient	Herbicide Characteristic and Target Vegetation	Pesticide Movement Rating	Wetland/ Aquatic Use (Yes/No)[2]	Bare Ground Only	ROW Only	Bare Ground or ROW
Oust Extra[1]	56.25% sulfometuron methyl 15% metsulfuron methyl	Selective post emergent for woody plants and broadleaf weeds in desirable grasses.	Moderate High	No			X
Oust XP[1]	56.25% sulfometuron methyl	Selective broad-spectrum broadleaf weed and grass control.	Moderate	No			X
Pathfinder II[1]	13.6% triclopyr	Selective for basal bark and cut-stump treatments	Low	No		X	
Polaris	27.7% imazapyr	Non-selective post emergent all weeds, grasses and woody. Best used with pre-emergent.	High	Yes	X		
Profile 2CS	21.8% paclobutrazol	Selective post emergent and tree growth regulator for management of shoot growth and the reduction of biomass when trees are pruned	High	No		X	
Remedy Ultra	60.45% triclopyr (ester)	Selective post emergent for woody plants and some broadleaf weeds	Moderate	No			X
Rodeo[1]	53.8% glyphosate	Non-selective post emergent all weeds, grasses and woody with no soil residual activity. Best used with pre-emergent.	Extremely Low	Yes	X		
Roundup Pro[1]	41.0% glyphosate	Non-selective post emergent broadleaf and woody plants with no soil residual activity. Best used with pre-emergent.	Extremely Low	No	X		
Sahara DF[1]	62.2% diuron 7.78% imazapyr	Non-selective, pre-emergent	Moderate	No			X
Streamline	39.5% aminocyclopyrachlor 12.6% metsulfuron methyl	Selective post emergent for woody plants. Spot treat only.	Very High	No		X	

Trade Name	Active Ingredient	Herbicide Characteristic and Target Vegetation	Pesticide Movement Rating	Wetland/ Aquatic Use (Yes/No)[2]	Bare Ground Only	ROW Only	Bare Ground or ROW
Topsite 2.5G[1]	0.5% imazapyr 2% diuron	Non-selective	Moderate	No		X	
Tordon 101M	24.4% picloram 39.6% 2,4-D	Selective post emergent for broadleaf and some woody. Works best when mixed with Garlon 4 for better results. Restricted Use	Very High Moderate	No		X	
Tordon 22K	24.4% picloram	Selective post emergent broadleaf weed and some woody, no grazing restrictions; good for desirable grasses under power lines. Restricted Use	Very High	No		X	
Transline	40.9% clopyralid	Selective post emergent for broadleaf and woody	Very High	No		X	
Vastlan	54.72% triclopyr choline	Selective post emergent for broadleaf and woody, has aquatic label and can be used in wetland area.	Very High	Yes			X
Vista[1]	26.2% fluroxypyr	Selective post emergent for broadleaf, specific for kosha	Moderate	No			X

[1] Herbicide is currently used (No Action Alternative) and would continue to be used under the Proposed Action.
[2] Southwestern does not spray herbicides directly on surface water, nor do they spray within 15 feet from any water's edge. Herbicides approved for aquatic use should be used near sensitive water receptors or open water bodies.
ROW Right-of-way

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

In this PEA, Southwestern analyzed potential impacts to the following resource areas: land use, water resources, biological resources, air quality, geology and soils, cultural resources, environmental justice, noise, safety and health, materials and waste, transportation, and intentional destructive acts. The Proposed Action would cause minimal impacts during O&M and vegetation management activities. In most cases, the impacts would be temporary and short-term. Best management practices (BMPs) and regulatory requirements identified in the PEA and described below would be implemented to minimize short-term impacts. No long-term adverse impacts would occur. No impacts to visual resources or socioeconomics are expected. With the use of better formulated herbicides that are geographically targeted under the Proposed Action, beneficial impacts are expected. Less disturbance overall and fewer incidents (e.g., safety and health or transportation) are expected due to the longer time intervals between herbicide applications and reduced use of large machinery.

Southwestern conducted formal consultation with the U.S. Fish and Wildlife Service (USFWS), through preparation of a Programmatic Biological Assessment for listed species in three states. The Proposed Action *may affect but is not likely to adversely affect* 23 special status species. The Proposed Action *may affect and is likely to adversely affect* the American burying beetle (*Nicrophorus americanus*) in Oklahoma and Arkansas. As of February 2019, the USFWS is finalizing a Programmatic Biological Opinion for the American Burying Beetle and has indicated they concur with the findings of the Programmatic Biological Assessment.

The incidence of an intentional destructive act is speculative and could potentially occur anywhere within Southwestern's system. Proposed O&M activities and integrated vegetation management would help reduce the potential impacts of a destructive act and lower the potential for generating any regional or large-scale destruction.

Impacts of the No Action Alternative are expected to be similar but slightly greater than those of the Proposed Action. Without the use of better formulated herbicides that are geographically targeted, shorter time intervals between herbicide treatments and greater use of large machinery would be required, potentially causing more disturbance as compared to the Proposed Action.

BEST MANAGEMENT PRACTICES AND REGULATORY REQUIREMENTS

BMPs would be implemented as part of the Proposed Action to minimize the potential for impacts to natural and cultural resources. In addition, Southwestern's Environmental Management System would ensure that federal and state regulatory requirements, protective of water resources, air quality, safety and health, materials and waste, and transportation, are met.

Karst terrain, a complex network of springs, caves, and sinkholes, occurs in a portion of the project area and has the potential to serve as conduits and transport herbicides to unwanted areas or water sources. Because of this, Southwestern does not allow herbicide application within 15 feet of a karst feature (cave, sinkhole, spring) or surface water.

Southwestern would implement BMPs from the bat guidance document, as well as from its standard operating procedures to offset or decrease the environmental effects of implementing the Proposed Action. Southwestern has developed and would implement a bat guidance document for vegetation management to comply with the Endangered Species Act.

The guidance document provides seasonal timing restrictions, as noted throughout the Programmatic Biological Assessment, for the protection of bat roosting areas. Usage of the step-wise bat guidance document, including consultation for emergency activities, would assist Southwestern in minimizing impacts to listed bat species. Southwestern would continue to survey for the Missouri bladderpod in those areas that have been determined suitable habitat. Southwestern will attempt to minimize disturbance to areas outside of the required maintenance footprints of the proposed projects whenever practicable and feasible and utilize the most current version or equivalent of the *Best Management Practices for American Burying Beetle in Oklahoma*. Southwestern proposes to include detection surveys at the project site prior to ground disturbance or may assume presence in lieu of detection surveys. Upon completion of the Programmatic Biological Opinion, Southwestern would implement any reasonable and prudent measures outlined by the USFWS.

Potential adverse impacts to cultural resources are not expected, because impacts would be avoided and minimized by the implementation of the Section 106 consultation process and the Programmatic Agreements (PAs) under Section 106 of the National Historic Preservation Act, one with each State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP). Southwestern is in the active consultation process with SHPOs, ACHP, Oklahoma Archaeological Survey, and tribes to update and combine the three separate PAs into one unified multi-state PA. In the event cultural materials are encountered, the work shall be immediately halted in the area of the find until the material can be evaluated by a qualified cultural resource specialist for National Register of Historic Preservation eligibility.

DECISION

Based on my review of the facts and analyses contained in the PEA, I conclude that implementation of the Proposed Action would not have any significant direct, indirect, or cumulative impacts on the human environment (which includes the physical and natural environment and the relationship of people with those environments). Accordingly, requirements of NEPA and regulations promulgated by CEQ are fulfilled and an environmental impact statement is not required.

Danny Johnson
Program Manager
Office of Corporate Compliance
Southwestern Power Administration

March 18, 2019
Date

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LIST OF ABBREVIATIONS / ACRONYMS

ABB	American Burying Beetle
ACHP	Advisory Council on Historic Preservation
AGFC	Arkansas Game and Fish Commission
ANSI	American National Standards Institute
APP	Avian Protection Plan
AR	Arkansas
ARPA	Archaeological Resources Protection Act
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practice
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cm	centimeter(s)
dBA	A-weighted decibel
DOE	U.S. Department of Energy
EA	Environmental Assessment
EMS	Environmental Management System
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FICMNEW	Federal Interagency Committee for the Management of Noxious and Exotic Weeds
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
GIS	Geographic Information System
GUS	Groundwater Ubiquity Score
ISO	International Standardization Organization
Koc	Sorption Potential
m	meter(s)
MBTA	Migratory Bird Treaty Act
MDC	Missouri Department of Conservation
MO	Missouri
NAAQS	National Ambient Air Quality Standards
NAGPRA	Native American Graves Protection and Repatriation Act
NCC	Nixa Control Center
NEPA	National Environmental Policy Act
NERC	North American Electric Reliability Corporation
NESC	National Electric Safety Code
NHPA	National Historic Preservation Act
NLEB	Northern Long-eared Bat
NOA	Notice of Availability
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NRHP	National Register of Historic Places

NWP	Nationwide Permit
O&M	Operations and Maintenance
OAS	Oklahoma Archeological Survey
OK	Oklahoma
OSHA	Occupational Safety and Health Administration
PA	Programmatic Agreement
PBA	Programmatic Biological Assessment
PBO	Programmatic Biological Opinion
PCB	polychlorinated biphenyl
PEA	Programmatic Environmental Assessment
PM_{10}	Particulate Matter less than or equal to 10 micrometers in Diameter
$PM_{2.5}$	Particulate Matter less than or equal to 2.5 micrometers in Diameter
PPE	Personal Protective Equipment
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
ROW	Right-of-way
SARA	Superfund Amendments and Reauthorization Act
SDS	Safety Data Sheet
SHPO	State Historic Preservation Officer
SOP	Standard Operating Procedure
Southwestern	Southwestern Power Administration
SPCC	Spill, Prevention, Control, and Countermeasures
TSCA	Toxic Substances Control Act
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
WMA	Wildlife Management Area

EXECUTIVE SUMMARY

ES.1 Introduction

Southwestern Power Administration (Southwestern) is an agency of the U.S. Department of Energy (DOE). As one of four Power Marketing Administrations in the United States, Southwestern markets hydroelectric power in Arkansas, Kansas, Louisiana, Missouri, Oklahoma, and Texas from 24 U.S. Army Corps of Engineers (USACE) multipurpose dams to not-for-profit municipal utilities and rural electric cooperatives. Southwestern has over one hundred such "preference" customers, and these entities ultimately serve over 8 million end-use customers.

This Programmatic Environmental Assessment (PEA) focuses on Southwestern's operations in Arkansas, Missouri, and Oklahoma which include high-voltage transmission lines, electrical substations, and a communications system that includes microwave, mobile radio, and fiber optics. The purpose of the Proposed Action is to fulfill Southwestern's obligation to deliver federal hydropower to end-use customers. The need for the Proposed Action is to operate and maintain Southwestern facilities in Oklahoma, Arkansas, and Missouri; protect worker and public safety, streamline the regulatory process for right-of-way (ROW) maintenance; have a management framework to evaluate herbicides as they become available; control the spread of noxious weeds; balance environmental protection with system reliability, while maintaining compliance with the National Electric Safety Code (NESC), North American Electric Reliability Corporation (NERC), Institute of Electrical and Electronics Engineers standards, and Southwestern's directives and standards for maintaining system reliability and protection of human safety.

The National Environmental Policy Act (NEPA) of 1969 requires all federal agencies to give appropriate consideration to potential environmental effects of proposed major actions in planning and decision making. This PEA has been prepared in accordance with NEPA; the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (1978); 40 *Code of Federal Regulations* (CFR) Parts 1500 through 1508; and 10 CFR Part 1021, DOE NEPA Implementing Procedures (2011). This PEA included federal and state agency consultation and an advertised public review period that occurred from November 27, 2018 through January 12, 2019.

ES.2 Proposed Action

The Proposed Action encompasses operations and maintenance (O&M) activities, which also include the component of integrated vegetation management activities. Since the integrated vegetation management program is a large component of the O&M program the Proposed Action has been divided into the two components: 1) O&M activities for infrastructure; and 2) integrated vegetation management activities. Southwestern proposes to continue O&M and perform vegetation management activities under a new management framework designed to provide maximum operational flexibility and enhance safety.

Proposed O&M activities include continued aerial and ground patrols of line structures, lines, line hardware, and access roads to locate and correct problems along the transmission line ROWs, regular and preventive maintenance, inspections, repairs, upgrades, rebuilds, and replacements. Proposed O&M activities would occur at existing substations, transmission lines, communication system facilities, access

roads, and maintenance or office-type facilities. O&M activities are physical controls and repairs; geography has little bearing on these activities and they are performed routinely.

The proposed Integrated Vegetation Management Program would include a combination of manual and mechanical control and herbicide treatments. As part of the Proposed Action, Southwestern has developed a management framework for evaluating and selecting herbicides on an ongoing basis to improve the range of herbicides used based on geographic regions and to increase control of undesirable vegetation over longer periods of time. The goal of the Integrated Vegetation Management Program is to develop site-specific, environmentally sensitive, cost effective and socially responsible solutions to vegetation control. Due to the complexity of vegetation control, the proposed management framework for herbicide use considers numerous factors, such as special geographic concerns, the type of vegetation to control, and the arrival of new herbicides coming on the market. Southwestern has developed a geographic information system (GIS) Resource Mapper, a GIS tool, to help identify environmental restrictions to herbicide use in specific locations within Proposed Action areas.

ES.3 No Action Alternative

Under the No Action Alternative, Southwestern would continue its O&M activities and integrated vegetation management as it currently does, as defined under its Office of Corporate Facilities Maintenance Standards, *Vegetation Maintenance Program* (No. MA-23) and would adhere to requirements cited in its two 1995 environmental assessments (EAs). As with the Proposed Action, aerial and ground patrols of line structures, lines, line hardware, and access roads to locate and correct problems along the transmission line ROWs, regular and preventive maintenance, inspections, repairs, upgrades, rebuilds, and replacements would continue.

Southwestern would continue to apply herbicides at substations and communication sites. Southwestern would continue to maintain the ROWs to keep facilities clear of all tall-growing trees, brush, and other vegetation that could grow too close to the conductors on a 4- to 5-year cycle using manual/mechanical and herbicide methods with some flexibility for instances beyond the control of Southwestern. The use of herbicides would still be supplemented by the use of manual/mechanical means to maintain the ROWs. Southwestern would use selection criteria for herbicides in the 1995 EAs that are based on Southwestern's most sensitive ecoregion receptor area and therefore are overly restrictive. This eliminates the use of herbicides that could be used safely and efficiently in some specific areas as well as new herbicides that have become available. Southwestern would not use the GIS Resource Mapper to assist with site-specific herbicide selection.

ES.4 Environmental Consequences

Proposed Action

Land Use. The Proposed Action activities would take place within existing Southwestern facilities and ROWs. No new ROWs would be created and no new facilities would be constructed. Activities could temporarily disrupt residential, recreational, and farming activities on adjacent land. In general, adjacent uses are mostly agricultural, pasture, and forest lands in rural areas that are sparsely populated. No changes to land use or land ownership would occur.

Water Resources. Some short-term decreases in water quality, from erosion, increasing surface water runoff, or sedimentation, could occur during O&M activities, such as bank repair, replacement of poles, and from large machinery disturbing the soil during mechanical techniques for controlling vegetation. Chemical, fuel, oil, or herbicide spills, if not contained immediately, could migrate and threaten surface water and groundwater quality. Southwestern's employees are prepared and trained to clean up such minor spills, so impacts would be minor. Implementation of Southwestern's spill prevention, control, and countermeasures (SPCC) and emergency spill plans for substations would minimize impacts from spills.

Impacts to water quality from herbicides are not expected because powerlines are linear in nature so the area of land treated with herbicides would be relatively small (narrow strips across the landscape) compared to the surrounding area. The ratio of treated to untreated surface area in any given watershed is usually sufficiently low to permit rapid dilution. In addition, Southwestern does not spray herbicides directly on surface water, nor do they spray within 15 feet from any water's edge or karst feature. Herbicides approved for aquatic use would be used near sensitive water receptors or open water bodies.

Biological Resources. No impacts from Proposed Action activities to vegetation at the substations, communication sites, and offices are expected due to the lack of vegetation at these facilities. Vegetation is maintained in a lawn-like state at the offices, except for the Tulsa office which does not have vegetation. Along the ROW, large equipment has the potential to temporarily trample vegetation, increase erosion in select areas under certain conditions, and increase invasive species. Woody species would continue to be removed and the habitat would continue to favor low-growing non-woody plant species. However, potential impacts to vegetation from O&M activities would be short-term and concentrated in specific areas along the ROW.

Potential impacts to wildlife would be short-term and temporary (noise, vibration, and construction equipment movement) and concentrated in specific areas along the ROW. Direct impacts to wildlife could result from mortality or injury from collision with vehicles. The general disturbance associated with Proposed Action activities would result in the temporary displacement of most wildlife from the immediate vicinity of the maintenance area and adjacent areas. Larger or more mobile wildlife would leave the vicinity but would eventually return to the area after the activities were completed. Less mobile species may be crushed by heavy equipment. Indirect impacts could include habitat degradation, disruption of foraging and prey availability, and disruption of nesting. However, these impacts would not affect species populations as few individuals would be impacted.

Potential impacts to wildlife species from herbicide exposure depends on the quantity of the chemical the species was exposed to as well as the toxicity of the herbicide. Herbicides proposed for use are low in toxicity to wildlife. The GIS Resource Mapper would be used to identify sensitive wildlife areas including karst and known areas of threatened and endangered species to reduce unintentional exposure.

A Programmatic Biological Assessment determined that the Proposed Action *may affect but is not likely to adversely affect* 23 special status species. The Proposed Action *may affect and is likely to adversely affect* the American burying beetle (ABB). Southwestern will attempt to minimize disturbance to areas outside of the required maintenance footprints of the proposed projects whenever practicable and feasible and utilize the most current version or equivalent of the *Best Management Practices for American Burying Beetle in Oklahoma*. In addition, Southwestern has established an agreement with the USACE

Tulsa District for the utilization of 100 ABB mitigation acres (out of 2,000 total acres) belonging to USACE Tulsa District associated with ABB mitigation lands. As of February 2019, the U.S. Fish and Wildlife Service (USFWS) is finalizing a Programmatic Biological Opinion for the ABB in Oklahoma and Arkansas and has concurred with the findings of the Programmatic Biological Assessment.

Air Quality. Potential impacts to air quality would be minimal and no changes to regional air quality would occur. The primary source of air emissions from Proposed Action activities would be from the burning of fossil fuels in internal combustion engines and particulate matter and fugitive dust emitted from those activities that disturb the soil, such as from replacing poles, driving on dirt roads, and from other ground-disturbing activities. The burning of fossil fuels in gasoline or diesel engines would result in the short-term emission of criteria pollutants, small amounts of toxic air contaminants, and greenhouse gases during the time that the engines are in operation. Sulfur hexafluoride gas used in electrical equipment is an extreme greenhouse gas, but proper maintenance of equipment should eliminate leaks and the resulting release of the gas.

Geology and Soils. Undetected sinkholes in karst terrain and the New Madrid Seismic Zone could potentially present health and safety risks to workers. Karst terrain could serve as conduits for herbicide applications, transporting the herbicide to unwanted areas or water sources. Because of this, herbicide application is not allowed within 15 feet of a karst feature (cave, sinkhole, spring).

Potential impacts to soils include soil erosion, compaction, and disturbance of the physical arrangement of soils from ground disturbing activities and the use of heavy equipment. Soil compaction and erosion would be very localized and short-term. Vegetation removal would have the potential to impact soil resources by increasing the amount of exposure of susceptible soils to water or wind erosion at the land surface. Manual impacts on soil include disturbance of the uppermost soil layer in only a very small area, not enough to cause substantial impacts on the soil as a resource. Additionally, as vegetation is removed, it would be dispersed across the ROW as wood chips (mechanical vegetation removal) or as scattered limbs/logs and stumps cut flush with the ground surface (manual methods). The application of this debris to the cleared land surface would assist in mitigating impacts to soil resources by intercepting rainfall, limiting impact erosion, and slowing surface runoff; and combined with existing grasses in the ROW (which are not removed as a part of vegetation management), further limits erosion.

When herbicides are used, some of the chemical can end up in the soil and can reduce soil microbes' numbers and/or change species composition. ROWs would be treated with relatively small amounts of herbicide with long-time spans between treatments, so there would be little potential for impacts on soil microbes. At substations, the soil is treated intentionally to keep plants from growing, and the regular use of herbicides would affect the microbes within the substation. If herbicides were to migrate offsite into adjacent soils, microbes (and thus soil productivity) could be affected.

Cultural Resources. Potential adverse impacts to cultural resources are not expected because impacts would be avoided and minimized by the implementation of the Section 106 consultation process and the Programmatic Agreement (PA) with State Historic Preservation Officers (SHPOs), the Advisory Council on Historic Preservation (ACHP), the Oklahoma Archaeology Society (OAS), and tribes. Despite these processes, inadvertent discoveries and/or long-term, direct impacts to cultural resources could still occur from surface and subsurface disturbance during activities including pole replacement, road maintenance,

or culvert replacement and by vehicles and equipment traversing the ROW areas. Removal of vegetation may expose cultural resource areas or provide accessibility to yet unidentified resources and provide the potential for vandalism. Herbicides, themselves, would not impact cultural resources.

Environmental Justice. The Proposed Action would ensure continued maintenance and safe operation of the transmission lines and delivery of reliable power to not-for-profit municipal utilities, rural electric populations, and military installations within Southwestern's service area. One minority population and several low-income populations were identified in the Proposed Action areas. Because Southwestern facilities are spread throughout a large geographic area, impacts of the Proposed Action are dispersed. These populations would not experience disproportionate impacts when compared to census tracts without minority or low-income populations.

Noise. The Proposed Action would cause short-term noise from vehicles, machinery, and equipment, as well as helicopter noise during aerial inspections and aerial side saw trimming that could cause potential disruptions to residential and recreational lands. Activities would be temporary, intermittent, of short duration, and dispersed throughout the Proposed Action area. No new stationary sources of permanent noise would be introduced.

Safety and Health. Members of the public could be exposed to exhaust and fuel vapors from trucks and experience direct or indirect exposure to herbicides. People could sustain physical injuries from flying debris and falling trees, from poles being removed, and from heavy equipment. Aerial reconnaissance could result in a mishap that impacts the public. Adverse impacts to the public would be negligible, due to the public's limited access to Southwestern's facilities, close supervision of activities, implementation of Occupational Safety and Health Administration (OSHA)-approved worker safety and environmental training programs, and conduct of aerial reconnaissance by licensed pilots. Controlling brush and trees along the ROW in a systematic fashion and preventing service interruptions, fire, or impediments to restoration of service when outages occur would benefit public health and safety.

Workers could be exposed to exhaust and fuel vapors from trucks, chemical vapors from wood treating chemicals, as well as fuel and other chemicals used at the substations and communication sites, and herbicides. Physical injuries could arise from electrocution, falls, flying debris and falling trees and from poles being removed, as well as from the use of tools and operation of heavy equipment. Some locations within Southwestern's service region are mountainous, rugged, and relatively remote and pose treacherous working conditions. Chemicals in herbicides can be toxic to workers, to varying degrees. Any chemical poses a health risk at a sufficient dose. Most clinical reports of herbicide effects are of skin and eye irritation. Impacts on the workers' health and safety would be negligible because Southwestern staff is trained in health and safety and environmental actions, and activities are closely supervised.

Materials and Waste. Hazardous materials, petroleum products, and miscellaneous materials, such as sulfur hexafluoride would continue to be used under the Proposed Action. Wastes, such as polychlorinated biphenyl (PCB) items, used oils, used oil contaminated waste, treated wood products, spent solvents, rags, paints, thinners, asbestos and lead-based paint abatement wastes, and solid wastes would continue to be generated. Southwestern has materials and waste management processes and procedures in place and no impacts are expected.

Transportation. Potential impacts such as vehicle accidents and temporary lane closures or disruptions (limited only to areas where lines cross public roadways) could occur during some maintenance activities. Very few interstates and major roads are crossed by Southwestern transmission lines; therefore, impacts to heavily traveled roads are expected to be minimal. Southwestern would use all-terrain vehicles, light duty four-wheel drive vehicles, trailers, and specialized heavy-duty heavy rolling equipment to traverse access roads and ROWs. Access through private property would be maintained with permission of the specific landowner. Wear or damage to existing access roads from Proposed Action activities would be repaired as needed to maintain roads at their current maintenance level.

Intentional Destructive Acts. The destruction of a tower on a high-voltage transmission line or of equipment at a substation by terrorism or sabotage could disrupt electrical services and affect the utility customers and end users. The impacts of intentional destructive acts and wildfire would likely be relatively localized, and would depend on the nature and location of the acts, the magnitude of the damage, and other variables. The impacts would typically be similar to outages caused by other natural phenomena such as hurricanes, ice storms or tornadoes. Vandalism and theft, while potentially expensive to repair, do not normally cause a large effect to utility customers or to the environment.

The incidence of an intentional destructive act is speculative and could potentially occur anywhere within Southwestern's system. Proposed O&M activities and integrated vegetation management would help reduce the potential impacts of a destructive act and lower the potential for generating any regional or large-scale destruction. Any intentionally destructive acts that might occur would be localized from an environmental perspective with preventative measures being installed to limit an intentional destructive act to de minimis or negligible environmental impacts.

No Action Alternative

Under the No Action Alternative, impacts to environmental justice, materials and waste, and intentional destructive acts would be the same as those described for the Proposed Action. Potential impacts to land use, water resources, biological resources, air quality, geology and soils, cultural resources, noise, safety and health, and transportation would be similar to those described for the Proposed Action. However, the magnitude of the impacts would likely be greater because the No Action would require greater use of heavy equipment to control vegetation within the ROW and these activities may need to occur more often.

Southwestern would not have the flexibility to readily use better formulated herbicides that are geographically targeted and would not use the GIS Resource Mapper to assist with site-specific herbicide selection. These restrictions would lead to shortened time intervals between herbicide treatments and would require more frequent use of large machinery which causes greater noise, disturbance to vegetation and wildlife, air emissions, transportation impacts, and ground disturbance. In addition, impacts to health and safety would be greater as more time would be spent on vegetation management particularly in remote and treacherous spans of ROW.

1.0 PURPOSE AND NEED FOR ACTION

1.1 Introduction

Southwestern Power Administration (Southwestern) is an agency of the U.S. Department of Energy (DOE). As one of four Power Marketing Administrations in the United States, Southwestern markets hydroelectric power in Arkansas, Kansas, Louisiana, Missouri, Oklahoma, and Texas from 24 U.S. Army Corps of Engineers (USACE) multipurpose dams.

This Programmatic Environmental Assessment (PEA) focuses on Southwestern's operations in Arkansas, Missouri, and Oklahoma which include high-voltage transmission lines, electrical substations, and a communications system that includes microwave, mobile radio, and fiber optics. Southwestern is currently operating under environmental assessments (EAs) that require revision. These EAs are more restrictive and burdensome than necessary, because approved vegetation management practices in the EAs are based on analysis of the most sensitive ecoregion where Southwestern operates and therefore, they restrict the use of herbicides that could be safely used in other locations. This PEA addresses operations and maintenance (O&M) activities and updates vegetation management activities and practices, Endangered Species Act (ESA) listed species, regulations, permitting requirements, and facilities. Southwestern proposes to continue O&M and perform vegetation management activities under a new management framework designed to provide maximum operational flexibility and enhance safety at the following facilities located in Arkansas, Missouri, and Oklahoma (Figures 1-1 through 1-4):

- Four office/maintenance complexes and the Nixa Control Center (NCC)
- 24 substations
- 1,347 miles of linear physical transmission line and 1,380 circuit miles of conductor transmission line and the associated 100-foot width right-of-way (ROW)
- Approximately 6 miles of fiber optic communication line and associated corridors
- Approximately 50 communication sites (communication towers)
- 3 pole yards
- Access roads/pathways to access transmission ROW

Southwestern has completed this PEA to evaluate the potential environmental impacts associated with these activities. The National Environmental Policy Act (NEPA) of 1969 requires all federal agencies to give appropriate consideration to potential environmental effects of proposed major actions in planning and decision making. This PEA has been prepared in accordance with NEPA; the Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (1978); 40 *Code of Federal Regulations* (CFR) Parts 1500 through 1508; and 10 CFR Part 1021, DOE NEPA Implementing Procedures (2011).

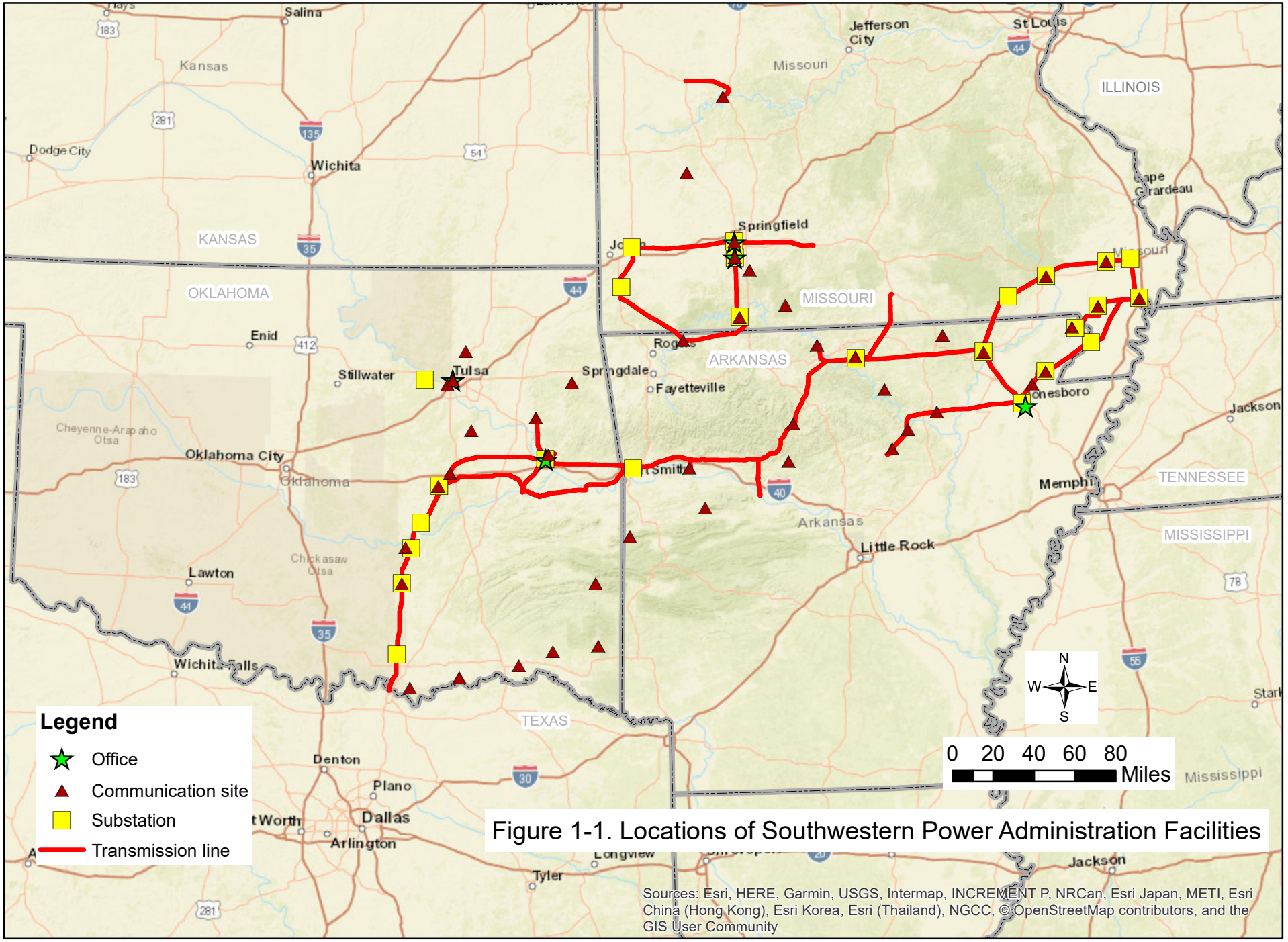
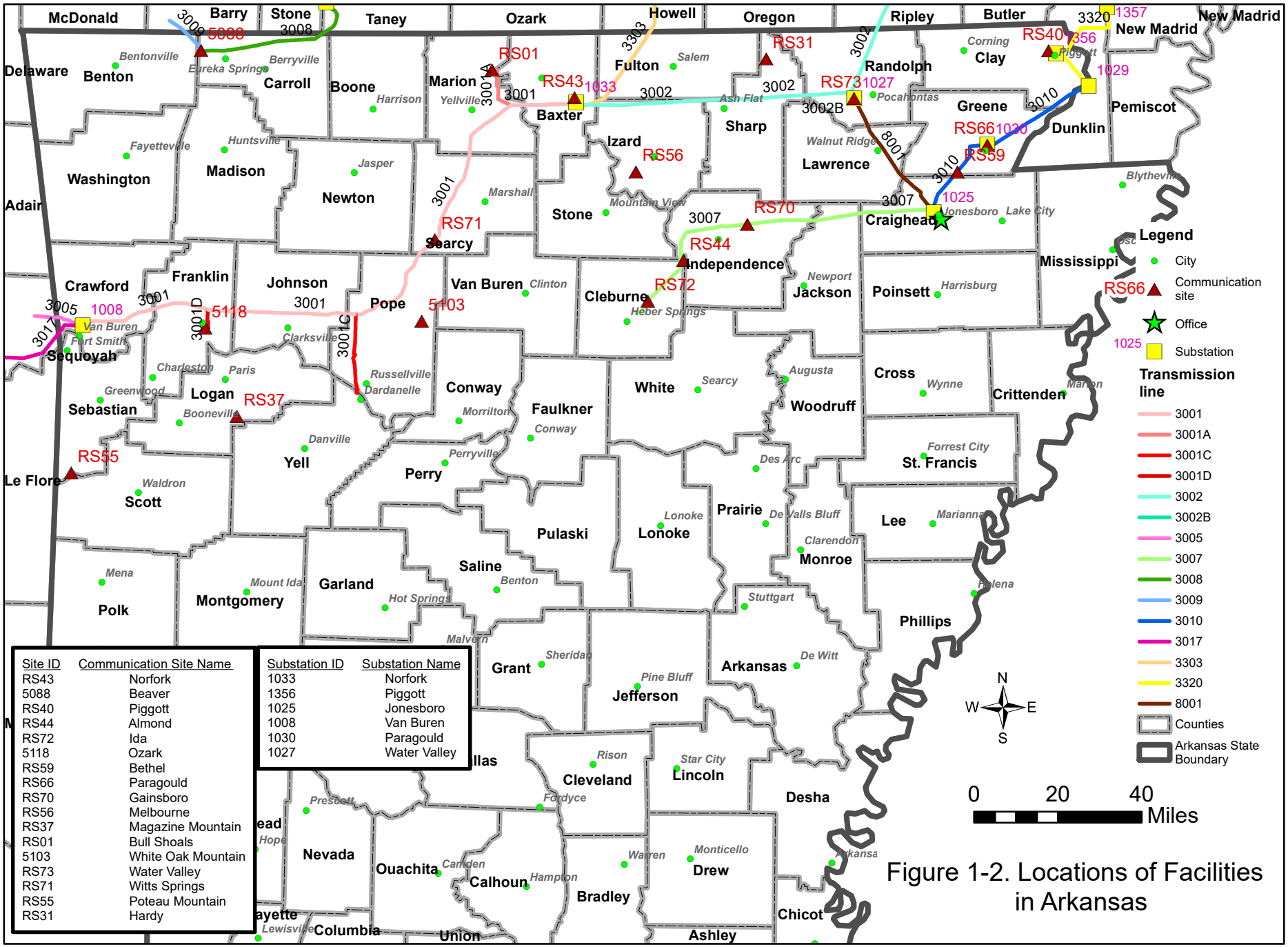


Figure 1-1. Locations of Southwestern Power Administration Facilities



Site ID	Communication Site Name
RS43	Norfork
5088	Beaver
RS40	Piggott
RS44	Almond
RS72	Ida
5118	Ozark
RS59	Bethel
RS66	Paragould
RS70	Gainsboro
RS56	Melbourne
RS37	Magazine Mountain
RS01	Bull Shoals
5103	White Oak Mountain
RS73	Water Valley
RS71	Witts Springs
RS55	Poteau Mountain
RS31	Hardy

Substation ID	Substation Name
1033	Norfork
1356	Piggott
1025	Jonesboro
1008	Van Buren
1030	Paragould
1027	Water Valley

Figure 1-2. Locations of Facilities in Arkansas

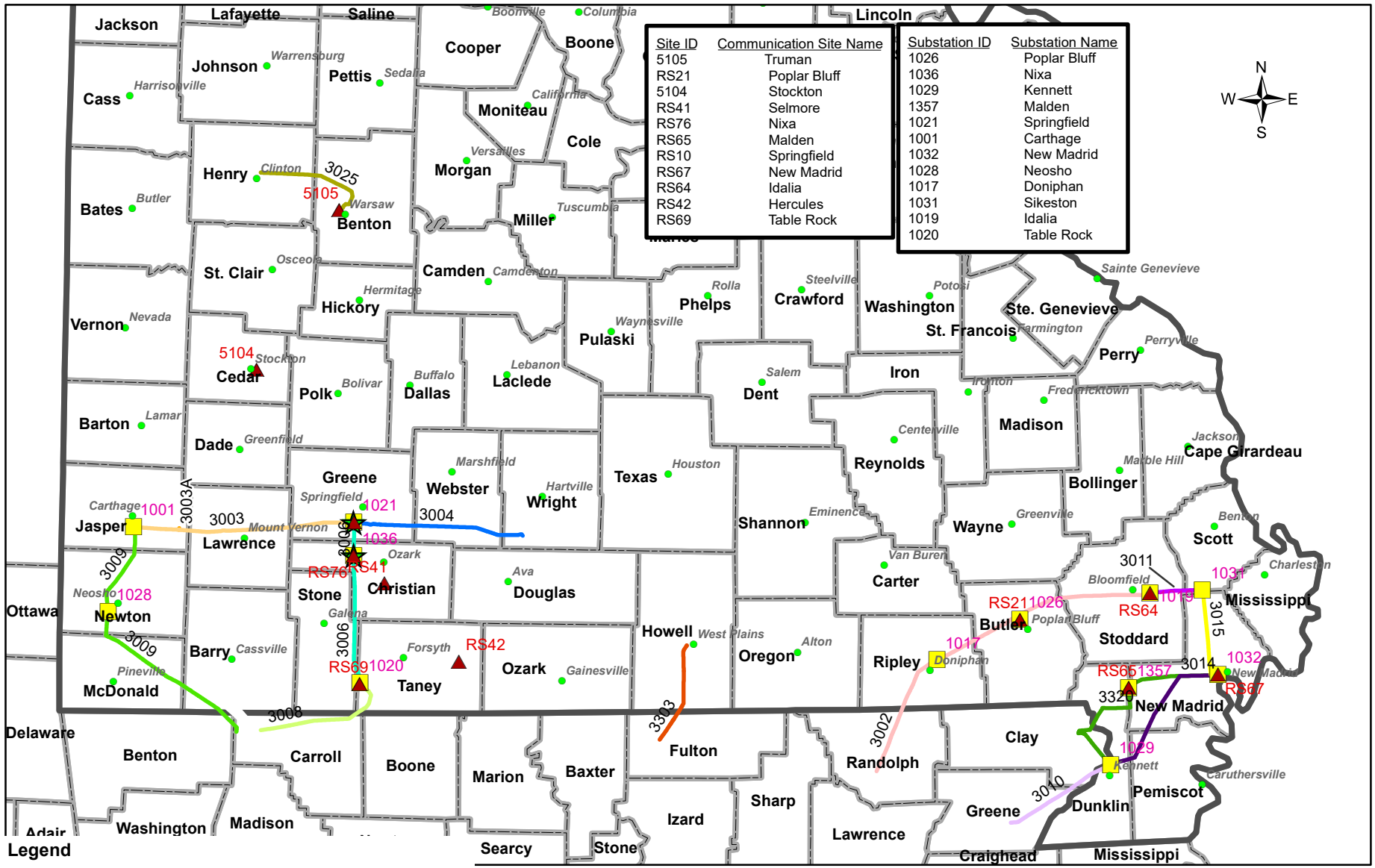


Figure 1-3. Locations of Facilities in Missouri

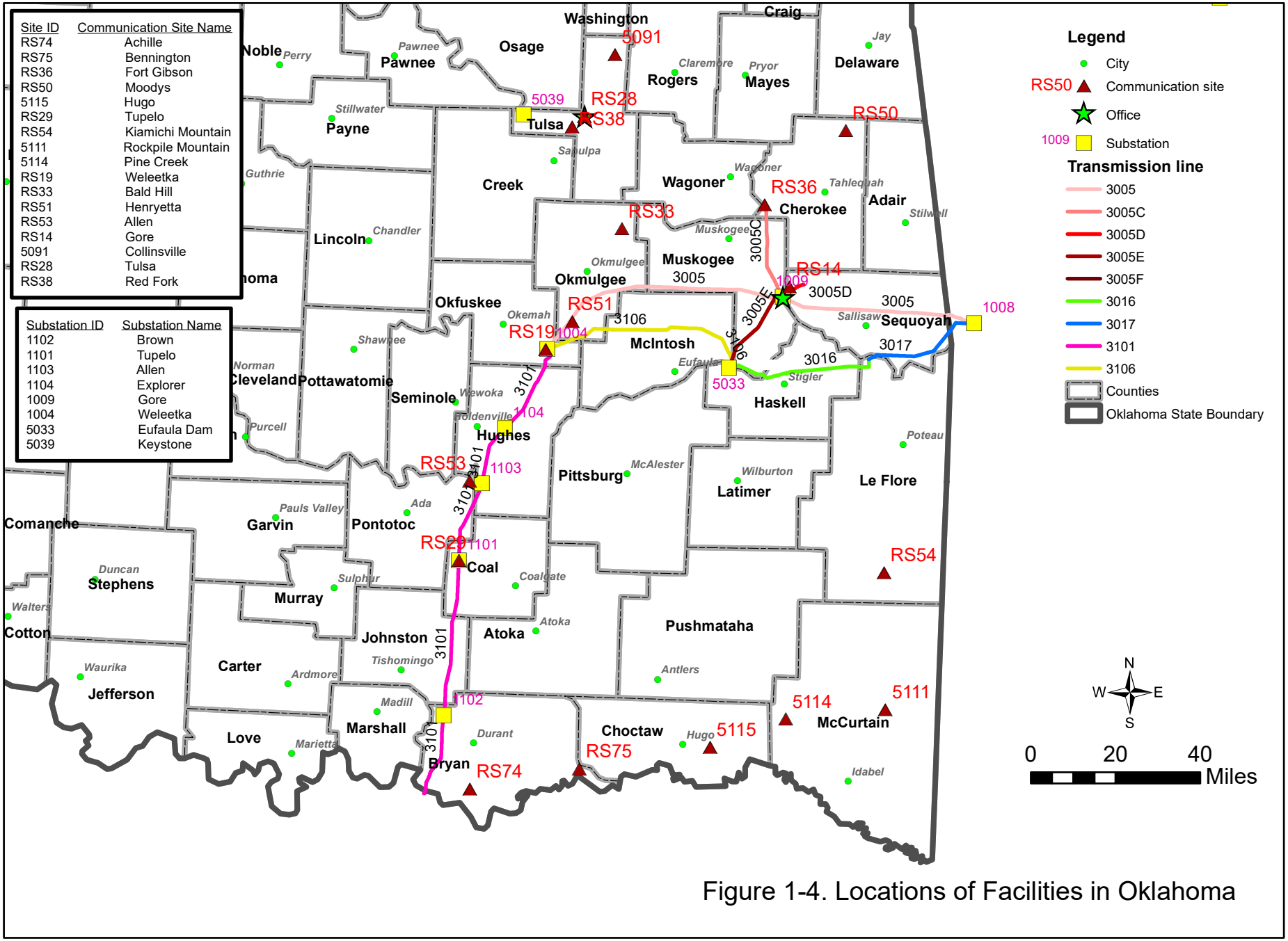


Figure 1-4. Locations of Facilities in Oklahoma

1.2 Purpose and Need for Action

The purpose of the Proposed Action is to fulfill Southwestern's obligation to deliver federal hydropower to end-use customers. The need for the Proposed Action is to operate and maintain Southwestern facilities in Oklahoma, Arkansas, and Missouri; protect worker and public safety, streamline the regulatory process for ROW maintenance; have a management framework to evaluate herbicides as they become available; control the spread of noxious weeds; balance environmental protection with system reliability, while maintaining compliance with the National Electric Safety Code (NESC), North American Electric Reliability Corporation (NERC), Institute of Electrical and Electronics Engineers standards, and Southwestern's directives and standards for maintaining system reliability and protection of human safety.

To protect worker safety, total elimination of weedy species at the substations and the towers is necessary to ensure that these facilities maintain grounding requirements through the ground grid to dissipate lightning. Vegetation removes moisture at the substations causing issues with the ground grid. Gravel is used to maintain an insulating buffer for workers. The gravel insulates the workers from potentials that may be present in the soil during electrical faults and also provides a more stable working surface during wet periods than either soil or grass. Vegetation must be eliminated from the gravel areas as it could result in electric potentials that are hazardous to workers.

Transmission facilities must be kept clear of all tall-growing trees, brush and other vegetation that could grow too close to the conductors. The most significant impediment to the transmission line ROW O&M and also emergency response is the growth of woody vegetation (trees and shrubs) within the ROW. Trees are a major contributor of electric service interruptions. They cause outages in two ways, mechanical and electrical. Mechanical damage refers to entire trees or portions of trees falling and physically damaging facilities. Because of their conductive properties, electrical outages can also occur. These interruptions are caused when a portion of a tree becomes a short-circuit path for electricity to flow causing a protective device to operate which interrupts the flow of electricity. Therefore, trees must be maintained an adequate distance from the conductors. Southwestern needs to select vegetation management practices appropriate to specific conditions along the ROW. With the development of new herbicide formulations, enhanced delivery technology, and increased knowledge regarding environmental interaction, Southwestern needs a management framework that allows evaluation of new herbicides as they become available. In addition, Southwestern needs to lower safety risks of conducting vegetation management operations in remote and treacherous spans of ROW.

1.3 Consultations and Public Involvement

1.3.1 Initial Outreach

The purpose of the initial outreach is to notify stakeholders that Southwestern intends to prepare the PEA and to ensure all relevant issues are identified and analyzed in the PEA. Initial outreach for this PEA included a scoping letter sent to stakeholders. The letter and the list of stakeholders, as well as responses received are provided in Appendix A.

1.3.2 Draft EA Outreach

A Notice of Availability (NOA) was published in the following newspapers to notify the public that the draft EA was available for public review.

- The Tulsa World
- Hughes County Tribune
- Springfield News-Leader
- Poplar Bluff Daily American Republic
- Jonesboro Sun
- Southwest Times Record

In addition, letters were sent to the list of stakeholders used for initial outreach announcing that the draft EA was available (Appendix A). The draft EA was made available on Southwestern's website at: https://www.swpa.gov/ and on DOE's website at: www.energy.gov/node/3793593. Hard copies were mailed upon request and were available at the following public libraries:

- Tulsa City-County Library, 400 Civic Center, Tulsa, OK 74103
- The Library Center, 4653 S. Campbell Avenue, Springfield, MO 65810
- Little Rock Public Library, 100 Rock Street, Little Rock, AR 72201

The NOA invited public comment during a review period from November 27, 2018 through January 12, 2019. The NOA and stakeholder letters are provided in Appendix A. No comments on the draft EA were received from the public. Two comments were received and are included in Appendix A; one from the Mark Twain National Forest and the other from the Missouri Department of Natural Resources.

1.3.3 Agency Participation

Currently Southwestern has three programmatic agreements (PAs) under Section 106 of the National Historic Preservation Act (NHPA), one with each State Historic Preservation Officer (SHPO) and the Advisory Council on Historic Preservation (ACHP) which cover the proposed O&M and integrated vegetation management activities in the Proposed Action through July 24, 2019. The PA for Oklahoma also includes the Oklahoma Archeological Survey (OAS). Southwestern is in the active consultation process with SHPOs, ACHP, OAS, and tribes to update and combine the three separate PAs into one unified multi-state PA. Responses received from SHPOs to the notification of intent to prepare the EA are provided in Appendix A.

Southwestern initiated consultation with the USFWS, through preparation of a Programmatic Biological Assessment (PBA) for listed species in three states (Appendix C). The USFWS determined that the American burying beetle (ABB; *Nicrophorus americanus*) is the only species with incidental take and proposed avoidance measures allowed the USFWS to concur with the *not likely to adversely affect* determination for all other listed species. As of February 2019, the Oklahoma and Arkansas USFWS are finalizing the Programmatic Biological Opinion (PBO) for the ABB. The USFWS email indicating they concur with the findings of the PBA is provided in Appendix A.

1.3.4 Native American Participation

Southwestern is conducting consultation with federally recognized Native American tribes according to the DOE American Indian Tribal Government Interactions and Policy (DOE Order 144.1). These entities were invited by Southwestern to participate as Sovereign Nations per Executive Order (EO) 13175, *Consultation and Coordination with Indian Tribal Governments*, in both the EA and the NHPA Section 106 process. Letters and responses are included in Appendix A.

1.4 Permits and Required Compliance

Southwestern has special use permits for its facilities in the Mark Twain National Forest in southeastern Missouri and the Ozark-St. Francis National Forest in Arkansas. A special use permit with the Mark Twain National Forest allows Southwestern to manage the 7 miles of transmission lines and ROW through this portion of the National Forest (note, this length includes the proclamation boundaries ROW length, as well as Southwestern's special use permit ROW through the forest). In the Ozark-St. Francis National Forest, vegetation management for the two communication towers and the 20.5 miles of transmission line occurs under a special use permit and was analyzed in an amended U.S. Forest Service (USFS) 2014 EA (USDA 2014). Three communication sites within the Ouachita National Forest in Oklahoma and Arkansas are also under special use permit with the USFS.

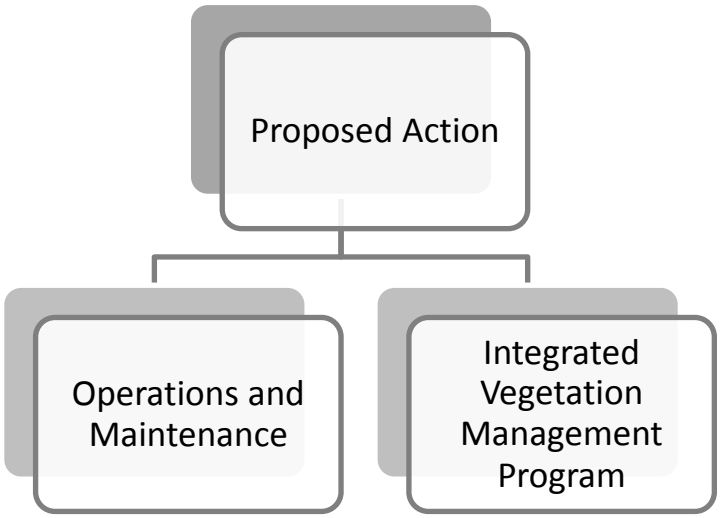
In addition, a small percentage of Southwestern transmission lines and substations are located on USACE hydropower dam generation sites, by permits. Southwestern receives electricity immediately below the dam, through substations and conveyance through a short span of transmission lines until it reaches private lands in the ROW. These permits will be maintained and updated by Southwestern when necessary.

USACE Nationwide Permits (NWPs) may be required for certain O&M activities such as stream crossing or bank repairs. Southwestern requests NWPs and consults with the USACE on a case-by-case basis. When an activity involves ground disturbance of 1 acre of soil or more, Southwestern obtains a stormwater construction permit from the appropriate state environmental agency. However, this PEA includes maintenance activities, not new construction. Maintenance activities would usually not require greater than 1 acre of ground disturbance and many maintenance activities are exempt from National Pollutant Discharge Elimination System (NPDES) permitting requirements. For substations in Missouri that have an oil/water separator, Southwestern holds oil/water separator NPDES permits and will maintain and update such permits as necessary.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 Proposed Action Overview

The Proposed Action encompasses O&M activities, which also include the component of integrated vegetation management activities. Since the integrated vegetation management program is a large component of the O&M program the Proposed Action has been divided into the two components: 1) O&M activities for infrastructure; and 2) integrated vegetation management activities. These are discussed briefly here and in detail in Sections 2.2 and 2.3.



Proposed O&M activities include continued aerial and ground patrols of line structures, lines, line hardware, and access roads to locate and correct problems along the transmission line ROWs, regular and preventive maintenance, inspections, repairs, upgrades, rebuilds, and replacements. Proposed O&M activities would occur at existing substations, transmission lines, communication system facilities, access roads, and maintenance or office-type facilities. O&M activities are physical controls and repairs; geography has little bearing on these activities and they are performed routinely. Southwestern proposes to continue these activities; details of O&M activities are provided in Section 2.2.

The proposed Integrated Vegetation Management Program would include a combination of manual and mechanical control and herbicide treatments. As part of the Proposed Action, Southwestern has developed a management framework for evaluating and selecting herbicides on an ongoing basis to improve the range of herbicides used based on geographic regions and to increase control of undesirable vegetation over longer periods of time. The goal of the Integrated Vegetation Management Program is to develop site-specific, environmentally sensitive, cost effective and socially responsible solutions to vegetation control. No individual method will control undesirable vegetation in a single treatment; diligence and persistence are required over a number of years to subdue vegetation such as woody plants, including trees and brush. Due to the complexity of vegetation control, the proposed management framework for herbicide use considers numerous factors, such as special geographic concerns, the type of vegetation to control, and the arrival of new herbicides coming on the market. Details of the proposed manual and

mechanical control methods, as well as the management framework for herbicide use, are provided in Section 2.3.

2.2 Proposed Operations and Maintenance Activities

Proposed O&M activities include continuing regular and preventive maintenance, inspections, repairs, upgrades, rebuilds, and replacements at existing substations, transmission lines, communication system facilities, access roads, and maintenance or office-type facilities. Aerial and ground patrols of line structures, lines, line hardware, and access roads to locate and correct problems along the transmission line ROWs would continue. Clearances of the transmission lines would continue to be visually checked by aerial patrol on a biannual basis and ground patrols by foot would continue on a 24-month cycle. Machinery and personnel would be transported to and from the facilities using established and maintained roadways. Some portions of ROW are accessible at points where the ROW crosses existing roads; however, many areas would need to be accessed through private properties. Access through private property would be maintained with permission of the specific landowner. Access within the ROW exists through existing jeep trails or would be developed as the machinery travels over herbaceous vegetation. This access would be used by Southwestern personnel to access the target areas within the ROW. Proposed O&M activities are listed below in Table 2-1.

Table 2-1. Proposed Operations and Maintenance Activities

O&M Activities at Substations
▪ Remove, test, clean, repair, replace, modify, maintain or operate electrical equipment, and its support systems or foundations. ▪ Clean, repair, replace, maintain, modify, operate and upgrade control building facilities, fencing, access roads, parking areas, grounding, grounding grids, substation ground-cover materials, substation perimeter, gates, storage buildings, underground utilities, security systems, and pole yards. ▪ Clean up chemical spills. ▪ Prepare equipment, oil, or waste material for offsite shipment and disposal. ▪ Acquire, dispose, or transfer facility or property when use remains unchanged. ▪ Use light duty vehicles, heavy rolling equipment, and temporary storage of heavy materials. ▪ Remove facilities and equipment and restore site to adjacent natural vegetated surroundings. ▪ Perform erosion, flood or drainage control improvements. ▪ Control pests. ▪ Employ avian management practices. ▪ Perform biological or cultural resources environmental sampling activities, or environmental remediation actions.
O&M Activities at Transmission Lines
▪ Install, maintain, operate, repair, remove, and inspect or replace any transmission structure, including poles of any material or height, and their associated components such as aircraft warning devices or avian protection/deterrent devices, insulators, pole guards, cross arms, steel members, X-braces, knee braces, structure mile marker signs, dampeners, ground rods or spikes, guy-wires, anchors and foundations. ▪ Install, string, pull, splice, maintain, repair, operate, remove or replace any electrical conductor, optical ground wire (OPGW), shield wire, or fiber optic cables and their connections, and place or remove aircraft warning devices or avian deterrent devices upon overhead wires. ▪ Use all-terrain vehicles, light duty four-wheel drive vehicles, trailers, and specialized heavy-duty heavy rolling equipment to traverse access roads and rights-of-way. ▪ Perform temporary equipment storage or material staging for installation or repairs. ▪ Clean-up and dispose of spills. ▪ Install, maintain, operate, repair, remove, and inspect culverts.

- Maintain, operate, repair, remove, and inspect access roads and their components.
- Repair or perform maintenance at water crossings or bank stabilization.
- Perform soil/vegetation disturbances or digging activities along the rights-of-way such as, but not limited to, drilling holes for pole placement, gathering core samples for geotechnical studies, drilling and placing deep pilings/foundations for self-supporting monopole structures, dozing, grading, blading for miscellaneous activities, installing fence post holes, digging for guy-wire anchor holes, burying transmission lines or utilities, uncovering tower legs or anchors, and performing erosion repairs.
- Conduct ground inspections and aerial inspections.
- Install, repair, or remove gates, fences, or signs.
- Place, move, or remove fill or rocks around culverts, towers, structures, or along rights-of-way.
- Stage and prepare for disposal of transmission line associated materials and waste for offsite disposal.
- Perform emergency actions to restore or repair electrical power due to storms or accidents such as clearing downed trees or powerlines, access road construction or upgrading to allow emergency actions. (This activity may take place adjacent to, or outside of, Southwestern facilities).
- Perform biological or cultural resources environmental sampling activities.
- Apply wood preservatives, fire retardants, or chemical resin compounds on wooden pole structures.
- Complete customer interconnections to transmission lines, and applications to encroach through rights-of-way for utilities or other use requests.

O&M Activities at Communication System Facilities

- Remove, test, clean, repair, replace, modify, maintain or operate communications equipment, and its support systems.
- Clean, repair, replace, maintain, modify, operate and upgrade control building facilities, fencing, access roads, parking areas, grounding, communication facility ground-cover materials, communication facility perimeter, gates, storage buildings, generator buildings, generators, underground utilities, liquid propane gas tanks.
- Clean up chemical spills.
- Prepare equipment, oil, or waste material for offsite shipment and disposal.
- Acquire, dispose, or transfer facility or property when use remains unchanged.
- Remove facilities and equipment and restore site to adjacent natural vegetated surroundings.
- Use heavy rolling equipment or temporarily store heavy materials.
- Perform erosion, flood or drainage control improvements.
- Control pests.
- Employ avian management practices.
- Perform biological or cultural resources environmental sampling activities, or environmental remediation actions.

O&M Activities at Maintenance or Office-Type Facilities

- Clean, repair, expand, replace, demolish, maintain, modify, operate, utilize, and upgrade office buildings, maintenance buildings, warehouses, emergency generators and fuel storage, waste storage buildings, equipment storage buildings, operation control centers, and miscellaneous facilities, fencing, roads, parking areas, sidewalks, gates, wastewater treatment lagoons, landscaping and utilities.
- Use and store light duty vehicles and heavy rolling equipment.
- Clean up chemical spills.
- Prepare equipment, oil, or waste material for offsite shipment and disposal.
- Acquire, dispose, or transfer facility or property when use remains unchanged.
- Remove facilities and equipment and restore site to adjacent natural vegetated surroundings.
- Control pests.
- Perform biological or cultural resources environmental sampling activities, or environmental remediation actions.
- Employ avian management practices.

2.3 Proposed Integrated Vegetation Management Program

As discussed in Section 2.1, Southwestern proposes a combination of manual and mechanical control, as well as herbicide treatments, evaluated and selected through a management framework proposed herein,

to control undesirable vegetation. Proposed vegetation management activities would occur at existing substations, transmission lines, communication system facilities, and maintenance or office-type facilities. Manual and mechanical control methods are discussed in Section 2.3.1 and the management framework for using herbicides is discussed in Section 2.3.2.

2.3.1 Manual and Mechanical Control

Manual treatment involves the use of hand tools and hand-operated power tools to cut, clear, or prune herbaceous and woody species. Treatments would include cutting undesired plants above the ground level, and pulling, grubbing, or removing undesired plants to prevent sprouting and regrowth. Manual techniques, primarily using chainsaws, would be used where equipment access is limited by terrain, soil conditions, or other environmental conditions. A chainsaw would be used to control vegetation larger than 3 inches in diameter, including dense shrub growths, tree limbs, and large trees. These manual methods are initially effective on woody vegetation; however, resprouting from the stumps or other exposed woody vegetation is common. When deciduous trees are cut, they usually resprout with more stems than before, creating even more dense vegetation. Successive cuttings significantly increase the amount and difficulty of labor needed to complete vegetation control.

Mechanical treatment involves the use of vehicles such as large wheeled-type tractors, or crawler-type equipment with attached tools specially designed to mulch, cut, uproot, or chop existing vegetation. The mechanical methods would include a tractor-mounted brush hog mower used to maintain existing terrain features for cutting grass and woody vegetation. The brush hog mower cuts, chops, or shreds vegetation near the land surface and allows mulching of vegetation and onsite nutrient recycling. This tool is most effective on vegetation 3 inches or less in diameter. Southwestern would continue to use this method to maintain the majority of the areas within its facilities. The other mechanical methods are more easily controlled by humans; therefore, the target vegetation can be individually controlled. Large wheel-mounted or track-type equipment with rotary or mulching type attachments would be utilized to cut, chop, or shred various types of vegetation, and break the connection between the roots and stems. This type of equipment is utilized for herbaceous and woody type vegetation up to 10 inches in diameter. Southwestern would continue to use this method to maintain fast growth vegetation, as well as non-herbicide applied sections. Most side trimming would be performed via ground equipment; however, aerial side saw trimming would be used at locations where ground equipment cannot be used, for example, inaccessible areas or river crossing areas. Generally, the cuttings from manual and mechanical vegetation control would remain onsite and allowed to deteriorate. In general, mechanical methods that disturb soil (heavy equipment) are not appropriate to use near water bodies or wetlands, on steep slopes, or in areas of soft soils.

Under the Proposed Action, manual and mechanical control of the ROW floor would occur anytime throughout the year and manual and mechanical control of trees would occur in accordance with the USFWS recommendations for protection of bat species. The length of time between manual and mechanical treatments would be extended as compared to current operations. Surface mowing of the 100-foot ROW would be on a 4-year cycle and side trimming would be performed on an 8-year cycle. The clearances would be visually checked on a biannual basis by aerial patrol and on a 24-month cycle by foot patrol. Isolated areas that require trimming between cycles or danger trees that present themselves would be addressed on an as needed basis. During both aerial and foot patrols, ROW encroachments by

vegetation which may cause an imminent threat of a transmission line outage would be reported to the System Dispatcher and then to the Regional Maintenance Manager for correction. Table 2-2 summarizes the proposed manual and mechanical control methods and locations where they would be used.

Table 2-2. Proposed Uses of Manual and Mechanical Control Methods

Method	Type of Vegetation	Locations for Use			
		Sub-stations	ROWs	Communi-cation Sites	Offices
Manual Control Methods					
Chainsaws	Tree or shrub branches larger than 3 inches in diameter; and along slopes too steep for the tractor-mounted brush hog		X		
Brush saw	Dense shrub growths smaller than 3 inches in diameter		X		
Power weed trimmers	Most effective on herbaceous vegetation at fence rows and areas surrounding communication tower supports	X		X	X
Mechanical Control Methods					
Tractor-mounted brush hog mower	Landscaped areas; most effective on vegetation 3 inches or less in diameter	X	X	X	X
Large wheel-mounted boom-tip saw	Encroaching tree limbs along the sides of the ROW; allows the live tree to remain		X		
Large mowers/site prep tractors/track-mounted mulching machine	Herbaceous and woody plant species up to 10-inch diameter		X		

ROW Right-of-way

2.3.2 Management Framework for Using Herbicide Treatments

Herbicides are chemicals that kill or injure plants and can be categorized as selective or non-selective. Selective herbicides kill only a specific type of plant, such as broad-leaved plants, while non-selective herbicides kill all types of plants. Herbicides can also be classified by their mode of action, and include growth regulators, amino acid inhibitors, grass meristem destroyers, cell membrane destroyers, root and shoot inhibitors, and amino acid derivatives, which interfere with plant metabolism in a variety of ways. Southwestern uses U.S. Environmental Protection Agency (EPA) and state-registered herbicides, and appropriately licensed or certified applicators apply the herbicides following the label requirements. Southwestern's Proposed Action consists of a two-step process for herbicide determination: herbicide approval (on a programmatic scale) and site-specific herbicide selection (on a local or geographic scale).

The management framework for selecting and using herbicide treatments consists of the following considerations:

- Application Methods
- Herbicide Approval
- Site-Specific Herbicide Selection
- Waste Generation and Herbicide Containment
- Future Activities

2.3.2.1 Application Methods

Herbicide application methods would include a combination of methods depending on season of the year, species needing control, and area to be treated. The application method chosen depends upon the treatment objective (removal or reduction); accessibility, topography, and size of the treatment area; characteristics of the target species and the desired vegetation; location of sensitive areas and potential environmental impacts in the immediate vicinity; anticipated costs; equipment limitations; and meteorological and vegetative conditions of the treatment area at the time of treatment. Herbicide application schedules and type are designed to minimize impacts to non-target species while still meeting vegetation control objectives. The application rates depend upon the target species, the presence and condition of non-target vegetation, soil type, depth to the water table, presence of other water sources, and the label requirements. Applications would be in accordance with "Herbicide Application Guidelines" in Southwestern's Office of Corporate Facilities Maintenance Standards, *Vegetation Maintenance Program*, No. MA-23, Revision 2 (2014). Application methods would include:

- Power-driven vehicle-mounted mechanical sprayer – used for general brush control especially along ROW. Wind gusts must not exceed 10 miles per hour.
- Foliar spray application – can be used during the growing season to control species. Herbicide is applied directly to the target foliage using pressurized or backpack sprayers.
- Cut-stump treatment – used to prevent re-sprouting of freshly cut stumps. Applied using backpacker sprayer or Radiarc sprayer.
- Tree injection and girdle/frill method – used in the ROW to kill larger tree species.
- Basal application – used to apply herbicide directly to the lower 12 to 14 inches of the stem. Application occurs in the winter during the dormant season and is effective near row crops.

An adjuvant is any substance in an herbicide formulation or added to improve herbicidal activity or application characteristics. Two examples of adjuvants are dyes and surfactants. Dyes can be used to mark where herbicides are sprayed to aid the applicator in determining the area covered. Occasionally, herbicides would be diluted with seed oil, limonene, basal oil, or another surfactant when used in conjunction with the cut stump method or when used to control highly resistant species. Surfactants are wetting agents that increase surface contact and therefore, overall effectiveness of the herbicide. Adjuvants would be used at recommended label rates. Table 2-3 lists adjuvants.

Table 2-3. List of Adjuvants

Adjuvant	Type	Notes
Activator 90	Nonionic surfactant	Mixes well with most herbicides without affecting the water pH. Mix at 2 pints per 100 gallons of water.
Basal oil	Surfactant	Use with Garlon 4.
Elite Champion	Nonionic Surfactant	For right-of-way, mix 0.5-2 quarts per 100 gallons.
Grounded	Surfactant	Blend of surfactants and aliphatic hydrocarbons designed for soil/gravel with no organic matter. Use for bare ground applications (substations and towers) at a rate of 2 pints per acre.
Hi-Light	Marking adjuvant	Use on bare ground at 16 ounces per 100 gallons. For woody plant applications, use 24 ounces per 100 gallons.
Induce	Nonionic surfactant	Mixes well with most herbicides without affecting the water pH. Mix at 2 pints per 100 gallons of water.
Metholated Seed Oil (MSO)	Surfactant	Best used for the woody plant applications, especially when pine trees are present. The rate is 2 pints per acre.
Redriver 90	Fatty acid ionic Surfactant	For right-of-way, mix 0.5-2 quarts per 100 gallons.

Under the Proposed Action, Southwestern hopes to extend the length of time between herbicide treatments using better formulated herbicides that are now available. Herbicide applications at each substation would occur in spring when vegetation blooms and then would be spot sprayed as needed. Towers would be spot sprayed as needed.

Herbicide applications in ROWs would occur from May through October. Regional offices would manage the applications on a rotating schedule. The system-wide maintenance plan documents which transmission lines need to be cleared each year on a 4- to 5-year rotating schedule. Clearing of a line means that either manual/mechanical or herbicide control (or both is used) or that the line is free of vegetation issues. Means of control would be determined based on what is identified at each site. Aerial patrols would be conducted on a biannual basis and foot surveys would be conducted every 2 years.

2.3.2.2 Herbicide Approval

This section presents Southwestern's proposed process for determining which herbicides are approved on a programmatic scale for use under the Integrated Vegetation Management Program. Site-specific characteristics, which also have to be considered, are discussed in the following section. The approval process is necessary, because herbicide availability and formulation are constantly changing and there are restrictions to where herbicides can be applied depending on soil type, water availability, landowner restrictions, and other environmental restrictions.

The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requires all herbicides to be classified for their potential hazards based on the circumstances to which they are used. The two classifications are "General Use" and "Restricted Use." General Use herbicides generally have lower toxicities with corresponding lower hazards to humans and the environment. Restricted Use herbicides generally have higher toxicity ratings and are often hazardous to humans and/or the environment. Some herbicide

formulations containing the same active ingredient may be registered in both classifications, depending on the ingredient concentration, application method, and intended use. With exception, General Use herbicides can be purchased and applied by the general public without training or licensing. Exceptions include, but are not limited to, applying General Use herbicides with motorized equipment and the application of aquatic use herbicides. These exceptions and all Restricted Use herbicides can be purchased and used only by trained and licensed applicators or others under the direct supervision of a trained and licensed applicator. With either classification, the applicator is required by law to follow all label instructions and restrictions.

In the 1995 EAs, Southwestern developed selection criteria for determining which herbicides could be used at the substation/communication towers and in the ROW. These selection criteria were applied across all of Southwestern's lands and were limited by the most restrictive type of ecoregion. Although the selection criteria were well developed and provided protection to the environment and species, they did not provide flexibility to more effectively manage vegetation in ecosystem regions which may have been able to utilize less restrictive selection criteria. Under the Proposed Action, the current Southwestern approved herbicides, as well as other potential herbicides, were evaluated with the criteria shown in Figure 2-1. Consideration was focused on the factors that indicate the greatest likelihood of groundwater contamination. Many pesticides bind strongly to soil and are therefore immobile. A measure of how strongly a pesticide binds to soil is its sorption potential (Koc). For those that are mobile in soil, their leaching to groundwater can be thought of as a race in time between their degradation into nontoxic by-products and their transport to groundwater. If the pesticide is not readily degraded and moves freely with water percolating downward through the soil, the likelihood of it reaching groundwater is relatively high. If, however, the pesticide degrades quickly or is tightly bound to soil particles, then it is more likely to be retained in the upper soil layers until it is degraded to nontoxic by-products. Even if degradation is slow, this type of pesticide is unlikely to pose a threat to groundwater. The time it takes for a pesticide to degrade to half of its original concentration is called its half-life. The Groundwater Ubiquity Score (GUS) is an experimentally calculated value that relates pesticide half-life and Koc. The GUS can be used to rank pesticides for their potential to move to groundwater (NPIC 2018).

Groundwater Ubiquity Score (GUS)

The GUS is an experimentally calculated value that relates pesticide half-life and sorption potential (Koc) (from laboratory data). The GUS may be used to rank pesticides for their potential to move toward groundwater.

$$GUS = \log_{10}(\text{half-life}) \times [4 - \log_{10}(Koc)].$$

GUS Value	Potential for movement toward groundwater
Below 0.1	Extremely low
1.0 – 2.0	Low
2.0 – 3.0	Moderate
3.0 – 4.0	High
Above 4.0	Very high

Figure 2-1. Approval Criteria for New Herbicides

Approval Criteria for New Herbicides

1. Herbicide must be labeled for the specific site of application (Range Land, Aquatic, ROW/Bare Ground).
2. Herbicide must be a proven herbicide with documented acceptable results.
3. Herbicide must be safe for wildlife.
4. Based on the GUS value, the pesticide movement rating must be low to moderate. If the rating is high or very high, the herbicide must be nontoxic or exhibit low toxicity to aquatic species.

Table 2-4 identifies the proposed list of herbicides selected for consideration under the Proposed Action, as well as, their characteristics, target vegetation, and types of facilities where they could be used. Southwestern does not spray herbicides directly on surface water, nor do they spray within 15 feet from any water's edge. Table 2-4 identifies herbicides approved for aquatic use and these should be used near sensitive water receptors or open water bodies. In cases where a generic herbicide has the equivalent percentage or less of the active ingredient as the brand name, that herbicide may be substituted. Sometimes herbicides are combined to make them more effective for certain applications. For example, combining herbicides allows more than one mode of action affecting the plant which allows better management. In addition, for bare ground applications where existing plants are visible, both a pre-emergent and post-emergent herbicide are necessary, as most pre-emergent herbicides will not have any effect on existing plants. Table 2-5 lists recommended combinations of herbicides for use under the Proposed Action. Some herbicides currently approved for use were removed from consideration under the Proposed Action because they are no longer available (Table 2-6). Section 2.3.2.5 describes the process Southwestern would use to approve herbicides that are developed in the future.

Table 2-4. Herbicides Considered for Use Under the Proposed Action

Trade Name	Active Ingredient	Herbicide Characteristic and Target Vegetation	Pesticide Movement Rating	Wetland/ Aquatic Use (Yes/No)[2]	Bare Ground Only	ROW Only	Bare Ground or ROW
4 # Amine	47.3% dimethylamine salt of 2,4-dichlorophenoxyactic acid	Selective post emergent for broadleaf weeds in desirable grasses and gravel/rock areas	Moderate	Yes			X
Accord XRT[1]	53.6% glyphosate	Non-selective broad spectrum systemic herbicide for control of annual/perennial weeds and woody plants.	Extremely Low	No			X
Arsenal Powerline[1]	27.8% imazapyr	Controls a broad-spectrum of troublesome vines and brambles, brush and tree species, and grasses and broadleaf weeds	High	No			X
Arsenal[1]	27.8% isopropylamine salt of imazapyr	Non-selective control most annual and perennial grass and broadleaf weeds in addition to many brush and vine species. Readily absorbed through emergent leaves and stems.	High	Yes			X
Cleantraxx	40.3% oxyfluorfen 0.85% penoxsulam	Pre-emergent broadleaf and grass weeds for hard surface/gravel areas	Extremely Low	No	X		
Credit Systemic Extra[1]	41% glyphosate	Non-selective	Extremely Low	No			X
Diuron 4L	40.7% diuron	Pre-emergence control of broadleaf weeds and annual grasses, as well as certain woody brush seedlings	Moderate	No	X		
Endurance[1]	65% prodiamine	Pre-emergence control of broadleaf weeds and annual grasses, as well as certain woody brush seedlings	Extremely Low	No	X		

Trade Name	Active Ingredient	Herbicide Characteristic and Target Vegetation	Pesticide Movement Rating	Wetland/ Aquatic Use (Yes/No)[2]	Bare Ground Only	ROW Only	Bare Ground or ROW
Escort XP[1]	60% metsulfuron methyl	Selective post emergent for broadleaf and woody plants in desirable grasses	High	No		X	
Garlon 3A[1]	44.4% triclopyr (salt)	Selective post emergent for broadleaf and woody plants in desirable grasses	Moderate	No			X
Garlon 4[1]	61.6% triclopyr (ester)	Selective post emergent for broadleaf and woody plants in desirable grasses	Moderate	No			X
Karmex-DF[1]	80% diuron	Long-term non-selective herbicide for control of most annual and some perennial weeds	Moderate	No			X
Krenite S[1]	41.5% ammonium salt of fosamine	Selective for woody species	Low	No		X	
Mastiff PGR[1]	48.1% flurprimidol	Growth regulator on established trees. Injected into individual trees.	Very High	No		X	
Method 240SL	25% potassium salt of aminocyclopyrachlor	Selective pre and post emergent for broadleaf and woody plants, can be used near water. Works best with Esplanade.	Very High	No	X		
Milestone VM	40.6% triisopropanolammonium salt of 2-pyridine carboxylic acid, 4-amino-3,6-dichloro	Selective post emergent broadleaf weed and some woody, no grazing restrictions; good for desirable grasses under power lines.	Low	No		X	
Mojave 70 EG	7.78% imazapyr 32.2% diuron	Pre-emergent use for broadleaf weeds and grasses. Can be used near water.	High Moderate	No	X		

Trade Name	Active Ingredient	Herbicide Characteristic and Target Vegetation	Pesticide Movement Rating	Wetland/ Aquatic Use (Yes/No)[2]	Bare Ground Only	ROW Only	Bare Ground or ROW
Oust Extra[1]	56.25% sulfometuron methyl 15% metsulfuron methyl	Selective post emergent for woody plants and broadleaf weeds in desirable grasses.	Moderate High	No			X
Oust XP[1]	56.25% sulfometuron methyl	Selective broad-spectrum broadleaf weed and grass control.	Moderate	No			X
Pathfinder II[1]	13.6% triclopyr	Selective for basal bark and cut-stump treatments	Low	No		X	
Polaris	27.7% imazapyr	Non-selective post emergent all weeds, grasses and woody. Best used with pre-emergent.	High	Yes	X		
Profile 2CS	21.8% paclobutrazol	Selective post emergent and tree growth regulator for management of shoot growth and the reduction of biomass when trees are pruned	High	No		X	
Remedy Ultra	60.45% triclopyr (ester)	Selective post emergent for woody plants and some broadleaf weeds	Moderate	No			X
Rodeo[1]	53.8% glyphosate	Non-selective post emergent all weeds, grasses and woody with no soil residual activity. Best used with pre-emergent.	Extremely Low	Yes	X		
Roundup Pro[1]	41.0% glyphosate	Non-selective post emergent broadleaf and woody plants with no soil residual activity. Best used with pre-emergent.	Extremely Low	No	X		
Sahara DF[1]	62.2% diuron 7.78% imazapyr	Non-selective, pre-emergent	Moderate	No			X

Trade Name	Active Ingredient	Herbicide Characteristic and Target Vegetation	Pesticide Movement Rating	Wetland/ Aquatic Use (Yes/No)[2]	Bare Ground Only	ROW Only	Bare Ground or ROW
Streamline	39.5% aminocyclopyrachlor 12.6% metsulfuron methyl	Selective post emergent for woody plants. Spot treat only.	Very High	No		X	
Topsite 2.5G[1]	0.5% imazapyr 2% diuron	Non-selective	Moderate	No		X	
Tordon 101M	24.4% picloram 39.6% 2,4-D	Selective post emergent for broadleaf and some woody. Works best when mixed with Garlon 4 for better results. Restricted Use	Very High Moderate	No		X	
Tordon 22K	24.4% picloram	Selective post emergent broadleaf weed and some woody, no grazing restrictions; good for desirable grasses under power lines. Restricted Use	Very High	No		X	
Transline	40.9% clopyralid	Selective post emergent for broadleaf and woody	Very High	No		X	
Vastlan	54.72% triclopyr choline	Selective post emergent for broadleaf and woody, has aquatic label and can be used in wetland area.	Very High	Yes			X
Vista[1]	26.2% fluroxypyr	Selective post emergent for broadleaf, specific for kosha	Moderate	No			X

[1] Herbicide is currently used (No Action Alternative) and would continue to be used under the Proposed Action.
[2] Southwestern does not spray herbicides directly on surface water, nor do they spray within 15 feet from any water's edge. Herbicides approved for aquatic use should be used near sensitive water receptors or open water bodies.
ROW Right-of-way

Table 2-5. Recommended Combinations of Herbicides Considered for Use Under the Proposed Action

Proposed Combinations	Herbicide Characteristic and Target Vegetation	Wetland/ Aquatic Use (Yes/no)	Bare Ground Only	ROW Only
Cleantraxx and Roundup	Bare Ground application with existing grasses/weeds	No	X	
Mojave and Rodeo	Bare Ground application with existing grasses/weeds	Yes	X	
Mojave and Diuron	Bare Ground application with existing grasses/weeds	No	X	
Polaris and Vastland	Bare Ground application with existing grasses/weeds	Yes	X	
Tordon 22K and Milestone	Selective application for weeds and woody	No		X
Transline and Milestone	Selective application for weeds and woody	No		X
Vastland and Amine	Selective application for weeds and woody	Yes		X

ROW Right-of-way

Table 2-6. Currently Approved Herbicides Not Included Under the Proposed Action

Trade Name	Active Ingredient	Rationale
Accord SP	41% glyphosate	No longer available
Habitat	28.7% imazapyr	No longer available
Journey	8.13% imazipic 21.94% glyphosate	No longer available
Spike 80DF	80% tebuthiuron	Moves in soil. Does not meet the GUS ranking requirement and is highly toxic to aquatic organisms.
Tordon K	24.4% picloram	No longer available. Replaced by Tordon 22K.

GUS Groundwater Ubiquity Score

2.3.2.3 Site-Specific Herbicide Selection

Although an herbicide is approved for use, site-specific information, such as vegetation to be treated, hydrological data, soil composition, sensitive species, and restricted areas, must be considered when selecting an herbicide for use at a specific site. Table 2-4 provides the general locations where each herbicide could be used, i.e., bare ground, the ROW, and near water. However, Southwestern would determine which herbicides, if any, would be appropriate for site-specific use.

Southwestern has developed the geographic information system (GIS) Resource Mapper, a GIS tool, to help identify environmental restrictions in specific locations within Proposed Action areas. The GIS Resource Mapper considers soil type, presence of karst and water features, general vegetation types, and

known land management restrictions. Land management restrictions include areas that are managed by the USFS and Wildlife Management Areas (WMAs) managed by state agencies. Along with the GIS Resource Mapper, the items in Figure 2-2 would be considered to identify an appropriate herbicide from the approved list for a specific site.

Figure 2-2. Considerations for Site-Specific Herbicide Selection

Site-Specific Herbicide Selection

- Identify if the site is within a known restricted area, for example, areas with known Threatened and Endangered species and areas with other management practices, such as USFS lands. No herbicides are allowed for use within these restricted areas.
- Identify the facility (ROW, Bare Ground) and the vegetation management need (Selective, Non-Selective, Pre-Emergent, Broadleaf, Woody). Narrow down the list of possible choices in the Approved Herbicides List.
- Identify nearby water resources. Select herbicide allowed in water or near water. Herbicides should not be used within 15 feet from any water's edge.
- Identify karst features. Herbicides should not be used within 15 feet of karst features.
- Identify if sandy soil is present. Low organic matter content (e.g., sand) indicates a greater likelihood of groundwater contamination because soil adsorption is dependent on soil characteristics. If sandy soil is present, do not choose an herbicide that has permeable soil restrictions.

2.3.2.4 Waste Generation and Herbicide Containment

Wastes would be generated by the Proposed Action, including herbicide product containers, spray tips, and personal protective equipment (PPE). Herbicide product containers would be triple rinsed with water, punctured, and disposed of in a sanitary landfill or by any other method indicated on the manufacturer's label. Spray tips would be triple rinsed and disposed of in a sanitary landfill or by any other method indicated on the manufacturer's label. PPE would either be rinsed and disposed of in a sanitary landfill or washed and reused. The rinse water generated in cleaning containers and spray tips would be applied in the treated areas. There would be no excess herbicide mixture remaining onsite after each day because any excess herbicide mixture would be applied on site before Southwestern personnel leave the site.

Product herbicide would be delivered to the site in either 2.5-gallon or 55-gallon containers. The herbicide would normally be diluted with water. Non-water diluents (adjuvants) would be transported to the site in small (less than 5-gallon) containers and would be poured into the hand or backpack sprayers as necessary. The herbicide dilution would occur within the ROW. In case of a rupture or other release of an herbicide container, the remainder of mixed herbicide would be applied to the target area until the container was empty. Leaking herbicide containers would not be transported off of the ROW until no herbicide remained in the container. If an uncontrollable rupture or other release of an herbicide or non-water diluent container did occur, Southwestern personnel would contain any liquids within the ROW. To further reduce the risk of release, no product herbicide, diluted herbicide, or non-water diluents would remain in non-contained areas within the ROW without Southwestern personnel supervision.

2.3.2.5 Future Activities

Herbicides' availability and formulation are constantly changing. When an applicator wishes to use an herbicide not on the currently approved list, the applicator would need to complete a request for a new herbicide (Appendix B). Southwestern would then evaluate the requested herbicide using this PEA and the criteria shown in Figure 2-2 and determine whether or not it can be added to the approved list.

If a new herbicide passes the criteria in Figure 2-2, Southwestern would also consider the following items when determining if a new herbicide should be added to its official Approved List of Herbicides. The answers to the questions below would not automatically eliminate an herbicide from approval but are helpful in determining whether or not an herbicide meets Southwestern's needs.

- Is the cost of the herbicide per acre of application acceptable?
- Is the herbicide available for purchase in the local market?
- Is the herbicide a General Use herbicide or a Restricted Use herbicide? Restricted Use herbicides have the potential to cause unreasonable adverse effects to the environment and injury to applicators or bystanders without added restrictions. The "Restricted Use" classification restricts a product, or its uses, to use by a certified applicator or someone under the certified applicator's direct supervision.
- Is the label signal word Caution or less? Note: other common signal words include Danger and Poison; these herbicides involve greater adverse health risks.
- Are mix rates per acre in ounces rather than in the pounds or gallons to limit the amount of herbicide on the landscape?
- Are there PPE requirements other than the standard gloves, long sleeves, long pants, rubber boots, and eye protection?

2.4 No Action Alternative

Under the No Action Alternative, Southwestern would continue its O&M activities and integrated vegetation management as it currently does, as defined under its Office of Corporate Facilities Maintenance Standards, *Vegetation Maintenance Program* (No. MA-23) and would adhere to requirements cited in its two 1995 EAs (Southwestern 1995a and 1995b). O&M activities as listed in Table 2-1 would continue under the No Action Alternative. As with the Proposed Action, aerial and ground patrols of line structures, lines, line hardware, and access roads to locate and correct problems along the transmission line ROWs would continue. Clearances of the transmission lines would continue to be visually checked by aerial patrol on a biannual basis and ground patrols by foot would continue on a 24-month cycle. As with the Proposed Action, machinery and personnel would be transported to and from the facilities using established and maintained roadways. Access within the ROW exists through existing jeep trails or would be developed as the machinery travels over herbaceous vegetation. This access would be used by Southwestern personnel to access the target areas within the ROW.

Southwestern would continue to apply herbicides at each substation in spring when vegetation blooms and then spot spray as needed. Towers would be spot sprayed as needed. Southwestern would continue to maintain the ROWs to keep facilities clear of all tall-growing trees, brush, and other vegetation that could grow too close to the conductors on a 4- to 5-year cycle using manual/mechanical and herbicide methods with some flexibility for instances beyond the control of Southwestern. The use of herbicides would still be supplemented by the use of manual/mechanical means to maintain the ROWs in many areas. Southwestern would use selection criteria for herbicides in the 1995 EAs that are based on Southwestern's most sensitive ecoregion receptor area and therefore are overly restrictive. This eliminates the use of herbicides that could be used safely and efficiently in some specific areas as well as new herbicides that have become available. Southwestern would not use the GIS Resource Mapper described in Section 2.3.2.3. Southwestern would continue to use basil oil, mineral oil, and Redriver 90 as surfactants under this alternative. Herbicides that would be used under the No Action Alternative are the herbicides currently approved for use and are listed below in Table 2-7.

Table 2-7. Approved Herbicides for Use Under the No Action Alternative

Trade Name	Active Ingredient	Herbicide Characteristic and Target Vegetation	Bare Ground Only	ROW Only	Bare Ground or ROW
Accord SP	41% glyphosate	Non-selective broad spectrum systemic herbicide for control of annual/perennial weeds and woody plants.			X
Accord XRT	53.6% glyphosate	Non-selective broad spectrum systemic herbicide for control of annual/perennial weeds and woody plants.			X
Arsenal	27.8% isopropylamine salt of imazapyr	Non-selective control most annual and perennial grass and broadleaf weeds in addition to many brush and vine species. Readily absorbed through emergent leaves and stems.			X
Arsenal Powerline	27.8% imazapyr	Controls a broad-spectrum of troublesome vines and brambles, brush and tree species, and grasses and broadleaf weeds			X
Credit Systemic Extra	41% glyphosate	Non-selective			X
Endurance	65% prodiamine	Pre-emergence control of broadleaf weeds and annual grasses, as well as certain woody brush seedlings	X		
Escort XP	60% metsulfuron methyl	Selective post emergent for broadleaf and woody plants in desirable grasses		X	
Garlon 3A	44.4% triclopyr	Selective post emergent for broadleaf and woody plants in desirable grasses			X
Garlon 4	61.6% triclopyr	Selective post emergent for broadleaf and woody plants in desirable grasses			X
Habitat	28.7% imazapyr	Non-selective		X	
Journey	8.13% imazipic 21.94% glyphosate	Non-selective	X		
Karmex-DF	80% diuron	Long-term non-selective herbicide for control of most annual and some perennial weeds			X
Krenite S	41.5% ammonium salt of fosamine	Selective for woody species		X	

Trade Name	Active Ingredient	Herbicide Characteristic and Target Vegetation	Bare Ground Only	ROW Only	Bare Ground or ROW
Mastiff PGR	48.1% flurprimidol	Growth regulator on established trees. Injected into individual trees		X	
Oust Extra	56.25% sulfometuron methyl 15% metsulfuron methyl	Selective post emergent for woody plants and broadleaf weeds in desirable grasses.			X
Oust XP	56.25% sulfometuron methyl	Selective broad-spectrum broadleaf weed and grass control			X
Pathfinder II	13.6% triclopyr	Selective for basal bark and cut-stump treatments		X	
Profile 2CS	21.8% paclobutrazol	Selective post emergent and tree growth regulator for management of shoot growth and the reduction of biomass when trees are pruned		X	
Rodeo	53.8% glyphosate	Non-selective post emergent all weeds, grasses and woody with no soil residual activity. Best used with pre-emergent	X		
Roundup Pro	41.0% glyphosate	Non-selective post emergent broadleaf and woody plants with no soil residual activity. Best used with pre-emergent	X		
Sahara DF	62.2% diuron 7.78% imazapyr	Non-selective, pre-emergent			X
Spike-80DF	80% tebuthiuron	Pre-emergent	X		
Topsite 2.5G	0.5% imazapyr 2% diuron	Non-selective		X	
Tordon K	24.4% picloram	Selective broadleaf weed and some woody			X
Vista	26.2% fluroxypyr	Selective post emergent for broadleaf, specific for kosha			X

ROW Right-of-way

2.5 Comparison of Alternatives

Table 2-8 summarizes and compares the potential impacts under the Proposed Action and the No Action Alternative. Chapter 3 provides detailed information for potential impacts of each alternative.

Table 2-8. Summary of Environmental Consequences by Alternative

Proposed Action	No Action Alternative
Land Use	
▪ No changes to land use or land ownership. ▪ No creation of new ROWs or construction of new facilities. ▪ Potential for temporary disruption to residential, recreational, and farming activities on adjacent land. In general, adjacent land uses are mostly agricultural, pasture, and forest lands in rural areas that are sparsely populated.	Similar but slightly greater impacts to adjacent land uses could occur since the No Action would require greater use of heavy equipment to control vegetation within the ROW and these activities may need to occur more often. No changes to land use or land ownership would occur.
Water Resources	
▪ Potential short-term decreases in water quality from erosion, increased surface water runoff, or sedimentation, during O&M activities, such as bank repair, replacement of poles, or repairing underground utilities and from large machinery disturbing the soil during mechanical techniques for controlling vegetation. ▪ Potential threat to surface water and groundwater quality from migration of chemical, fuel, oil, or herbicide spills, if not contained immediately. ▪ No direct impacts from herbicides are expected because the area of land treated with herbicides would be relatively small (narrow strips across the landscape) compared to the surrounding area which allows rapid dilution. In addition, Southwestern does not use herbicides within 15 feet of surface water features or karst features.	Similar but slightly greater impacts to water resources could occur since for the No Action Southwestern would not have the flexibility to readily use better formulated herbicides that are geographically targeted. These restrictions would lead to shortened time intervals between herbicide treatments, and would require continued use of large machinery around surface body waters, potentially causing more erosion and sedimentation.
Biological Resources	
▪ No impacts to vegetation at the substations, communication sites, and the Tulsa office due to lack of vegetation at these sites. Vegetation at other offices would continue to be maintained in a lawn-like state. ▪ Along the ROW, potential for large equipment to temporarily trample vegetation, increase erosion in select areas under certain conditions, and increase invasive species. ▪ Continued removal of woody species in the ROW to favor low-growing non-woody plant species. ▪ Potential short-term impacts to wildlife from noise, vibration, and construction equipment movement. ▪ Potential direct impacts to wildlife from mortality or injure from collision with vehicles. ▪ Temporary displacement of most wildlife from the immediate vicinity of the maintenance area and adjacent areas. Larger or more mobile wildlife would leave the vicinity but would eventually return to the area after the activities were completed. Less mobile species may be crushed by heavy equipment.	Impacts to vegetation, wildlife and special status species would be similar as described for the Proposed Action. However, greater impacts may occur because older formulations of herbicides would be used which would increase the frequency of visits to manage vegetation within the ROW and more herbicide could be applied across the landscape as compared to under the Proposed Action. An increase in use of mechanical equipment would occur to control vegetation which would cause greater disturbance to the vegetation and wildlife. In addition, the GIS Resource Mapper would not be used to assist with site-specific herbicide selection.

Proposed Action	No Action Alternative
▪ Potential indirect impacts of habitat degradation, disruption of foraging and prey availability, and disruption of nesting. ▪ Potential impacts to wildlife species from herbicide exposure depends on the quantity of the chemical the species was exposed to and the toxicity of the herbicide. Herbicides proposed for use are low in toxicity to wildlife. The GIS Resource Mapper would be used to identify sensitive wildlife areas including karst and threatened and endangered species areas to reduce unintentional exposure. ▪ Approximately 859 acres of potential ABB habitat occur along the ROW in the three counties in Arkansas. Approximately 4,732 acres per year may be subject to disturbance on short notice or during the dormant season with little avoidance possible in Oklahoma. The Proposed Action *may affect but is not likely to adversely affect* 23 special status species. The Proposed Action *may affect and is likely to adversely affect* the ABB. USFWS has concurred with this finding and is finalizing the PBO for the ABB.	
Air Quality	
▪ Minimal impacts to air quality and no change to regional air quality. ▪ Emission of criteria pollutants, small amounts of toxic air contaminants, and greenhouse gases from burning of fossil fuels (gasoline or diesel) in internal combustion engines in emergency generators, light duty four-wheel drive vehicles, all-terrain vehicles, trucks, tractors, and specialized heavy equipment. ▪ Emission of particulate matter and fugitive dust from those activities that disturb the soil, such as from replacing poles, driving on dirt roads, and from other ground-disturbing activities. ▪ Emission of greenhouse gases from sulfur hexafluoride containing electrical equipment.	Potential impacts to air quality would not change from current conditions. However, the time interval between herbicide applications may be shorter and therefore, air emissions from vehicles could be greater as compared to the Proposed Action.
Geology and Soils	
▪ Potential health and safety risks to workers from undetected sinkholes in karst terrain and from the New Madrid Seismic Zone. ▪ Potential for karst terrain to serve as conduits and transport herbicides to unwanted areas or water sources. Because of this, herbicide application is not allowed within 15 feet of a karst feature (cave, sinkhole, spring). ▪ Potential localized and short-term soil erosion, compaction, and disturbance of the physical arrangement of soils from ground disturbing activities and the use of heavy equipment. ▪ Potential increased exposure of susceptible soils to water or wind erosion at the land surface from vegetation removal. ▪ Potential reduction in soil microbes' numbers and/or change in species composition from herbicide use. Little potential at ROWs due to relatively small amounts of herbicide with long-time spans between treatments. Greater potential within substations with the regular use of herbicides to keep plants from growing and if these herbicides were to migrate offsite	The potential impacts are the same but without the use of better formulated herbicides that are geographically targeted, shorter time intervals between herbicide treatments and greater use of large machinery would be required potentially causing more disturbance as compared to the Proposed Action.

Proposed Action	No Action Alternative
into adjacent soils, microbes (and thus soil productivity) could be affected.	
Cultural Resources	
▪ Potential adverse impacts to cultural resources are not expected because impacts would be avoided and minimized by the implementation of the PA and or the Section 106 process. ▪ Potential for long-term, direct impacts to cultural resources from surface and subsurface disturbance during activities including pole replacement, road maintenance, or culvert replacement and by vehicles and equipment traversing the ROW areas. ▪ Potential exposure of resources to vandalism or new accessibility to yet unidentified resources from removal of vegetation. ▪ No direct impact from herbicide application.	Similar as the Proposed Action however more frequent maintenance and increased use of heavy equipment could increase the likelihood of inadvertent effects to cultural resources along the ROW. However, impacts would be avoided and minimized by implementation of the PA and/or the Section 106 process.
Environmental Justice	
▪ Continued maintenance and safe operation of the transmission lines and delivery of reliable power to not-for-profit municipal utilities and rural electric cooperatives within Southwestern's service area. ▪ Potential impacts of the Proposed Action are dispersed because Southwestern facilities are spread throughout a large geographic area. One minority population and several low-income populations were identified in the Proposed Action areas, but would not experience disproportionate impacts when compared to census tracts without minority or low-income populations.	Same as the Proposed Action
Noise	
▪ Short-term noise from vehicles, machinery, and equipment, as well as helicopter noise during aerial inspections and aerial side saw trimming may disrupt residential and recreational lands. Activities would be temporary, intermittent, of short duration, and dispersed throughout the Proposed Action area. ▪ No introduction of new stationary sources of permanent noise.	Similar as the Proposed Action but slightly greater noise impacts may occur because the range of herbicides that could be used under the Proposed Action would not be available and the No Action would require greater use of heavy equipment to control vegetation within the ROW on a more frequent basis.
Safety and Health	
Public Health and Safety ▪ Potential exposure to exhaust and fuel vapors from trucks and direct or indirect exposure to herbicides. ▪ Potential physical injuries from flying debris and falling trees, from poles being removed, and from heavy equipment running over people if the operator does not see them. ▪ Potential mishap during aerial reconnaissance that impacts the public. ▪ Negligible impacts due to the public's limited access to Southwestern's facilities, close supervision of activities, implementation of OSHA-approved worker safety and environmental training programs, and conduct of aerial reconnaissance by licensed pilots. ▪ Beneficial impacts by controlling brush and trees along the	Potential beneficial impacts to public and occupational health and safety from the Proposed Action, such as fewer required herbicide applications, more selective or targeted herbicide applications, and less time spent on vegetation management particularly in remote and treacherous spans of ROW, would not be realized. The types of potential impacts to public and occupational health and safety would be the same; however, the No Action Alternative has the potential to expose the public more often.

Proposed Action	No Action Alternative
ROW in a systematic fashion to prevent service interruptions, fire, or impediments to restoration of service when outages occur. **Occupational Health and Safety** ▪ Potential exposure to exhaust and fuel vapors from trucks, chemical vapors from wood treating chemicals, as well as fuel and other chemicals used at the substations and communication sites, and herbicides. ▪ Potential physical injuries from electrocution, falls, flying debris and falling trees and from poles being removed, as well as from the use of tools, such as minor cuts, blisters, sprains, abrasions, bruises, muscle strains, and exposure to equipment noise. ▪ Potential injuries from operating heavy equipment as a result of equipment malfunctions, overturns, loss of control, and equipment noise and vibration. Especially in mountainous, rugged, and relatively remote areas that pose treacherous working conditions. ▪ Negligible impacts due to staff training in health and safety and environmental actions, and close supervision of activities.	
Materials and Waste	
▪ Continued use of hazardous materials, petroleum products, and miscellaneous materials, such as sulfur hexafluoride. ▪ Generation of wastes, such as PCB items, used oils, used oil contaminated waste, treated wood products, spent solvents, rags, paints, thinners, asbestos and lead-based paint abatement wastes, and solid wastes. ▪ Minimal impacts due to implementation of existing materials and waste management processes and procedures.	Same as Proposed Action
Transportation	
▪ Potential vehicle accidents and temporary lane closures or disruptions (limited only to areas where lines cross public roadways) during some maintenance activities. ▪ Minimal impacts to heavily traveled roads due to very few interstates and major roads crossed by Southwestern transmission lines. ▪ Use of all-terrain vehicles, light duty four-wheel drive vehicles, trailers, and specialized heavy-duty heavy rolling equipment to traverse access roads and ROWs. ▪ Access through private property would be maintained with permission of the specific landowner. ▪ Impacts to existing access roads from wear or damage would be repaired as needed to maintain roads at their current maintenance level.	Similar as the Proposed Action; however, greater use of heavy equipment to control vegetation within the ROW and more frequent maintenance could cause slightly greater impacts to transportation.

Proposed Action	No Action Alternative
Intentional Destructive Acts	
▪ Potential for destruction of a tower on a high-voltage transmission line or of equipment at a substation by terrorism or sabotage and disruption of electrical services. ▪ Potential for vandalism or theft, while potentially expensive to repair, would not normally cause a large effect to utility customers or to the environment. ▪ Potential for an incidence of an intentional destructive act is speculative and could occur anywhere within Southwestern's system. However, the likelihood of an act of terrorism would be low due the low potential for generating any regional or large-scale destruction. ▪ Proposed O&M activities and integrated vegetation management would help reduce the potential impacts of a destructive act and keep the potential for generating any regional or large-scale destruction low.	Same as for the Proposed Action

ABB American Burying Beetle
GIS Geographic Information System
O&M Operations and Maintenance
OSHA Occupational Safety and Health Administration
PA Programmatic Agreement
PCB polychlorinated biphenyl
ROW Right-of-way

2.6 Alternatives Eliminated from Further Consideration

Southwestern considered using only manual and mechanical control without use of herbicides to manage vegetation. Prior to 1995, Southwestern used manual and mechanical methods to control vegetation through the ROW and a combination of manual/mechanical/chemical control at the substations. The use of manual and mechanical methods only often resulted in a long-term increase in stem counts and the establishment of dense woody cover. As a result of this habitat change, manual and mechanical methods of control have required extensive re-clearing efforts every few years and limited annual re-clearing (brush-hogging) for localized line maintenance. These extensive efforts increase costs and safety risks by increasing the frequency of vegetation management operations, particularly in remote and wild areas. Therefore, this alternative was eliminated from further consideration.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the existing environmental and human resources that could potentially be affected by the Proposed Action and No Action Alternative. The environment described in this chapter is the baseline for the consequences that are presented for each resource and each alternative. The region of influence (ROI), or study area for each resource category, is defined in the individual resource category discussion.

This chapter also describes potential impacts for each environmental and human resource. CEQ defines impacts at 40 CFR 1508.8, "Effects and impacts as used in these regulations are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial."

Twelve resource areas were considered for potential impacts from the Proposed Action and the No Action Alternative: land use; water resources; biological resources; air quality; geology and soils; cultural resources; environmental justice; noise; safety and health; materials and waste; transportation; and intentional destructive acts. Some resources were eliminated from detailed analysis as described below.

3.1 Resource Areas Excluded from Further Analysis

Consistent with NEPA implementing regulations and guidance, Southwestern focuses the analysis in an EA on topics with the greatest potential for environmental impacts. This approach is consistent with NEPA [40 CFR 1502.2(b)], under which impacts, issues, and related regulatory requirements are investigated and addressed with a degree of effort commensurate with their importance. This section identifies the impact topics dismissed from detailed analysis in this PEA and provides the rationale for the dismissal. Generally, issues and impact topics are dismissed from detailed analysis because either the resource does not exist in the analysis area, the resource would not be affected by the proposal, or the likelihood of impacts are not reasonably expected (i.e., no measurable effects).

Because the Proposed Action facilities are part of an existing transmission line system, the activities associated with maintaining the transmission system are limited in time and scope, and the study area is well defined and has been previously disturbed. Southwestern concluded that the Proposed Action would result in no impacts or negligible impacts to the resource areas identified in Table 3-1 and they are not considered further in this EA.

Table 3-1. Resource Areas Excluded from Further Analysis

Resource Area	Rationale
Visual Resources	Proposed Action activities would occur along existing transmission lines and at existing substations, communication sites, and offices. A majority of Southwestern facilities have been in place since about the 1970s and are an existing component of their respective viewsheds. Activities could affect scenic quality from the temporary visual intrusion of construction vehicles, equipment helicopters, storage materials, and workers. Proposed Action activities would be temporary, intermittent, of short duration, and dispersed throughout Proposed Action areas. No new permanent visual intrusions would be introduced. Material storage and staging areas would be selected to minimize views from public roads, recreation areas, and residences, to the extent feasible. Work sites would be kept clean of debris and waste and best management practices for waste management would be implemented as described in Section 3.11.2.1.
Socioeconomics	The Proposed Action would not alter socioeconomics factors (unemployment rate, changes in total income, business volume, and local housing markets). Almost all of the existing transmission lines and facilities have been in place since about the 1970s and maintenance along the lines is not expected to affect social and economic values. By law, Southwestern's power is marketed and delivered to not-for-profit municipal utilities and rural electric cooperatives. Southwestern has over one hundred such "preference" customers, and these entities ultimately serve over 8 million end-use customers. Southwestern would utilize standard workforce already conducting maintenance activities along the transmission system. The proposed activities described in Section 2.0 would maintain the existing transmission system and are not proposed to expand the system. Therefore, maintenance on existing transmission lines, facilities, and rights-of-way would not stimulate new development or growth and would not change existing socioeconomic patterns of the areas proximate to activities.

3.2 Land Use

Land use encompasses natural land uses and land uses that reflect human modification. Natural land use classifications include wildlife areas, forests, and other open or undeveloped areas. Human land uses include residential, commercial, industrial, utilities, agricultural, recreational, and other developed uses. Management plans, policies, ordinances, and regulations determine the types of uses that are allowable, or protect specially designated or environmentally sensitive uses. The ROI for impacts to land use is the land where proposed activities would take place (i.e., Southwestern facilities) and lands that are immediately adjacent to the facilities.

3.2.1 Affected Environment

Southwestern facilities are located in Arkansas, Missouri, and Oklahoma (Figures 1-1 through 1-4) and include five office/maintenance complexes, 24 substations, 1,347 miles of linear physical transmission line and 1,380 circuit miles of conductor transmission line and the associated 100-foot width ROW, approximately 6 miles of fiber optic communication line and associated corridors, approximately 50 communication sites, and access roads/pathways to access transmission ROW. Southwestern facilities are located within 23 counties in Arkansas, 22 counties in Missouri, and 16 counties in Oklahoma in mostly sparsely populated areas. The ROW encompasses 6,405 acres in Arkansas, 5,377 acres in Missouri, and 4,587 acres in Oklahoma or a total area of 16,369 acres (25.6 square miles). In addition, approximately 341 acres of land are used for the office/maintenance facilities, communication sites, and substations.

Table 3-2 provides a summary of the facilities by county and the predominant land use types in these areas. The main land use types adjacent to Southwestern facilities are agricultural and forest. Other adjacent land uses include: residential, commercial, industrial, and recreational. Figure 3-1 shows land cover data and the abundance of agricultural and wooded areas near the facilities.

Table 3-2. Overview of Facilities by County and nearby Land Use

Jurisdiction/Land Management Agency	Approximate Miles Traversed	Predominant Land Use Types Adjacent to ROWs
Arkansas		
Baxter County[1, 2]	25	Wooded, agricultural, pasture Residential/commercial near Rena, Alma, Russellville, Horseshoe Bend, and Paragould; as well as scattered rural residences Recreation Areas: Lee Creek Reservoir Recreation Area; Harold Alexander WMA, Robert L. Hankins Mud Creek WMA; Foushee Cave Natural Area; Buffalo National River; Beaver Lake; Bull Shoals Lake and State Park; Greers Ferry; Norfork Lake Forest: Ozark-St. Francis National Forest; Ouachita National Forest
Benton County	4	
Carroll County[1]	34	
Clay County[1, 2]	20	
Cleburn County[1]	18	
Craighead County[2, 3]	39	
Crawford County[2]	32	
Franklin County[1]	25	
Fulton County	25	
Greene County[1, 2]	32	
Independence County[1]	36	
Izard County[1]	28	
Jackson County	12	
Johnson County	28	
Lawrence County	15	
Logan County[1]	NA	
Marion County[1]	28	
Pope County[1]	45	
Randolph County[1, 2]	37	
Searcy County[1]	28	
Sebastian County[1]	NA	
Sharp County[1]	19	
Yell	0.6	
Arkansas Fish and Game Commission ▪ Harold Alexander WMA ▪ Robert L. Hankins Mud Creek WMA	 3 1	
Arkansas Natural Heritage Commission (Foushee Cave Natural Area)	1.8	

Jurisdiction/Land Management Agency	Approximate Miles Traversed	Predominant Land Use Types Adjacent to ROWs
USFS ▪ Ozark-St. Francis National Forest[1] ▪ Ouachita National Forest[1]	20.5 NA	
National Park Service (Buffalo National River)	0.6	
Missouri		
Barry	10	Agricultural, wooded, pasture
Benton[1]	16	
Butler[1, 2]	26	Residential/commercial/industrial near Springfield; scattered rural residences throughout
Cedar[1]	NA	
Christian[1, 2, 3]	19	Recreation Areas: Truman Lake Mountain Bike Park near the Harry S. Truman Reservoir; Table Rock Lake and State Park; Stockton Lake; Taneycomo Lake; Moonshine Beach State Recreation area; Fair Acres Sports Complex north of the Carthage, Missouri substation; Missouri Department of Conservation land
Dunklin[2]	12	
Greene[1, 2, 3]	35	
Henry	13	
Howell	16	Forest: Mark Twain National Forest
Jasper[2]	20	
Lawrence	25	
McDonald	23	
New Madrid[1, 2]	67	
Newton[2]	22	
Pemiscot	8	
Ripley[2]	25	
Scott[2]	5	
Stoddard[1, 2]	30	
Stone	14	
Taney[1, 2]	11	
Webster	21	
Wright	5	
USFS - Mark Twain National Forest	7	
Missouri Department of Conservation	1	

Jurisdiction/Land Management Agency	Approximate Miles Traversed	Predominant Land Use Types Adjacent to ROWs
Oklahoma		
Bryan[1, 2]	22	Wooded, agricultural, pasture
Cherokee[1]	4	
Choctaw[1]	NA	Residential: near Cartwright and scattered rural residences throughout
Coal[1, 2]	18	
Haskell[2]	23	Recreation Areas: Broken Bow Reservoir, Keystone Lake, Lake Tenkiller, Eufaula Lake, Fort Gibson Lake, Lee Creek, and Webbers Falls
Hughes[2]	38	
Johnston	21	
LeFlore[1]	6	Indian trust land for several tribes along the Arkansas River in eastern Oklahoma
McCurtain[1]	NA	
McIntosh	38	
Muskogee[2, 3]	79	
Okfuskee[1, 2]	13	
Okmulgee[1]	37	
Pontotoc[1]	10	
Sequoyah[1]	64	
Tulsa[1, 2, 3]	NA	
USFS – Ouachita National Forest[1]	NA	
Indian Trust Land	0.2	

1 One or more communication sites are located in this county.
2 One or more substations are located in this county.
3 An office is located in this county.
NA not applicable-no transmission lines; facility only
ROW rights-of-way
USFS U.S. Forest Service
WMA Wildlife Management Area

3.2.1.1 Agricultural

Southwestern substations are generally located in rural settings. In general, open pasture surrounds the majority of the Missouri substations with the exception of Springfield, Table Rock, and Norfork substations. The Springfield substation is located on the outskirts of Springfield and is adjacent to areas of industrial and agricultural use. With the exception of the Jonesboro substation, all the Arkansas substations are located in rural settings surrounded by agricultural land including pastures and farmland. The Jonesboro substation is located on the outskirts of Jonesboro. Industrial and agricultural use areas are adjacent to the substation. The Oklahoma substations are also located in rural areas. Surrounding land use is generally agriculture including farming and pasture land. Much of the transmission line ROW travels through agricultural lands in all three states. Agricultural lands include pasture and farmland. Crops include rice, soybeans, corn, beans, cotton, watermelon and cantaloupe.

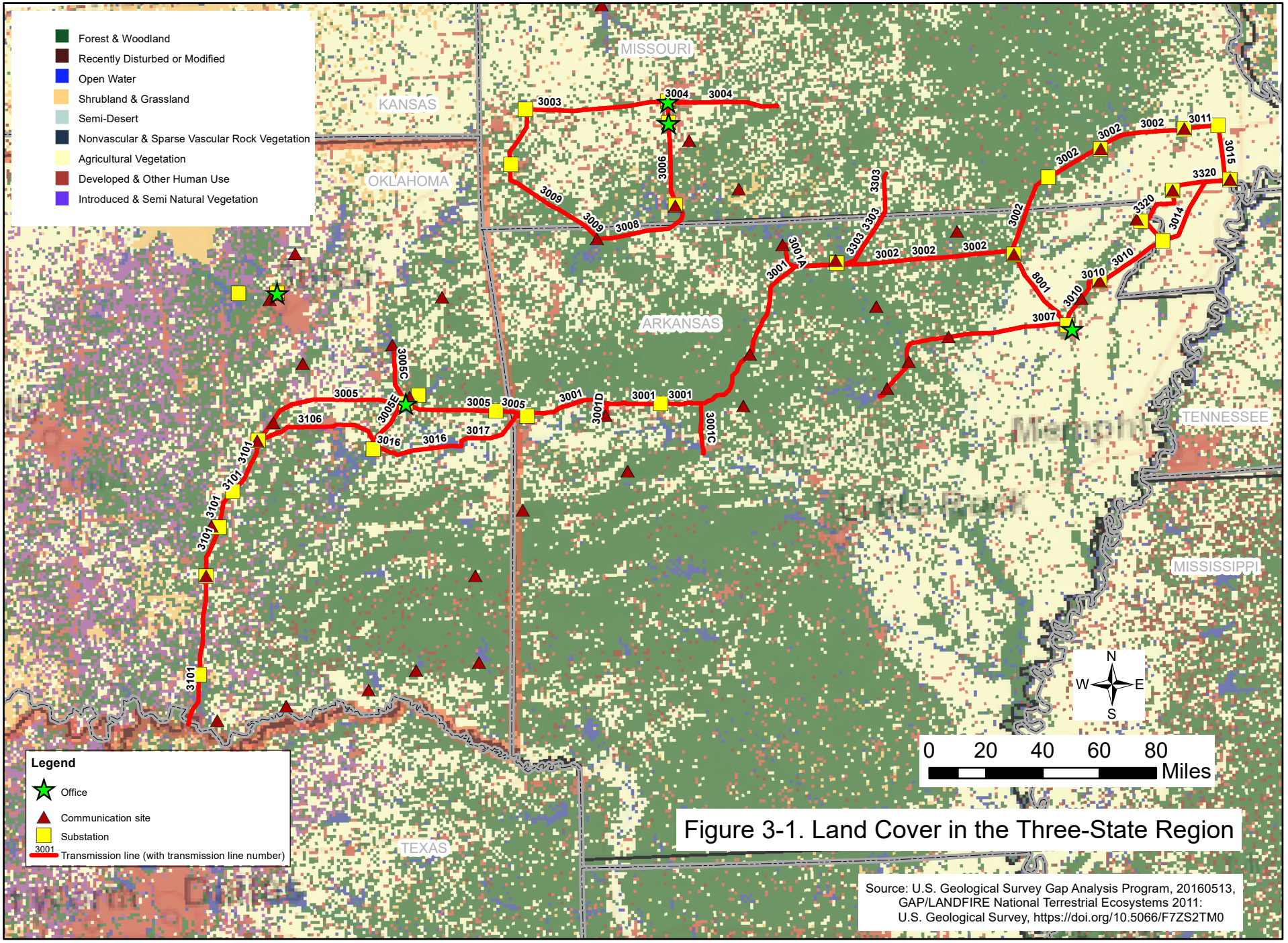


Figure 3-1. Land Cover in the Three-State Region

Source: U.S. Geological Survey Gap Analysis Program, 20160513, GAP/LANDFIRE National Terrestrial Ecosystems 2011: U.S. Geological Survey, https://doi.org/10.5066/F7ZS2TM0

3.2.1.2 Forest

Much of the transmission line ROW passes through wooded areas in all three states. The Poplar Bluff (MO) and Water Valley (AR) substations are also adjacent to wooded areas. Some wooded areas also surround the Gore (OK) and Van Buren (AR) substations.

Southwestern has special use permits for its facilities in the Mark Twain National Forest in southeastern Missouri and the Ozark-St. Francis National Forest in Arkansas. A special use permit with the Mark Twain National Forest allows Southwestern to manage the 7 miles of transmission line (line 3002) and ROW through this portion of the National Forest (note, this length includes the proclamation boundaries ROW length as well as Southwestern's special use permit ROW through the forest). In the Ozark-St. Francis National Forest, vegetation management for the two communication sites and the 20.5 miles of transmission line (line 3001) occurs under a special use permit and was analyzed in an amended U.S. Forest Service (USFS) 2014 EA (USDA 2014). Three communication sites within the Ouachita National Forest in Oklahoma and Arkansas are also under special use permit with the USFS.

3.2.1.3 Residential, Commercial, and Industrial

Rural residences are scattered throughout the Proposed Action areas in all three states. The most urban area in the ROI is Springfield, Missouri where residential, commercial and industrial land uses occur and some transmission lines go through residential backyards. The second most populated area is Paragould, Arkansas. Other residential and commercial areas in Arkansas are near Rena, Alma, Russellville, and Horseshoe Bend. In Oklahoma, a transmission line passes through a residential area on the east side of Cartwright. Industrial use areas are adjacent to the Springfield and Jonesboro substations.

3.2.1.4 Recreational

USACE operates water-based outdoor recreation areas, including lakes and reservoirs in Oklahoma, Arkansas, and Missouri with parks, campsites, improved swimming beaches, and boat ramps (USACE 2018a and 2018b). As shown on Figures 3-3 through 3-5 in the Water Resources section, many of these lakes are near transmission lines and some communication sites. The Norfork (AR), Table Rock (MO), Keystone (OK), and Tenkiller (OK) substations are located adjacent to USACE dams. The primary land use surrounding these dams is recreation and hydroelectric power. Fishing and camping sites are located near the dams. Table Rock Lake State Park is a public recreation area with 356 acres on Table Rock Lake along the southern side of the city of Branson, Missouri. The park includes a marina, campgrounds, and trails for hiking and bicycling. The Shepherd of the Hills Fish Hatchery is located 6 miles southwest of Branson just below Table Rock Dam. The hatchery includes a free conservation center, where the public can learn more about trout culture, aquatic life, fishing and the Missouri Department of Conservation's (MDC's) role in aquatic resource management. Trails are available near the hatchery for hiking, wildlife viewing, and access to Lake Taneycomo for fishing (MDC 2018a). A transmission line (line 3005) crosses a state-designated scenic river in Sequoyah County, Oklahoma (Big Lee's Creek) (Oklahoma Scenic Rivers Commission 2018). Numerous springs and caves in northern Arkansas and southern Missouri are used for recreation. Section 3.6 discusses caves and karst features in these areas.

Approximately 0.6 mile of line 3001 crosses the Buffalo National River near Gilbert, in Searcy County, Arkansas. The river is managed by the National Park Service (NPS). Southwestern facilities cross a portion of three management areas in Arkansas that provide recreational opportunities. An approximate 3-mile portion of line 3002 crosses the Harold Alexander WMA, located approximately 6 miles south of Hardy in Sharp County. Most of the WMA is owned by the Arkansas Game and Fish Commission (AGFC); the rest is Arkansas Natural Heritage Commission land. The WMA was created because of a growing concern of habitat loss in the area. The primary goal was to create optimum habitat conditions for white-tailed deer and turkey, with secondary goals for habitat development for quail, rabbit, squirrel and furbearers. Recreational opportunities include hunting, fishing, canoeing along the Spring River, hiking, sightseeing, and a chance to observe bald eagles during late winter along the Spring River (AGFC 2018a).

An approximate 1-mile portion of line 3002 also crosses Robert L. Hankins Mud Creek WMA, located in Randolph County about 10 miles north of Pocahontas in the Ozark foothills region of the state. It is a small but scenic area, well suited to bird watching, hiking or photography. Interior roads are off limits to motor vehicles. No camping areas have been developed. The land is owned by AGFC and offers hunting opportunities (AGFC 2018b).

A portion of line 3007, approximately 1.8 miles, crosses the Foushee Cave Natural Area. The area is Arkansas Natural Heritage Commission land and is located where the Boston Mountains meet the Springfield Plateau of the Ozarks in Independence County. It includes one of the most biologically significant caves in Arkansas making protecting the site a high priority (Arkansas Natural Heritage Commission 2018).

In Missouri, approximately 60 miles southwest of Springfield near Diamond, the George Washington Carver National Monument is a NPS site near transmission line 3009. George Washington Carver's boyhood home consists of rolling hills, woodlands, and prairies. The 240-acre park has a visitor center, theater, museum, an interactive exhibit area for kids, and a 0.75-mile nature trail. In addition, a small portion of transmission line 3002 (approximately 1 mile) crosses a tract of MDC land (Poplar Bluff and Stephen J. Sun conservation areas) in Butler County.

3.2.1.5 Land Ownership

Approximately 96 percent of Southwestern's transmission line corridors are located on private landowner's property via easement. An easement is a right to cross or otherwise use someone else's land for a specified purpose. In general, private land which is not located within any municipality falls under the jurisdiction of the county it is located within. Generally, Southwestern owns the land where offices/maintenance complexes, communication sites, and substations are located. A small percentage of Southwestern transmission lines, substations, and communication sites are located on USACE hydropower dam generation sites, by permits. Southwestern receives electricity immediately below the dam, through substations and conveyance through a short span of transmission lines until it reaches private lands in the ROW. As discussed above, some facilities are under special use permit with the USFS and very small portions of lines cross WMAs and the Foushee Cave Natural Area owned by the State of Arkansas (Table 3-2). Southwestern's service area does not include any Indian Reservations or Indian Trust Lands other than an area where a transmission line (line 3017) spans a small portion, approximately

0.2 mile, of a 96-mile-long section of the Arkansas River in eastern Oklahoma which is Indian Trust Land for several tribes. Figure 3-2 identifies land ownership/management near the facilities in the three-state area.

3.2.1.6 Applicable Land Use Plans and Policies

Because the Proposed Action area is large, this EA does not identify every land use plan and policy that potentially applies. In addition, new land use plans and policies could be created, as well as existing plans and policies may be revised. Southwestern would work with land managers to follow updated and new provisions. As described above, the Proposed Action areas include 96 percent private property via easement, as well as a very small amount of Indian Trust Land where a line spans 0.2 mile across the Arkansas River in Oklahoma, and Southwestern, USACE, USFS, AGFC, Arkansas Natural Heritage Commission, NPS, and MDC lands. Major resource management plans in effect within the Proposed Action areas include:

Revised Land and Management Plan for the Ozark-St. Francis National Forests and accompanying environmental impact statement (2005) – describes desired conditions for management areas and the ecological systems that occur within the management areas.

3.2.2 Environmental Consequences

Impacts on land use would be significant if the Proposed Action would cause:

- Land use changes that would conflict with existing or planned land uses
- Land use changes that would conflict with community land use plans or zoning

3.2.2.1 Proposed Action

The Proposed Action activities would take place within existing Southwestern facilities and ROWs. No new ROWs would be created and no new facilities would be constructed. The Proposed Action would not cause any changes to existing land uses. Southwestern would continue to work with property owners to ensure that any potential use of a ROW does not pose a threat to public safety or to the reliability of the electrical system. Unauthorized use, however, could result in the removal of structures or other personal property at the expense of the property owner. The Proposed Action would not cause any changes to land ownership or management.

O&M activities would take place within existing Southwestern facilities but could temporarily disrupt adjacent land uses. In general, adjacent uses are mostly agricultural, pasture, and forest lands in rural areas that are sparsely populated. Nuisance noise that could affect adjacent residential and recreational land uses is described in Section 3.9. Likewise, manual and mechanical control of vegetation could cause similar short-term disruptions to adjacent land uses.

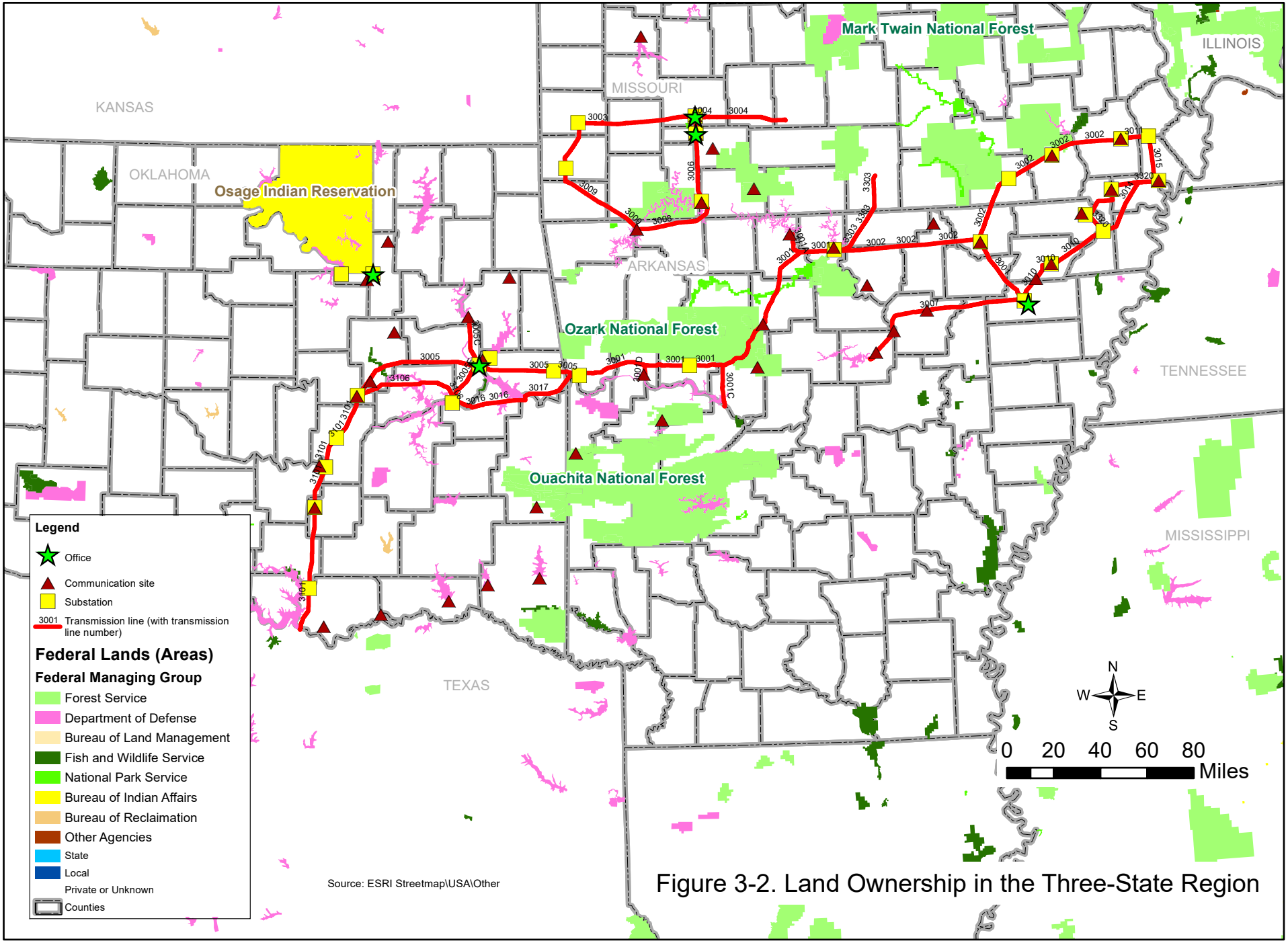


Figure 3-2. Land Ownership in the Three-State Region

In accordance with the Office of Corporate Facilities Maintenance Standards, *Vegetation Maintenance Program* (MA-23, Rev. 2), Southwestern would contact the landowner to request permission to apply herbicides and would identify the herbicides and application methods to be used and any restrictions that would occur on the property. For example, some herbicides have restrictions related to farming. Southwestern generally controls vegetation in forest and overgrown shrubland. Areas used for pastureland and farming require little to no vegetation control. Since Southwestern does not need to control much vegetation in these areas, these restrictions would usually not be a factor for the program. However, there could be cases where the landowner or tenant would want to use the treated ROW for hay, pasture or crops. Copies of the farming restrictions and safety data sheets (SDSs) are provided to landowners upon request. If the landowner does not give permission, the herbicides would not be applied.

Southwestern would continue to comply with existing special use permits for its facilities in the Mark Twain National Forest in southeastern Missouri and the Ozark-St. Francis National Forest in Arkansas. Southwestern would coordinate approved vegetation management with the Missouri Department of Natural Resources for any transmission lines that cross Missouri State Park properties, such as Table Rock Lake State Park. Impacts to recreation areas next to or outside transmission line ROWs, such as increased noise near campgrounds or preventing access to the recreation site, trail, or trailhead, could occur during maintenance or vegetation treatment activities. Activities would occur for short periods at various locations and would not be concentrated in one area for extended periods. Southwestern would coordinate with land management agencies to ensure the public is informed of any disruptions to recreation.

Best Management Practices

The following BMPs would be implemented to protect adjacent land use:

- If using herbicides near crops, comply with pesticide-free buffer zones, if any, per label instructions.
- Request permission from landowners to apply herbicides and provide SDSs upon request.
- Notify land owners and recreation users and post signage in areas requiring temporary closure for proposed activities.
- Minimize noxious weeds by cleaning seeds from ground-disturbing equipment and repair any damage caused during maintenance activities.
- Coordinate with affected land management agencies to ensure activities are consistent with applicable land use plans and regulations.
- Comply with existing special use permits.

3.2.2.2 No Action Alternative

Activities under the No Action Alternative would take place within existing Southwestern facilities. No new ROWs would be created and no new facilities would be constructed. The No Action Alternative would not cause any changes to existing land uses. Potential disruptions to agricultural, residential, and recreational lands would be similar to those described for the Proposed Action. Because the range of herbicides that could be used under the Proposed Action would not be available under the No Action

Alternative, the No Action would require greater use of heavy equipment to control vegetation within the ROW and these activities may need to occur more often. Therefore, there may be slightly greater impacts to adjacent land uses.

3.3 Water Resources

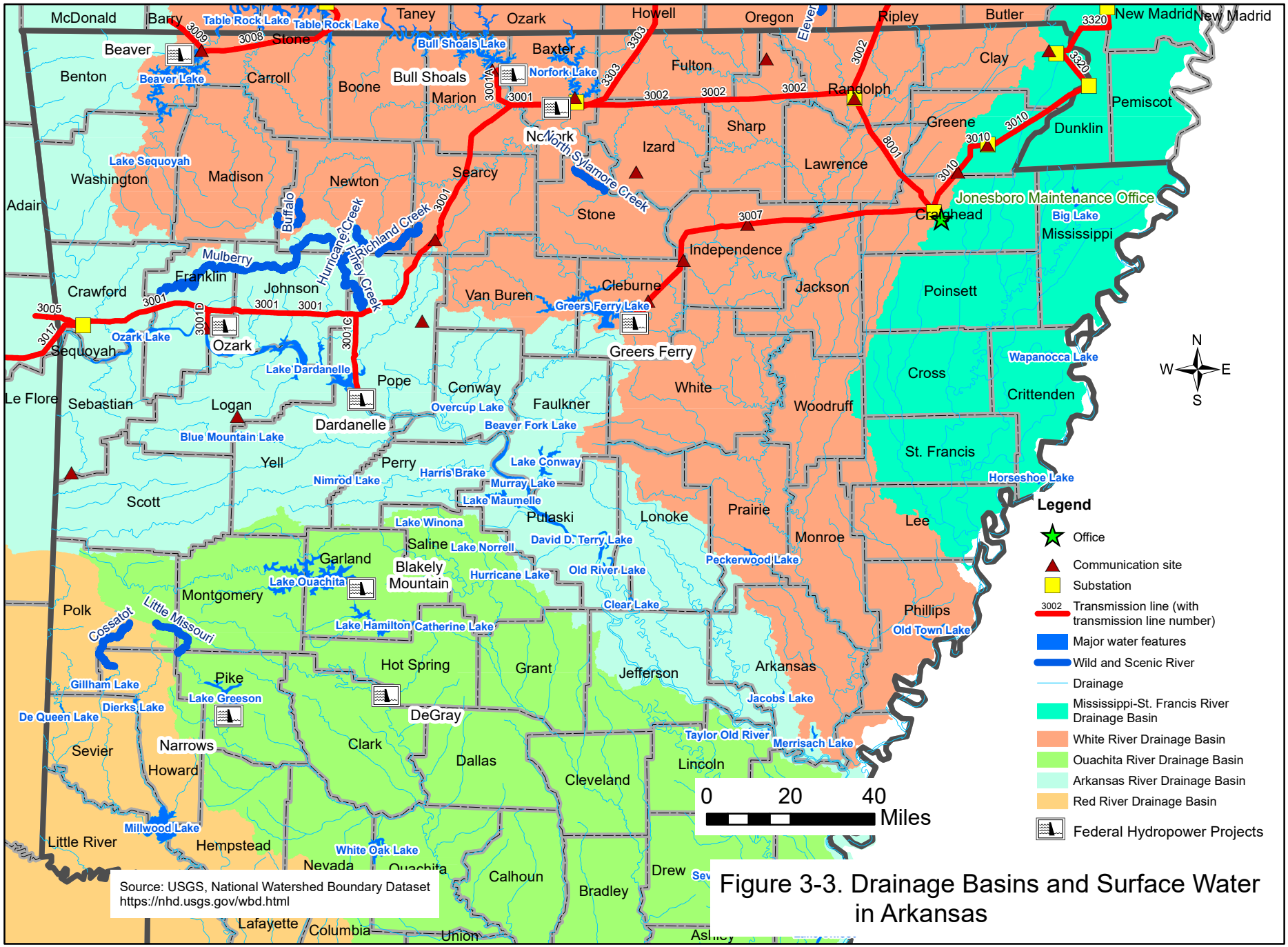
The humid climate of the region produces abundant precipitation. Precipitation can either generate overland flow and runoff into surface waters or infiltrate into the soil and recharge groundwater. Surface water and groundwater are abundant in the Proposed Action areas and are discussed in this section, along with wetlands and floodplains. The ROI for impacts to water resources is the surface water, groundwater, wetlands, and floodplains at Southwestern's facilities as well as drainage pathways that could be affected by runoff adjacent to them.

3.3.1 Affected Environment

3.3.1.1 Surface Water

Surface water is present as rivers, streams, swamps, wetlands, springs, and natural and made-made lakes and impoundments. The transmission lines cross six major drainage basins in the three state area going from the south to north, Red River (OK), Arkansas River (OK and AR), White River (AR and MO), Mississippi-St Francis River (MO and AR), Osage (MO), and Missouri River (MO) as shown on Figures 3-3, 3-4, and 3-5. These rivers are important sources of water and in places with major dams they form the area's largest lakes. The transmission lines cross numerous perennial and intermittent streams, natural lakes, manmade lakes, and reservoirs; line 3005 crosses a state-designated scenic river in Oklahoma (Big Lee's Creek) (Oklahoma Scenic Rivers Commission 2018). Line 3001 crosses the Buffalo River in Searcy County, Arkansas. To the west, in Newton County, Arkansas the Buffalo River is designated as a National Wild and Scenic River, the NPS manages the resources for which the river has been designated. Although the ROW does not cross the Buffalo River where it is designated as a National Wild and Scenic River, the NPS has been consulted during the preparation of this EA. Most perennial streams in the study area are fed by intermittent streams, springs, and natural lakes. There are a number of major reservoirs with dams and locks operated by the USACE for hydroelectric power, flood control, and recreation. USACE also operates locks and dams at a couple locations on the Arkansas River in Arkansas.

A spring is a place where groundwater flows naturally from rock, sediment or soil onto the land surface. Its presence depends on the nature and relationship of permeable and impermeable units, on the position of the water table, and on the land topography. Springs are prevalent in the Ozark Plateau region where transmission lines pass through northern Arkansas and southern Missouri. Springs consist of two general types: perennial and seasonal. Perennial springs flow year round whereas seasonal or "wet weather" springs dry up periodically, especially during droughts or long periods of minimal rainfall. In Arkansas and Missouri these conditions often occur during late summer and early fall. In this region, springs have historically been important community water sources. Most communities have now begun to abandon natural springs as water supplies because shallow springs are susceptible to contaminants from the surface (Arkansas Geological Survey 2015a).



Source: USGS, National Watershed Boundary Dataset
https://nhd.usgs.gov/wbd.html

Figure 3-3. Drainage Basins and Surface Water in Arkansas

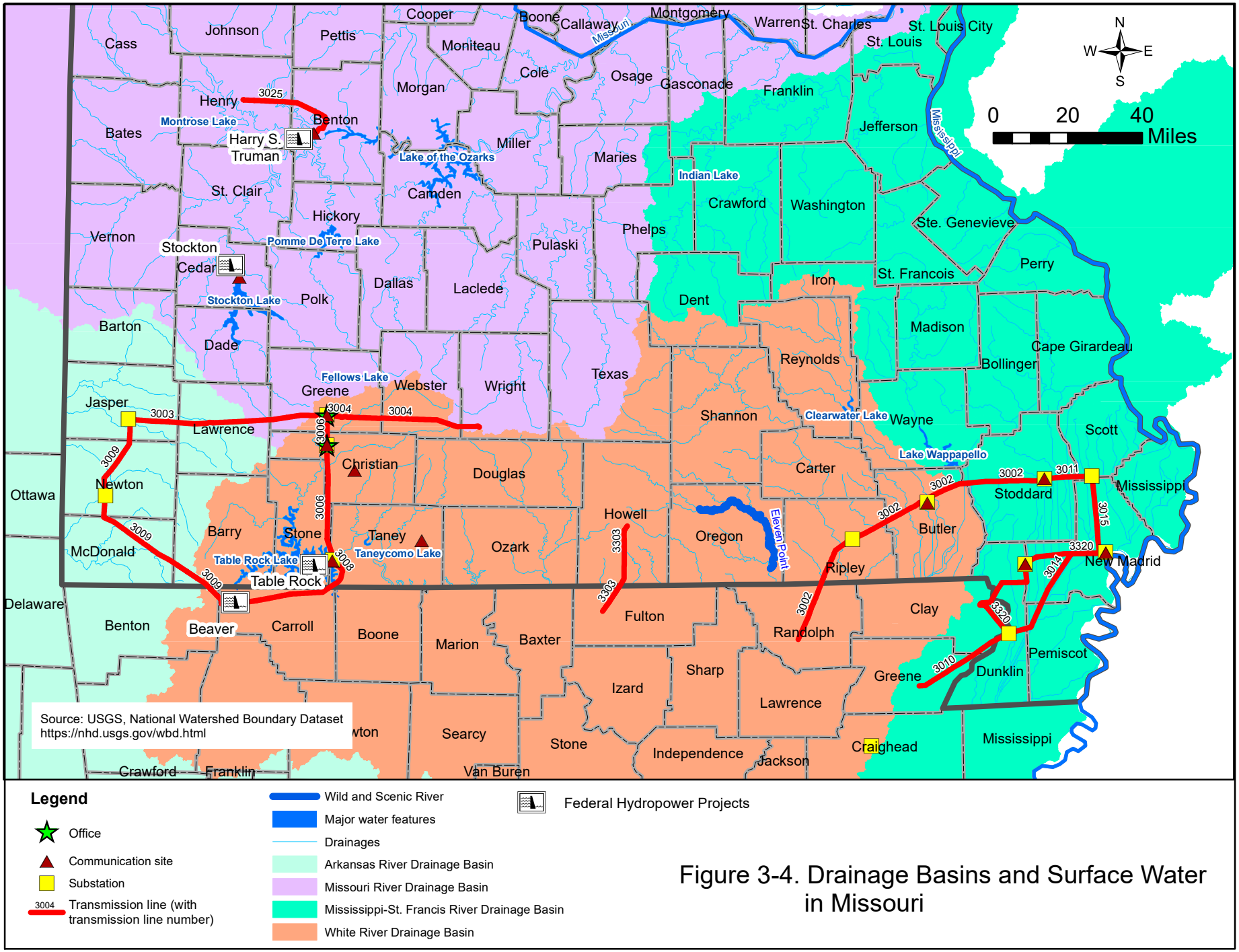


Figure 3-4. Drainage Basins and Surface Water in Missouri

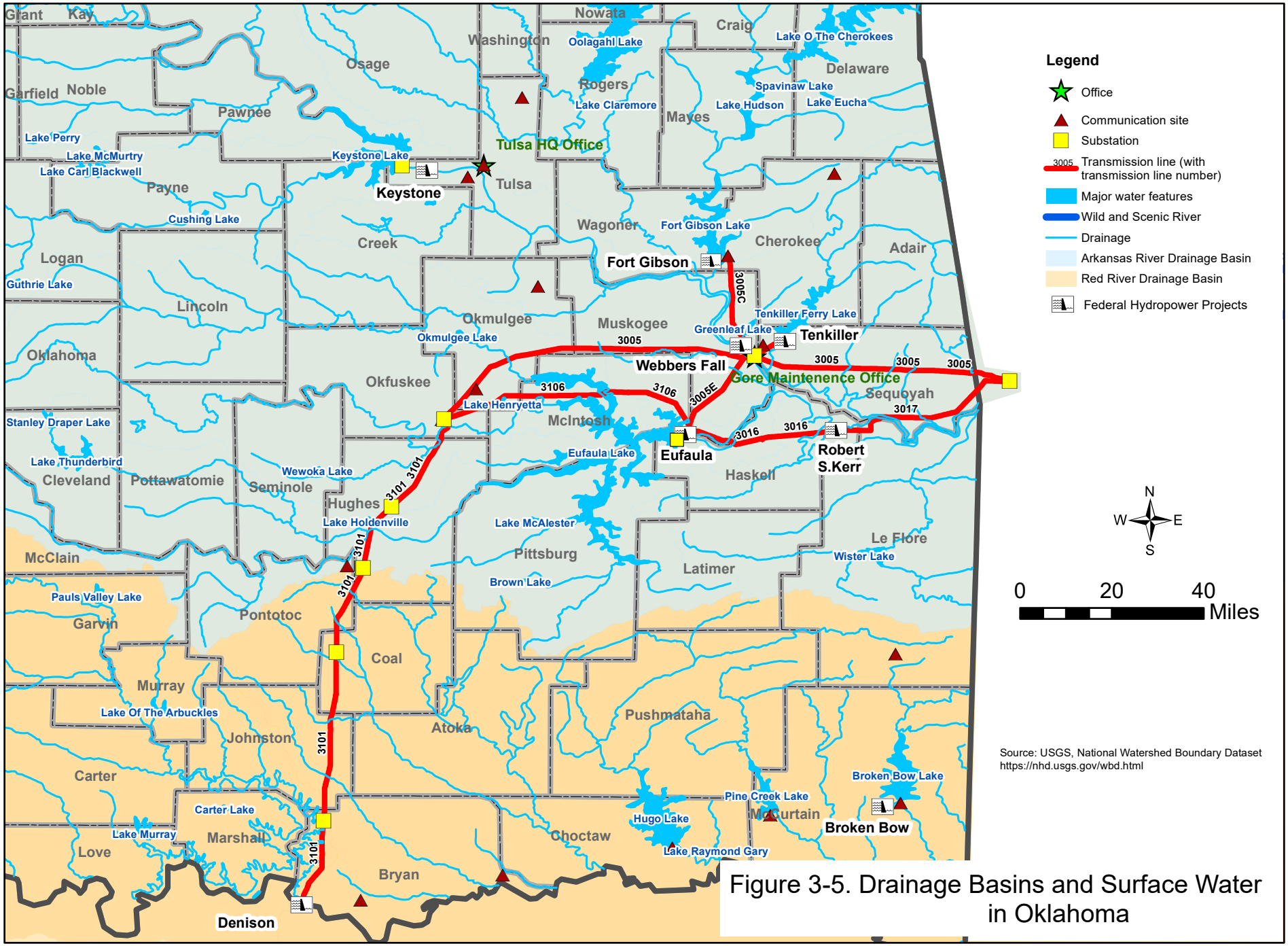


Figure 3-5. Drainage Basins and Surface Water in Oklahoma

Surface water is used for municipal, industrial, agricultural, and recreational uses. Many of the watersheds fed by the perennial streams are used as sources for public drinking water. Surface water quality is excellent in most streams except during major storms, when runoff from mines, farms, roads, and construction sites contributes materials to the surface water. Localized contamination often occurs near urban areas, industrialized centers, agricultural chemical use areas, and waste sites. In the Salem and Springfield portions of the Ozark Plateau, limestone and dolomite produce a neutral pH surface water high in dissolved minerals. Elsewhere in the Ozark Plateau, sandstone and novaculite produce neutral pH surface water low in dissolved minerals.

Surface water quality is protected under the Clean Water Act (CWA). Three sources of surface water discharge were identified at Southwestern facilities: storm water drainage, discharges from conduit sumps, and discharges from secondary oil containment areas. "Storm water" means storm water runoff, snowmelt runoff, and surface water runoff and drainage. These surface water discharges are managed through the National Pollutant Discharge Elimination System (NPDES) permit program, authorized by the CWA, and carried out by the States. Southwestern's Environmental Management System (EMS) establishes a *National Pollutant Discharge Elimination System Program* that includes the provisions for NPDES permits that are required at Southwestern facilities. According to the preamble of 40 CFR Part 122 (2005), Southwestern substations are not required to apply for NPDES permits because Southwestern activities do not involve industrial operations as defined in the regulation and because oil is enclosed in electrical equipment and does not come into direct contact with storm water. This exemption applies to storm water drainage, discharges from conduit sumps and discharges from secondary oil containment structures. However, the State of Missouri views secondary containment devices such as oil/water separators as wastewater treatment devices, which require general operating NPDES permits according to its regulations. Currently, Southwestern has five substations in Missouri (Nixa, Table Rock, Kennett, New Madrid, and Norfork) which use these types of devices. Southwestern holds a general operating NPDES permit for these facilities and monitoring is performed in accordance with its provisions.

The exemption described above also applies to pentachlorophenol-treated wood products stored onsite at three pole yards, because the treated wood products are not expected to have an effect on storm water quality and because the primary function of Southwestern facilities is the transmission of electric power (not the storage of treated wood products).

Storm water construction permits are obtained from the appropriate state environmental agency when an O&M activity disturbs 1 acre or more of soil. Storm water construction permits require implementation of BMPs and appropriate pollution prevention to minimize impacts to surface water.

Southwestern's EMS establishes a *Spill Prevention Control and Countermeasures Program*, described in Section 3.11 of this PEA, and provides procedures to limit the transfer of pollutants to storm water. Procedures to inspect discharge storm water from oil/water separation tanks and catchment basins are included, and an Environmental Inspection Checklist is completed on a bi-monthly basis.

3.3.1.2 Groundwater

Groundwater levels in the surficial aquifer respond to climatic influences, as continual discharges to streamflow are offset by periodic rainfall. There are also areas within the study area where streams

recharge the groundwater in a region. Water levels in these unconfined aquifers are typically highest in the winter and lowest in the summer.

Groundwater found within limestone and dolomite usually contains high levels of calcium carbonate. Groundwater found within the valley deposits of the Mississippi, Arkansas, Red, Ouachita, and White rivers is often high in iron. Groundwater can be easily impacted in karst terrain through sinkholes, sinking creeks, and caverns.

Generally the substations and transmission lines in Oklahoma are located within the Central Lowlands Physiographic Province where the surficial geologic deposits are predominantly bedrock formations consisting of shale, and shaly sandstone and to a lesser extent non-karst limestone. The substations are located within the Red River and Arkansas River alluvial valleys where the surficial geologic deposits predominantly consist of unconsolidated clay, silt, sand and gravel. These deposits comprise unconfined aquifers with moderate to high permeability whose water table is generally within 10 to 30 feet below land surface. Within Cherokee County, Oklahoma groundwater in the surficial aquifer in this region exists in fractured and karstified carbonate formations.

The majority of the substations and transmission lines in southwest Missouri and northern Arkansas are situated within the Ozark Plateau Physiographic Province. The Ozark Plateau is characterized by an extremely thick sequence of carbonate (limestone and dolomite) bedrock formations. Generally there exists a thick clay rich residual soil overlying the bedrock. The carbonate rocks in this area are quite soluble in the presence of water. Solution by groundwater has caused many large openings through which water passes so quickly that contaminants from the surface cannot be filtered out. Signs of these openings are caves, sink holes, springs, and lost stream segments. Groundwater in the surficial geologic deposits exists in unconfined to semiconfined fractured and karstified bedrock formations. There are two important aquifers at greater depth – the Roubidoux Formation and the Gunter Member of the Gasconade Formation. Both are permeable sandstone and carbonate units of Ordovician age. These aquifers serve as the principal source of high-quality water for many communities in northern Arkansas. These formations do not outcrop anywhere in Arkansas but instead outcrop in southern Missouri (Arkansas Geological Survey 2015b).

Substations and transmission lines located in southeastern Oklahoma and west-central Arkansas are situated within the Ouachita Physiographic Province and underlain by weathered shale. The dominant rock types consist of sandstone along the ridges and shale in the valleys. The topsoil in the upland regions generally consists of sandy loam and is only a few feet thick. Bedrock formations in the upland region have a low permeability and yield very small quantities of water to wells. The surficial geologic deposits in low lying areas commonly consist of alluvial deposits of clay, silt, sand, and gravel. The alluvial deposits generally possess surficial unconfined aquifers and groundwater occurs relatively close to the ground surface. Because of the predominance of shale in both the surface and subsurface rocks in the Arkansas Valley and Ouachita Mountains regions, and the low porosity of many of the interbedded sandstones, few rock units qualify as aquifers. Because most wells yield less than 10 gallons per minute, most communities rely on surface water supplies (Arkansas Geological Survey 2015).

Substations and transmission lines located in Dunklin, New Madrid, Butler, and Stoddard counties in Missouri, and in Craighead, Greene, and Clay counties in Arkansas, are situated in the Mississippi

Alluvial Plain Physiographic Province. The surficial geologic deposits in this region consist of unconsolidated alluvial deposits of clay, silt, sand, and gravel. The surficial aquifer in this area is generally unconfined and groundwater occurs relatively close to the land surface (approximately 5 to 50 feet below ground surface) (Arkansas Natural Resources Commission 2017). Although usable for irrigation and some domestic uses, the high iron content of surficial aquifers makes the water generally unsuitable for human consumption in many areas. In this area, most domestic and municipal needs are supplied by deeper aquifers, including the Mississippi River Valley alluvial aquifer, which extends north from Arkansas into Missouri, south into Louisiana, and under the Mississippi River into Tennessee and Mississippi. The aquifer is the uppermost aquifer in the Mississippi Embayment and is composed of 50 to 150 feet of sand and gravel, grading from coarse gravel at the bottom to fine sand at the top. It generally is overlain by the Mississippi River Confining Unit, which is composed of 0 to 50 feet of fine-grained sand, silt, and clay. The alluvial aquifer is underlain by confining units composed of aquifers and confining units of the Mississippi Embayment, which are less permeable than the alluvial aquifer. The alluvial aquifer is connected hydraulically with several rivers and drainage areas (Arkansas Geological Survey 2015).

Southwestern's EMS establishes a *Groundwater Protection Management Program* that indicates there is little to no potential for groundwater contamination associated with the transmission lines or the radio and microwave towers. Thus, Southwestern's groundwater management program is focused on substation facilities that handle dielectric fluid and compressor oils. Currently, there is no need for a site-specific groundwater monitoring program, and that need is evaluated based on current conditions. In addition, Southwestern has a *Well Management Program*, which establishes procedures for maintaining or plugging water wells to protect water-bearing formations against possible contamination.

3.3.1.3 Wetlands and Waters of the U.S.

Wetlands are transitional lands between terrestrial and aquatic ecosystems, and are characterized by the presence of hydrophytic vegetation, hydric soil, and hydrology. In addition to providing habitats for many plants and animals, wetlands function to improve water quality, control flood waters, and control erosion. Wetlands have been impacted through agriculture in the United States. Agricultural impacts include drainage and filling, channelization, alteration of wetland hydrology, and the runoff of herbicides, pesticides, fertilizers, and soil into wetlands. The transmission lines cross several types of wetlands, including forested, scrub-shrub, and emergent. Forested wetlands are dominated by woody vegetation greater than 20 feet tall. Scrub-shrub wetlands are dominated by woody vegetation less than 20 feet tall. Emergent wetlands are dominated by erect, rooted, herbaceous hydrophytic vegetation (Southwestern 1995a). Wetlands are protected under Section 404 of the CWA and 24 CFR Part 55. Additionally, EO 11990, *Protection of Wetlands*, intends "to avoid to the extent possible the long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practicable alternative."

"Waters of the U.S." are considered jurisdictional waters under the CWA and are regulated by the USACE. Work in or adjacent to waters of the U.S. requires a permit by the USACE. Waters of the U.S. within the ROI include, but are not limited to the following: Illinois River, Arkansas River, Missouri River, Red River, White River, St. Francis River, and Mississippi River.

3.3.1.4 Floodplains

Floodplains are low-lying areas associated with streams, rivers, and/or wetlands that have at least a one-percent chance of flooding each year. Under 10 CFR 1022 and EO 11988, *Floodplain Management*, federal agencies are required to avoid or minimize adverse impacts that might result from changing or occupying floodplains. Many of Southwestern's transmission lines and access roads cross floodplains, while some substations are located next to floodplains. In addition, the Jonesboro maintenance office complex is located in a floodplain.

3.3.2 Environmental Consequences

Potential impacts to water resources, including surface water and groundwater, are evaluated with respect for the potential to irreversibly diminish water supply, water quality, or endanger public health by creating or worsening adverse health hazard conditions.

3.3.2.1 Proposed Action

Under the Proposed Action, the regulatory compliance requirements and Southwestern's guidelines and programs that are in place to be protective of water resources would remain in place and continue to be reviewed and updated on a regular basis. Continuation of O&M activities and the Integrated Vegetation Management Program have the potential to impact surface water, groundwater, wetlands, and floodplains, as described below.

3.3.2.1.1 Surface Water and Groundwater

Some short-term decreases in water quality, from erosion, increasing surface water runoff, or sedimentation, could occur during O&M activities, such as bank repair, replacement of poles, or repairing underground utilities. Storm water runoff from maintenance sites has the potential to pick up pollutants like sediment, debris and chemicals and transport these to a nearby municipal storm sewer system or directly to a stream, lake, or wetland. Additionally, mechanical techniques for controlling vegetation have the potential to cause erosion, by compaction or rutting from the wheels of the tractors, which can directly or indirectly affect water quality. Erosion can affect water quality by causing increased turbidity (sediments suspended in water), sedimentation (sediments that settle to the bottom), and/or surface-water runoff. Sediment in water bodies can reduce the amount of sunlight reaching aquatic plants, clog fish gills, smother aquatic habitat and spawning areas, and cause stream bank erosion.

Small, non-distinct streams and wetlands have the greatest potential to be affected because they are small and can be overlooked. Removal of streamside (or riparian) vegetation, could affect surface water by the following:

- Increasing surface runoff
- Promoting erosion and sedimentation, which reduces water quality
- Reducing shading and increasing water temperatures
- Limiting organic plant debris, and thus the amount of nutrients, entering the water

However, Southwestern transmission lines normally do not parallel streams but rather cross them at an angle. The amount of vegetation removed and consequently the amount of steam surface exposed by such activity is thereby kept to a minimum.

Initial use of herbicides in the ROW may result in increased erosion due to less vegetative cover; however, the promotion of grass growth in the ROW would reduce impacts to surface water, since grasses provide more soil erosion protection than shrubs and trees.

If an O&M activity would disturb 1 acre or more of soil, Southwestern would obtain a storm water construction permit from the state environmental agency. Implementation of the BMPs discussed below and appropriate pollution prevention controls required in the permit would minimize erosion and sedimentation impacts to surface water.

There is the potential for chemical or oil spills while conducting O&M activities, or working along the ROW and at the substations. Such spills, if not contained immediately, could potentially migrate and threaten surface water quality. Minor fuel and oil spills could occur from power tools (chainsaws) and release of oil during operation of equipment and machinery. There is also the potential for herbicide spills during application activities. The impacts of herbicide spills would depend on the persistence and mobility of the spill, as well as on how quickly and thoroughly the spill was cleaned up. Southwestern's employees are prepared and trained to clean up such minor spills, so impacts would be minor.

For operation of substations in Missouri that have an oil/water separator, an NPDES permit would be maintained or obtained, as appropriate. Implementation of Southwestern's spill prevention, control, and countermeasures (SPCC) plans for substations, as described in Section 3.11 of this PEA, would minimize impacts from spills.

Of the herbicides evaluated in the Proposed Action, five herbicides are approved for use in surface waters: 4 # Amine; Arsenal; Polaris; Rodeo; and Vastlan. The other herbicides are specifically restricted from use in surface waters. Table 2-4 identifies the proposed list of herbicides selected for consideration under the Proposed Action, as well as, their characteristics, target vegetation, and types of facilities where they could be used. Table 2-5 lists recommended combinations of herbicides for use under the Proposed Action. Southwestern does not spray herbicides directly on surface water, nor do they spray within 15 feet from any water's edge. The five herbicides noted above that are approved for aquatic use should be used near sensitive water receptors or open water bodies. When applying herbicides near surface water, selecting one of these herbicides would minimize impacts to water resources and possibly improve water quality in terms of minimizing erosion and sedimentation that would otherwise come from use of mechanical vegetation control techniques.

The potential for a land-approved herbicide to reach water would depend on the herbicide's physical properties and the site conditions. The four most significant means of offsite movement are runoff, leaching, drift, and misapplication/spills. Runoff is the surface or lateral migration through rainfall or erosion. Leaching is the downward (or vertical) migration through the soil. Drift is the airborne movement of herbicides through wind or evaporation. Misapplications and spills are caused by failure of the applicator to follow the label instructions/restrictions or by the accidental spilling of an herbicide

during mixing, application or equipment cleaning. Surface water could be affected by any of these means of herbicide movement, whereas groundwater would be potentially affected only by leaching.

Southwestern would use of the GIS Resource Mapper and the site-specific herbicide selection considerations in Figure 2-2 to prevent herbicides from reaching surface water and groundwater from runoff and leaching. Southwestern only uses herbicide application methods which positively limit the spray to Southwestern's ROW, thus limiting drift. Specifically, herbicides would not be applied within 15 feet of surface water; karst features to be protective of leaching through the karst to groundwater; and if sandy soil is present, an herbicide that has permeable soil restrictions would not be permitted. The GIS Resource Mapper would be used to identify surface water, karst terrain, and sandy soil.

Site conditions also determine the likelihood of herbicide reaching water resources. How close herbicides are applied to water resources determines the potential for herbicides to reach water. Buffers (defined widths of non-treated land) are the most common measure used to protect such environments. Southwestern would not use any herbicide within 15 feet of surface water or karst features.

Because powerlines are linear in nature, the area of land treated with herbicides would be relatively small (narrow strips across the landscape) compared to the surrounding area. The ratio of treated to untreated surface area in any given watershed is usually sufficiently low to permit rapid dilution. This ratio is much lower than that for the concentrated areas or blocks of land typical of herbicide treatments in agricultural and forestry practices.

3.3.2.1.2 Wetlands and Waters of the U.S.

O&M activities occurring in the waters of the U.S. or impacting a wetland, such as repairing a stream crossing, could require obtaining a USACE 404 permit. Wetlands can be affected by machines compacting the typically soft, saturated soils. For specific O&M projects, wetlands would be identified using the USFWS National Wetland Inventory Mapper at https://www.fws.gov/wetlands/data/mapper.html.

3.3.2.1.3 Floodplains

O&M activities occurring in the 100-year or 500-year floodplain would require special attention to minimize impacts to the floodplain. Heavy vehicles would be kept on access roads and not driven off road in the floodplain. For specific O&M projects, floodplains would be identified using the Federal Emergency Management Agency (FEMA) Flood Map Service Center at https://msc.fema.gov/portal.

Permitting and Best Management Practices

The following BMPs would be applied for protection of water resources:

- *Consistently* utilize Southwestern's Table 2-4, Table 2-5, and Figure 2-2 in this PEA and also the GIS Resource Mapper for selecting the herbicide with lowest relative risk of migrating to water resources.
- Continue to implement Office of Corporate Facilities Maintenance Standards, *Vegetation Maintenance Program* (MA-23).

- Recognize that any discharge of material (displaced soils and, in certain circumstances, vegetation debris) within a water of the U.S. may be subject to USACE regulations under the CWA.
- Obtain appropriate construction storm water permit if project area is greater than 1 acre.
- Obtain appropriate NPDES permit from Missouri for oil/water separators.
- In riparian areas, use manual control methods and take care not to affect non-target vegetation.
- In riparian areas, leave vegetation intact, where possible.
- In floodplains, ensure heavy trucks/machinery stay on access roads.
- Do not permit debris from tree falling, cutting, or disposal to fall into or be placed in any watercourse, spring, pond, lake, or reservoir, *unless* there is approval from the appropriate authorities for stream habitat projects.
- *For all methods using machinery or vehicles* (i.e. chainsaws, trucks, graders) keep the equipment in good operating condition to eliminate oil or fuel spills.
- Do not wash equipment or vehicles at a stream.
- Follow herbicide product label directions for appropriate uses, restrictions etc.
- Ensure that there is no danger of granular herbicides being washed from the areas of application.
- Notify inspector and the State of any amount of herbicide spill in or near water.
- Always use siphon prevention devices/methods when filling herbicide tanks from domestic water supplies.
- Protect surface water and groundwater by observing the 15-foot buffer in karst terrain and at water's edge.
- *Before herbicide application*, thoroughly review the ROW to identify and mark, if necessary, the buffer requirements.

3.3.2.2 No Action Alternative

Under the No Action Alternative, the regulatory compliance requirements and Southwestern's guidelines and programs that are in place to be protective of water resources (described in Section 3.3.1) would remain in place and continue to be reviewed and updated on a regular basis.

However, Southwestern would not have the flexibility to use better formulated herbicides that are geographically targeted. These restrictions would lead to shortened time intervals between herbicide treatments, and would require continued use of large machinery around surface body waters, potentially causing more erosion and sedimentation.

3.4 Biological Resources

Biological resources include native or naturalized plants and animals and the habitats (e.g., grasslands, forests, and wetlands) in which they exist. Special status plant and wildlife species are subject to regulations under the authority of federal and state agencies. Special status species include species

designated as threatened, endangered, or candidate species by state or federal agencies. The federal Endangered Species Act (ESA) of 1973 protects listed species against killing, harming, harassment, or any action that may damage their habitat. Under the ESA (16 USC §§ 1531 – 1544), an endangered species is defined as any species in danger of extinction throughout all or a significant portion of its range. A threatened species is defined as any species likely to become an endangered species in the foreseeable future. Candidate species are those species for which the USFWS has sufficient information on their biological status and threats to propose them as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by other higher-priority listing activities. Although candidate species receive no statutory protection under the ESA, the USFWS believes it is important to advise government agencies, industry, and the public that these species are at risk and could warrant protection under the ESA. Sensitive habitats include those areas designated by the USFWS as critical habitat protected by the ESA and sensitive ecological areas as designated by state or federal rulings.

The Migratory Bird Treaty Act (MBTA), 16 USC §§ 703-712, protects those migratory birds listed in 50 CFR 10.13 from capture, pursuit, hunting, or removal from natural habitat. Over 800 bird species are currently protected under the MBTA. In 2001, EO 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, was issued to ensure that federal agencies consider environmental effects on migratory bird species and, where feasible, implement policies and programs supporting the conservation and protection of migratory birds. The USFWS removed the bald eagle from the list of species protected under the ESA in July 2007. However, the bald eagle continues to be protected under the federal Bald and Golden Eagle Protection Act (BGEPA) and the MBTA.

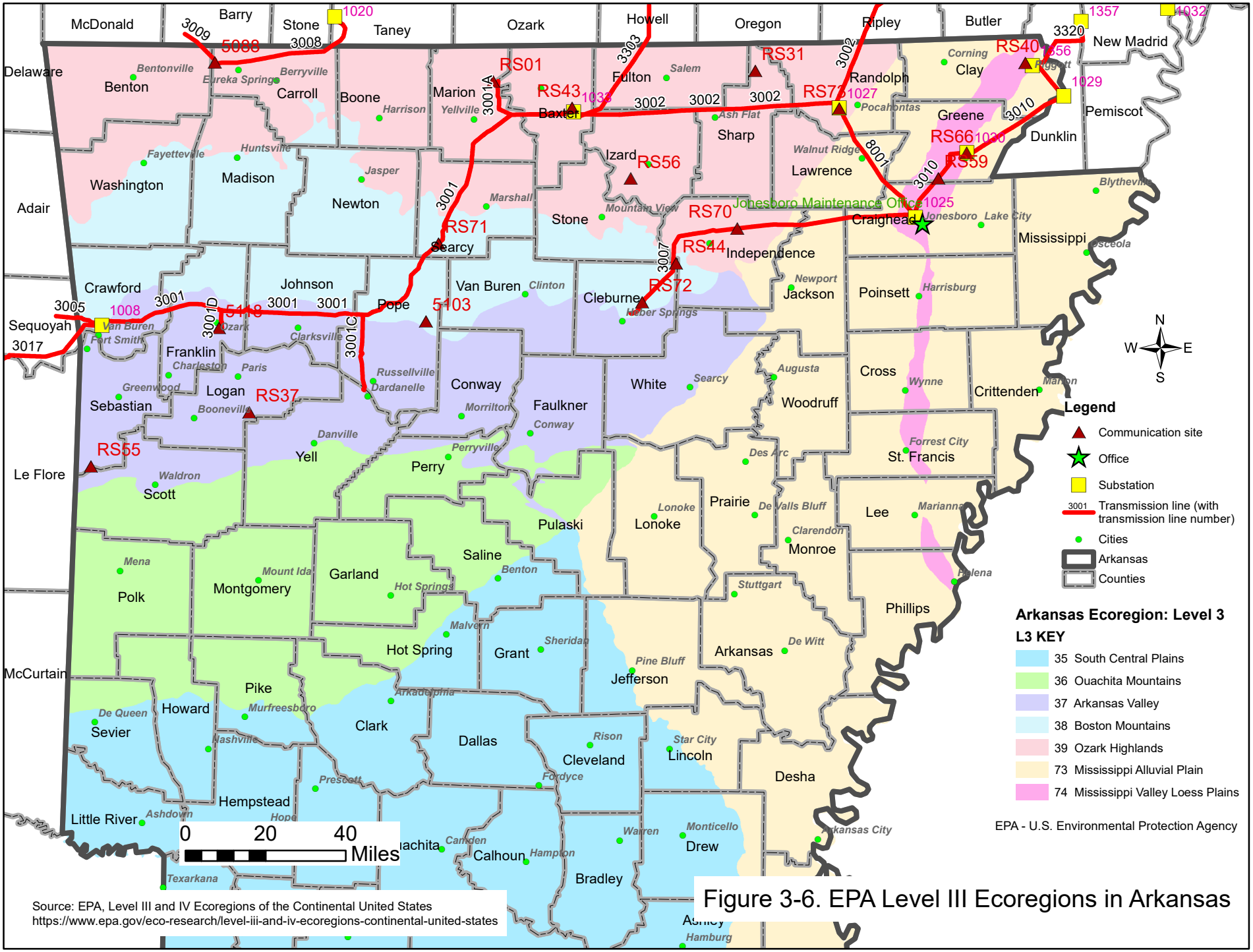
The ROI for biological resources is defined as the Proposed Action areas and includes 1,347 miles of transmission lines as well as 69 structures or sites of varying size (i.e., communication sites, substations, pole yards, etc.). The transmission lines and associated structures occupy land in northern Arkansas, southern Missouri, and eastern Oklahoma. The total disturbed area within each state (including structures, sites, and the ROW) is 6,525 acres, 5,485 acres, and 4,700 acres in Arkansas, Missouri, and Oklahoma, respectively, for a total of approximately 16,710 acres.

3.4.1 Affected Environment

3.4.1.1 Vegetation

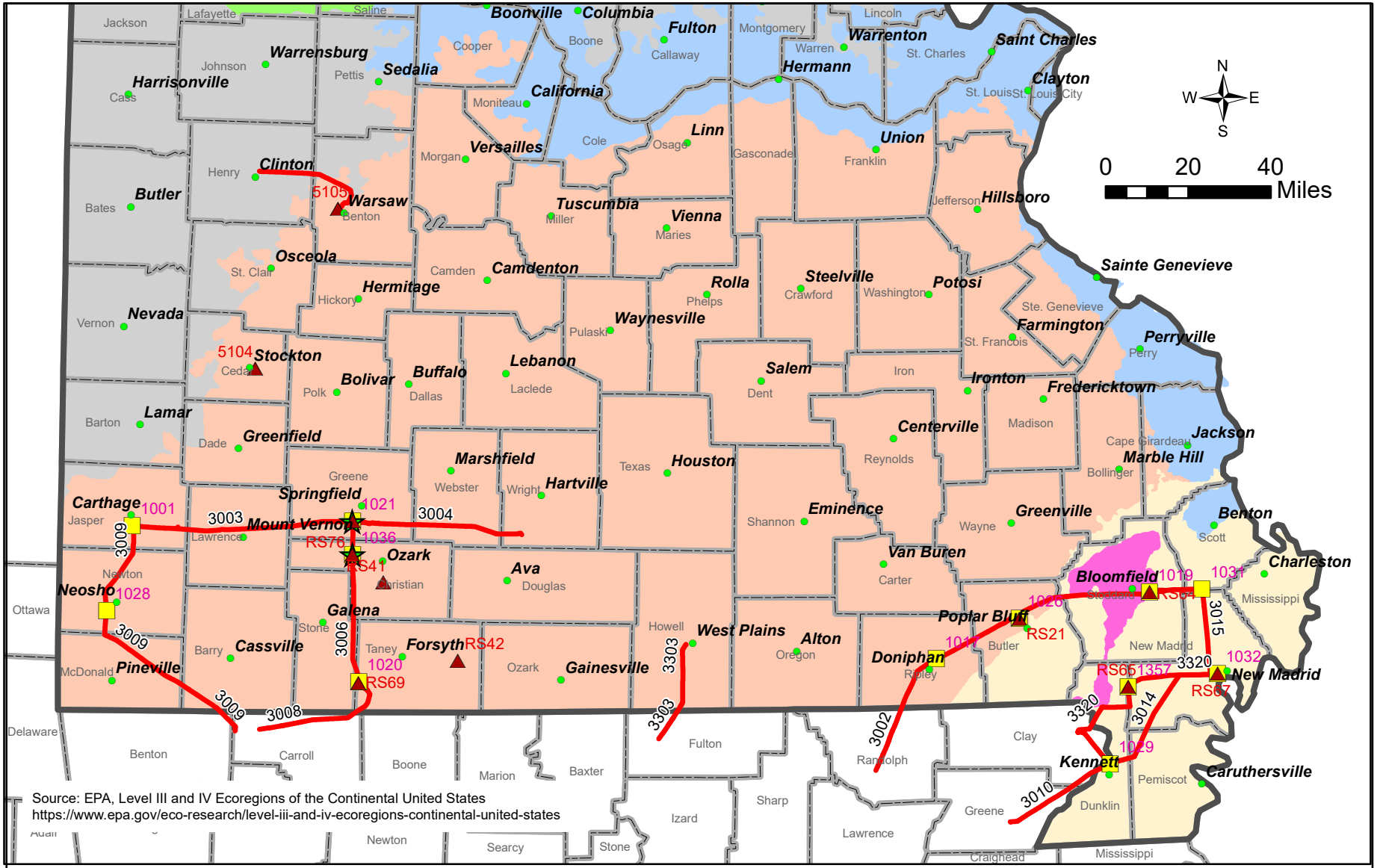
The Proposed Action encompasses 10 Level III ecoregions as defined by the EPA. Figures 3-6, 3-7, and 3-8 show the ecoregions near the facilities in Arkansas, Missouri, and Oklahoma, respectively. The following Level III ecoregion descriptions were compiled from Chapman et al. (2002), Wiken et al. (2011), and Woods et al. (2005):

- **Arkansas Valley –** The Arkansas Valley lies between the Ozark Plateau and the Ouachita Mountains in eastern Oklahoma and western Arkansas. It is a diverse area containing plains, floodplains, hills, terraces, and low mountains. Vegetation consists of oak (*Quercus* spp.) savanna and oak-hickory-pine (*Quercus-Carya-Pinus*) forests; sycamore (*Platanus occidentalis*), willow (*Salix* spp.), eastern cottonwood (*Populus deltoides*), and elm (*Ulmus* spp.) on the floodplains; and the bottomlands are typically croplands or pastures. The region is characterized by mild winters, hot summers, and 45 inches of precipitation annually.



Source: EPA, Level III and IV Ecoregions of the Continental United States
https://www.epa.gov/eco-research/level-iii-and-iv-ecoregions-continental-united-states

Figure 3-6. EPA Level III Ecoregions in Arkansas



Legend

- Office
- Communication site
- Substation
- 3004 Transmission line (with transmission line number)
- Cities

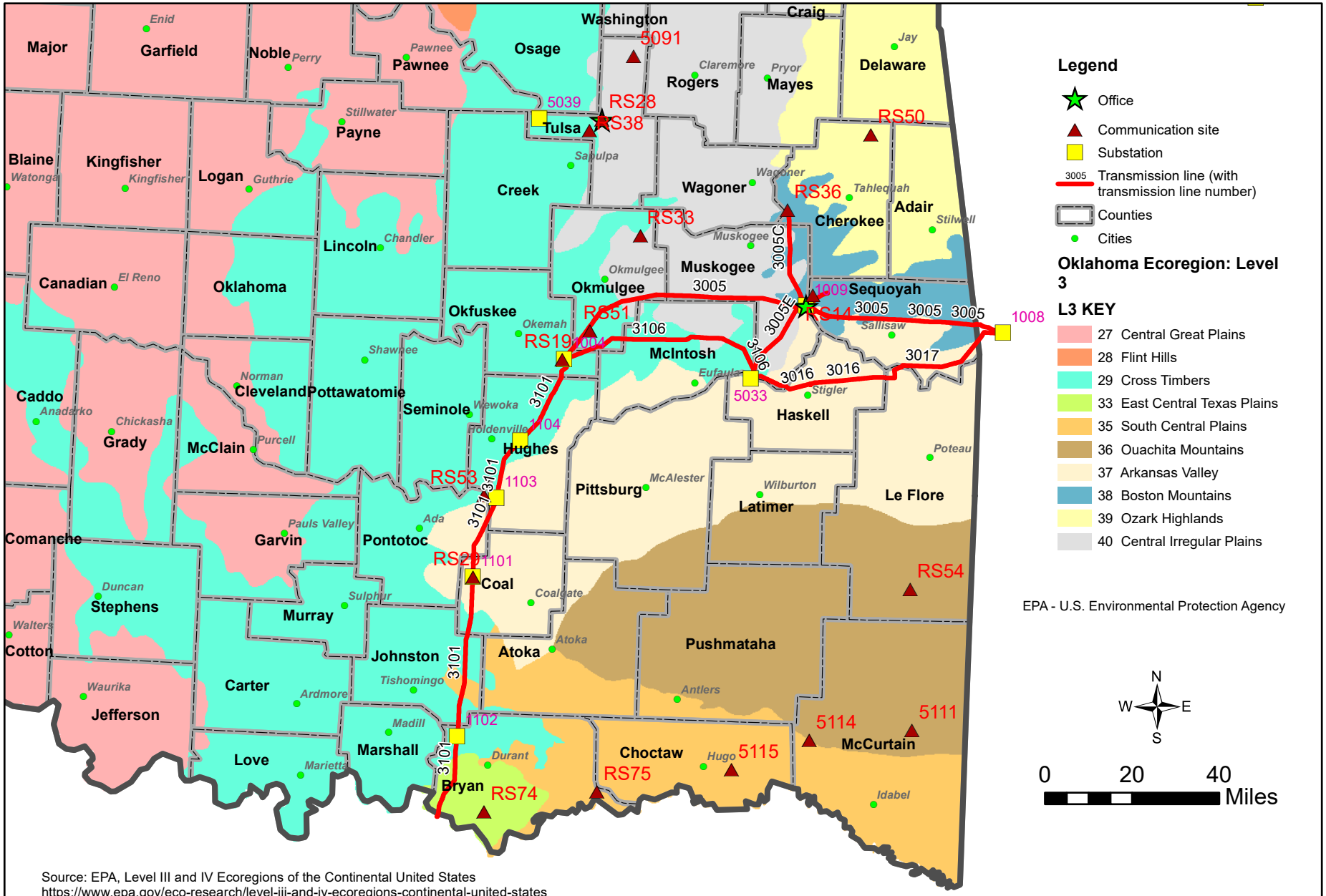
EPA - U.S. Environmental Protection Agency

Missouri EcoRegion: Level 3

L3 KEY

- 39 Ozark Highlands
- 40 Central Irregular Plains
- 47 Western Corn Belt Plains
- 72 Interior River Valleys and Hills
- 73 Mississippi Alluvial Plain
- 74 Mississippi Valley Loess Plains

Figure 3-7. EPA Level III Ecoregions in Missouri



Source: EPA, Level III and IV Ecoregions of the Continental United States
https://www.epa.gov/eco-research/level-iii-and-iv-ecoregions-continental-united-states

Figure 3-8. EPA Level III Ecoregions in Oklahoma

- **Boston Mountains –** The Boston Mountains encompass land in northwestern Arkansas and northeastern Oklahoma. They are just north of the Arkansas Valley and consist of deeply dissected mountainous plateaus. Vegetation is predominately oak-hickory forest. Shortleaf pine (*P. echinata*) and eastern red cedar (*Juniperus virginiana*) may be found on south- and west-facing slopes, while north-facing slopes consists of beech (*Fagus* spp.), basswood (*Tilia americana*), hickory (*Carya* spp.), sugar maple (*Acer saccharum*), and oak. Non-forested flatlands are used as pasture or hayland. The region is characterized by mild winters, hot summers, and 48 inches of precipitation annually.
- **Central Irregular Plains –** The Central Irregular Plains ecoregion is a prairie belt running between the Cross Timbers and Ozark Highlands. The region is characterized by flat to rolling, irregular plains, low hills, and cuestas. This region occupies western Missouri and northeastern Oklahoma in the Proposed Action areas. Historically, vegetation was predominately tallgrass prairie, with forests and woodlands consisting of oak and hickory found on stony hilltops. Now, the region consists of grasslands, farmlands, rangelands, woodlands, and floodplain forests. Hot summers and mild to cold winters characterize this region; precipitation annually is approximately 38 inches.
- **Cross Timbers –** The Cross Timbers region lies on the western edge of the Central Irregular Plains in central Oklahoma. To its west is the Central Great Plains region. This large ecoregion consists of rolling plains, low hills, cuestas, and ridges. The vegetation is considered transitional, between the winter wheat fields to the west and mountains to the east. Little bluestem (*Schizachyrium scoparium*) grasslands are dotted with blackjack oak (*Q. marilandica*) and post oak (*Q. stellata*); other vegetation includes big bluestem (*Andropogon gerardi*), Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), elm, and black hickory (*C. texana*). The climate for this region consists of hot summers and mild winters; annual precipitation is approximately 34 inches.
- **East Central Texas Plains –** The East Central Texas Plains consists of flat to rolling, irregular plains, crossed by wide rivers. In Oklahoma, the ecoregion occupies a small area on the Texas border. Vegetation consists of tallgrass prairie, post oak savannas, and many croplands. Forest stands consist of oak and hickory, with little bluestem, purpletop (*Tridens flavus*), and Indiangrass grasses. The region is characterized by hot summers and mild winters, with a mean annual precipitation of 37 inches.
- **Mississippi Alluvial Plain –** The Mississippi Alluvial Plain terrain consists of a broad, flat, alluvial plain broken occasionally by river terraces and levees. This region is found in far southeastern Missouri and along eastern Arkansas. Vegetation historically consisted of bottomland deciduous forest, though most has been cleared for agriculture. Hardwood swamp forests consist of hickory, red maple (*A. rubrum*), green ash (*Fraxinus pennsylvanica*), and river birch (*Betula nigr*a), while river swamp forests consist of bald cypress (*Taxodium distichum*) and water tupelo (*Nyssa aquatica*). Sweetgum (*Liquidambar styraciflua*), sycamore, and several oaks may be found in higher areas. The region has mild winters and hot, humid summers with 55 inches of annual precipitation.
- **Mississippi Valley Loess Plains –** The Mississippi Valley Loess Plains run from far southeastern Missouri and down through eastern Arkansas. It is bound by the Mississippi Alluvial Plain on both sides. The terrain is characterized by irregular plains and rolling hills, with dissected hills, ridges, and bluffs occurring on the Mississippi River. In the east, forests consist of oaks, hickories, and loblolly (*P. taeda*) and shorleaf pine; in the west, oak-hickory forests occur, as well as forests containing

beech, maples, southern magnolia (*Magnolia grandiflora*), and American holly (*Ilex opaca*). The region has hot summers and mild winters, with a mean annual precipitation of 56 inches.

- **Ouachita Mountains –** The Ouachita Mountains region lies directly south of the Arkansas Valley region in central western Arkansas and southeastern Oklahoma, though Southwestern facilities only occur in the Oklahoma portion. It is made of open hills, low mountains, and sharp east-west trending ridges. Historically, the region consisted of oak-hickory-pine forests but is currently covered in loblolly and shortleaf pine. Other forest vegetation includes southern red (*Q. falcata*), black (*Q. velutina*), post, and white (*Q. alba*) oaks as well as hickories. The region has mild winters and hot summers, and a mean annual precipitation of 52 inches.
- **Ozark Highlands –** The Ozark Highlands consist of irregular terrain: from rolling plains, to steep, rocky hills, and many karst features. Vegetation also varies from savannas and tallgrass prairies to oak-hickory-pine forest stands. Other common vegetation includes shortleaf pine, big and little bluestem, Indiangrass, and eastern red cedar. In the Proposed Action areas, the region encompasses most of southern Missouri, northern Arkansas, and a small portion of northeastern Oklahoma. This region is characterized by hot summers and mild to severe winters. Annual precipitation is around 43 inches.
- **South Central Plains –** The South Central Plains region lies in the far southeastern and southwestern corners of Oklahoma and Arkansas, respectively. The terrain consists of dissected rolling plains, broken up by terraces, bottomlands, low hills, and cuestas. Natural vegetation is dominated by longleaf pine woodlands and shortleaf pine/hardwood forests. The bottomlands consist of water (*Q. nigra*), willow (*Q. phellos*), and swamp chestnut (*Q. michauxii*) oak, sweetgum, bald cypress, and water tupelo. Climate consists of hot summers and mild winters, with 50 inches of mean annual precipitation.

3.4.1.2 Wildlife

3.4.1.2.1 Mammals

Across the three states, mammals are abundant, including white-tailed deer (*Odocoileus virginianus*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), and racoon (*Procyon lotor*). In forested or woodland areas, black bear (*Ursus americanus*), gray fox (*Urocyon cinereoargenteus*), gray squirrel (*Sciurus carolinensis*), and eastern chipmunk (*Tamias striatus*) may occur. Beaver (*Castor canadensis*) and muskrat (*Ondatra zibethicus*) occur in and around bodies of water, while opossum (*Didelphis virginiana*), swamp rabbit (*Sylvilagus aquaticus*), and mink (*Neovison vison*) prefer to inhabit areas close to a water body. In grasslands, various shrews, moles, voles, mice, pocket gophers, and rabbits are likely to occur (Choate and Jones 1998, Connior 2010). Many species of bats occur in the study area, with four listed as threatened or endangered and are discussed in Section 3.4.1.3.

3.4.1.2.2 Birds

Hundreds of bird species occupy the Proposed Action areas. In wooded areas, warblers, thrushes, and many other passerines occur, as well as hawks, owls, and woodpeckers. In grasslands, kingbirds, killdeer (*Charadrius vociferus*), meadowlarks and sparrows abound. Mourning doves (*Zenaida macroura*), hawks, and swallows are also likely to occur. In or around water bodies, shorebirds, waterfowl, red-

winged blackbirds (*Agelaius phoeniceus*), and other marsh birds occur (Audubon Arkansas 2018, MDC 2018d).

3.4.1.2.3 Herps

The Proposed Action areas are home to many reptiles and amphibians. Turtles, snakes, lizards, and the American alligator (*Alligator mississippiensis*) are reptiles that may occur in the Proposed Action areas. Snapping turtles (*Chelydra serpentina*) are aquatic, while box turtles (*Terrapene* spp.) are terrestrial. Similarly, snakes may be aquatic (e.g., moccasins) or terrestrial (e.g., rattlesnakes); however, the lizards are all terrestrial. Amphibians, including salamanders, frogs, and toads are also prevalent (Herps of Arkansas 2017, Missouri Herpetological Atlas Project 2017).

3.4.1.2.4 Fish

The Proposed Action areas encompass many streams, rivers, lakes, and reservoirs. The Arkansas Valley and Ozark Highlands contain the highest diversity and species richness, as well as many sensitive species. Common fish in the Proposed Action areas include darters, minnows, shiners, suckers, and sunfish. Large rivers may hold large gar and sturgeon (Woods et al. 2005). Cavefish occur in several underground aquifer systems. Three fish species of concern are found within the Proposed Action areas, as discussed below.

3.4.1.3 Special Status Species

The Proposed Action areas encompass habitat for federal and state protected species in several counties in all three states**.** Thirty-five species are listed as endangered, threatened, candidate, proposed, or experimental, nonessential population in the three-state area (Table 3-3). Twenty-four of these species have been documented or have the potential to occur in the Proposed Action areas. These are discussed in more detail below the table and in the PBA (Appendix C).

Table 3-3. Species Federally Listed as Threatened and Endangered Potentially Occurring in the Three-State Area

Common Name (Species Name)	Status[1]	Habitat Requirements	Potential for Occurrence in Proposed Action Areas	Determination
Geocarpon (*Geocarpon minimum*)	T	Slicks or slickspots from eroded areas in grasslands high in salinity. In Missouri, the species occurs in Pennsylvanian-age sandstone glades or outcrops in upland prairies in shallow depressions within rocks	Species listed in Arkansas.	May affect but not likely to adversely affect
Harperella (*Ptilimnium nodosum*)	E	Sunny, rocky or gravel shoals and margins of clear, swift- flowing stream sections.	Species listed in Arkansas. Species range is currently in six counties south of the Proposed Action Area.	No effect
Mead's milkweed (*Asclepias meadii*)	T	Moderate dry to moderately wet conditions in upland tall grass prairies or glade/barren habitat.	Species listed in Missouri.	May affect but not likely to adversely affect
Missouri bladderpod (*Physaria filiformis*)	T	Restricted to limestone glades and dry rocky outcrops; also documented in Arkansas on a dolomite glade.	Species listed in Missouri and has been found in the Proposed Action area.	May affect but not likely to adversely affect
Virginia sneezeweed (*Helenium virginicum*)	T	Prefers low lying fields and meadows, plains and shorelines around sinkholes, and seasonally flooded limestone ponds.	Species listed in Missouri.	May affect but not likely to adversely affect
Pondberry (*Lindera melissifolia*)	E	Associated with margins of sinks, ponds and other depressions, as well as bottomland hardwoods and is tolerant of prolonged and regular flooding.	Species listed in Arkansas and Missouri.	May affect but not likely to adversely affect
Running buffalo clover (*Trifolium stoloniferum*)	E	Prefers somewhat moist habitats with filtered sunlight, such as between open forests and prairie in rich soils, and moderate or periodic disturbance from grazing, mowing, and flood scouring.	Species listed in Arkansas. No known existing populations in the state and habitat not found along the project area.	No effect
Cave crayfish (*Cambarus zophonastes*)	E	Cave stream systems.	Species listed in Arkansas and Missouri. In the project area, the species occurs in Benton and Washington counties, AR. Line 3009 occurs in the far northeastern corner of Benton County, but is not close to any cave stream systems with known cave crayfish populations.	No effect

Common Name (Species Name)	Status[1]	Habitat Requirements	Potential for Occurrence in Proposed Action Areas	Determination
Curtis pearlymussel (*Epioblasma florentina curtisii*)	E	Slow-flowing streams with shallow depths and stable substrates.	Species listed in Arkansas and Missouri.	May affect but not likely to adversely affect.
Fat pocketbook (*Potamilus capax*)	E	Typically inhabits silt, sand, or mud substrates and are found in water ranging from a few inches to 20 feet in depth.	Species listed in Arkansas and Missouri.	May affect but not likely to adversely affect
Ouachita rock pocketbook (*Arkansia wheeleri*)	E	Stable substrates including gravel and sand in side channels of larger rivers in pools or backwaters with slow currents.	Species listed in Oklahoma and may potentially occur downstream of Towers 5111, 5114, 5115, RS54; however project activities would be located away from water sources and would not impact this species.	No effect
Neosho mucket (*Lampsilis rafinesqueana*)	E	Typically found in shallow riffles with gravel substrate and a swift current.	Species listed in all three states.	May affect but not likely to adversely affect
Pink mucket (*Lampsilis abrupta*)	E	Inhabits rivers that are over 20 meters in width with silt, sand, gravel, or boulder substrates.	Species listed in Arkansas and Missouri.	May affect but not likely to adversely affect
Rabbitsfoot (*Quadrula cylindrica cylindrical*)	T	Typically found in shallow water along banks in small streams to large rivers.	Species listed in all three states.	May affect but not likely to adversely affect
Scaleshell mussel (*Leptodea leptodon*)	E	Medium to large rivers, typically in riffle areas.	Species listed in Arkansas and Missouri.	May affect but not likely to adversely affect
Snuffbox mussel (*Epioblasma triquetra***)**	E	Gravel or sand substrates with swift currents, including shores of lakes.	Species listed in Arkansas and Missouri.	May affect but not likely to adversely affect
Speckled pocketbook (*Lampsilis streckeri*)	E	Restricted to the Little Red River (Middle, South, Archey, and Devil's forks) and Big Creek in northcentral Arkansas.	Species listed in Arkansas; however these rivers are not located within the project area.	No effect

Common Name (Species Name)	Status[1]	Habitat Requirements	Potential for Occurrence in Proposed Action Areas	Determination
Spectacle case (*Cumberlandia monodonta*)	E	Buried in firm mud that lies between or under large rocks or ledges in large rivers.	Species listed in Arkansas. In the project area, a single spectacle case was found in the Mulberry River in Franklin County, AR although the finding is questionable.	No effect
Turgid blossom (*Epioblasma turgidula*)	E	Fresh flowing streams and rivers in the Ozark Mountain region. Historically found in the Spring Creek River of Arkansas, and the Black and White rivers winding through Arkansas and Missouri.	Species listed in Arkansas and Missouri. Lines (3308 and 3002) cross the White River and Spring River but not near historical occurrences of the species.	No effect
Winged mapleleaf (*Quadrula fragosa*)	E	Historically found in large, fast streams and impoundments, in muddy and gravel substrates.	Species listed in Oklahoma and found along and the Little River upstream of towers 5111, 5114, and 5115.	May affect but not likely to adversely affect
American Burying Beetle (*Nicrophorus americanus*)	E	Habitat generalist, with a slight preference for grasslands and open understory oak hickory forests.	Species listed in Arkansas and Oklahoma. Species is listed as EXPN in SW Missouri.	May affect and likely to adversely affect
Hine's Emerald Dragonfly (*Somatochlora hineana*)	E	Wetland habitat with slow flowing shallow water.	Species listed in Arkansas and Missouri.	May affect but not likely to adversely affect
Ozark cavefish (*Amblyopsis rosae*)	T	Underground caves, sinks, and wells in the Springfield Plateau Region of SW Missouri, NW Arkansas, and NE Oklahoma.	Species listed in all three states.	May affect but not likely to adversely affect
Leopard darter (*Percina pantherina*)	T	Occurs in pools with rubble or boulder substrates.	Species listed in Oklahoma only at Tower site 5114 and RS54. In the Proposed Action area, no transmission lines cross any of the creeks or rivers the species occurs in. Critical habitat occurs in several of the streams, but the Proposed Action does not encompass them. Potential habitat does not exist at the structure sites.	No effect
Arkansas River shiner (*Notropis girardi*)	T	Occurs in shallow, wide rivers and large streams with sandy substrate.	Species listed in Oklahoma. Critical habitat designated and within Proposed Action area (Line crossing 3101, str.680-681) over Canadian River, Hughes Co.	May affect but not likely to adversely affect

Common Name (Species Name)	Status[1]	Habitat Requirements	Potential for Occurrence in Proposed Action Areas	Determination
Ozark hellbender (*Cryptobranchus alleganiensis*)	E	Fast-moving streams in the Ozark Highlands of Missouri and Arkansas.	Species listed in Arkansas and Missouri.	May affect but not likely to adversely affect
American alligator (*Alligator mississippiensis*)	SAT	Inhabits wetlands, lakes, and rivers throughout the southeastern U.S. The species is currently listed as threatened due to similarity of appearance to the American crocodile.	Species listed in Oklahoma with limited potential in the aquatic environment of Broken Bow Reservoir near Tower 5111.	No effect
Least tern (*Sterna antillarum*)	E	Prefers open, unvegetated sand or gravel habitats near their feeding areas.	Species listed in Oklahoma and Arkansas.	May affect but not likely to adversely affect
Piping plover (Charadrius melodus)	T	Nests along lakes, rivers, and reservoirs along open, mostly vegetation-free gravel or sand shorelines of rivers and lakes and on gravel or sand pits.	Species listed in all three states.	May affect but not likely to adversely affect
Red knot (*Calidris canutus rufa*)	T	Breeds in the Arctic and overwinters in southern, coastal locations of the U.S. all the way to the southern tip of South America. In the central flyway, knots typically fly 2 to 3 days nonstop from Texas to the Northern Great Plains or Canada, making stopovers in Oklahoma or Arkansas rare.	Species listed in Oklahoma and Arkansas. Stop overs on migration route are rare in the project area.	No effect
Whooping crane (*Grus americana*)	E	Migratory species through the western half of Oklahoma. Feed in marshes, shallow-water wetlands, wet meadows and sometime crop fields	Species listed in Oklahoma. *Critical habitat designated, but outside Proposed Action area*; limited, marginal habitat or no suitable habitat. Avian species (ESA, MGTA, and BGEPA) protection is addressed through Southwestern's Avian Protection Plan. The species was discussed and analyzed under the Oklahoma PBA and PBO.	No effect
Gray bat (*Myotis grisescens*)	E	Caves, preferably limestone. Summer cave habitat is usually within 2 miles of rivers, streams, reservoirs, or lakes.	Species listed in all three states.	May affect but not likely to adversely affect

Common Name (Species Name)	Status[1]	Habitat Requirements	Potential for Occurrence in Proposed Action Areas	Determination
Indiana bat (*Myotis sodalist*)	E	Winter habitat consists of caves and summer habitat in agricultural areas with fragmented forests.	Species listed in all three states.	May affect but not likely to adversely affect
Northern long-eared bat (*Myotis septentrionalis*)	T	Hibernates between mid-fall through mid-spring in mines or caves and spend its summer in wooded areas.	Species listed in all three states.	May affect however maintenance activities comply with the 4(d) rule
Ozark big-eared bat (*Corynorhinus (=Plecotus) townsendii ingens*)	E	Caves in limestone karst formations.	Species listed in all three states.	May affect but not likely to adversely affect

[1] Federal (USFWS) status definitions:
E = Endangered. Any species considered by the USFWS as being in danger of extinction throughout all or a significant portion of its range. The ESA specifically prohibits the take of a species listed as endangered. Take is defined by the ESA as: to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to engage in any such conduct.
T = Threatened. Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The ESA specifically prohibits the take (see definition above) of a species listed as threatened.
EXPN = A population that has been established within its historical range under section 10(j) of the ESA to aid recovery of the species. The Service has determined a non-essential population is not necessary for the continued existence of the species. For the purposes of consultation, non-essential experimental populations are treated as threatened species on National Wildlife Refuge and National Park land (require consultation under 7(a)(2) of the ESA) and as a proposed species on private land (no section 7(a)(2) requirements, but Federal agencies must not jeopardize their existence (section 7(a)(4))).
SAT = Similarity of appearance, threatened. Any species listed as threatened due to similarity of appearance with another species that is listed as threatened. Species listed under a similarity of appearance are not biologically endangered and are not subject to section 7 consultation.
BGEPA Bald and Golden Eagle Protection Act
ESA Endangered Species Act
MBTA Migratory Bird Treaty Act
PBA Programmatic Biological Assessment
PBO Programmatic Biological Opinion

3.4.1.3.1 Plant Species

The following five special status plant species potentially occur in the Proposed Action areas:

- **Geocarpon** – Geocarpon (*Geocarpon minimum*) is a small, inconspicuous plant, 0.4-1.6 inches (1-4 centimeters [cm]) tall. Geocarpon is a monotypic genus with this single species and is also known as tinytim and earth-fruit. The species relies on the presence of specific microhabitats. Slicks or slickspots from eroded areas in grasslands high in salinity is the preferred habitat for Geocarpon in most areas (USFWS 2018a). The species may be a pioneer species of newly cleared sandstone slicks. When first listed, the species was found in only 28 locations in Arkansas, Louisiana, and Missouri (USFWS 1993). In 2009, 37 populations (including three plantings in Missouri) were recognized within 17 counties in four states.
- **Mead's milkweed** – Mead's milkweed (*Asclepias meadii*) is a perennial with a single slender unbranched stalk, approximately 7.9-15.7 inches (20-40 cm) high. The species persists in stable late-successional prairie in full sun (USFWS 2003a). This tallgrass prairie species is long-lived, often taking up to 15 years to mature after which time it can persist indefinitely (USFWS 2018b). Currently the species is known from 171 sites in 34 counties in eastern Kansas, Missouri, south-central Iowa, and southern Illinois. Mead's milkweed has been reintroduced in Indiana and Wisconsin where it was extirpated (USFWS 2018b).
- **Missouri bladderpod** – The Missouri bladderpod (*Physaria filiformis*) is a small, non-woody, annual plant, about 3.9-7.9 inches (10-20 cm) tall (MDC 2018b). The species has always been restricted to limestone glades and dry rocky outcrops, but it has been found on a dolomite glade in Arkansas. These glades are usually open and dry, with shallow, loose soil and exposed rock (USFWS 2003b). The current range of the species is northern Arkansas and southern Missouri. The number of documented populations includes 76 sites in five Arkansas counties (Izard, Washington, Sharp, Garland, and Hot Spring) and four counties in Missouri (Dade, Greene, Christian, and Lawrence) (USFWS 2003b).
- **Virginia sneezeweed** – Virginia sneezeweed (*Helenium virginicum*) is an herbaceous, fibrous-rooted perennial reaching around 47.2 inches (120 cm) in height (MDC 2015). The species prefers low lying fields and meadows, plains and shorelines around sinkholes, and seasonally flooded limestone ponds (USFWS 2010a). Currently, the species is limited in distribution to two counties in Virginia and five counties in southern Missouri, four within the Proposed Action area (Howell, Wright, Webster, and Christian). There are over 40 occurrences of the species in Missouri, several on lands owned by the MDC (MDC 2015).
- **Pondberry** – Pondberry (*Lindera melissifolia*) is a low-growing, 23.6-71.6 inches (60-182 cm), colony-forming deciduous shrub (MDC 2018c). Pondberry is usually associated with margins of sinks, ponds and other depressions, as well as bottomland hardwoods and is tolerant of prolonged and regular flooding (USFWS 2015a). In Missouri, pondberry is associated with swampy depressions with small sand dunes that are poorly drained (MDC 2018c). The species can thrive in relatively closed canopies, but are not exclusive to low light habitat (USFWS 2013a). In Missouri, pondberry is found only in Sand Ponds Natural Area and Conservation Area in Ripley County, in the Missouri

Lowlands Region (MDC 2018c). The species also has the potential to occur in Butler County, Missouri (USFWS 2018c).

3.4.1.3.2 Mussel Species

Eight special status mussel species potentially occur in the Proposed Action areas:

- **Curtis' pearlymussel** – The Curtis' pearlymussel (*Epioblasma florentina curtisii*) is a relatively small mussel, less than 1.5 inches (3.9 cm) in length. The species needs slow-flowing streams with shallow depths and stable substrates to survive. The species is found in depths of 1.9-299 inches (5-76 cm), in gravel, cobble, or boulder substrates. It is found in riffles or runs in reaches that occur between headwater and lowland streams (USFWS 1986). Historically, the species was found in the White and Black River basins in Missouri. USFWS (1986) states the species was only found in six sites in the upper Little Black River and the Castor River. During surveys in 1988, no specimens were found in either river, and mussel species in those rivers underwent catastrophic declines. In 1993, a single specimen was found alive, however, none have been found since (USFWS 2010b).
- **Fat pocketbook** – The fat pocketbook (*Potamilus capax*) is a medium-sized freshwater mussel, reaching 4.9 inches (12.5 cm) in length (USFWS 1989a, LMRCC 2014). The species typically inhabit silt, sand, or mud substrates and are found in water ranging from a few inches to (6 meters [m]) in depth (USFWS 2012a). Although currently extirpated from the upper Missouri River drainage, the species has expanded its range in the St. Francis and Ohio River systems, and is also now found in the Lower Mississippi River system as well as streams and ditch channels in Arkansas and Missouri. In Arkansas, a single specimen has been reported in the lower White River, although no data exist on population size (USFWS 2012a).
- **Neosho mucket** – The Neosho mucket (*Lampsilis rafinesqueana*) is a medium-sized freshwater mussel, reaching 3.7 inches (9.5 cm) in length. The species is typically found in shallow riffles with gravel substrate and a swift current (USFWS 2012b). Historically, this species occupied streams of the Illinois, Neosho, and Verdigris River basins. All but one of the populations is experiencing declines. The Spring River population of Kansas, Oklahoma, and Missouri is currently the only viable population of the species (USFWS 2012b). Critical habitat was designated for the species on April 30, 2015 and occurs along the Spring River and the north fork of the Spring River in Jasper and Lawrence counties (USFWS 2018d) in the Proposed Action area.
- **Pink mucket pearlymussel** – The pink mucket pearlymussel (*Lampsilis abrupta*) is a relatively large freshwater mussel, reaching 4.1 inches (10.5 cm) in length. The species inhabits rivers that are over 20 m in width with silt, sand, gravel, or boulder substrates. They are typically found in moderate to fast-flowing water, though they have also been found in standing water. They have been found in 0.5-8 m depths (USFWS 1985). Historically, the species was found in the Tennessee, Cumberland, Ohio, and Mississippi River drainage systems, 25 river systems in total. It was widespread, though considered rare. Currently, the species inhabits 16 river systems, from Arkansas to West Virginia (USFWS 1985).

- **Rabbitsfoot** – The rabbitsfoot (*Quadrula cylindrica cylindrica*) is a relatively large, rectangle-shaped freshwater mussel, reaching 4.7 inches (12 cm) in length (USFWS 2013b). The species occurs in small streams to large rivers. It is typically found in shallow water along banks, but may also occur in deeper water. Substrate habitat is typically gravel and sand. The species does not typically burrow into the substrate, but rather lies on its side (USFWS 2012b). Historically, this species inhabited 140 streams in the lower Great Lakes Sub-basin and the Mississippi River Basin. Of those, only 51 streams currently hold populations. Populations are generally restricted to short reaches and, based on life history, it is not likely that they are able to travel to establish new populations (USFWS 2012b). Critical habitat for the species was designated on April 30, 2015 (USFWS 2015b, USFWS 2018e) and exists in the Proposed Action area.
- **Scaleshell mussel** – The scaleshell mussel (*Leptodea leptodon*) is a medium-sized freshwater mussel, reaching 3.9 inches (10 cm) in length. They occur in medium to large rivers, typically in riffle areas containing mussel beds. The mussel beds are typically diverse and occur on stable substrate in clear, good quality water. Historically, the scaleshell mussel was found in 55 rivers in 13 eastern states. Currently, the species is only found in 18 rivers, and is only consistently found in three of those; the species are considered rare in the study area (USFWS 2001a).
- **Snuffbox mussel** – The snuffbox mussel (*Epioblasma triquetra*) is a small freshwater mussel, reaching up to 2.8 inches (7 cm) in length. The species inhabits small creeks to lakes. They are found in gravel or sand substrates with swift currents, including shores of lakes. Historically, the species were found in 210 streams; currently, they occur in 79 streams in 14 states. In the Proposed Action area, the species is found in five streams in the Lower Mississippi River sub-basin (USFWS 2012c).
- **Winged mapleleaf** – The winged mapleleaf (*Quadrula fragosa*) is relatively small freshwater mussel (USFWS 1997). Exact habitat requirements are unknown, as the species has been found in a wide variety of habitats. They have been historically found in large, fast streams and impoundments, in muddy and gravel substrates, and at depths ranging from 4.9-21.3 feet (1.5-6.5 m; USFWS 1997). Recently, the areas where they are found are in dense and diverse established mussel beds. They also appear to prefer substrates with coarse and compact sediment (USFWS 2015c). They were listed as endangered in 1991 due to extirpation of the species in their entire range except for one population in the St. Croix River (USFWS 1991a); however, it has recently been discovered in four additional populations in three states, for a total of five populations in five states. Five individuals have been found in the Bourbeuse River in central Missouri; the Ouachita and Saline rivers in southcentral Arkansas contain unknown population sizes; and the Little River flowing from the far southeastern corner of Oklahoma into Arkansas also has a winged mapleleaf population of unknown size (USFWS 2015c).

3.4.1.3.3 Insect Species

Two special status insect species potentially occur in the Proposed Action areas:

- **American Burying Beetle** – The ABB (*Nicrophorus americanus*) is the largest silphid (carrion beetle) in North America, reaching 0.98-1.8 inches (2.5-4.5) cm in length (Anderson 1982). ABBs are habitat generalists and have been found in several vegetation types including native grasslands, grazed pastures, riparian zones, coniferous forests, mature forests, deciduous forests with little undergrowth, and oak-hickory forests, as well as on a variety of various soil types (USFWS 1991b,

Creighton et al. 1993, Lomolino et al. 1995, Lomolino and Creighton 1996). Ecosystems supporting ABB populations are diverse and include primary forest, scrub forest, forest edge, grassland prairie, riparian areas, mountain slopes, and maritime scrub communities (USFWS 1991b, Ratcliffe 1996). The ABB readily moves between different habitats (Creighton and Schnell 1998, Lomolino et al. 1995). In 2016, the known range of the ABB in Oklahoma was updated from the original 26 Oklahoma counties to 33 counties. The current range of the ABB within Oklahoma is dominated by the Osage Cuestas (an irregular to undulating plain) of the Central Irregular Plains, the Arkansas Valley, the Ouachita Mountains, and the South Central Plains ecoregions. In Arkansas, the ABB has the potential to occur in six counties of which Crawford, Franklin, and Johnson are located with the Proposed Action area. In Missouri, ABBs are part of a nonessential experimental population (under Section 10(j) of the ESA) that was reintroduced in 2012.

- **Hine's emerald dragonfly** – The Hine's emerald dragonfly (*Somatochlora hineana*), known for its bright emerald-green eyes, is approximately 2.5 inches (6.3 cm) long and is one of the most endangered dragonflies (USFWS 2001b). The species is restricted to wetland habitat with slow flowing shallow water for larvae development. Preferred habitat for the species consists of calcareous spring-fed marshes, wetlands, streams, and sedge meadows overlaying dolomite bedrock (USFWS 2018f). Other important habitat components of these wetland areas are nearby or adjacent forest edge for shaded perching areas and open, vegetated areas for foraging (USFWS 2001b). Current known populations of the Hine's emerald dragonfly occur in Dent, Iron, Phelps, Reynolds, and Ripley counties in Missouri. Habitat for two of these sites is fully protected and managed by the MDC (USFWS 2013c).

3.4.1.3.4 Fish Species

Two special status fish species potentially occur in the Proposed Action areas:

- **Arkansas River shiner** – The Arkansas River shiner (*Notropis girardi*) is a small, freshwater fish reaching 51 mm in length. The species occurs in shallow, wide rivers and large streams with sandy substrate (USFWS 1998). Historically, the species occupied streams in the western portion of the Arkansas River basin. Construction of damns has isolated populations, stopping dispersal and recruitment from occurring. Currently, almost the entire population resides in the Canadian River of Oklahoma, Texas, and New Mexico; they are considered extirpated from 80 percent of their historical range. In the Proposed Action area, critical habitat exists in the Canadian River near Lamar, Oklahoma (USFWS 2005). The species is presumed extinct in Arkansas (USFWS 1998).
- **Ozark cavefish** – The Ozark cavefish (*Amblyopsis rosae*) is a small fish with translucent skin, reaching 2.9 inches (75 mm) in length (USFWS 2011a). They are found in underground caves, sinks, and wells in the Springfield Plateau Region of southwest Missouri, northwest Arkansas, and northeast Oklahoma. Forty-one sites in the three-state area are considered active cavefish sites (USFWS 2011a). Cavefish are found in waters that are "high-quality," with low levels of toxic metals (Willis and Brown 1985, Graening and Brown 2000) and that depend on nutrient flow from outside of the cave, such as bat guano or leaf litter (USFWS 1989b). In Oklahoma, confirmed sightings of the cavefish have not occurred in the Proposed Action area (Graening et al. 2010), while in Arkansas, confirmed sightings have occurred in Benton County (Graening and Brown 2000, Graening et al. 2010), where one transmission line is located. In Missouri, confirmed sightings have been made in

seven counties in the southwest corner of the state (Graening and Brown 2010). The Proposed Action passes through all of those counties.

3.4.1.3.5 Amphibian Species

One special status amphibian species potentially occurs in the Proposed Action areas, the Ozark hellbender. The Ozark hellbender (*Cryptobranchus alleganienis bishopi*) is a large, stream-dwelling salamander, reaching 29-51 cm (USDA 2003). They are found in fast-moving streams in the Ozark Highlands of Missouri and Arkansas. They require particular levels of flow, dissolved oxygen, and temperature in these streams to survive. The streams must also contain gravel beds or large rocks, as they spend most of their time under rocks (USFWS 2012d). They are restricted to five rivers (Spring, White, Black, Eleven Point, and Current) and three tributaries off of those main rivers. The most recent population estimate was 590 individuals, down 70 percent from historic population estimates (USFWS 2012d). In Arkansas, a transmission line crosses the Eleven Point River in Randolph County, while in Missouri, a line crosses the Current River in Ripley County.

3.4.1.3.6 Avian Species

Two special status avian species potentially occur in the Proposed Action areas:

- **Least tern** – The least tern (*Sternula antillarum*) is a small, migratory shorebird. It is the smallest tern in North America, at just 8.3-9.1 inches (21-23 cm) in length (USFWS 2013d). This ground-nesting species prefers open, unvegetated sand or gravel habitats near their feeding areas (USFWS 2013d). A majority of interior least terns spend their time on river habitats, though other habitats utilized include sand pits, reservoirs, salt flats, industrial sites, and rooftops (USACE 2006). They typically prefer to nest away from trees or other structures that could harbor predators (USFWS 2013d). The Proposed Action area does include habitat least terns use, and indeed, the species has been documented breeding along rivers within the project area. During the 2005 range-wide survey, least terns were found on several rivers in Oklahoma and Arkansas, including the Canadian and Arkansas rivers.
- **Piping plover** – The piping plover (*Charadrius melodus*) is a small, migratory shorebird, reaching 6.5-6.9 inches (16.5-17.5 cm) in length. The species nests along lakes, rivers, and reservoirs from the Midwest to the Atlantic Coast. The piping plover is tied to open sand or gravel shorelines throughout its range (USFWS 1988). While migration stopover sites and their usage are unknown (USFWS 2016a), the Proposed Action area does include some habitat that could potentially be used by the species. Suitable habitat may be found on the shores and sandbars of the Canadian and Arkansas rivers, where brief stopovers could potentially occur.

3.4.1.3.7 Mammal Species

Four special status mammal species potentially occur in the Proposed Action areas:

- **Gray bat** –The gray bat (*Myotis grisescens*) is one of the largest species in the genus *Myotis* in eastern North America (USFWS 2009a), weighing 0.25-0.56 ounces (7-16 grams) and is approximately 3-5 inches (76-127 mm) in length with a wingspan of 10.8-11.8 inches (275-300 mm; ODWC 2011a). The species is tied to limestone caves throughout its lifecycle with foraging availability near stream, lakes, and reservoirs required during the summer months. Foraging areas

often are forested to provide shelter for the foraging bats. Known cave habitat and rock outcroppings occur along portions of the transmission lines in all three states. Along the ROW within the counties of Greene, Christian, Stone, and McDonald in Missouri are four known occupied gray bat caves: one occurs within 1 mile and the other three within 0.5 mile of the ROW (Marquardt 2018). The site in Christian County is a Priority 2 maternity cave. No known gray bat summer use caves or hibernaculum sites occur within or immediately adjacent to the ROW in Arkansas (Inebnit 2018). In Oklahoma, there are three known hibernacula or summer use caves within and/or adjacent to the existing ROWs (Fuller 2018).

- **Indiana bat** – The Indiana bat (*Myotis sodalist*) is a migratory, small bat, weighing approximately 0.25 ounces (7 grams) with a wingspan of 8.9-10.9 inches (228-279 mm). This species spends the winter hibernating in cool, humid caves with stable temperatures; in the summer, they migrate to summer habitat in wooded areas where they usually roost on dead or dying trees under lose bark (USFWS 2006). In the Proposed Action area, substations and communication towers are not situated near foraging or roosting habitat. Hibernaculum and roost trees occur in the Proposed Action area; however, none of them are situated within or adjacent to the transmission line ROW. Based on correspondence with the USFWS in support of the bat guidance document (*Vegetation Management – Endangered Species Act Bat Decision Guide)*, there are no known Indiana bat hibernaculum or roost trees within 1 mile of the ROW in Missouri (Marquardt 2018, Southwestern 2018). Within Arkansas and Oklahoma, there are no known hibernacula or roost trees within or adjacent to the ROW for the Indiana bat (Inebnit 2018; Fuller 2018; Southwestern 2018); however, in Arkansas there are a few known hibernacula within close proximity to the ROW. Southwestern has documented within the ROW of line 3007 in Arkansas, a cave known to provide winter habitat for bats although it is used infrequently and has been screened for bat presence.
- **Northern long-eared bat** – The northern long-eared bat (NLEB; *Myotis septentrionalis*) is a migratory, medium-sized bat that has a body length of 3.0-3.7 inches (76-93 mm) and wing span of 8.9-10 inches (228-254 mm; USFWS 2016b). This species winters in caves that have high humidity and minimal air flow with relatively constant, cool temperatures. During the summer, the NLEB uses a wide variety of forested/wooded habitats, which may also include some adjacent and interspersed non-forested habitats, as well as linear features such as fencerows, riparian forests, and other wooded corridors (USFWS 2016c). Potential habitat for hibernacula may be located near the Proposed Action areas and forested habitat outside of the ROW and the substations for summer roosting. However, no known hibernaculum or roost trees occur within 0.25 mile of the ROW in Missouri (Marquardt 2018, Southwestern 2018) and none occur within or immediately adjacent to the existing ROW in Oklahoma and Arkansas (Fuller, 2018, Inebnit 2018, Southwestern 2018). Along the ROW within the counties of Greene, Christian, Stone, and McDonald in Missouri are four known occupied gray bat caves which also contain NLEB (Marquardt 2018, Southwestern 2018).
- **Ozark big-eared bat** – The Ozark big-eared bat (*Plecotus townsendii ingens*) is a medium-sized bat weighing 0.25-0.46 ounces (7-13 grams) and measuring approximately 3.5-4.6 inches (90-116 mm; USFWS 1995). Like the gray bat, this species does not migrate and prefers caves year-round, usually in limestone karst formations; however, movement between caves may occur (ODWC 2011b). The caves are of moderate to high humidity and relatively cold temperatures (USFWS 1995). The current range of the Ozark big-eared bat includes the Ozark Highlands and Boston Mountains ecoregions of northeastern Oklahoma and northwestern and north-central Arkansas (USFWS 2011b). No known

Ozark big-eared bat summer use caves or hibernaculum sites occur within or immediately adjacent to the ROW in Arkansas (Inebnit 2018) or Oklahoma (Fuller 2018).

3.4.2 Environmental Consequences

Impacts to biological resources may occur when an action contributes to the disturbance, degradation, or loss of habitat or contributes to the loss or disturbance of local wildlife populations. The sensitivity of the wildlife populations and the habitat to the activities will determine the magnitude of the impact. Adverse impacts to biological resources may occur if the Proposed Action would:

- Affect a threatened or endangered species;
- Substantially diminish habitat for a plant or animal species;
- Substantially diminish a regionally or locally important plant or animal species;
- Interfere substantially with wildlife movement or reproductive behavior; or
- Result in a substantial infusion of exotic plant or animal species.

3.4.2.1 Proposed Action

Continuation of O&M activities and the Integrated Vegetation Management Program have the potential to impact vegetation, wildlife, and special status species, as described below.

3.4.2.1.1 Vegetation

The transmission lines pass through many unique ecoregions containing various plant communities. Vegetation along the transmission lines has undergone continuous management for several decades and much of the native vegetation has been removed (e.g., trees) and maintained below a specific height along the ROW. Ecological diversity and succession have been influenced by the historical vegetation management practices. Naturally occurring vegetation is absent, except in areas outside the fence, from the substations and communications sites due to construction of these facilities and the need to maintain a barren ground.

No impacts from O&M activities to vegetation at the substations, communication sites, and offices are expected due to the lack of vegetation at these facilities. Along the ROW, large equipment has the potential to temporarily trample vegetation, increase erosion in select areas under certain conditions, and increase invasive species within the Proposed Action areas. However, potential impacts to vegetation from O&M activities would be short-term and concentrated in specific areas along the ROW. Vegetation in the disturbed area would recover once the activities were complete. DOE is part of the Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW) which was established through a Memorandum of Understanding signed by agency leadership in August 1994 and 1997 (Simpson 2018). FICMNEW represents a formal partnership between 18 federal agencies with direct invasive plant management and regulatory responsibilities spanning across the United States and territories. Southwestern follows the guidelines established by the FICMNEW for management of invasive species under their Integrated Vegetation Management Program. BMPs to reduce erosion (e.g., erosion mats) would reduce long-term impacts to vegetation and decrease the potential for establishment of noxious species. In addition, through the Integrated Vegetation Management Program, noxious and invasive species would be controlled.

Vegetation management at the substations and communication sites is non-selective as all vegetation is targeted. These areas have been devoid of vegetation for decades and will continue to be so. Surrounding vegetation is only managed when it proposes a threat to the facility and human safety. Direct and long-term impacts to vegetation within the facilities would continue to occur under the Proposed Action; however, impacts to vegetation outside the fenced areas would not occur since barren ground is not required in those areas. Vegetation at the offices is maintained in a lawn-like state, except for at the Tulsa office which lacks vegetation.

Long-term impacts to vegetation along the ROW have occurred through the change in species diversity and density as well as vegetation structure. Transmission facilities must be kept clear of all tall-growing trees, brush and other vegetation that could grow too close to the conductors. The primary goal of vegetation control within the ROW is to minimize woody vegetation growth while increasing the growth of herbaceous vegetation. Species managed along the ROW are mainly woody species such as silver maple (*Acer saccharinum*), black locust (*Robinia pseudoacacia*), red cedar (*Juniperus virginiana*), pine (*Pinus spp*.), sycamore (*Platanus occidentalis*), pin oak (*Quercus palustris*), red oak (*Q. rubra*), post oak (*Q. stellata*), and elm (*Ulmus spp*.). The use of manual, mechanical, and herbicide treatments for vegetation management would continue to alter the species diversity in the ROW. The removal of woody vegetation has created open habitat that favors recolonization by grasses, forbs, and potentially weed species. Although manual techniques are more selective and would target specific vegetation, vegetation could be crushed though by the workers with in the ROW. In addition, rare plant species could occur along the ROW, such as the zig-zag spiderwort (*Tradescantia subaspera*) in the Alexander Spring River WMA. Indirect impacts to non-target species could occur with the use of mechanical treatments as larger pieces of equipment could damage or destroy plant species. Herbicides considered under the Proposed Action along the ROW would be selective for specific species. Although there is a potential for drift to occur which might damage non-target vegetation, the Proposed Action would provide better control of target species and reduce the amount and frequency of herbicide treatments. BMPs including using herbicides under specific weather conditions and specifying the type of application would reduce impacts to non-target species. Under the Proposed Action, woody species would continue to be removed and the habitat would continue to favor low-growing non-woody plant species. In some areas, the ROW would create an edge habitat, if adjacent to forest, which would provide diversity of habitats across a landscape. The Proposed Action would allow for an increase in time between treatments which would allow desired low growing native vegetation to recover from activities. Southwestern would use the GIS Resource Mapper to identify those areas with sensitive habitat or rare plant species to reduce potential impacts to these species.

3.4.2.1.2 Wildlife

Wildlife species are as diverse as the habitat across the Proposed Action area. Impacts to wildlife occur by harming or disturbing species within the ROW and facility areas or through the disturbance of habitat. Naturally occurring habitat within the substations, communication sites, and offices is non-existent, and therefore, very few species except the potential avian or transient wildlife species are likely to occur in these areas. The analysis of impacts from the Proposed Action is concentrated on activities within the transmission line ROW.

Impacts to wildlife from O&M activities would be short-term and temporary (noise, vibration, and construction equipment movement). Direct impacts to wildlife could result from mortality or injure from collision with vehicles. The general disturbance associated with O&M activities would result in the temporary displacement of most wildlife from the immediate vicinity of the maintenance area and adjacent areas. Larger or more mobile wildlife would leave the vicinity during activities but would eventual return to the area after the activities were completed. Less mobile species may be crushed by heavy equipment. Indirect impacts could include habitat degradation, disruption of foraging and prey availability, and disruption of nesting. O&M activities are generally short in duration and spatially distributed across the Proposed Action area. Vehicles traveling the access roads and especially in the ROW are usually traveling at slower speeds to allow wildlife species to avoid vehicular traffic. Impacts to wildlife from O&M activities are not expected to be significant.

Operation of Southwestern's transmission lines and substations, as well as maintenance of these structures, offers a unique challenge to manage avian species. Bald and golden eagles are prevalent in the Gore, Oklahoma region, although no nests have been found in the Proposed Action areas. In addition, osprey (*Pandion haliaetus*) nesting has been documented in Gore along the Arkansas River and Southwestern has installed nesting platforms to prevent electrocution of the birds. Avian mortality risks that result from interactions with electrical transmission facilities have the potential to impact species protected under the MBTA, BGPEA, and ESA. Southwestern is committed to working towards the overall goal of reducing avian mortality for migratory birds, eagles, raptors, and federally listed endangered or threatened avian species and to preventing interactions which result in outages and potential loss in system reliability. Southwestern has developed an Avian Protection Plan (APP) which provides guidelines for reducing avian mortality risks and incorporates existing laws and executive orders. Under the APP, Southwestern uses a tiered approach in conducting transmission system avian evaluations to identify areas that have an increased likelihood for collisions or electrocutions which can guide O&M activities (e.g., retrofitting of structures, creation of nesting platforms, avian protection devices). BMPs for communication towers and office facilities are also outlined in the APP to further prevent impacts to avian species. Implementation of the APP would reduce impacts to avian species from O&M activities.

Direct impacts associated with vegetation management include noise which could disturb wildlife and cause them to temporality leave the area. Impacts to vegetation under the Proposed Action could further degrade or limit available habitat for wildlife species causing indirect impacts. Manual removal of selective species would have less of an impact to habitat as it is selective. Mechanical impacts could cause reduction in some habitats as well as potential disturbance to the soil which could increase non-native species and also alter habitat composition. Direct impacts to wildlife from mechanical equipment would be similar to those under the O&M activities for less mobile species. The disturbance however would be localized. With both manual and mechanical treatments, removal of trees could impact nesting species and other species that depend on trees for living (see Section 3.4.2.1.3 for discussion of bat species).

Potential impacts to wildlife species from herbicide exposure depends on the quantity of the chemical the species was exposed to as well as the toxicity of the herbicide. Herbicides proposed for use are low in toxicity to wildlife. Herbicides are designed to be toxic to plants, not animals, and contain chemicals that target plant physiological processes. Direct impacts to wildlife species could occur if species were

directly sprayed during herbicide application. Indirect impacts could occur from ingestion of vegetation which has been chemically treated.

Limb trimming of larger trees has the potential to impact nesting species more than saplings removed in the ROW that do not provide good nesting habitat. Impacts to nesting species would be short-term as very few localized individuals may be impacted and trimming may occur outside the nesting season. Herbicide application is target specific and applied under the appropriate weather conditions (e.g., wind speed, temperature, and humidity). Broadcast spraying does not occur and application methods are more concentrated to avoid over-spraying. Herbicides would not be directly applied to wildlife species. In addition, herbicides would not be applied within 15 feet (4.6 m) of surface water. Garlon 4 is highly toxic to fish and is restricted in use in areas with streams and recharge zones. These areas have been identified by Southwestern and are also identified in the GIS Resource Mapper to reduce any accidental exposures. Karst features are marked for future identification as well and herbicides would not be applied within 15 feet of these features.

Under the pollinator health task force created in 2014 by Presidential Memorandum, Southwestern has preliminarily assessed their lands to determinate the appropriateness for implementing pollinator-friendly BMPs per the memorandum. The assessment indicated that in 40 percent of the total ROW acreage, vegetation is managed to promote a low to mid-growing plant community within the ROW. This keeps the vegetation in the ROW in an early seral stage, promoting the growth of native flowering plants, including forbs and shrubs, potential habitat for pollinators. Periodic treatment of selected noxious weeds or invasive species within the ROW promotes the establishment of desirable flowering plant species. Under the Proposed Action the increase in the time between vegetation management treatments would encourage the development of habitat for pollinators.

3.4.2.1.3 Special Status Species

This section describes potential impacts to special status species, including plant, mussel, insect, fish, amphibian, avian, and mammal species.

Plant Species

Geocarpon

Geocarpon prefers slicks in grasslands/sandstone and requires some disturbance. Current population and habitat information limits this species to potentially occurring in only one county in Arkansas: Franklin County. Although activities in the ROW would avoid slicks, there is a potential for trucks to crush plants during vegetation management and some O&M activities such as pole replacement. In addition, there is a potential for herbicide treatments to impact local populations although this species would not be targeted. Information on identification of the listed plant species in the Proposed Action areas would reduce the potential for direct impacts from herbicide treatments. Any potential impacts to the plant would be localized and activities are temporally limited to the vegetation cycle of 4 to 5 years. The Proposed Action *may affect but is not likely to adversely affect* Geocarpon.

Mead's milkweed

Mead's milkweed prefers stable tall grass prairies. Destruction of tall grass prairies is the main threat to the species which includes prairie hay fields where mowing typically takes place in late June to early July, which removes immature Mead's milkweed fruits and prevents completion of the plant's life cycle (USFWS 2018g). However, tall grass prairies do not occur within the ROW. If tall grass prairies occur adjacent to the ROW, there could be a chance of short-term impacts from overspray during herbicide application. The potential for overspray however is minimized through Southwestern's maintenance standards (MA-23) on herbicide application which dictates environmental conditions for application. With implementation of the standards, impacts to Mead's milkweed are not likely to occur and the Proposed Action *may affect but is not likely to adversely affect* the species.

Missouri bladderpod

Under the Proposed Action, there is a potential for trucks to crush plants during vegetation management and some O&M activities such as pole replacement. In addition, there is a potential for herbicide treatments to impact local populations although this species would not be targeted. The areas containing appropriate habitat within the ROW have been previously documented and surveys would be performed prior to any activities in these known preferred habitat areas. Per the Southwestern SOP, specific locations of Missouri bladderpods would be identified and no mowing or herbicides would be used near the populations. Survey information prior to activities within the ROW would reduce potential direct impacts to the species; therefore, the Proposed Action *may affect but is not likely to adversely affect* the species.

Virginia sneezeweed

Four counties within the Proposed Action areas have populations known to occur: Howell, Wright, Webster, and Christian (USFWS 2018h, MDC 2018d). Preferred wetland habitat is limited along the ROW for lines in those counties and would be avoided by both mechanical and herbicide treatment in those areas. The MDC recommends several BMPs to protect populations of Virginia sneezeweed. They include no mowing from July through September in wetland areas (preferred habitat), and limited use of non-specific herbicides (MDC 2015). The GIS Resource Mapper developed by Southwestern to help identify and avoid wetland areas in the ROW would be used prior to any vegetation management along these ROWs. The Proposed Action *may affect but is not likely to adversely affect* the Virginia sneezeweed with implementation of the BMPs.

Pondberry

Potential impacts to the species may occur along the ROW during O&M activities to repair/replace lines and poles that occur near surface waters and river bottoms. Indirect impacts from siltation or erosion altering the hydrological regime may degrade habitat. Direct impacts from herbicide application and trampling of plants are unlikely as activities within areas of regular flooding are limited. BMPs to avoid wetland areas and reduce sedimentation runoff would reduce impacts to this listed species; therefore, the Proposed Action *may affect but is not likely to adversely affect* the pondberry.

Mussel Species

Curtis' pearlymussel

A transmission line crosses the Little Black River right at or very close to the stretch of river where the last live specimen was found in 1993. Lines also cross the Black River between Williamsville and Poplar Bluff, where specimens were found in the 1960s. In these areas, any vegetation management and O&M activities may have the potential to impact the Curtis' pearlymussel. Herbicide application would occur at least 15 feet from any surface water body and would not directly impact species. Only herbicides with approved aquatic labels would be used near surface water bodies. Sedimentation from O&M activities including pole replacements can indirectly affect the species. Erosion controls, including a floating silt screen when poles are surrounded by water, can be used to reduce sedimentation into surface water. Any equipment that enters waterbodies would be washed prior to activities to prevent the spread of zebra mussels. The Proposed Action *may affect but is not likely to adversely affect* the Curtis' pearlymussel.

Fat pocketbook

In the Proposed Action areas, the species is present in the St. Francis River drainage and has the potential to occur in both Arkansas and Missouri. The species is present in many river channels, streams, and ditches in the basin (USACE 2018c). Threats to the species include pesticide/herbicide usage, dredging, and other water activities (USACE 2018c). Sedimentation from O&M activities including pole replacements can indirectly affect the species. Erosion controls, including a floating silt screen when poles are surrounded by water, can be used to reduce sedimentation into surface water. Herbicide application would occur at least 15 feet from any surface water body and would not directly impact species. Only herbicides with approved aquatic labels would be used near surface water bodies. Any equipment that enters waterbodies would be washed prior to activities to prevent the spread of zebra mussels. The Proposed Action *may affect but is not likely to adversely affect* the fat pocketbook.

Neosho mucket

Critical habitat for this species exists in the Proposed Action area in Missouri. Line 3003 crosses the Spring River near Stotts City, MO, but not through designated critical habitat. The Spring River population is currently the only viable population of this species. Line 3009 crosses the Shoal Creek north of Neosho, Missouri through designated critical habitat O&M activities on poles/structures near the river also have the potential to indirectly affect the population and critical habitat at the Shoal Creek. Due to critical habitat along the Shoal Creek, no equipment would be used within the river. Sedimentation from O&M activities including pole replacements can indirectly affect the species. However, no poles are located at the river edge near the critical habitat, but are approximately 0.1 mile from the river. Erosion controls would be used to reduce sedimentation into surface water and Southwestern would avoid creating impoundments that may alter water turbidity or increase siltation. Herbicide application would occur at least 15 feet from any surface water body and would not directly impact species. Only herbicides with approved aquatic labels would be used near surface water bodies. The Proposed Action *may affect but is not likely to adversely affect* the Neosho mucket and would not modify critical habitat.

Pink mucket pearlymussel

In the Proposed Action areas, the species has been reported in rivers on the Arkansas/Missouri River: the Spring, Current, Black, and Little Black rivers (USFWS 1985). The species is negatively affected by impoundments, siltation, and pollution (USFWS 1976). Southwestern would avoid creating impoundments that may alter water turbidity or increase siltation and indirectly affect the species. Sedimentation from O&M activities including pole replacements can indirectly affect the species. Erosion controls, including a floating silt screen when poles are surrounded by water, can be used to reduce sedimentation into surface water. Herbicide application would occur at least 15 feet from any surface water body and would not directly impact species. Only herbicides with approved aquatic labels would be used near surface water bodies. Any equipment that enters waterbodies would be washed prior to activities to prevent the spread of zebra mussels. The Proposed Action *may affect but is not likely to adversely affect* the pink mucket.

Rabbitsfoot

Transmission lines and poles cross several rivers where critical habitat occurs. Herbicide application would occur at least 15 feet from any surface water body and would not directly impact species. Only herbicides with approved aquatic labels would be used near surface water bodies. Southwestern would avoid creating impoundments that may alter water turbidity or increase siltation and indirectly affect the species. Sedimentation from O&M activities along the ROW including pole replacements can indirectly affect the species. Erosion controls, including a floating silt screen when poles are surrounded by water, can be used to reduce sedimentation into surface water. Any equipment that enters waterbodies would be washed prior to activities to prevent the spread of zebra mussels and equipment would not be used in the water in areas with designated critical habitat. Although critical habitat is designated in the Buffalo National River, none of the Southwestern lines cross this portion of the river. The Proposed Action would not modify critical habitat and *may affect but is not likely to adversely affect* the rabbitsfoot.

Scaleshell mussel

In areas where the transmission lines cross rivers, any vegetation management and O&M activities near these water bodies may have the potential to impact the scaleshell mussel. Herbicide application would occur at least 15 feet from any surface water body and would not directly impact species. Only herbicides with approved aquatic labels would be used near surface water bodies. Sedimentation from O&M activities including pole replacements can indirectly affect the species. Erosion controls, including a floating silt screen when poles are surrounded by water, can be used to reduce sedimentation into surface water. Any equipment that enters waterbodies would be washed prior to activities to prevent the spread of zebra mussels. The Proposed Action *may affect but is not likely to adversely affect* the scaleshell mussel.

Snuffbox mussel

Southwestern would avoid creating impoundments that may alter water turbidity or increase siltation and indirectly affect the species. Sedimentation from O&M activities including pole replacements can indirectly affect the species. Erosion controls, including a floating silt screen when poles are surrounded by water, can be used to reduce sedimentation into surface water. Herbicide application would occur at least 15 feet from any surface water body and would not directly impact species. Only herbicides with

approved aquatic labels would be used near surface water bodies. Any equipment that enters waterbodies would be washed prior to activities to prevent the spread of zebra mussels. The Proposed Action *may affect but is not likely to adversely affect* the snuffbox mussel.

Winged mapleleaf

Communication sites 5115, and potentially 5114, appear upstream of the Little River where specimens have been found in Oklahoma and Arkansas. The species need to be considered as a chemical spill or other disruption could travel downstream and impact the species. The species occur in small isolated populations and are subject to extirpation following a catastrophic event. The species are also at risk from exotic species such as zebra mussels. Only herbicides with approved aquatic labels would be used near surface water bodies. Sedimentation from O&M activities including pole replacements can indirectly affect the species. Erosion controls, including a floating silt screen when poles are surrounded by water, can be used to reduce sedimentation into surface water. Any equipment that enters waterbodies would be washed prior to activities to prevent the spread of zebra mussels. The Proposed Action *may affect but is not likely to adversely affect* the winged mapleleaf.

Insect Species

American Burying Beetle

O&M activities have the potential to compact and disturb soils which would potentially injure or kill ABBs. These projects would be implemented throughout the year, potentially affecting the ABB during all phases of its lifecycle. Overwintering adults and reproductive broods may be affected through the direct loss of individual adults and larvae, and a decrease in ABB fecundity. Vegetation management in the ROW would potentially involve mowing or herbicide treatments which could reduce the availability of habitat for small bird and mammal populations thus reducing potential carcasses for the ABB. Most maintenance activities normally only entail minimal soil disturbance or compaction and may cause multiple, though often minor, disturbances over the life of the project. Approximately 859 acres of potential ABB habitat occur along the ROW in the three counties in Arkansas: Crawford, Franklin, and Johnson.

In Oklahoma, the estimated maximum soil disturbance in ABB habitat due to Southwestern activities for any given year is 4,855 acres. This estimate includes maintenance, and possible emergency actions. Planned activities could be scheduled or modified to avoid impacts to the ABB on approximately 123 acres per year. Approximately 4,732 acres per year may be subject to disturbance on short notice or during the dormant season with little avoidance possible; these acres, if disturbed under such conditions, will be considered "incidental take". This is an estimated maximum amount since actual impacts would be limited to the individual project footprints – an area usually considerably smaller than the entire ROW.

O&M activities at the communication site and the substation are not likely to impact ABBs as the sites are already disturbed and are now graveled. Due to the potential impact to ABB from O&M and vegetation management activities along the ROW, the Proposed Action *may affect and is likely to adversely affect* the species. Southwestern will attempt to minimize disturbance to areas outside of the required maintenance footprints of the proposed projects whenever practicable and feasible and utilize the most current version or equivalent of the *Best Management Practices for American Burying Beetl*e in

Oklahoma. Southwestern proposes to include detection surveys at the project site prior to ground disturbance or may assume presence in lieu of detection surveys. This section will be updated when consultation with the USFWS is complete and reasonable and prudent measures outlined by the USFWS will be added.

Hine's emerald dragonfly

Invasive vegetation can potentially impact Hine's emerald dragonfly behavior and habitat. The encroachment of cattails (*Typha* spp.) and woody vegetation has the potential to affect adult flight behavior and movement (USFWS 2001b). Potential impacts to the Hine's emerald dragonfly may occur if wetland habitat is destroyed during O&M activities. Maintenance of the poles near the Current River may crush riparian vegetation along the river bank associated with the poles. Herbicide spraying would not occur within 15 feet of water's edge nor in any associated riparian habitat, therefore, potential impacts from vegetation management would be limited to removal of undesirable tree species. However, during habitat assessment and adult surveys conducted in the Upper Peninsula of Michigan, utility ROWs that are kept clear of woody vegetation appear to serve as flight corridors for the species (USFWS 2015). Vegetation management and work along line 3002 at the structures would be sporadic and the timeframe in between visits would be long. Temporary, short-term impacts to the species may occur during O&M activities but these would be temporally separated over a minimum of 5 years and would not significantly impact the population. Therefore, the Proposed Action *may affect but is not likely to adversely affect* the Hine's emerald dragonfly.

Fish Species

Arkansas River shiner

In the Proposed Action areas, critical habitat exists in the Canadian River near Lamar, OK (USFWS 2005). Line 3101 crosses the Canadian River at this point although no structures occur right at the river edge. Threats to the species include habitat loss or alteration and water quality degradation (USFWS 1998). O&M activities occurring along line 3101 at the Canadian River have the potential to impact water quality. Potential impacts due to erosion during pole maintenance can indirectly affect the species. Erosion controls, including a floating silt screen when poles are surrounded by water, can be used to reduce sedimentation into surface water. Activities, even when replacing the pole near the Current River, would occur away from and out of the water body. O&M activities would occur at a localized area and would be temporally spaced occurring at 5-year or longer intervals. The Proposed Action *may affect but is not likely to adversely affect* the Arkansas River shiner.

Ozark cavefish

Potential threats to the species include spills, which can leak into the groundwater system. Contaminants such as herbicides (among other man-made chemicals) may cause abnormalities and increased cancer risks, although little is known about effects on cave-dwelling organisms (USFWS 2011a). The Ozark cavefish is highly specialized and may not recover well from small changes in its environment (USFWS 1989b). Dispersal of the species occurs only during periods of cave flooding. Impacts to the species from O&M activities would be limited since disturbance would occur mainly aboveground. Herbicide usage for vegetation management though has the potential to impact the species. In Greene, Newton, and Lawrence

counties in Missouri where the cavefish has been confirmed, Southwestern SOPs limit the use of herbicides to only Garlon 3A on woody plants. Southwestern personnel are also trained to identify karst features and herbicide application is kept a minimum of 15 feet from the features. The Proposed Action *may affect but is not likely to adversely affect* the Ozark cavefish with implementation of these BMPs.

Amphibian Species

Ozark hellbender

The Ozark hellbender is a strictly aquatic species. Impacts from O&M activities would be limited to any work that occurs within the waterbodies or that has the potential to alter water quality. Increased sedimentation from maintenance at the lines which cross the Current and Elven Point rivers could increase erosion into the rivers. Erosion control measures would reduce short-term impacts to the species. Activities at the lines would be infrequent and temporally separated. Herbicides would not be used in the water. The Proposed Action *may affect but is not likely to adversely affect* the Ozark hellbender.

Avian Species

Least Tern

O&M activities have the potential to disturb nesting species although activities would be limited in duration. While activities in the Proposed Action areas could potentially disturb the species, as stated in USFWS (2013d), due to the species' flexibility about habitat changes, the sheer number of established breeding colonies, and the increase in population size, it is unlikely that infrequent visits to the sites would impact the species at all. Vegetation removal on sandbars would likely benefit the species as they prefer open habitats. Therefore, the Proposed Action *may affect but is not likely to adversely affect* the least tern.

Piping plover

While piping plovers have been documented migrating through Arkansas (USFWS 2014), the Proposed Action areas do not appear to encompass any habitat the species may use. Similarly, the species has been documented in Missouri, though not in the Proposed Action areas. Noise from O&M activities near the Arkansas and Canadian rivers may cause short-term displacement of the plovers resting in stopover habitat. Invasive plants encroaching into piping plover habitat could lead to habitat degradation and loss (USFWS 2009b). Vegetation removal activities would likely benefit the species, as it provides more available habitat for the species to stop at. The Proposed Action *may affect but is not likely to adversely affect* migrating piping plovers.

Mammal Species

Gray bat

No direct impacts from O&M activities or vegetation management would occur as these activities do not occur in or near known occupancy caves. Potential indirect effects may occur from a reduction in vegetation near water sources where bats may forage. Impacts from vegetation management may occur if

located near known caves. O&M ground disturbing activities within 0.25 mile of the caves may cause runoff that would reduce water quality in karst habitat. Surface disturbing activities in the vicinity of hibernacula may affect bat populations if those activities result in changes to the temperature and air flow.

Southwestern developed a bat decision guidance document for vegetation management along the ROWs. Maintenance and tree trimming along the existing ROWs is not likely to impact bats at the known sites in Missouri and Arkansas (Marquardt 2018, Inebnit 2018). Erosion control measures to protect water quality in karst areas would be implemented to reduce potential impacts to the gray bat. In addition, SOPs developed by Southwestern restrict the use of herbicides within 15 feet of a cave or karst feature. The USFWS recommends no tree trimming around any rivers or streams from May 1 through September 15 to avoid impacts to aquatic foraging areas and disturbance of the species in Oklahoma (Fuller 2018). With implementation of the bat guidance document, seasonal tree trimming restrictions, and the protection of water quality, the Proposed Action *may affect but is not likely to adversely affect* the gray bat.

Indiana bat

O&M activities conducted during the summer time may cause short-term impacts to Indiana bats from noise and human presence in potential foraging and roosting areas. During summer, female and juvenile Indiana bats roost almost always in trees, as do adult males. Adult females, however, apparently used a crevice in a utility pole in Indiana, and adult males were found under metal brackets on utility poles in Arkansas (USFWS 2008). Removal of trees may affect summer roosting for the Indiana bat. The Indiana bats usually prefer taller trees 52-85 ft (16-26 m) (USFWS 2008). Vegetation management includes vertical clearance and maintenance of trees (trimming) and depends on the tree species and re-sprouting as well as the mandatory electrical clearance. Trees usually removed are smaller diameter trees (<9 inches) and trees over 50 feet in height would not be found within the ROW due to constant maintenance. Trees cut are usually live and not snags. Pesticides within or near suitable habitat could harm Indiana bats directly (via dermal contact or ingestion) or indirectly by reducing prey availability of foraging bats.

Tree trimming and felling would unlikely impact the species in the fall and spring near caves near the ROW (Inebnit 2018). In the Proposed Action areas, there are no known Indiana bat hibernacula or roost trees within or immediately adjacent to the ROWs (Marquardt 2018, Inebnit 2018, Fuller 2018, Southwestern 2018). During spring migration Indiana bats in the Arkansas area have been known to use forested habitat within the ROW and potentially for maternity areas. The USFWS recommended that tree trimming and felling with the ROW occur from September 15 through March 1 to reduce potential impacts. The bat guidance document specifically notes areas in Arkansas where seasonal trimming should occur (Southwestern 2018). With implementation of the bat guidance document and seasonal tree trimming restrictions, the Proposed Action *may affect but is not likely to adversely affect* the Indiana bat.

Northern long-eared bat

On January 14, 2016 the USFWS finalized the 4(d) rule for the NLEB, which tailors protections to areas affected by white-nose syndrome during the bat's most sensitive life stages (USFWS 2018i). The USFWS PBO analyzed several activities that may affect the NLEB including timber harvest and herbicide usage. Tree removal without a permit is prohibited: 1) within 0.25 mile of known hibernaculum; and 2) within a

150-foot radius of the maternity roost tree from June 1 through July 31. The 2016 PBO (USFWS 2016b) was developed for federal agencies to fulfill their project-specific Section 7(a)(2) responsibilities.

Disturbance associated with O&M and vegetation management activities could cause NLEB to flee or abandon day-time roosts, which increases the likelihood of predation. This may also result in females aborting or not being impregnated depending on the time of year (USFWS 2016b). O&M ground disturbing activities within 0.25 mile of the caves may cause runoff that would reduce water quality in karst habitat. Bats may also be directly exposed to herbicides or other pesticides sprayed in roosting areas. Although some adverse effects to NLEBs are reasonably certain to occur from herbicides and other pesticide use, due to the dispersed nature of the treatments both temporally and spatially, a relatively small number of bats may be impacted. Southwestern would use all herbicides in accordance to their labels and application would not occur in water. Southwestern has implemented a bat guidance document (*Vegetation Management –Endangered Species Act Bat Decision Guide)* for the four listed bat species. Implementation of the guidance, including guidance for emergency situations that would require after the fact consultation, would reduce potential impacts to listed species and as noted by USFWS the maintenance activities would comply with the final 4(d) rule for the species (Southwestern 2018). The Proposed Action *may affect* the NLEB however maintenance activities comply with the 4(d) rule.

Ozark big-eared bat

Current impacts to the Ozark big-eared bat include lost forested foraging habitat due to development, timber harvest, and ROW construction (USFWS 1995). No direct impacts from O&M activities or vegetation management would occur as these activities do not occur in or near caves. Indirect impacts could occur if forested habitat near the cave sites which provide cover for the bats and prey species was greatly reduced. The ROWs have already been developed for the Proposed Action and tree removal is limited to selective trees species spatially spread across the species' range. Although there are a couple of known caves located with 300 meters of the ROW in Arkansas, the USFWS did not recommend seasonal restriction on maintenance activities (Inebnit 2018). In addition, no seasonal restrictions were recommended (Fuller 2018, Inebnit 2018, Southwestern 2018) in Oklahoma. SOPs developed by Southwestern restrict the use of herbicides within 15 feet of a cave or karst feature and would reduce the potential impact to this species. The Proposed Action *may affect but is not likely to adversely affect* the Ozark big-eared bat.

Best Management Practices

The following BMPs would be implemented to protect vegetation and wildlife:

- Implement the APP and conduct preventative transmission system evaluations and implement avian preventative measures
- To reduce impacts to nesting migratory bird species (March to August), initially survey the ROW area for treatment for potential nests and restrict mechanical disturbance during this period in naturally vegetated areas.
- Implement erosion control methods when necessary.
- Do not apply herbicide within 15 feet of karst habitat.

- Do not apply herbicide within 15 feet of surface water.
- Use approved aquatic herbicides when spraying near sensitive water resources.
- Implement the GIS Resource Mapper to identify areas with sensitive habitats or listed species.

3.4.2.2 No Action Alternative

Under the No Action Alternative, impacts to vegetation, wildlife and special status species from O&M activities would be similar as described for the Proposed Action. Southwestern would continue its current ROW vegetation management throughout its system area under the No Action Alternative. Impacts to vegetation and wildlife from manual and mechanical vegetation removal would be similar as for the Proposed Action. Older formulations of herbicides would be used under the No Action Alternative which would increase the frequency of visits to manage vegetation within the ROW and more herbicide could be applied across the landscape as compared to under the Proposed Action. As compared to the Proposed Action, an increase in use of mechanical equipment would occur to control vegetation which would cause greater disturbance to the vegetation and wildlife. In addition, the GIS Resource Mapper would not be used to assist with site-specific herbicide selection.

3.5 Air Quality

The United States Clean Air Act (CAA), which was amended in 1990, requires states to implement and administer air pollution control programs, which contain, at a minimum, the requirements of the federal legislation. This generally includes the control of the emission of six criteria air pollutants above *de minimis* levels and the permitting of emission sources. The criteria pollutants are ozone (as total volatile organic compounds), carbon monoxide, particulate matter (PM_{10}: particulate matter less than or equal to 10 micrometers in diameter and $PM_{2.5}$: particulate matter less than or equal to 2.5 micrometers in diameter), sulfur oxides, nitrogen oxides, and lead. In addition, the CAA requires the control (above *de minimis* levels) of 189 air toxics (hazardous air pollutants), many of which are also volatile organic compounds, and the permitting of those emission sources. The ambient air quality in an area can be characterized in terms of whether it complies with the primary and secondary National Ambient Air Quality Standards (NAAQS). Stricter rules exist in areas that are not in compliance with NAAQS (non-attainment areas). The CAA also includes a plan to eliminate the production of chlorofluorocarbons which are ozone-depleting compounds, as well as requirements for the handling and use of such chemicals.

Section 176(c)(1) of the CAA requires federal agencies to ensure that their actions conform to applicable implementation plans for the achievement and maintenance of the NAAQS for criteria pollutants. To achieve conformity, a federal action must not contribute to new violations of standards for ambient air quality, increase the frequency or severity of existing violations, or delay timely attainment of standards in the area of concern (for example, a state or a smaller air quality region). Federal agencies prepare written Conformity Determinations for federal actions that are in or affect NAAQS nonattainment areas or maintenance areas when the total direct or indirect emissions of nonattainment pollutants (or their precursors in the case of ozone) exceed specified thresholds.

The ROI for air quality impacts is the 23 counties in Arkansas, 22 counties in Missouri, and 16 counties in Oklahoma that contain Southwestern facilities.

3.5.1 Affected Environment

No Southwestern facilities are currently located in non-attainment areas in Arkansas, Missouri, or Oklahoma; and therefore, no written Conformity Determination is required for the Proposed Action. Southwestern's EMS establishes an *Air Pollution Control Program* to address the CAA requirements. The Order discusses Southwestern's emission sources at its facilities and its determination of need for permitting, monitoring, and reporting. Southwestern made the determination that based on current air laws and regulations, air permits are not required at its facilities.

A summary of each state's (Arkansas, Missouri, and Oklahoma) air pollution control regulations, as they relate to current Southwestern operations, is provided below. In all states, the regulations and pollutant levels apply to each facility separately, not to Southwestern operations as a whole.

The applicable emissions of concern and their respective regulatory levels for the state of Arkansas are presented in Table 3-4. The environmental impact of any proposed change would be considered trivial if the emission increase would be less than the *de minimis* levels presented.

Table 3-4. *De Minimis* Changes of Emissions of Concern in Arkansas

Parameter of Concern	De Minimis Level Tons/year (megagrams/year)
Carbon monoxide	75
Nitrogen dioxides	40
Sulfur dioxides	40
VOC	40
Particulate matter Direct $PM_{2.5}$ PM_{10}	25 10 15
Lead	0.5

Source: Arkansas Pollution Control and Ecology Commission 2016
PM_{10} particulate matter less than or equal to 10 micrometers in diameter
$PM_{2.5}$ particulate matter less than or equal to 2.5 micrometers in diameter
VOC volatile organic compound

The applicable emissions of concern and their respective *de minimis* levels for the state of Missouri are presented in Table 3-5.

Table 3-5. *De Minimis* Levels of Emissions of Concern in Missouri

Parameter of Concern	De Minimis Level Tons/year (megagrams/year)
Carbon monoxide	100
Nitrogen oxides	40
Sulfur dioxide	40
Particulate matter	
PM	25
$PM_{2.5}$	10
PM_{10}	15
Ozone	
VOC (ozone precursor)	40
Nitrogen oxides (ozone precursor)	40
Lead	0.6

Source: Missouri 2017
PM particulate matter
PM_{10} particulate matter less than or equal to 10 micrometers in diameter
$PM_{2.5}$ particulate matter less than or equal to 2.5 micrometers in diameter
VOC volatile organic compound

The applicable emissions of concern and their respective regulatory levels for the state of Oklahoma are presented in Table 3-6.

Table 3-6. Regulatory Levels of Emissions of Concern in Oklahoma

Parameter of Concern	De Minimis Level Tons/year (megagrams/year)
Each Criteria Pollutant[1]	5

1 Criteria pollutants include: ozone, particulate matter (PM_{10} and $PM_{2.5}$), sulfur oxides, nitrogen oxides, carbon monoxide, and lead.
Source: Oklahoma 2017
PM_{10} particulate matter less than or equal to 10 micrometers in diameter
$PM_{2.5}$ particulate matter less than or equal to 2.5 micrometers in diameter

Southwestern has facilities within 23 counties in Arkansas, 22 counties in Missouri, and 16 counties in Oklahoma. All counties containing Southwestern facilities in all three states are in attainment for the six criteria pollutants. Southwestern has determined that the following potential air pollution sources exist at its facilities (Southwestern 2005):

- Particulate matter, sulfur oxides, nitrogen oxides, and other pollutants are emitted from emergency electrical generators, vehicles, and other fossil fuel-powered equipment used during O&M activities (such as trucks, tractors, cranes, backhoes, forklifts, chippers, mulchers, brush cutters, and mowers).
- Particulate matter (including fugitive dust) can be created during maintenance activities, driving over dirt roads, and during sandblasting (painting preparation).
- Volatile organic compounds and air toxics are released through maintenance activities including equipment cleaning and painting.

Insulating oil was used in circuit breakers at substations as an insulate and as a coolant until 1990. By 2015, all the breakers had been changed to sulfur hexafluoride gas. Sulfur hexafluoride gas does not deplete the ozone but it is an extreme greenhouse gas.

3.5.2 Environmental Consequences

Potential impacts to air quality are considered significant if the Proposed Action would:

- Increase ambient air pollution above any NAAQS;
- Contribute to an existing violation of any NAAQS; or
- Interfere with or delay timely attainment of NAAQS

3.5.2.1 Proposed Action

The environmental consequences from the Proposed Action would be minimal and would not cause regional changes to air quality. O&M activities are currently performed routinely and would continue under the Proposed Action. Details of O&M activities and the types of equipment used are shown in Table 2-1.

The primary source of air emissions from O&M activities would be from the burning of fossil fuels in internal combustion engines. Gasoline or diesel engines would power numerous emission sources, including emergency generators, light duty four-wheel drive vehicles, all-terrain vehicles, trucks, tractors, specialized heavy equipment, and other equipment referenced in Table 2-1. The burning of fossil fuels in these engines would result in the emission of criteria pollutants, small amounts of toxic air contaminants, and greenhouse gases. The emissions would be short-term and would occur only during the time that the engines are in operation.

Particulate matter and fugitive dust would be emitted from those activities that disturb the soil, such as from replacing poles, driving on dirt roads, and from other ground-disturbing activities referenced in Table 2-1.

Volatile organic compounds and air toxics would be released through maintenance activities including equipment cleaning and painting. Sulfur hexafluoride gas used in electrical equipment is an extreme greenhouse gas, but proper maintenance of equipment should eliminate leaks and the resulting release of the gas.

O&M activities under the Proposed Action would be a continuation of existing O&M activities. No increase in air emissions is anticipated and the Proposed Action would not impact regional air quality.

Vegetation management includes manual control, which involves using hand tools and hand-operated power tools, such as chainsaws, to cut and clear vegetation. The vehicles required to reach the treatment area and the power tools that run on fossil fuels would emit criteria pollutants and greenhouse gases. Fugitive dust could be generated from disturbing the vegetation and land surface. The emissions would be the same as current conditions, be short-term, occur only during the time of the activity, and would not impact regional air quality.

The vehicles and equipment used during mechanical treatment would emit criteria pollutants and greenhouse gases from their internal combustion engines. In addition, the chopping and mulching of existing vegetation could generate particulate matter and fugitive dust.

Changing the process by which herbicides are selected would not change air emissions. Application of herbicides by vehicle-mounted mechanical sprayers would emit criteria pollutants and greenhouse gases from the internal combustion engines of the vehicles. The application of the herbicide from either vehicle-mounted sprayers or backpack sprayers could result in the drift of droplets of herbicide in a very localized area. Although emissions would not impact air quality the use of better formulated herbicides would increase the time between applications and would reduce air emissions from vehicles.

Best Management Practices

The following BMPs would be implemented to protect air quality:

- Perform recurring vehicle emission inspections and proper vehicle maintenance.
- Maintain emergency generators and comply with the appropriate state regulations.
- Do not apply herbicides if wind gusts exceed 10 miles per hour to minimize drift.
- Maintain circuit breakers and other equipment at substations to minimize leaks of sulfur hexafluoride gas.

3.5.2.2 No Action Alternative

Under the No Action Alternative, Southwestern would continue its O&M activities and vegetation management as it currently does. Impacts to air quality would not change from current conditions. However, the time interval between herbicide applications may be shorter and therefore, air emissions from vehicles could be greater as compared to the Proposed Action.

3.6 Geology and Soils

Geology is the study of the earth's physical structure and substance; in this PEA, geology includes the analysis of landforms and geologic hazards that are relevant to the Proposed Action. Soil is the upper layer of earth in which plants grow, a black or dark brown material typically consisting of a mixture of organic remains, clay, and rock particles. Soil is included for prime farmland considerations and its general composition and texture as it relates to the Proposed Action. The ROI for geology and soils includes the land where proposed activities would take place (i.e., Southwestern facilities) and areas that are immediately adjacent to the facilities that could be affected by herbicide overspray as well as land within drainage pathways that could be affected by runoff.

3.6.1 Affected Environment

3.6.1.1 Geology

The land forms of the region are extremely diverse consisting of broad valleys and plateaus, and the Ozark and Boston Mountain ranges. These mountains have a few peaks extending above 2,600 feet. On the east side of the mountain region is the broad delta region of the Mississippi River. The service area begins at the Red River on the Oklahoma-Texas border, then crosses the rolling plains of south central Oklahoma into the rolling Cookson Hills of the eastern portion of the state along the foothills of the Boston Mountains in western Arkansas, crossing that minor range into the Ozarks in northern Arkansas and southern Missouri through the plateaus and rolling hills adjacent to the Mississippi River and terminating in the Mississippi delta region of southeast Missouri. At elevations between 250 and 2,600 feet, this region is frequently traversed by streams and rivers running generally northwest to southeast, which empty into the Arkansas and Mississippi rivers. Southwestern's facilities are located in four distinct physiographic provinces: the Central Lowland, Ozark Plateau, Ouachita, and Mississippi Alluvial Plain Physiographic Provinces.

The facilities in southern Oklahoma are located within the Central Lowlands Physiographic Province, characterized by numerous wide, flat valleys incised by rivers. The surficial geologic deposits are predominantly bedrock formations consisting of shale, and shaly sandstone, and to a lesser extent non-karst limestone.

The majority of the facilities in southwest Missouri and northern Arkansas are situated within the Ozark Plateau Physiographic Region, characterized by a low dome dissected with deep valley walls and narrow floors. The Ozark Plateau is characterized by an extremely thick sequence of carbonate (limestone and dolomite) bedrock formations. Generally there exists a thick clay rich residual soil overlying the bedrock. The Ozark Plateau geology is characterized by karst terrain, which develops as dissolution features within the carbonate rocks. Sinkholes, caves, and springs are common features of karst terrain. Numerous springs and caves in the area are used for recreation. Figures 3-9 and 3-10 show the numerous karst features of this area. Figure 3-10 also shows the density of caves throughout Missouri. A particular hazard associated with sinkholes in this area has to do with the fact that the carbonate bedrock is not directly exposed at the surface, but is covered by a variable thickness of clay, silt and sand. A thicker clay-rich overburden may bridge subsurface cavities for long periods of time. Eventually a catastrophic collapse of the overburden into the subsurface cavity may occur, forming a cover-collapse sinkhole. Typically, cover-collapse sinkholes form steep-sided cylindrical openings. A cover-collapse sinkhole usually develops in a short period of time with no prior indication of its pending existence, thus having the potential to cause damage to property and structures (Arkansas Geological Survey 2018a).

Facilities located in eastern Oklahoma and west-central Arkansas are located within the Ouachita Physiographic Province, characterized by sharp ridges, mostly east-west trending, and often buckled and distorted, separated by narrow to broad valleys. Surface rocks from this region are mostly shales, sandstone, novaculite, chert, and minor limestone, generally underlain by weathered shale.

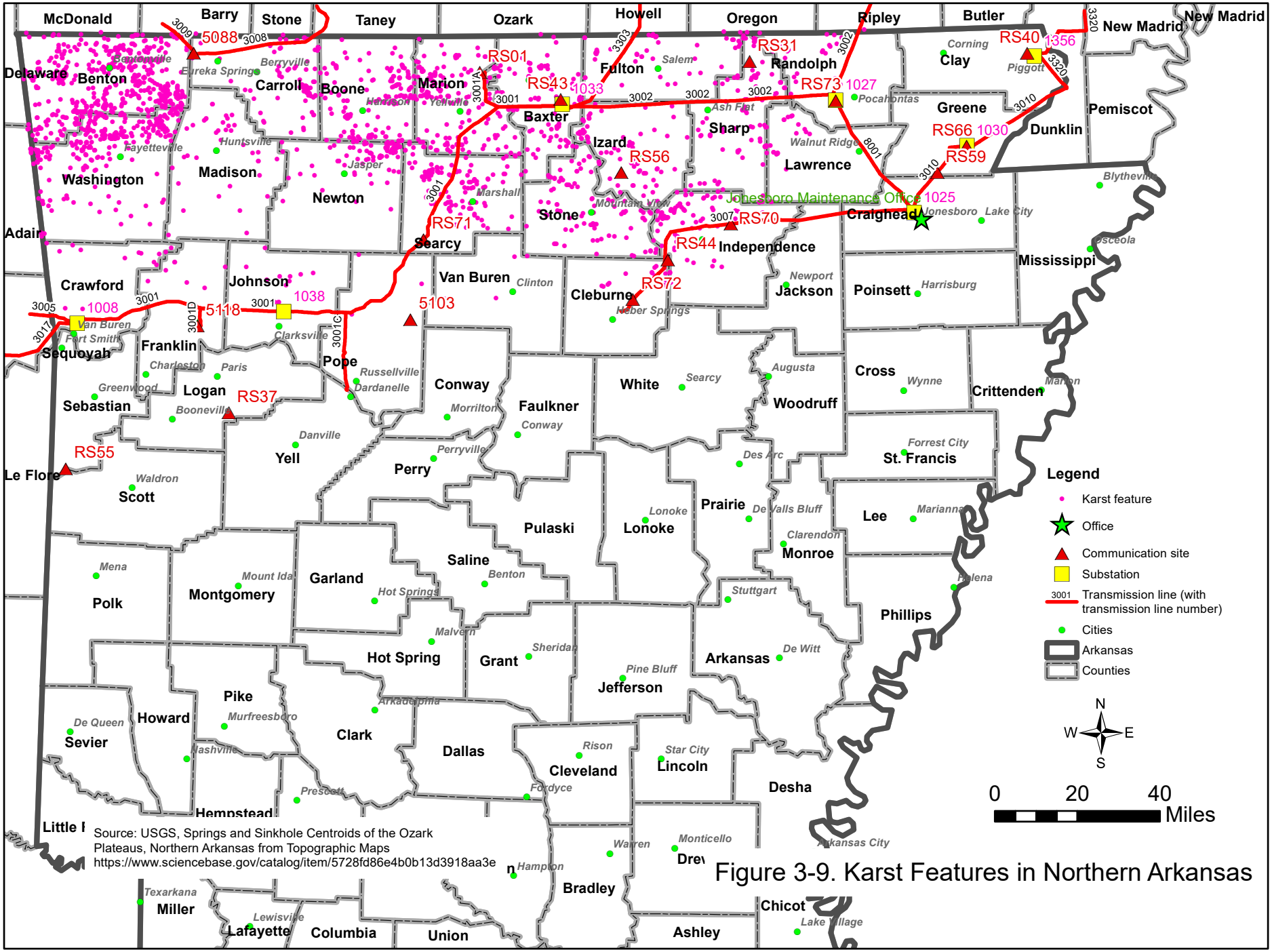
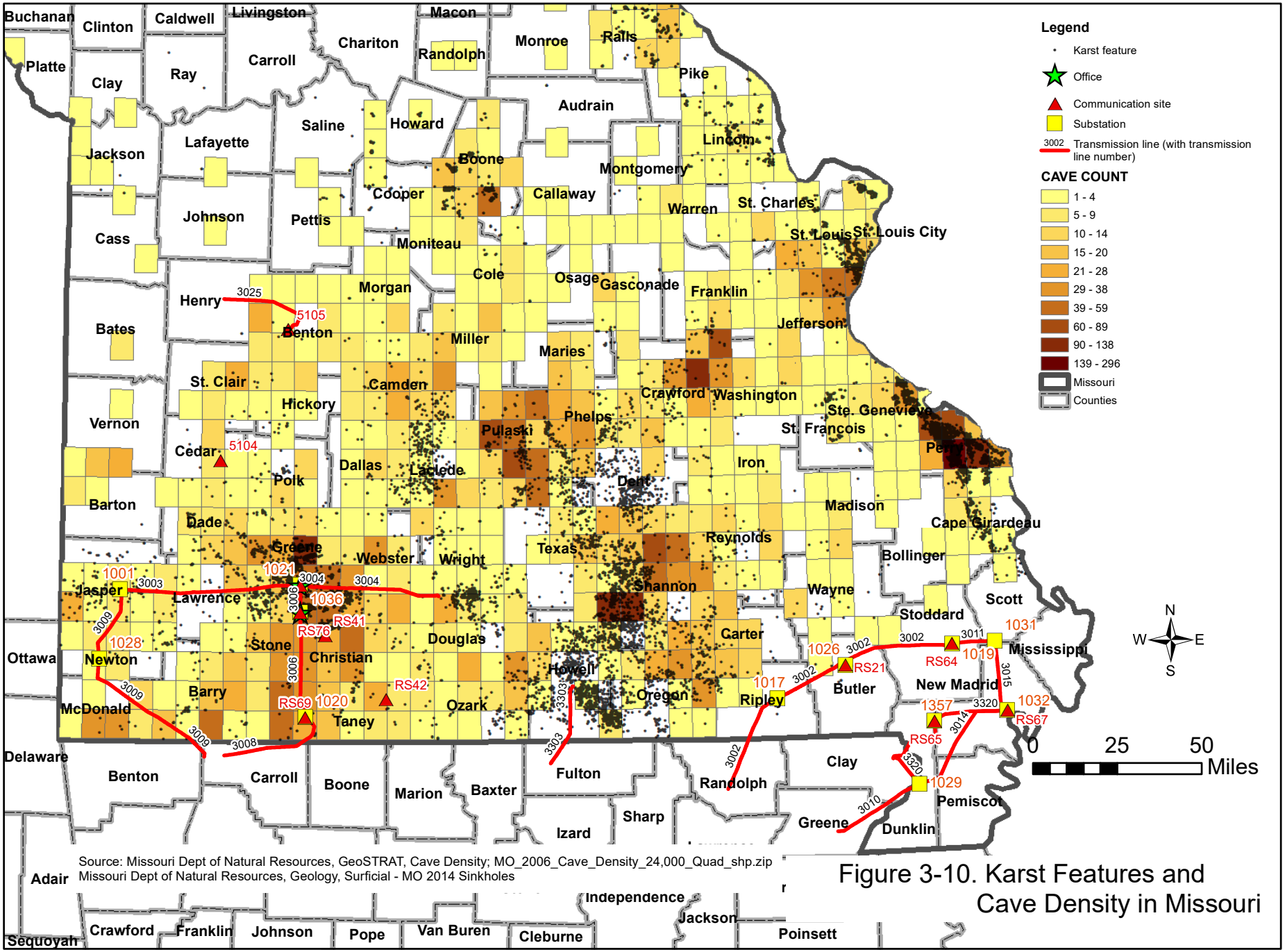


Figure 3-9. Karst Features in Northern Arkansas



Source: Missouri Dept of Natural Resources, GeoSTRAT, Cave Density; MO_2006_Cave_Density_24,000_Quad_shp.zip
Missouri Dept of Natural Resources, Geology, Surficial - MO 2014 Sinkholes

Figure 3-10. Karst Features and Cave Density in Missouri

Facilities located in southeastern Missouri and northeastern Arkansas are situated in the Mississippi Alluvial Plain Province, a relatively flat area, which is well drained and contains excellent farmland. The surficial deposits in this region consist of unconsolidated alluvial deposits of clay, silt, sand, and gravel. The New Madrid Seismic Zone is an active series of faults, running approximately 150 miles from Arkansas into Missouri and Illinois. Southwestern's facilities located in southeastern Missouri and northwestern Arkansas are located in the fault zone. The New Madrid zone averages about 20 minor events per month, registering at least a 1.0 on the Richter scale. About once per year, there occurs a tremor up to 3.0, and about once every ten years, there is a quake of 5.0 or greater. In 1811–1812, this zone was responsible for the most violent series of earthquakes in the history of the continental United States (though there have been larger individual earthquakes). Scientists predict that another large earthquake is due which could inflict great damage to Arkansas as well as up to half the nation (Missouri Department of Natural Resources 2018, Arkansas Geological Survey 2018b).

3.6.1.2 Soils

The soil in which vegetation grows is a complex system of physical and biological elements and processes. It is essential for plant life, and has a major role in defining local ecosystems. It is vital for crop, forage, and timber production. There are a total of 11 major soil categories (known as *soil orders)*; five of these occur within Southwestern's service area (USDA 1998), as described below.

- **Alfisols** – Alfisols form in semi-arid to humid areas, typically under a hardwood forest cover. They have a clay-enriched subsoil and relatively high native fertility. They are productive for both commercial timber and agriculture. These soils occur mainly in south and central Oklahoma (Central Lowland Physiographic Province) and in the Ozark Plateau Physiographic Province in southeastern Missouri and northeastern Arkansas.
- **Entisols** – These soils are of relatively recent origin, and characterized by great diversity. These soils occur along the major river valleys in all three states.
- **Mollisols** – Mollisols form in semi-arid to semi-humid areas, typically under a grassland cover, and are important, productive agricultural soils. The parent material is typically base-rich and calcareous and includes limestone, loess, or wind-blown sand. Mollisols occur in south and central Oklahoma (Central Lowland Physiographic Province) and south/central Missouri.
- **Ultisols** – Ultisols, commonly known as red clay soils, are seen as the ultimate product of continuous weathering of minerals in a humid, temperate climate. These soils occur in eastern Oklahoma in the Ouachita Physiographic Province and the Ozark Plateau Physiographic Region in southeastern Missouri and northeastern Arkansas.
- **Inceptisols** – These soils form quickly through alteration of parent material. They have no accumulation of clays, iron oxide, aluminium oxide, or organic matter. Inceptisols are found in east central Oklahoma (Central Lowland Physiographic Province) and southeastern Missouri.

Prime farmland includes soil types of significant agricultural value and is specifically regulated by the Natural Resource Conservation Service of each state. Prime farmland is defined by the U.S. Department of Agriculture (USDA) as the land best suited for producing food, feed, forage, fiber, and oilseed crops. The soil quality, growing season, and moisture supply within prime farmland produce sustained high

yields of crops when treated and managed with acceptable farming methods. Prime farmland may be cropland, pasture, woodland, or any lands other than urban areas, developed lands, or open water.

Generally, prime farmland can be delineated using the local soil survey. Previously, delineation of prime farmland with respect to the substation locations was conducted by comparing the soil types adjoining the substation locations to a listing of soil types classified as prime farmland supplied by the local USDA, Natural Resource Conservation Service office. Several of the substations are upgradient or adjacent to prime farmland designated areas. The majority of the substations that adjoin prime farmland are located within the Mississippi Alluvial Plain and the Central Lowlands Physiographic Provinces (Southwestern 1995b). Likewise, for the ROW, most farmland identified by Southwestern is located along lines 3002, 3007, 3010, 3011, 3014, 3015, and 3320, located within the Mississippi Alluvial Plain.

Sandy soils, as identified by Southwestern, generally occur in areas of farmland and have been noted as occurring along lines 3011, 3014, 3015, and 3320. Sandy soils are an important consideration for herbicide application, as they are very permeable and promote herbicide migration to groundwater.

3.6.2 Environmental Consequences

Potential impacts to geology or soils are considered significant if the Proposed Action would:

- Expose people or structures to major geologic hazards
- Cause substantial erosion or siltation
- Cause substantial land sliding

3.6.2.1 Proposed Action

Area geology considerations include karst terrain and faulting. Karst terrain would be unlikely to be impacted by O&M activities. Undetected sinkholes could potentially present a health and safety risk to workers. Likewise, the New Madrid Seismic Zone could be hazardous if it became active while workers were in the area. Karst terrain could serve as conduits for herbicide applications, transporting the herbicide to unwanted areas or water sources. Because of this, herbicide application is not allowed within 15 feet of a karst feature (cave, sinkhole, spring). The GIS Resource Mapper that Southwestern developed in conjunction with the Proposed Action would be used to identify the locations of all karst features. In addition, workers are trained on identification of karst terrain. Likewise, the New Madrid Seismic Zone could become a hazard if it became active while herbicide application workers were in the area.

O&M activities would be expected to produce impacts to soil similar to those from construction activities, such as soil erosion and compaction. Soil compaction and erosion would be very localized and short-term. Erosion would occur only in isolated incidents under certain conditions, such as crossing small stream banks with heavy equipment or on areas with steep slopes without much vegetation. If an O&M activity would disturb 1 acre or more of soil, Southwestern would obtain a storm water construction permit from the state environmental agency. Restoration would occur in compliance with the permit to stabilize soil after completion of any O&M activities that disturb the soil. The 100-foot ROW buffer has been out of farmland production for years, so impacts to farmland are not expected.

Vegetation removal (by manual and mechanical means) would have the potential to impact soil resources by increasing the amount of exposure of susceptible soils to water or wind erosion at the land surface. Manual impacts on soil include disturbance of the uppermost soil layer in only a very small area, not enough to cause substantial impacts on the soil as a resource. Mechanical techniques have the greatest impacts on soils. Ground-disturbing heavy equipment can expose soils, compact soils, and disturb the physical arrangement of soils. The erosion potential from vegetation removal is expected to be lessened due to the humid climate and the nature of the soils encountered (slight erosion hazard potential). Additionally, as vegetation is removed, it would be dispersed across the ROW as wood chips (mechanical vegetation removal) or as scattered limbs/logs and stumps cut flush with the ground surface (manual methods). The application of this debris to the cleared land surface would assist in mitigating impacts to soil resources by intercepting rainfall, limiting impact erosion, and slowing surface runoff; and combined with existing grasses in the ROW (which are not removed as a part of vegetation management), further limits erosion.

When herbicides are used, some of the chemical can end up in the soil. Once in the soil, herbicides can reduce soil microbes' numbers and/or change species composition. This reduction and change can affect soil productivity, including the ability of soils to support certain vegetation. Many herbicides, such as 2,4-D and glyphosate break down quickly and have very temporary effects on soil microbes. Herbicides that do not break down relatively quickly (e.g., tebuthiuron) may have longer-lasting effects. For instance, if an area is re-treated often and regularly, herbicides may build up in the soils and can reduce soil productivity before breaking down. The potential effects on soil microbes can also depend on the application technique. Spot and localized applications, such as those proposed under the Proposed Action, affect much smaller areas and microbes might quickly recolonize affected soils from adjacent, unaffected areas. The effect on soil microbes also depends on the existing vegetation, climatic factors, and soil properties. ROWs would be treated with relatively small amounts of herbicide with long-time spans between treatments, so there would be little potential for impacts on soil microbes. At substations, the soil is treated intentionally to keep plants from growing, and the regular use of herbicides would affect the microbes within the substation. If herbicides were to migrate offsite into adjacent soils, microbes (and thus soil productivity) could be affected.

All of the herbicides meeting the herbicide selection criteria could impact prime farmland through rainfall runoff of treated areas, where such prime farmland exists. Herbicides carried offsite by rainfall runoff would primarily effect vegetation and soils within established drainage pathways. At substations, continuous use of herbicides meeting the herbicide selection criteria could impact prime farmland in the short-term by affecting vegetation with roots along the drainage pathway, and in the long-term by either preventing seed germination, or by causing soil sterilization within the drainage pathway. To address potential impacts to prime farmland, the USDA, Natural Resource Conservation Services from each state, has been consulted during preparation of this EA regarding recommended techniques to reduce soil erosion and migration of herbicides by rainfall runoff at substations adjoining prime farmland prior to herbicide application. Additionally, if sandy soil is present, an herbicide that has permeable soil restrictions would not be permitted. The GIS Resource Mapper would be used to identify sandy soil.

In accordance with the Office of Corporate Facilities Maintenance Standards, *Vegetation Maintenance Program* (MA-23, Rev. 2), Southwestern would contact the landowner to request permission to apply herbicides and would identify the herbicides and application methods to be used and any restrictions that

would occur on the property. For example, some herbicides have restrictions related to farming. Southwestern generally controls vegetation in forest and overgrown shrubland. Areas used for pastureland and farming require little to no vegetation control. Since Southwestern does not need to control much vegetation in these areas, these restrictions would usually not be a factor for the program. However, there could be cases where the landowner or tenant would want to use the treated ROW for hay, pasture or crops. Copies of the farming restrictions and SDSs would be provided to landowners upon request.

Best Management Practices

The following BMPs would be apply to geology and soils:

- Identify prime farmland through the USDA, Natural Resources Conservation Service at https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm.
- Do not apply herbicides within 15 feet of karst terrain.
- Follow county restrictions for herbicide usage near agricultural lands.
- If sandy soil is present, do not use an herbicide that has permeable soil restrictions.
- In accordance with the Office of Corporate Facilities Maintenance Standards, *Vegetation Maintenance Program* (MA-23, Rev. 2), contact the landowner to request permission to apply herbicides and identify the herbicides and application methods to be used and any restrictions that would occur on the property.
- As vegetation is removed, disperse it across the ROW as wood chips (mechanical vegetation removal) or as scattered limbs/logs and stumps cut flush with the ground surface (manual methods). The application of this debris to the cleared land surface would assist in mitigating impacts to soil resources by intercepting rainfall, limiting impact erosion, and slowing surface runoff; and combined with existing grasses in the ROW (which are not removed as a part of vegetation management activities), further limits erosion.
- If an O&M activity would disturb 1 acre or more of soil, obtain a storm water construction permit from the state environmental agency. Restoration would occur in compliance with the permit to stabilize soil after completion of any O&M activities that disturb the soil.

3.6.2.2 No Action Alternative

Under the No Action Alternative, Southwestern's guidelines and programs that are in place to be protective of soil and geologic resources (Office of Corporate Facilities Maintenance Standards, *Vegetation Maintenance Program* (MA-23, Rev. 2) would remain in place and continue to be reviewed and updated on a regular basis.

However, Southwestern would not have the GIS Resource Mapper and the flexibility to use better formulated herbicides that are geographically targeted. These restrictions would lead to shorter times between herbicide treatments, and would require greater use of large machinery, potentially causing more disturbance as compared to the Proposed Action.

3.7 Cultural Resources

Cultural resources encompass archaeological, traditional (or ethnographic), and built environment resources, including but not necessarily limited to buildings, structures, objects, districts, and sites and include sites of important events, traditional cultural places and sacred sites, and places associated with an important person. The Proposed Action areas are diverse in cultural resources that could be affected without adequate protections in place. The ROI for cultural resources includes the land where proposed activities would take place (i.e., Southwestern facilities).

Section 106 of the NHPA, as amended [16 USC 470 et seq.], requires federal agencies to take into account the effects of their undertakings on historic properties. Federal agencies must meet their Section 106 responsibilities as set forth in the regulations at 36 CFR Part 800. These regulations require federal agencies to conduct the necessary studies or consultations to identify cultural resources that may be affected by an undertaking, evaluate cultural resources that may be affected to determine if they are eligible for the National Register of Historic Places (NRHP), and to assess whether such historic properties would be adversely affected. Other federal legislation pertinent to cultural resources includes the Archaeological Resources Protection Act (ARPA) as amended [16 USC 470aa-mm]; the American Antiquities Act [16 USC 431-433]; EO 11593, *Protection and Enhancement of the Cultural Environment;* EO 13007, *Indian Sacred Sites*; and the Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC 300).

3.7.1 Affected Environment

Cultural resources within the Proposed Action areas are defined as historic properties that are archaeological sites or historic structures. Historic structures are those structures that were constructed at least 50 years ago. Archaeological sites in the Proposed Action areas date from the Prehistoric period (12,000 B.C to 1500A.D.), Protohistoric (1500 AD through 1700 AD), and Historic (1700 AD through 1950 AD). The basic sequence of prehistoric stages used for the southwest consists of Paleoindian (ca. 13,500–11,500 B.P.), Archaic (ca. l 11,500–3000 B.P.), Woodland (ca. 3000–1000 B.P.), and Mississippian (ca. 1000–400 B.P.), with each of these further subdivided into Early, Middle, and Late periods (Nowak et al. 2018). Few sites are represented during the Early and Middle Paleoindian; however, during the Late Paleoindian as populations grew, more sites became evident (Nowak et al. 2018). Aboriginal groups of the period were likely small, mobile bands dependent upon a hunting and gathering economy (Buchner et al. 2016). During the Archaic period, greater sedentism occurred and husbanded crops were also being domesticated (Nowak et al. 2018). Both earthen and shell mounds appear in the archaeological record in the southeast; at this time there is evidence that the substantial "winter" villages, typically located on major streams, were actually occupied year round (Buchner et al. 2016). Late Woodland sites were widespread with high numbers occurring along stream valleys and characterized by Scallorn arrowpoints, cordmarked pottery, and dart points (Nowak et al. 2018). Mississippian sites tended to be found along the major river valleys with soils suitable for raising crops such as maize and squash (Nowak et al. 2018).

Most of southwest Missouri along with northern Arkansas and portions of Kansas and Oklahoma were Osage lands prior to the early nineteenth century. Prior to this, it is uncertain which Native American group(s) claimed this area as their homeland (Nowak et al. 2018). Except for a relatively narrow band of

land along the western border of Missouri south of present-day Kansas City, the Osage ceded all of Missouri to the United States in the Treaty of 1808 (Kansas Historical Society 2018). Land between the eastern edge of present-day Missouri, and much of the central part of present-day Kansas, south of the Kansas and Smoky Hill rivers, and the southern border of present-day Kansas and the Canadian River in present-day Oklahoma, were ceded in sections between 1825 and 1839 (Kansas Historical Society 2018). Oklahoma was acquired by the United States as part of the 1803 Jefferson Purchase, and was referred to as "Indian Territory" throughout most of the nineteenth century (Buchner et al. 2016). In 1820 under the Missouri Compromise, Missouri became a state (Missouri Digital Heritage 2018). The departure of Native American peoples from southwest Missouri was followed by a large influx of American settlers between 1830 and the Civil War (Nowak et al. 2018).

Economic depression and major droughts placed tremendous stress on the nation and the six states that Southwestern was to later service. President Roosevelt's New Deal led to numerous programs that put people back to work and gave attention to infrastructure problems within rural areas. The New Deal programs led to the federal government having stronger control over much of the infrastructure of the country, including the control of agricultural production, the regulation of investment companies, the control of major waterways, and the control of electrical power generation (Cooper et al. 2006). USACE was tasked to study major river valleys for opportunities to place dams, generate hydropower, control flooding, and provide recreational areas. Southwestern was established in 1943 by the Secretary of the Interior as a federal agency that today operates under the requirements of Section 5 of the Flood Control Act of 1944. In 1977, after many years within the Department of Interior, Southwestern was transferred to the DOE, a newly created department at that time. By about the 1970s the majority if the transmission system and facilities were constructed and the agency entered a more maintenance and upgrade mode (Cooper et al. 2006). A large portion of the existing Southwestern transmission system was built more than 50 years ago and is subject to evaluation.

Southwestern has conducted numerous small-scale cultural resources surveys for specific projects within the Proposed Action areas. Cultural resources found throughout the Proposed Action areas vary from prehistoric sites to historic sites. The types of recorded sites include:

- Prehistoric habitation/village
- Historic road/building/school/monument
- Historic trash dump
- Farmstead
- Lithic (stone) scatter (surface deposits)
- Burial ground
- Mounds
- Cultural material scatter (pottery, bone, camp items, bone fish hooks, arrow points, bison bone farming tools)
- Lithic (stone) tool scatter
- Rock shelter with petroglyph
- Bones of a mastodon (ice age, extinct 11,000 years ago) found in Arkansas

Table 3-7 summarizes historically listed sites near/on the Proposed Action areas.

Table 3-7. NRHP-listed Cultural Resources near or on Southwestern Property

Resource	Approximate Location to Proposed Action areas	Historic Significance
Leatherwood Historic District, Carroll County, Arkansas	Line 3008 and ROW crosses through approximately 20-24 structures.	Lake Leatherwood is a spring-fed lake defined by one of the largest hand-cut limestone dams in the nation. The Civilian Conservation Corps constructed the 1,600-acre plus municipal park and facilities between 1933-1942. The site was listed on the NRHP in 1998 (Department of Arkansas Heritage 2017).
Hemingway-Pfeifer House near Piggott, Clay County, Arkansas	Located within 0.75 mile of line 3320	The barn-studio is associated with Ernest Hemingway and the family home of his second wife, Pauline Pfeiffer. Both the home and the barn studio were listed on the NRHP in 1982 (ASU 2018).
Buford School, Baxter County, Arkansas	Line 3001	The school is a single-story Plain Traditional structure with Craftsman touches, built in 1936 (Baxter County Government 2018). The building was listed on the NRHP in 1992.
Mountain View School, Pope County, Arkansas	Line 3001	The school is a single-story masonry structure, built out of fieldstone and covered by a hip roof in 1926. The entrance is sheltered under a project gable-roofed porch with square columns set on stone piers (Wikipedia 2018). The building was listed on the NRHP in 1992.
Pearson Creek Archaeological District, Greene County, Missouri	Partially in the Springfield ROW. (exact location not disclosed)	Prehistoric habitation
George Washington Carver National Monument, Newton County, Missouri	Approximately 0.25 mile from the ROW along line 3009	The monument was dedicated in 1943 as the site of George Washington Carver's childhood home (NPS 2018). The monument was listed on the NRHP in 1966.
Lilbourn Mounds, New Madrid County, Missouri	Under the Southwestern lines (exact locations not disclosed)	Prehistoric mound and village
Nichols Park, Okmulgee, County, Oklahoma	Approximately 0.25 mile from the ROW along line 3106	The Civilian Conservation Corps and the National Park Service developed the park between 1938 and 1941 (The Living New Deal 2018). The park was listed on the NRHP in 2006.
Overstreet House, LeFlore County, Oklahoma	Near Cowlington, Oklahoma	The house was built in 1891 by T.G. Overstreet and was listed on the NRHP in 1980 (Oklahoma Historical Society 2018a).
Honey Springs Battlefield, Muskogee County, Oklahoma	Parallels the lines and runs up to the ROW along line 3005, structures 525-529	Site of the largest hostile encounter in Indian Territory during the Civil War – 1863. The Honey Springs Battlefield was designated a National Historic Landmark in 2013 (Oklahoma Historical Society 2018b).

Resource	Approximate Location to Proposed Action areas	Historic Significance
Sequoyah's Cabin, Sequoyah County, Oklahoma	Approximately 0.25 mile from the ROW along line 3005	The one-room log cabin was built in 1829. Sequoyah is a Native American scholar and inventor of the Cherokee Alphabet. It was listed on the NRHP and was designated as a National Literary Landmark in 2006 (Visit Cherokee Nation 2018).
Oktaha School, Muskogee County, Oklahoma	Approximately 0.25 mile from the ROW along line 3005	The Oktaha School, a two-story gray sandstone building, was built in 1909 and listed on the NRHP in 1978 (NPS 1978).

NRHP National Register of Historic Places
ROW Right-of-way

Southwestern also has certain obligations under the NHPA, as amended (16 USC 470f). In particular, Sections 106 and 110 of the NHPA identify compliance items for federal agencies. Section 110 of the NHPA sets forth both general and specific responsibilities for the identification, evaluation, registration, and protection of historic properties under the control or ownership of federal agencies. That section also calls for federal agencies to integrate historic preservation planning into their overall agency planning.

Southwestern has conducted evaluations of nearly every facility where the land is owned in-fee. In total, 23 facilities in Arkansas, 15 in Missouri, and 21 in Oklahoma have been evaluated. None were determined NRHP eligible and only two sites were recommended for archeological monitoring during deep disturbances.

3.7.2 Environmental Consequences

Potential impacts to historic properties and/or archaeological resources are considered significant if the Proposed Action would:

- Physically destroy, damage, or alter all or part of the property;
- Physically destroy, damage, alter or remove items from archaeological contexts without a proper mitigation plan;
- Isolate the property from or alter the character of the property's setting when that character contributes to the property's qualification for the NRHP;
- Introduce visual, audible, or atmospheric elements that are out of character with the property or alter its setting;
- Neglect a property resulting in its deterioration or destruction; or
- Transfer, lease, or sell the property without a proper preservation plan.

3.7.2.1 Proposed Action

Conducting O&M activities at Southwestern facilities and managing vegetation along the ROWs may adversely affect cultural resources. Short-term, direct impacts to cultural resources may occur from surface and subsurface disturbance during activities including pole replacement, road maintenance, or culvert replacement. Subsurface resources may be crushed by vehicles and equipment traversing the

ROW areas; however, Southwestern has used similar routes for conducting O&M activities for years so the potential for damage to subsurface resources is minimal. Removal of vegetation may expose cultural resource areas or provide accessibility to yet unidentified resources and provide the potential for vandalism. Herbicides, themselves, would not impact cultural resources.

However, the effects from the above activities are expected to be avoided and/or minimized through the implementation of Southwestern's proactive and effective cultural resources program. This program covers the activities under this Proposed Action through the application of three PAs with each state SHPO and the ACHP. Southwestern is currently working with the SHPOs from the three states to develop one unified multi-state PA. For the new multi-state PA, Southwestern has invited the tribes and federal agencies who have management responsibilities on lands where SWPA has been permitted to use U.S.-owned lands, including the USFS and USACE to be concurring parties. The PA for Oklahoma also includes the OAS. The PA applies to activities along the ROW, transmission line easements, substations, communication sites, maintenance facilities, and ancillary features, but does not apply to undertakings sponsored by other agencies within these areas nor do they cover undertakings subject to Section 106 review such as new construction. Southwestern, in consultation with the three state SHPOs, OAS, and tribes, has identified those undertakings with little or no potential to affect historic properties which will require no further consultation. In addition, the PA provides a list of maintenance activities that will receive Section 106 review at the discretion of Southwestern. These maintenance, maintenance-related construction, engineering, and operations activities are relatively small-scale projects that are routine, infrequent, and are generally conducted at locations that have been previously disturbed or maintained in the same or similar fashion since the establishment of the Southwestern transmission system. The purpose of the case-by-case discretionary decision-making process is to identify those activities that may impact less disturbed areas and to initiate the Section 106 review. Any O&M or vegetation management activities (PEA undertakings) not included in the current or proposed PA(s) and any construction activities would receive a separate Section 106 consultation. Southwestern uses BMPs to protect previously unknown historic properties which include properly training employees for increased awareness of resources, and the cessation of work should cultural resources or human or associated funerary items be uncovered.

The PA ensures that all Southwestern and contract cultural resources staff conducting studies associated with these projects must meet the Secretary of the Interior Qualification Standards and must have all of the appropriate federal and state permits. In addition, the PA requires an annual report that summarizes the historic preservation training program, any personnel changes, changes to real estate, and activities that underwent the discretionary decision-making process.

Therefore, potential adverse impacts to cultural resources associated with the Proposed Action would be avoided and minimized by the implementation of the PA and the Section 106 consultation process and impacts to cultural resources would be considered less than significant.

Best Management Practices

The following BMPs would be implemented to protect cultural resources:

- In the event cultural materials are encountered, immediately halt work in the area of the find until the material can be evaluated by a qualified cultural resource specialist for NRHP eligibility.
- If previous unknown cultural materials are discovered, implement 36 CFR 800.13 as appropriate, as described in the PA executed between Southwestern, each individual state SHPO, and the ACHP.

3.7.2.2 No Action Alternative

Under the No Action Alternative, Southwestern would continue to conduct O&M activities and their current vegetation management program. Potential impacts to cultural resources from O&M and vegetation management activities would be the similar as those described above for the Proposed Action. However, more frequent maintenance could increase the likelihood of inadvertent effects to cultural resources along the ROW.

3.8 Environmental Justice

EO 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low-income populations and communities. The required analysis involves screening the Proposed Action area to determine if environmental justice populations exist.

The ROI for environmental justice impacts includes all census tracts that are crossed by SWPA facilities. If a minority or low-income population exists, the analysis must determine whether any impacts would be significant, and if they would disproportionately affect any environmental justice population.

3.8.1 Affected Environment

CEQ guidance (1997) suggests that an environmental justice population may be identified if "the minority population percentage of the affected area exceeds 50 percent." Minority populations are defined as "individual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic Origin; or Hispanic" (ibid). It is important to note that the "some other race" category consists of all single race populations other than "White," "Black or African American," "American Indian or Alaska Native," "Asian," and "Native Hawaiian or Other Pacific Islander" race categories. This category comprises write-in entries, and could include Hispanic or Latino populations if the respondent considered this to be their race.

The CEQ defines low-income populations based on an annual statistical poverty threshold. In identifying low-income populations, poverty thresholds do not vary geographically and are identical across the United States. In 2016, the poverty threshold for an individual living alone was $12,228. For a family of four (two adults and two children), the poverty threshold was $24,339. If the income for a family of four

was below $24,339, then each person in the household was considered to be below the poverty level (U.S. Census 2016a).

SWPA facilities are located within 23 counties in Arkansas; 22 counties in Missouri; and 16 counties in Oklahoma. The facilities are mostly located in sparse, unpopulated areas. The race composition in 2016 of the states, counties, and the specific census tracts crossed by the Southwestern facilities was determined from the U.S. Census Bureau 2012-2016 American Community Survey Demographic and Housing Estimates (U.S. Census 2016b). The census tracts are composed of a largely white population. One specific census tract, Census Tract 7807 in Scott County, Missouri, has a minority population of 52.8 percent Black or African American. A substation and 1.5 miles of transmission line are located in Census Tract 7807, on the western side of Sikeston, Missouri near the Sikeston Power Plant.

Based on review of the U.S. Census Bureau, 2012-2016 American Community Survey 5-Year Estimates of poverty status in the past 12 months (2016), several of the counties in all three states have a greater percentage of residents below the poverty level than the overall statewide percentages (13 counties in Arkansas, 18 counties in Missouri, and 15 counties in Oklahoma) (U.S. Census 2016c). The census tracts with the highest percentages of residents below the poverty level are in Independence and Izard counties in Arkansas; in Dunklin, Greene, Henry, New Madrid, and Ripley counties in Missouri; and in Okmulgee, Sequoyah, and Tulsa counties in Oklahoma.

3.8.2 Environmental Consequences

Potential environmental justice impacts are considered significant if the Proposed Action would cause disproportionate adverse effects on low-income and/or minority populations.

3.8.2.1 Proposed Action

As noted in Section 3.8.1, one specific census tract, Census Tract 7807 in Scott County, Missouri, has a minority population of 52.8 percent Black or African American. A substation and 1.5 miles of transmission line are located in Census Tract 7807, on the western side of Sikeston, Missouri near the Sikeston Power Plant. The substation is located about 0.7 mile from the nearest residential area. As a comparison, the substations in Butler and Stoddard counties (non-minority populations) are much closer to residences, less than 0.1 mile. The Proposed Action would not cause disproportionate impacts to minority populations.

Several of the counties in all three states have a greater percentage of residents below the poverty level than the overall statewide percentages (13 counties in Arkansas, 18 counties in Missouri, and 15 counties in Oklahoma). The census tracts with the highest percentages of residents below the poverty level are in Independence and Izard counties in Arkansas; in Dunklin, Greene, Henry, New Madrid, and Ripley counties in Missouri; and in Okmulgee, Sequoyah, and Tulsa counties in Oklahoma. As shown in Table 3-2 in the Land Use section, Southwestern facilities are spread out throughout the counties. For example, Independence County in Arkansas has 36 miles of transmission lines, of which only 2 miles are located in Census Tract 4906 which has the highest percentage of residents below the poverty threshold. In Izard County, Arkansas, 8 miles of transmission line pass through Census Tract 9601, including 0.5 mile near the residential area in Horseshoe Bend. In Missouri, New Madrid County has the greatest amount of transmission line at 67 miles. However, the miles of line are spread out over 5 census tracts. Census Tract

9603 which has the highest poverty level contains 5 miles of transmission line that do not pass near any residences. This tract also contains a substation and communication tower; however, they are surrounded by vacant land. In Oklahoma, Sequoyah County contains the second greatest amount of transmission line at 64 miles, spread over 7 census tracts. Approximately 7.4 miles pass through Census Tract 301.03 which has the highest poverty rate for the census tracts crossed in this county.

Because Southwestern facilities are spread throughout a large geographic area, impacts of the Proposed Action are dispersed. Although much of the Proposed Action area contains census tracts with greater percentage of residents below the poverty level than the overall statewide percentages, these areas would not experience disproportionate impacts when compared to census tracts with lower poverty rates. The Proposed Action would ensure continued maintenance and safe operation of the transmission lines and delivery of reliable power to not-for-profit municipal utilities, rural electric populations, and military installations within Southwestern's service area. Southwestern has over one hundred such "preference" customers, and these entities ultimately serve over 8 million end-use customers.

3.8.2.2 No Action Alternative

Under the No Action Alternative, potential impacts would be similar to those under the Proposed Action. As with the Proposed Action, no disproportionate impacts to minority or low-income populations are expected.

3.9 Noise

Noise is unwanted sound that interferes with normal activities or otherwise diminishes the quality of the environment. Noise may be intermittent or continuous, steady or impulsive, stationary or transient. Stationary sources are normally related to specific land uses, for example, housing tracts or industrial plants. Transient noise sources move through the environment, either along established paths or randomly, for example, traffic, airplanes, or maintenance operations in a ROW. The ROI for noise analysis includes areas adjacent to Southwestern facilities that would encounter noise during O&M and vegetation maintenance activities.

3.9.1 Affected Environment

3.9.1.1 Noise Measurement

The human hearing system does not respond equally to all frequencies of sound. For sounds normally heard in the environment, low frequencies (below 250 Hertz) and very high frequencies (above 10,000 Hertz) are less audible than the frequencies in between. Therefore, it is appropriate to apply a weighting function to the noise spectrum, which approximates the response of the human ear. This is called A-weighting the frequency content of a noise signal and has been found to have an excellent correlation with the human subjective judgment of noise annoyance (Hanson et al. 2006). The sound pressure levels measured using the A-weighting network are expressed as A-weighted decibels (dBA). Table 3-8 identifies typical A-weighted sound levels for various sources.

Table 3-8. Typical Decibel Levels of Noise Encountered in Daily Life

Noise	Level (dBA)
Rustling leaves	20
Room in a quiet dwelling at midnight	32
Window air conditioner	55
Conversational speech	60
Busy restaurant	65
Loudly reproduced orchestral music in large room	82
Beginning of hearing damage (if prolonged exposure)	85
Heavy city traffic	92
Home lawn mower	98
Jet airliner (500 feet [150 meters] overhead)	115
F-15 aircraft (500 feet overhead, afterburner power)	123

Source: Newman and Beattie 1985, format modified.
Note: When distances are not specified, sound levels are the values at the typical location of the machine operators.
dBA A-weighted decibel

A characteristic of environmental noise is that it is not steady, but varies in amplitude from one moment to the next. To account for these variations in the sound pressure level with time, and to assess environmental noise in a consistent and practical manner, analysts use a statistical approach to reduce the time-varying levels to single numbers. Some commonly used single-number evaluators are the equivalent sound level (L_{eq}) and the day-night average sound level (DNL). These metrics are described in the text box below.

Noise Metrics

Equivalent sound level (L_{eq}) – describes an individual's cumulative exposure from all sources of noise over a specified period of time.

Day-night average sound level (DNL) – describes an individual's cumulative exposure from all sources of noise over a full 24 hours, with any noise exposure occurring between 10 p.m. and 7 a.m. increased by 10 dBA to account for an individual's greater nighttime sensitivity to noise.

The decibel scale is a logarithmic, or relative, scale. This means, that as the sound pressure is doubled (or the energy in the sound), the index increases by approximately 3. A sound level of 100 dBA contains twice the energy of a sound level of 97 dBA. This means when two noise sources of the same level are added, the resulting sound level will be increased by 3 dBA, not doubled. The reason for measuring sound this way is that human ears (and minds) perceive sound in terms of the logarithm of the sound pressure, rather than the sound pressure itself. Outside of the laboratory, a 3-dBA change in sound level is considered a barely discernible difference.

Noise can interrupt ongoing activities and can result in community annoyance, especially in residential areas. In general, most residents become highly annoyed when noise interferes significantly with activities such as sleeping, talking, noise-sensitive work, and listening to radio, television, or music (Hanson et al. 2006). Sound levels that cause annoyance in people vary greatly by individual and

background conditions. The EPA recommends indoor and outdoor sound levels of no more than 45 dBA and 55 dBA, respectively, for avoidance of annoyance (EPA 1978).

3.9.1.2 Background Noise Sources and Levels

No data exist for ambient noise in the ROI. Sources of noise in urban/suburban areas include aircraft overflights, road traffic, and other noises associated with urban/suburban areas, such as lawn mowers and ambulances. Much of the Proposed Action area is rural and includes agricultural land, pasture land, and wooded areas. Background sources of noise are estimated to be low for these rural and remote areas. Background noises near populated areas, such as Springfield, Missouri and Jonesboro and Paragould, Arkansas would be higher due to higher population density. Portions of the transmission line ROWs follow roads and highways. Vehicle noise is the main source of noise along transportation routes.

Operation of transmission lines creates corona discharge noise, which is usually experienced as random crackling or hissing sound. Corona noise is primarily audible during wet weather such as fog and rain and is most audible near transmission lines at 345 kV and above. For example, the typical corona noise for a 345 kV transmission line is less than 26 dBA during fair weather conditions and 49 dBA during wet weather. Southwestern lines are all lower voltage lines at 69 kV and 161 kV so corona noise is negligible. Estimated background noise levels based on land use categories are shown in Table 3-9.

Table 3-9. Estimated Background Noise Levels

Example Land Use Category	Average Population Density (people per square mile)	DNL	Leq (dBA)	
			Daytime	Nighttime
Rural or remote areas	1-100	35	35	25
	100-300	40	40	30
Quiet suburban residential	300-1,000	45	45	35
	1,000-3,000	50	50	40
Quiet urban residential	3,000-10,000	55	55	45
Quiet commercial, industrial, and normal urban residential	10,000-30,000	60	60	50

Source: Hanson et al. 2006 (modified)
dBA A-weighted decibel(s)
DNL day-night average sound level
Leq equivalent sound level

Southwestern is not aware of any noise complaints in the Proposed Action areas.

3.9.2 Environmental Consequences

Noise impacts are evaluated with respect to the potential for annoyance. Noise can impact the performance of various everyday activities such as communicating, watching television, and sleeping in residential areas and can impact the recreation experience in recreational areas. Sound levels that cause annoyance vary greatly by individual and background conditions. Section 3.4 discusses noise impacts on wildlife.

3.9.2.1 Proposed Action

As described in Section 3.2, the Proposed Action area is mostly rural in nature and sparsely populated. The most populated areas include Springfield, Missouri and Jonesboro and Paragould, Arkansas. In general, noise sensitive receptors include residences, schools, libraries, places of worship, cemeteries, medical centers, wildlife management and conservation areas, and recreation areas.

Rural residences are scattered throughout the Proposed Action areas in all three states. The nearest residences to Southwestern activities would be those in Springfield, Missouri where transmission lines go through some residential backyards. However, there is minimal vegetation in these areas so noise from vegetation management activities would be limited. Southwestern calls or knocks on doors of local landowners to inform them when activities would occur. Average maintenance activities in a particular area would be approximately 1 day.

Noise from O&M and vegetation management activities could temporarily affect the experience of recreationists in areas near the activities. Recreation areas are discussed in Section 3.2.1.4 and are distributed throughout the Proposed Action areas, especially near lakes and reservoirs. These locations may be temporarily disturbed during an aerial inspection by a helicopter or O&M and vegetation management activities. Aerial inspections would occur only twice per year and would disturb a specific area along the ROW for less than a few minutes. The Proposed Action would not increase the frequency of aerial inspections and therefore would not change noise levels from these inspections compared to existing conditions.

The Proposed Action would cause short-term noise from vehicles, machinery, and equipment, as well as helicopter noise during aerial inspections and aerial side saw trimming. Typical noise levels of this type of equipment are provided in Table 3-10. A reasonable analytical assumption is that three pieces of loud equipment would operate simultaneously. The combined sound level of three pieces of the loudest equipment (truck, tractor and chainsaw) is 91 dBA measured at 50 feet. Noise attenuates with distance at a rate of 6 dBA per doubling of distance to the receptor (Hanson et al. 2006). Therefore, equipment noise at a sound level of 91 dBA at 50 feet would attenuate to 85 dBA at a distance of 100 feet and to 65 dBA at a distance of 1,000 feet. *Transit Noise and Vibration Impact Assessment* (Hanson et al. 2006) recommends not exceeding a one-hour equivalent level of 90 dBA during the daytime in a residential area and 100 dBA in an industrial or commercial area.

Table 3-10. Typical Noise Levels of Equipment

Type of Equipment	Typical Noise Level, dBA at 50 feet
Backhoe[1]	80
Crane, mobile[1]	83
Tractor[2]	84
Chainsaw[2]	84
Truck[1]	88

1 Source: Hanson et al. 2006
2 Source: FHWA 2017
dBA A-weighted decibel(s)

Proposed Action activities would be temporary, intermittent, of short duration, and dispersed throughout the Proposed Action area. No new stationary sources of permanent noise would be introduced. With implementation of the BMPs discussed below, no significant noise impacts are expected.

Best Management Practices

The following BMPs would be implemented to minimize noise impacts:

- Limit the use of noise-generating equipment next to campgrounds to daytime hours.
- Use noise abatement devices on noisy equipment and vehicles.
- Notify landowners and post signage in recreation areas when excessive noise is expected.

3.9.2.2 No Action Alternative

Under the No Action Alternative, Southwestern would continue to conduct O&M and vegetation management activities at substations, communication sites, offices, and along the transmission line ROWs. Potential disruptions to residential and recreational lands from intermittent noise would be similar to those described for the Proposed Action. Because the range of herbicides that could be used under the Proposed Action would not be available under the No Action Alternative, the No Action would require greater use of heavy equipment to control vegetation within the ROW on a more frequent basis and therefore, slightly greater noise impacts may occur.

3.10 Safety and Health

Transmission facilities provide electricity for heating, lighting and other services essential for public health and safety. Contact with the electric equipment can injure people and cause property damage. Managing vegetation around electric transmission facilities keeps the electricity from flashing to ground or other objects. This same vegetation management can potentially harm humans. Exposure to herbicides, use of sharp tools, machinery, and heavy equipment can injure people. Aerial reconnaissance could result in a mishap injuring workers or people on the ground. This resource area considers public health and safety and occupational health and safety of the general public residing in the vicinity of Southwestern's facilities and Southwestern's employees.

3.10.1 Affected Environment

The following regulatory compliance requirements and Southwestern's guidelines are in place to be protective of both public and occupational health and safety.

- NERC requires electric utilities to maintain its electrical system in accordance with applicable requirements of the NESC. The NESC generally requires the trimming or removal of interfering trees. Southwestern's vegetation management program is based on portions of the NESC.
- Southwestern's Office of Corporate Facilities Maintenance Standards, MA-23, *Vegetation Maintenance Program*, includes, but is not limited to, the following safety procedures:
    - Applicable ROW maintenance personnel and contractors shall be trained, certified, and licensed as required by federal and/or state laws to apply herbicide in a safe and effective manner as per licensed applicator requirements.

- All applicable provisions of Southwestern's Power System Safety Manual shall be followed, including safe clearance procedures.
- All powered equipment shall be operated utilizing the manufacturers' safety guidelines and ensuring that all safety devices supplied with the equipment are in place and functional each time that the respective equipment is operated. Because of the hazards involved in working around power lines and with using the equipment that is required for this type of work each employee shall be trained and outfitted with the correct PPE.
- Vegetation management methods are performed in compliance with legal, legislative, or regulatory requirements and/or DOE's or Southwestern's policies, procedures, and/or guidelines.
- Vegetation management t methods are performed in accordance with existing agreements with property owners and/or land managers. Communication with land owners or tenants is required before each treatment.
- Herbicide methods are performed in compliance with SDSs and container labels for that particular herbicide and have been approved through Southwestern's herbicide review process. The EPA also imposes herbicide regulations by including them on container labels to direct the proper use of an herbicide. It is illegal *not* to follow label instructions and restrictions.
- Herbicide application is applied according to Southwestern's application methods and restrictions that were developed to be protective of human health and the environment.

- Southwestern's vegetation management program is based on the American National Standards Institute (ANSI) A300 standards for tree care practices, which incorporates occupational safety measures.
- Southwestern implements Federal Employee Training under their corporate training policy in accordance with 5 U.S.C. Chapter 41, *Training*, for employee training, education, and development and in conjunction with DOE Order 3610.1C, *Federal Employee Training*. While this training focuses more on professional development, it does include safety and security training for all employees.
- Southwestern's Occupational Safety and Health Administration (OSHA)-approved worker safety program includes the following annual occupational training:

  1. Heavy Equipment
  2. Asbestos Training
  3. Occupational Exposures
  4. Electrical Safety
  5. Temporary Protective Grounding Training
  6. Defensive Driving
  7. Fall Protection
  8. Fire Extinguisher
  9. Welding and Cutting
  10. Hazard Communication Training
  11. Lockout Tagout
  12. Confined Space Entry
  13. Forklift Training
  14. PPE Training

15. Switchman Training
16. Respiratory Protection
17. First Aid CPR/AED
18. Bloodborne Pathogen
19. Chainsaw/Trimming Procedures
20. Pole Top Rescue
21. Building Emergency Procedure/Fire Drill
22. Medical Services
23. Working in Hot/Cold Environments
24. Power Tool Safety

- Southwestern also implements environmental training as applicable for employees. Applicable topics for implementation of O&M and integrated vegetation management activities, include the following: hazardous waste operations and emergency response; karst; Resource Conservation and Recovery Act (RCRA) hazardous waste; SPCC; cultural resources; polychlorinated biphenyls (PCBs); ESA; and universal waste.
- Southwestern implements SPCC plans and emergency spill plans at their facilities containing petroleum materials as described in Section 3.11.1.2. While these plans are oriented towards water resource protection, they also provide for public and employee safety from petroleum releases.

3.10.1.1 Public Health and Safety

Within the past 4 to 5 years, the Southwestern Safety Office has not received any notifications of accidents or incidents involving the public. Occasionally, in the past, the Environmental Office has received complaints on over application of herbicides from the public. The public can notify Southwestern about environmental and safety concerns through the Southwestern website.

3.10.1.2 Occupational Health and Safety

The safety and well-being of all Southwestern employees are the firm and continuing responsibilities of every member of management. Each employee, in turn, shares with management the responsibility for his or her own safety by performing his or her duties in a safe and conscientious manner, complying with all safety rules and regulations, and observing the provisions of EO 12196, *Occupational Safety and Health Programs for Federal Employees.* Recordable incidents include all work related deaths, illnesses, and injuries which result in a loss of consciousness, restriction of work or motion, permanent transfer to another job within the company, or that require some type of medical treatment or first-aid. Companies with 10 or more employees need to report their incident rates, types of incidents and lost/restricted work days to OSHA every year. Recordable incidents are incidents that resulted from an exposure or event in the workplace and that required some type of medical treatment or first-aid. The Recordable Incident Rate shows, for every 100 employees, the number of employees that have been involved in a recordable injury or illness. Southwestern's Recordable Incident Rate for the past 5 years is shown in Table 3-11.

Table 3-11. Southwestern's Recordable Incident Rate for 2013-2017

Calendar Year	OSHA Recordable Incident Rate
2013	0.70
2014	1.41
2015	1.9
2016	1.5
2017	3.1

Source: Williams 2018
OSHA Occupational Safety and Health Administration

In addition, 2013 marked the 21st consecutive year, over 6 million man-hours worked, without any electrical-related recordable incidents – a significant achievement for an organization where approximately one half of the workforce operates in a high-voltage electrical environment. Southwestern does not have any knowledge regarding long-term employee health-related issues attributed to the work environment.

3.10.2 Environmental Consequences

Potential impacts to health and safety are considered significant if the Proposed Action would:

- Expose the public to hazardous conditions
- Increase the likelihood of work-related deaths, illnesses, and injuries

3.10.2.1 Proposed Action

Under the Proposed Action, the regulatory compliance requirements and Southwestern's guidelines and programs that are in place to be protective of both public and occupational health and safety (described in Section 3.10.1) would remain in place and would continue to be reviewed and updated on a regular basis.

3.10.2.1.1 Public Health and Safety

This section discusses the potential health and safety impacts to the general public from O&M activities and managing vegetation at Southwestern's facilities. Health and safety impacts include both physical injury risks and exposure risks. These risks are minimal due to implementation of Southwestern's OSHA-approved worker safety and environmental training programs. Overall, impacts to public health and safety by implementing the Proposed Action would be positive. Brush and trees along the ROW would be controlled in a systematic fashion to ensure they would not grow into the conductors and cause service interruptions, fire, or impede restoration of service when outages occur. Use of the management framework for herbicide selection and GIS Resource Mapper developed as part of the Proposed Action would ensure the most geographically appropriate and efficient herbicides are selected.

People who come near workers conducting O&M activities or vegetation management could be exposed to exhaust and fuel vapors from trucks. If near the work, people could sustain physical injuries from flying debris and falling trees, and from poles being removed. Heavy equipment could also run over people if the operator does not see them. Impacts on the public's health and safety are negligible, because

the public has limited access to Southwestern's facilities, and because O&M and vegetation management activities are closely supervised which would prevent exposure or injury to the general public. However, use of equipment on access roads used by the public presents an increased risk in vehicle accidents (discussed in Section 3.12). Aerial reconnaissance could result in a mishap that injures the public on the ground; this impact is unlikely as only licensed pilots conduct the reconnaissance, and aerial surveys occur infrequently.

Likewise, direct exposure to the public from herbicide application would be limited by supervision of the application. The concern with herbicide application is accidental exposure to the herbicides from entering areas soon after treatment, eating berries or other foods collected from the ROW, touching sprayed vegetation, drinking contaminated water, consuming contaminated fish, or accidental exposure to downwind drift. The general public, both visitors and residents, would not receive repeated exposures, because the ROW locations are remote, a variety of herbicides would be used, the timing of treatments would be widely spaced, and landowners and tenants are notified prior to application. In addition, Southwestern hopes to extend the length of time between herbicide treatments using better formulated herbicides, geographically targeted, that are now available. Application guidelines are designed to prevent accidental exposures to the public, water, and fish.

Members of the public, both visitors and nearby residents could potentially be exposed to herbicides from drift or accidental spraying, if they are in the area at the time of application. The application Southwestern employs is a power-driven vehicle-mounted mechanical sprayer. Potential public exposure from localized drift is extremely low because the application usually takes place close to the target plant, so the herbicide is airborne for only a very short moment. Southwestern also restricts the use of the vehicle-mounted mechanical sprayer to conditions when the wind is less than 10 miles per hour. Should a person be accidentally sprayed, then the person's skin and/or eyes might be irritated, depending on the particular herbicide formula. Individuals have reported chronic nausea, dizziness, and other symptoms following accidental exposure to herbicides. Laboratory tests on animals have shown that most herbicides are not carcinogenic, even at doses and repeated exposures well above that which could occur accidentally as part of vegetation management activities. Herbicides are designed to act on plants, not animals, so that the toxic effects generally do not affect the central nervous system or other vital functions.

Best Management Practices

The following BMPs would be implemented to protect public health and safety:

- Continue to implement measures described in Section 3.10.1 of this EA.
- Ensure the use of EPA-approved herbicides that have been selected by Southwestern for use; ensure the use of the geographic-specific requirements for herbicide selection.
- Restrict the use of power-driven vehicle-mounted mechanical sprayer to conditions when the wind is less than 10 miles per hour. Evaluate, generally, existing land uses (e.g., agriculture, residential) along a ROW or surrounding a facility needing vegetation control to determine any constraints on vegetation control.
- *To the extent practicable*, identify casual informal use of the ROW by non-owner public to determine any constraints on vegetation control.

- Determine whether there are *other* potentially affected people or agencies that need to be notified or coordinated with; determine appropriate method(s) of notification and coordination.
- Protect drinking water sources by following all buffer zone restrictions.
- Ensure that all herbicide applicators have received training and are licensed in appropriate application categories.
- Follow all herbicide label and SDS instructions regarding mixing and application standards to reduce potential exposure to the public through drift and misapplication.
- Never leave herbicides or equipment unattended in unrestricted access areas.
- Closely follow all equipment cleaning standards required by the herbicide label.
- In the event of a spill, immediately notify potentially affected parties.

3.10.2.1.2 Occupational Health and Safety

This section addresses the potential health and safety impacts to Southwestern's workers conducting O&M activities and vegetation management at Southwestern's facilities as described under the Proposed Action. The impacts can be divided into physical injury risks and health risks. In general, all techniques carry some degree of physical injury risks. Risks to health include exposure to herbicides, exhaust, and fuels. Indirect impacts on workers include the following: dehydration, heat exhaustion, insect stings, falls, and exposure to poisonous snakes and plants. Use of the management framework for herbicide selection and the GIS Resource Mapper developed as part of the Proposed Action would enable a broader, more flexible use of herbicides, as appropriate, and could be expected to decrease the potential for physical injuries and indirect impacts to workers, as described in the analysis below.

Workers conducting O&M activities could be exposed to exhaust and fuel vapors from trucks and chemical vapors from wood treating chemicals, as well as fuel and other chemicals used at the substations and communication sites. Physical injuries could arise from electrocution, falls, flying debris and falling trees and from poles being removed. Impacts on the workers' health and safety are negligible because Southwestern staff are trained in health and safety and environmental actions, and O&M activities are closely supervised.

Manual techniques for vegetation management include use of non-powered and powered hand-operated tools. Non-powered tools include axes, brush hooks, hoes, hand girdlers, and hand clippers. Powered tools include chainsaws and motorized brush cutters. Use of these tools can result in worker injuries such as minor cuts, blisters, sprains, abrasions, bruises, muscle strains, exposure to equipment noise, exposure to exhaust and fuel vapors, flying debris, and falling trees. Severe injuries would be rare as standard safety procedures are followed.

Potential direct impacts on worker health and safety from operating heavy equipment include injuries as a result of equipment malfunctions, equipment overturns, loss of control of the equipment, equipment noise, equipment vibration, exposure to exhaust and fuel vapors, flying debris, and falling trees. Minor injuries are bound to occur when mechanical techniques are employed. On the other hand, severe injuries are relatively rare if workers adhere to standard safety procedures associated with heavy machinery operation.

Some locations within Southwestern's service region are mountainous, rugged, and relatively remote. Use of the management framework for herbicide selection and the GIS Resource Mapper developed as part of the Proposed Action would enable a broader, more flexible use of herbicides, as appropriate, and could be expected to decrease safety and health risk to personnel within rural and untamed mountainous areas where there is an increased safety risk to conduct manual and mechanical activities.

The main potential impact associated with the use of herbicides is exposure to the compounds (herbicides, carriers, dyes, and adjuvants). Thirty-four different herbicide compounds are being considered for use under the Proposed Action. Others could be added in the future using the same selection process, thereby continuing to increase operational flexibility and effectiveness and potentially decreasing occupational risks by requiring less time conducting vegetation management.

These chemicals can all be toxic to workers, to varying degrees. Any chemical poses a health risk at a sufficient dose. Most clinical reports of herbicide effects are of skin and eye irritation. Some herbicides, such as triclopyr, can be severe skin irritants; others, such as metsulfuron methyl, can be severe eye irritants. Herbicides that may cause human health effects through inhalation include Accord, Escort, Garlon 3A, and Garlon 4. However, the likelihood of exposure through inhalation is unlikely since the droplet size that would be used reduces airborne herbicide mist. Of the herbicides considered for use under the Proposed Action, Garlon 3A and Garlon 4 may cause skin irritation through dermal contact. A less significant potential risk of human health effects is from the ingestion of water contaminated by these herbicides; however, this impact is minimized by the restriction of herbicide use in areas exhibiting karst features that can act as a conduit and transport herbicides to groundwater. Under the Proposed Action, the GIS Resource Mapper would be used to identify karst features and herbicides would not be used within 15 feet of these features.

Short-term effects of excessive exposure to herbicides include nausea, dizziness, or reversible abnormalities of the nervous system (reversible neuropathy). In extreme cases of prolonged, repeated, and excessive exposure (resulting from careless and/or negligent work habits), longer-term health problems can result, including: organ damage, immune system damage, permanent nervous system damage, production of inheritable mutations, damage to developing offspring, and reduction of reproductive success. It is important to note that EPA evaluates and registers herbicides according to a uniform, health-based standard to ensure a "reasonable certainty of no harm" to consumers. The EPA is responsible for restricting a product's use according to its potential impacts on human health and the environment. Much of that restriction is done through the product label, which states the precautions that must be taken, and how and where to apply a certain herbicide. In most cases, the hazards involved are comparable to or less than the risks associated with other vegetation management methods.

Occupational exposure to herbicides varies with the method of application. The greatest risk occurs when the worker must directly handle and/or mix chemicals. Spot and localized herbicide applications—including use of backpack sprayers, aerial mixers/loaders, and stem injection—require the most hands-on use of herbicides and, therefore, carry the greatest risk of exposure (and require the greatest amount of worker precaution and use of safety equipment, such as respirators). Under all application categories, workers can be exposed to herbicides from accidental spills, splashing, leaking equipment, contact with the spray, or by entering treated areas. Exposure can occur either through skin or through inhalation. Adherence to operational safety guidelines, use of protective clothing, equipment checks, and personal

hygiene can prevent incidents from occurring. The herbicide label and corresponding SDSs detail these application requirements in addition to safety guidelines.

Herbicides would be transported to the site in manufacturer's containers, available in either 2.5-gallon (9.46-liter) containers or 55-gallon (208.19-liter) containers. Herbicides would remain in manufacturer's containers until mixed with water prior to application. Unused concentrated herbicides would be transported from the site in manufacturer's containers. Diluted herbicides would be transported onsite using a 200-gallon (757.06-liter) tank mounted onto a tractor. No diluted herbicides would be transported offsite because all diluted herbicides would be applied to the ROW prior to removal from the ROW. Impacts from transport of herbicides are described in Section 3.12.

Two potential accident scenarios related to health and safety were identified in association with the Proposed Action, including human error in herbicide mixing and fire/explosion (Southwestern 1995a).

A potential exists for incorrect dilution of herbicide prior to application. The manufacturer's label for each of the herbicides lists a range of recommended dilution rates, depending on the vegetative species needing control. A lower dilution rate would be used for more resistant vegetation. This scenario would pose the greatest threat during the foliar spray application method, as the greatest area is covered by this method. Impacts resulting from incorrect dilution would be highly unlikely since Southwestern personnel supervising the application of the herbicide mixture have been formally trained in herbicide handling and application.

A potential exists for fire and explosion resulting from incorrect storage of the herbicides. Extinguishing agents appropriate for the herbicides used would be carried within Southwestern vehicles transporting or applying the herbicides. A copy of the herbicide SDSs would be carried by Southwestern personnel and transferred to emergency personnel upon any fire or explosion.

Best Management Practices

The following measures would be implemented to protect worker health and safety:

- Continue to implement measures described in Section 3.10.1 of this EA.
- Ensure the use of EPA-approved herbicides that have been selected by Southwestern for use; ensure the use of the geographic-specific requirements for herbicide selection.
- *For safety,* cut all brush stumps flat where possible. Angular cuts leave a sharp point that could cause injuries if workers fell on them.
- *For cutting trees close to "live" power lines,* use only qualified personnel.
- Ensure that all herbicide applicators have received training and are licensed in appropriate application categories.
- Follow all herbicide label and SDS instructions regarding worker safety standards. These include, but are not limited, to the following:
  - Wear appropriate protective equipment
  - Do not eat, drink, or smoke when handling herbicides

- Avoid spilling herbicides on skin or clothing and promptly change any clothing substantially contaminated by a herbicide
- Clean protective equipment daily
- Maintain ready access to clean water and first aid supplies
- Maintain access to emergency medical facilities
- Use self-contained herbicide handling equipment when appropriate and available to reduce worker exposure during herbicide mixing and handling.

3.10.2.2 No Action Alternative

Under the No Action Alternative, the regulatory compliance requirements and Southwestern's guidelines and programs that are in place to be protective of both public and occupational health and safety (described in Section 3.10.1) would remain in place and continue to be reviewed and updated on a regular basis.

Herbicide use would be more restrictive under the current selection criteria. Potential beneficial impacts to public and occupational health and safety, such as fewer required herbicide applications, more selective or targeted herbicide applications, and less time spent on vegetation management particularly in remote and treacherous spans of ROW, would not be realized.

3.11 Materials and Waste

Compliance with environmental laws and regulations governing materials management is central to Southwestern's EMS. Southwestern's EMS focuses on complying with applicable regulations for purchasing, handling, using and disposing of the materials used in operating and maintaining Southwestern's transmission system. The EMS implements the environmental protection requirements based on International Organization for Standardization (ISO) 14001, to comply with applicable federal, state, and local environmental protection laws and regulations, executive orders, and internal DOE policies.

Each regional office and the Headquarters implement the program through:

- Spill control and response
- Hazardous materials and transportation management
- Hazardous waste management
- Polychlorinated biphenyls management
- Non-hazardous waste management
- Storage tank management
- Pesticide management
- Emergency Planning and Community Right-to-Know Act implementation
- Emergency response procedures
- Comprehensive Response, Compensation and Liability Act implementation
- RCRA implementation

Southwestern also implements environmental training as applicable for employees. Hazardous materials, petroleum products, asbestos, and waste are considered in this analysis. The ROI includes all Southwestern's facilities that handle or store hazardous materials and petroleum products or generate waste, including substations, pole yards, switching stations, office/maintenance facilities, taps, and communication towers, and immediately adjacent areas that could be impacted by spills or other incidents related to these materials.

3.11.1 Affected Environment

3.11.1.1 Hazardous Materials

For purposes of this PEA, hazardous materials are those regulated under federal, state, and DOE regulations. Hazardous materials are required to be handled, managed, treated, or stored properly by trained personnel under the following regulations: OSHA Hazardous Communication, 29 CFR 1900.1200 and 29 CFR 1926.59; and Department of Transportation Hazardous Materials, 49 CFR 172.101; EPA, 40 CFR 260 et seq.

The substances of primary concern at Southwestern facilities include sulfuric acid, present in lead-acid batteries used for backup power; sulfur hexafluoride, present in gas circuit breakers; and PCBs, potentially present in small quantities in hermetically-sealed, oil-filled bushings and other electrical equipment. Minor amounts of cleaning materials and vehicle maintenance fluids are also used. Materials used at Southwestern's facilities are summarized in Table 3-12.

PCBs were banned from manufacture as of July 2, 1979 under the Toxic Substances Control Act (TSCA), which regulates the sampling and disposal of PCB-containing material. PCBs can still be found in electrical equipment used by Southwestern including voltage regulators, switches, re-closers, and bushings. However, Southwestern currently has no electrical equipment with PCB concentrations greater than 500 parts per million (ppm), the level above which the material is considered PCB-containing rather than PCB-contaminated. Southwestern is in the process of replacing PCB-contaminated electrical equipment having PCB concentrations between 50 and 500 ppm. Electrical equipment at Southwestern facilities for which the PCB concentration cannot be determined consists of bushings, coupling capacitors, and capacitor banks. Southwestern performs PCB analyses on this electrical equipment when it is removed from service for disposal. Disposal of PCB-contaminated material is discussed in Section 3.11.1.4.

The Community Right-To-Know Act, established under the Superfund Amendments and Reauthorization Act (SARA) Title III, provides guidelines for reporting potential hazards to state and local planning commissions. Southwestern's EMS establishes a *Community Right-To-Know Program* to meet the requirements of SARA incorporated into 40 CFR 370 (2005). Southwestern is exempt from Form R reporting because it does not use or release more than 4,540 kilograms/year (10,000 pounds per year) of any reportable substance. Southwestern does not manufacture, process or otherwise use any toxic chemicals listed at 40 CFR 372.65 or 40 CFR 372.28 above their threshold quantity, and therefore does not have to report to the Toxic Release Inventory (TRI). Southwestern is not currently required to submit Community Right-to-know Act Tier I and Tier II reports for its facilities, because individual facilities do not contain regulated substances in an amount above the regulated reporting thresholds. Southwestern

policy dictates that it will, at minimum, contact local fire departments and inform them of potential hazards at all Southwestern facilities.

3.11.1.2 Petroleum Products

40 CFR Part 112, Oil Pollution Prevention, established procedures, methods, equipment, and other requirements to prevent the discharge of oil from non-transportation related onshore and offshore facilities into or upon the navigable waters of the U.S. or adjoining shorelines. Oil means oil of any kind or in any form. The requirements established by this regulation apply to any owner or operator of a non-transportation related onshore or offshore facility engaged in drilling, producing, gathering, storing, processing, refining, transferring, distributing, using, or consuming oil or oil products, which due to its location, could reasonably be expected to discharge oil in harmful quantities and meets either of the following criteria:

- Facility has a completely buried storage capacity of oil/oil products greater than 42,000 gallons.
- Facility has an aggregate aboveground storage capacity of oil/oil products greater than 1,320 gallons (including containers with 55-gallon capacity or greater only).

Facilities subject to this regulation are required to prepare and implement a SPCC plan in accordance with the regulatory requirements of 40 CFR Part 112. Southwestern's EMS establishes a *Spill Prevention, Control, And Counter-Measures Program*, designed to meet the requirements of 40 CFR 112 (2005). Southwestern implements 12 different SPCC plans that are facility specific for their substations that have large (10,000-gallon) transformers. In compliance with 40 CFR Part 112, the plans address the following:

- Operating procedures in place to prevent oil spills.
- Control measures installed to prevent a spill of oil from reaching navigable waters.
- Communication procedures to be followed in the event of an oil spill.
- Countermeasures established to contain, clean up, and mitigate the effects of an oil spill that reaches navigable waters.

For the substations or switchyards that do not meet the oil threshold criteria to trigger a SPCC (<1,380 gallons of oil), but still have oil on site, Southwestern implements a simpler plan called an "Emergency Spill Plan." There are 12 site-specific emergency spill plans.

In addition, Southwestern operates oil/water separators at five of their facilities in Missouri. The State of Missouri views secondary containment devices such as oil/water separators as wastewater treatment devices, which require general operating NPDES permits according to its regulations. Southwestern holds a general operating NPDES permit for these facilities and monitoring is performed in accordance with its provisions. Southwestern's EMS establishes a *National Pollutant Discharge Elimination System Program*, which includes the provisions for NPDES permits that are required at Southwestern facilities. Petroleum materials at Southwestern's facilities are summarized in Table 3-12.

Table 3-12. Summary of Materials Used at Southwestern Facilities

Facility Type	Number	Hazardous Materials	Petroleum Products	Miscellaneous
Substation	24	▪ Lead acid batteries ▪ Small amounts of PCBs/tars in hermetically-sealed power transformer bushings on top of the big transformers ▪ Few small capacity oil-containing circuit transformers and potential transformers that all test less than 50-500 ppm PCB	Oil-containing transformers (10,000 gallon)	▪ Sulfur hexafluoride ▪ Pressurized cylinders of nitrogen ▪ Gas breakers (sulfur hexafluoride)
Pole yard	3	None	None	Poles are purchased as treated. No wood treating chemicals are used at pole yards.
Switching Station	3	▪ Lead acid batteries ▪ Small amounts of PCBs/tars in hermetically-sealed power transformer bushings on top of the big transformers ▪ Few small capacity oil-containing circuit transformers and potential transformers that all test less than 50-500 ppm PCB	Small amounts of electrical insulating oil in oil-filled electrical equipment	▪ Sulfur hexafluoride ▪ Pressurized cylinders of nitrogen ▪ Gas breakers (sulfur hexafluoride)
Office/ Maintenance Facility	3	Solvents	▪ Small amounts of hydraulic fluids and miscellaneous vehicle fluids for incidental repair (vehicles are serviced offsite) ▪ Transformer oils for disposal	▪ Janitorial cleaning supplies ▪ Pressurized cylinders of sulfur hexafluoride, oxygen, and nitrogen ▪ Herbicides ▪ Metals recycle dumpsters ▪ Emergency generators with diesel reservoirs within the generator ▪ Batteries ▪ Light bulbs
Tap	4	None	Small quantities of insulating oil	Sulfur hexafluoride
Communication Site	50	None	None	▪ Liquid propane gas tanks ▪ Batteries

Source: Pilcher 2018
PCB polychlorinated biphenyl
ppm parts per million

3.11.1.3 Asbestos

Southwestern's EMS establishes an *Asbestos Operations and Management Program* in compliance with 29 CFR 1926.1101 and 1910.1001 and other applicable regulatory requirements, and establishes limitations on work that can be performed by Southwestern employees. This applies to all demolition, salvage, and maintenance work, including, but not limited to: demolition or salvage of structures where asbestos is present; construction, alteration, repair, maintenance, or renovation of structures, substrates, or portions thereof that contain asbestos; installation of products containing asbestos; asbestos spill/emergency cleanup; and transportation, disposal, storage, or containment of asbestos or products containing asbestos, on the site or location at which construction activities are performed.

3.11.1.4 Waste

Southwestern's EMS establishes a *Waste Management Program*. Waste streams generated by Southwestern operations are predictable; however, the volume of these waste streams may vary. Wastes are categorized as principal waste streams and other waste streams.

- Principal waste streams – Most of the waste streams generated by Southwestern operations are small and infrequently generated. Due to the small quantities, most of the waste streams do not lend themselves to waste minimization. The principal waste streams generated at Southwestern include PCB items, used oils, materials containing or contaminated with used oil (used oil contaminated waste), and treated wood products.
- Other waste streams – Other wastes generated by Southwestern activities include those related to the following:
  - Spent solvents, rags, paint and thinner, defined herein as RCRA hazardous wastes
  - Asbestos and lead-based paint abatement wastes.
  - Herbicide application wastes
  - Solid wastes

The current disposal methods for the waste streams are listed below:

- PCB-contaminated items – Currently transported by a licensed hauler in compliance with 40 CFR 263 (2005) to a treatment, storage, and disposal facility that is permitted to accept PCB materials. However, alternative approved methods of disposal (e.g., chemical waste landfill, chemical de-chlorination, etc.) may be used. The appropriate method of disposal shall be determined and implemented by the Administrative Officers without further review.
- Used oils – Currently treated as PCB-contaminated oils or used oil and must be dechlorinated prior to being recycled. If used oils contain non-detectable quantity of PCBs (less than 2 parts per million), they may be sent to a non-TSCA-permitted facility for recycling.
- Used oil contaminated wastes – Typically includes rags and related maintenance items. These items could be managed as TSCA waste, solid waste, or hazardous waste or as appropriate and disposed according to the classification of the material and contaminant present upon or within the item. However, if used oil contaminated wastes contain PCBs in concentrations <50 ppm, then they may be disposed of at approved special waste landfill or sanitary landfill permitted to accept such waste.

- Treated wood products – Upon removal from service, unusable, treated wood products are offered to the property owner for their use if they contain only small, allowable levels of preservatives such as pentachlorophenol as allowed by the EPA. If the property owner does not want the treated wood products, they are removed and disposed of in an environmentally sound method available in compliance with the law.
- RCRA hazardous wastes – RCRA hazardous wastes generated by Southwestern during routine maintenance activities are generated in very small quantities and therefore Southwestern meets the criteria set forth as a "Very Small Quantity Generator" of hazardous wastes. Provided that the very small quantity generator meets all the conditions for exemption, hazardous waste generated by the very small quantity generator is not subject to the requirements of parts 124, 262 (except §§262.10-262.14) through 268, and 270 of this chapter, and the notification requirements of section 3010 of RCRA and the very small quantity generator may accumulate hazardous waste on site without complying with such requirements. Southwestern manages most of its hazardous waste as a "Small Quantity Handler of Universal Waste." Its universal wastes consist mostly of spent batteries, waste pesticides, used fluorescent lamps, and used mercury-containing thermostats.

Waste minimization and pollution prevention techniques are implemented as practical. A program has been initiated to promote cost-effective waste reduction and recycling of reusable materials in all operations. This program fosters: (a) practices that reduce waste generation, and (b) the recycling of recyclable materials such as, electronic equipment, paper, plastic, metals, glass, used oil, and lead acid batteries. All program activities must meet local and state recycling requirements.

3.11.2 Environmental Consequences

Potential impacts to materials and waste are considered significant if the Proposed Action would:

- Require permits or permit modifications
- Expose the public or workers to hazardous materials or waste
- Result in noncompliance with applicable federal and state regulations; or
- Increase the amounts of generated or procured hazardous materials or wastes beyond current permitted capacities or management capabilities

3.11.2.1 Proposed Action

Under the Proposed Action, the regulatory compliance requirements and Southwestern's guidelines and programs that are in place to manage materials and waste (described in Section 3.11.1) would remain in place and continue to be reviewed and updated on a regular basis. Use of materials and generation of waste is not expected to change much under the Proposed Action. No new hazardous materials or petroleum products are proposed.

Best Management Practices

The following BMPs would apply for materials and waste:

- Continue to implement measures described in Section 3.11.1 of this EA.
- Ensure the use of EPA-approved herbicides that have been selected by Southwestern for use; ensure the use of the geographic-specific requirements for herbicide selection by using the GIS Resource Mapper.
- Ensure that all herbicide applicators have received training and are licensed in appropriate application categories.
- Follow all herbicide label and SDS instructions regarding worker safety standards and disposal.

3.11.2.2 No Action Alternative

Under the No Action Alternative, the regulatory compliance requirements and Southwestern's guidelines and programs that are in place to manage materials and waste (described in Section 3.11.1) would remain in place and continue to be reviewed and updated on a regular basis. Use of materials and generation of waste would remain the same as current conditions.

3.12 Transportation

Transportation considers the use of roadways and transport of herbicides needed to perform O&M and vegetation management activities throughout Southwestern's transmission system. The ROI includes established and maintained roadways used to access Southwestern's facilities, as well as private property where there is no access to the ROW by existing roads.

3.12.1 Affected Environment

Southwestern facilities are located within 23 counties in Arkansas, 22 counties in Missouri, and 16 counties in Oklahoma in mostly sparsely populated areas. A network of roadways is available in the three-state region. Some transmission line ROWs, however, are in rural and remote areas and in some areas, no access roads to the ROWs exist. As shown in Figure 3-11, the transmission lines cross relatively few major roadways. The following summarizes the major roads crossed by transmission lines in the three states.

In Arkansas, line 3001 parallels Interstate 40 east of Alma. In Alma, it crosses Interstate 40 west of the interchange with Highway 71 and just west of there, it crosses Interstate 49. Line 3001C crosses Interstate 40 just west of Russellville. Both lines 3005 and 3017 cross Fayetteville Road (AR-59) near Rena, Arkansas. Line 3007 crosses Highway 555 just north of interchange with AR-91 in northwest Jonesboro. On the western side of Paragould, line 3010 crosses U.S. Highway 412, west of Pinecrest Drive. On the northeast side of Paragould, line 3010 crosses Highway 49 at Purcell Road near the substation and a communication site.

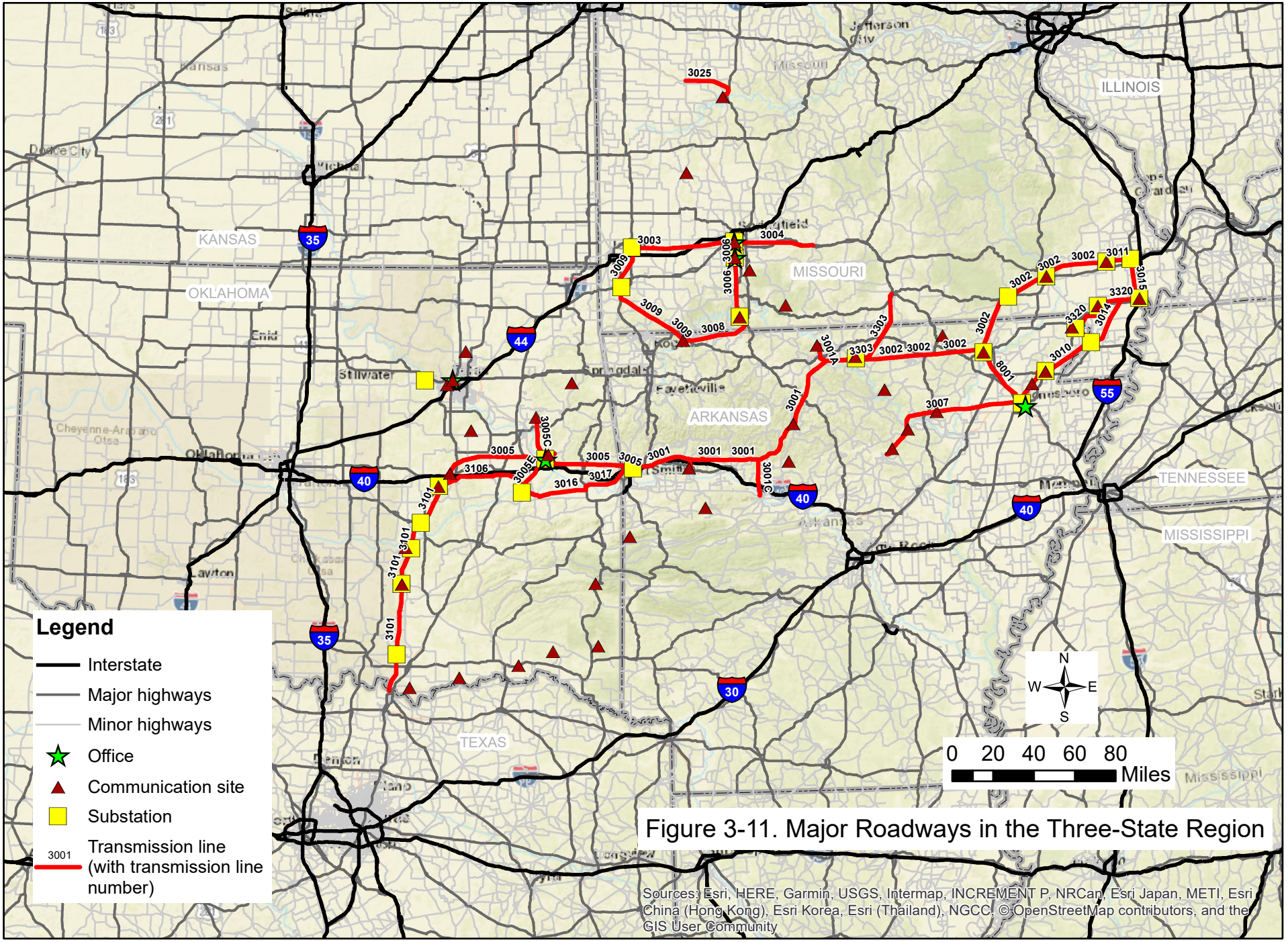


Figure 3-11. Major Roadways in the Three-State Region

In Missouri, line 3003 crosses State Highway Ff on the west side of Springfield before crossing U.S. Highway 60 further west and then parallels it on the south side to the interchange with W. Sunshine Street (MO-413). Also in Springfield, West Battlefield Road (West Farm Road 160) is on the south side of the substation and transmission lines (3003, 3004, and 3006) cross this road in three locations near the substation. Line 3006 heads south from the substation and crosses Highway 60 approximately mid-way between State Farm Road 135 and State Farm Road 137. Further east in Springfield, line 3004 crosses Business Route 65 near the Primrose Marketplace; as it continues east, it crosses Highway 65 just south of its interchange with Battlefield Road. Approximately 20 miles west of Springfield and northwest of Mt. Vernon, line 3003 crosses Interstate 44. Line 3003 crosses Interstate 44 again further west, approximately 0.8 mile east of the interchange with Interstate 49. Although on Figure 3-11, the transmission line near Sikeston looks close to Interstate 55, it is actually approximately 5 miles to the west.

In Oklahoma, line 3005E crosses the Muskogee Turnpike (Highway 351) and Interstate 40 southwest of Gore. Line 3005 also crosses the Muskogee Turnpike further to the north. Line 3005 crosses Main Street (OK-100) on the northeast side of Gore. Further west, line 3005 crosses Interstate 40 west of Henryetta. Line 3101 crosses Main Street (OK-91) in Cartwright, east of South 4th Avenue.

3.12.2 Environmental Consequences

Potential impacts to transportation are evaluated with respect to the potential for the Proposed Action to:

- Disrupt or improve current transportation patterns and systems
- Cause safety hazards

3.12.2.1 Proposed Action

Machinery and personnel would continue to be transported to and from the facilities using established and maintained roadways. Some portions of ROW are accessible at points where the ROW crosses existing roads; however, many areas would need to be accessed through private properties. Access through private property would be maintained with permission of the specific landowner. Access within the ROW exists through existing jeep trails or would be developed as the machinery travels over herbaceous vegetation. This access would be used by Southwestern personnel to access the target areas within the ROW. Southwestern would use all-terrain vehicles, light duty four-wheel drive vehicles, trailers, and specialized heavy-duty heavy rolling equipment to traverse access roads and ROWs.

Proposed Action activities would continue to occur along existing transmission lines and at substations, communication sites, and offices and are not expected to have measureable effects on transportation. While some maintenance activities identified in Section 2.0 may require temporary lane closures or disruptions (limited only to areas where lines cross public roadways), any such disruption would be short-term. Proper signage and traffic diversion would be used to reduce impacts. As described in the affected environment, very few interstates and major roads are crossed by Southwestern transmission lines, therefore, impacts to heavily traveled roads are expected to be minimal. Southwestern is not proposing to construct any new roads as a part of this action, but would maintain existing access roads to their current maintenance level, as needed based on wear or damage from Proposed Action activities.

A potential exists for motor vehicle accidents. In accordance with Southwestern procedures, all employees that drive Southwestern vehicles undergo defensive driving training. In addition, absorbent materials, shovels, etc. would be carried with herbicides to contain any spills resulting from motor vehicle accidents. A copy of the SDSs for the herbicides and the non-water diluents would be carried with the containers to inform any emergency response personnel of dangers associated with the herbicide. No U.S. Department of Transportation placarding is needed on the transporting motor vehicles for these herbicides.

In accordance with Southwestern procedures, herbicides would be transported to the site in manufacturer's containers. Additives, surfactants, or seed-oils would be transported to the site in small containers. Herbicides would remain in manufacturer's containers until mixed with water or other constituents prior to application. Unused concentrated herbicides would be transported from the site in manufacturer's containers. Diluted herbicides would be transported while on-site using a 200-gallon tank used by the vehicle mounted sprayer or in a pressurized backpack. No diluted herbicides would be transported offsite since they would be applied to the ROW before leaving the work site. Tanks would be inspected routinely for integrity issues. Dented, worn, or damaged tank or tank appurtenances would be repaired or replaced prior to use in field.

Transporting of hazardous waste occurs in compliance with 40 CFR 262 and 263. Personnel involved in transportation of hazardous waste are formally trained, including emergency response procedures.

Best Management Practices

The following BMPs would be implemented to reduce impacts to transportation:

- Obtain permission from landowner to access ROW through private property.
- Use proper signage and traffic diversion during temporary lane closures.
- Implement employee training, including defensive driving and emergency response procedures.
- Transport herbicides with absorbent materials, shovels, and SDSs and inform any emergency response personnel of dangers associated with the herbicide.
- Transport herbicides to the site in manufacturer's containers in accordance with Southwestern procedures.
- Inspect tanks routinely for integrity issues and repair dented, worn, or damaged tank or tank appurtenances prior to use in field.

3.12.2.2 No Action Alternative

Under the No Action Alternative, Southwestern would continue to conduct O&M and vegetation management activities at substations, communication sites, offices, and along the transmission line ROWs. Potential impacts to transportation would be similar to those described for the Proposed Action. Because the range of herbicides that could be used under the Proposed Action would not be available under the No Action Alternative, the No Action would require greater use of heavy equipment to control vegetation within the ROW and therefore, slightly greater impacts to transportation may occur.

3.13 Intentional Destructive Acts

The DOE Office of NEPA Policy and Compliance issued guidance on the need to explicitly consider intentional destructive acts (for example, acts of sabotage or terrorism) in NEPA documents (DOE 2006). Intentional destructive acts can also be expanded to include vandalism and theft. The ROI for intentional destructive acts includes Southwestern's entire transmission system, including transmission lines, substations, communication sites, and office/maintenance facilities.

3.13.1 Affected Environment

Southwestern's transmission system is part of the United States' critical infrastructure and is considered to be a possible target of intentional acts of destruction. Sabotage and terrorism to a transmission line or electrical substation could cause potentially large disruptions in electrical service while vandalism or theft of metals at a facility would be a more localized problem.

3.13.2 Environmental Consequences

3.13.2.1 Proposed Action

The destruction of a tower on a high-voltage transmission line or of equipment at a substation by terrorism or sabotage could disrupt electrical services and affect the utility customers and end users. The extent and duration of the impact would depend upon the specific role and relationship of the damaged or destroyed equipment within the overall infrastructure network, the particular configuration of the transmission system in the area, and the potential for cascading effects. The impacts of intentional destructive acts and wildfire would likely be relatively localized, and would depend on the nature and location of the acts, the magnitude of the damage, and other variables. The impacts would typically be similar to outages caused by other natural phenomena such as hurricanes, ice storms or tornadoes. Outages cause inconveniences to electrical end users, ranging from loss of heating, air conditioning, and refrigeration to effects on traffic signals and a numerous other systems that run on electricity.

Vandalism or theft (for example, theft of copper wire or other valuable metals) while potentially expensive to repair, do not normally cause a large effect to utility customers or to the environment. Southwestern's existing emergency preparedness and response procedures and SPCC Program would aid in recovery from localized vandalism and any potential spills (such as mineral insulating oils, petroleum products, or herbicides) at a facility.

The incidence of an intentional destructive act is speculative and could potentially occur anywhere within Southwestern's system. Proposed O&M activities and integrated vegetation management would help reduce the potential impacts of a destructive act and lower the potential for generating any regional or large-scale destruction. O&M activities such as continued aerial and ground patrols could help discover minor problems within the transmission system before they become critical and cause large-scale electrical outages. Ongoing repairs, upgrades, rebuilds and replacements within the system (including fencing and security systems) would keep the transmission system at optimum quality and reduce the likelihood of older equipment failing during an intentional destructive act. Removal of oil, chemicals, and waste material from the system facilities would eliminate their use during a potentially destructive act. The Integrated Vegetation Management Program would minimize the size and quantity of vegetation

within the transmission system and allow security systems to better monitor activities within the system. Removal of overhead and encroaching vegetation would eliminate their use during a potentially destructive act; such as cutting a tree or tree branch onto a transmission line. Any intentionally destructive acts that might occur would be localized from an environmental perspective with preventative measures being installed to limit an intentional destructive act to de minimis or negligible environmental impacts.

3.13.2.2 No Action Alternative

Under the No Action Alternative, potential impacts would be the same as those described for the Proposed Action. Southwestern's transmission system would be identical and the likelihood of an intentional destructive act would not change.

3.14 The Relationship Between Local Short-Term Uses of the Environment and the Maintenance and Enhancement of Long-Term Productivity

CEQ regulations require consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16). O&M and integrated vegetation management at Southwestern facilities would require short-term uses of land and other resources. Short-term use of the environment, as used here, is that used during the life of a project, whereas long-term productivity refers to the period of time after the project has been decommissioned, the equipment removed, and the land reclaimed and stabilized. The short-term use of the land for the Proposed Action would not affect the long-term productivity of the area. If it is decided at some time in the future that the facilities have reached their useful life, the facilities and foundations could be decommissioned and removed, and the areas reclaimed and re-vegetated to resemble a similar habitat to the pre-disturbance conditions.

3.15 Irreversible and Irretrievable Commitments of Resources

CEQ regulations require environmental analyses to identify "...any irreversible and irretrievable commitments of resources that would be involved in the proposal should it be implemented" (40 CFR Section 1502.16). A commitment of resources is irreversible when its primary or secondary impacts limit the future options for a resource or limit those factors that are renewable only over long periods of time. Examples of nonrenewable resources are minerals, including petroleum. An irretrievable commitment of resources refers to the use or consumption of a resource that is neither renewable nor recoverable for use by future generations. An example of an irretrievable resource is the loss of a recreational use of an area or the disturbance of a cultural site. While an action may result in the loss of a resource that is irretrievable, the action may be reversible.

For the Proposed Action, resources consumed during O&M activities and vegetation management activities, including labor, fossil fuels, and materials (e.g., poles, wire), would be committed for the life of the project. Nonrenewable fossil fuels would be irretrievably lost through the use of gasoline- and diesel-powered equipment and generators during O&M and vegetation management activities. The Proposed Action has committed approximately 341 acres of land for continuing the operation of the office/ maintenance facilities, communication sites, and substations. An additional 16,369 acres of ROW are committed with vegetation kept in seral stages. Although these resources could be reclaimed in the future,

especially along the ROW, it is unlikely that they would be restored to their original conditions and functionality. Therefore, these commitments are considered irreversible.

The implementation of the Proposed Action would potentially result in the irretrievable commitment of energy and small quantities of process chemicals, herbicides, and nutrients. Irretrievable commitment of building materials for maintenance of the facilities would also occur.

3.16 Unavoidable Adverse Impacts

Unavoidable adverse impacts are environmental impacts that cannot be effectively mitigated. Each resource section includes recommended BMPs and mitigation measures to avoid or reduce adverse environmental impacts. Vegetation management along the ROW could be considered to cause adverse effects as it limits vegetation diversity and structure. However, since vegetation management is necessary to ensure Southwestern can safely and reliably operate and maintain its existing electrical transmission facilities and deliver electrical power, it is unavoidable.

4.0 CUMULATIVE IMPACTS

4.1 Cumulative Impacts

The CEQ regulations (40 CFR 1508.7) require assessment of cumulative impacts in the decision-making process for federal projects. Cumulative impacts on environmental resources result from incremental effects of proposed actions, when combined with other past, present, and reasonably foreseeable future projects in the area. Cumulative impacts can result from individually minor, but collectively substantial, actions undertaken over a period of time by various agencies (federal, state, and local) or individuals. Informed decision making is served by consideration of cumulative impacts resulting from projects that are proposed, under construction, recently completed, or anticipated to be implemented in the foreseeable future.

4.1.1 Past, Present, and Reasonably Foreseeable Actions

For future actions to be relevant to the cumulative impacts analysis, the actions must affect resources (be the cause of some type of effect whether beneficial or adverse) within the Proposed Action areas. Construction, agricultural practices, and forest management activities can cause similar impacts to those described for the Proposed Action. Present and future projects may include:

- USFS land management activities
- USACE dam maintenance and reservoir activities
- Agricultural production
- Maintenance/construction at the hydropower dams where Southwestern's power is initiated
- Development and construction
- Land management activities on WMAs or conservation grounds
- Future construction planned by Southwestern: two communication towers and the associated access road would be constructed in the near future in Polk and Vista counties, Missouri. The estimated footprint of the project is expected to be 0.25 square mile for each.

4.1.2 Cumulative Impacts Summary

4.1.2.1 Proposed Action

Due to the temporal distribution and spatial distribution over a large geographical area, the O&M and vegetation management activities would contribute relatively minor impacts when considered together with other actions in the region. Potential cumulative impacts for each resource area are discussed below.

4.1.2.1.1 Land Use

The Proposed Action activities would take place within existing Southwestern facilities. No new ROWs would be created and no new facilities would be constructed; changes in land use and management would not occur. Southwestern would continue to comply with existing special use permits for its facilities in the Mark Twain National Forest in southeastern Missouri and the Ozark-St. Francis National Forest in

Arkansas. Areas owned by the USFS are not likely to change ownership and agricultural areas are likely to continue to be used for future agriculture production. A potential exists that some easements along private lands for the ROW may change ownership; however, Southwestern would continue to work with landowners to maintain the perpetual easements. Any changes in adjacent land use (e.g., development along the ROW) would be spatially and temporally distributed along the Proposed Action's location. No cumulative impacts to land use are expected.

4.1.2.1.2 Water Resources

Some short-term decreases in water quality, from erosion, increased surface water runoff, or sedimentation, could occur during Proposed Action activities, although implementation of BMPs would reduce the potential for impacts. Construction and forest management practices could contribute to soil erosion and indirectly impact water quality. The potential effect, however, would be minor, short-term, and restricted to conditions in which one or more of the identified project activities are in the same watershed as the Proposed Action watersheds. Southwestern procedures for herbicides restrictions near surface water bodies would minimize impacts from vegetation management under the Proposed Action. In addition, agricultural practices in areas along the ROW may include the use of herbicides. Due to the linear nature of powerlines, the ratio of treated to untreated surface area in any given watershed is usually sufficiently low to permit rapid dilution. Even when combined with concentrated areas or blocks of land typical of herbicide treatments in agricultural areas, cumulative impacts from vegetation management are not expected as the Proposed Action would contribute little to the impact.

4.1.2.1.3 Biological Resources

Potential impacts to vegetation and wildlife from the Proposed Action would be short-term and concentrated in a small footprint per activity. Potential cumulative effects could occur when multiple projects are implemented in the same general area at the same time increasing the magnitude of disturbance, decreasing plant diversity, and when wildlife habitats are permanently or temporarily affected. Other present and future activities are also confined to specific areas and have a small chance of temporally and spatially overlapping the Proposed Action since only portions of the ROW are managed at a time. Adverse cumulative effects to wildlife could include loss and degradation of wildlife habitat, increased disturbance from noise, increased mortality, and disturbance and displacement of wildlife. Because ROWs are linear and spread over a large geographic area, implementation of the Proposed Action when combined with other actions in the area would contribute relatively minor overall cumulative impacts on vegetation and wildlife in the region. Cumulative beneficial impacts to vegetation may be realized as land agencies collectively control noxious weeds.

Potential cumulative impacts to special status species is species specific. The dispersed nature of the mussel species and plant species combined with the temporal and spatial distribution of the Proposed Action and the future projects would preclude any cumulative impacts to these species. The distribution of the ABB and the four bat species, however, make them more likely to be impacted. Cumulative effects could occur when: 1) suitable species habitats are affected, either short-term or long-term, by multiple projects; 2) when multiple projects are implemented in the same general area at the same time increasing the magnitude of noise and general disturbance. Construction activities and forest management practices that remove trees have the potential to impact some of the bat species, and ground disturbing activities

could affect the ABB. Timing restrictions applied to federal tree removal projects, and the spatial distribution of other projects, would reduce potential cumulative impacts to bats across the region. For projects that disturb more than 3 acres in the six-county distribution of the ABB in Arkansas, absence/presence surveys must be conducted. Oklahoma requires surveys for projects with ground disturbance in the ABB area or if not conducted, it is assumed the species are present and mitigation efforts must be made (USFWS 2016d). Surveys, in addition to mitigation efforts and consultation with the USFWS for other federal projects, would reduce potential cumulative effects to the ABB; however, cumulative effects to the species would be adverse but minor due to the concentration of the species in the region.

4.1.2.1.4 Air Quality

Impacts from the Proposed Action would be minimal, emissions would be short-term and would occur only during the time that the engines are in operation, and would not cause regional changes to air quality. All counties containing Southwestern facilities in all three states are in attainment for the six criteria pollutants. Emissions from other projects would be localized and spatially distributed across a wide landscape in three states and when combined with the Proposed Action would not cumulatively impact air quality.

4.1.2.1.5 Geology and Soils

Potential cumulative impacts to this resource category include soil erosion and compaction and reduced soil productivity. Equipment use for both the O&M and vegetation management activities would cause localized and short-term soil compaction and erosion. Karst terrain would be unlikely to be impacted by O&M activities and vegetation management activities as Southwestern employees are trained to identify these areas and protect them. The Proposed Action, when combined with other projects, would not cause a direct cumulative effect on soils and geology. Any direct effects on soils would be spatially and temporally distributed along the Proposed Action's location and would not likely combine with other existing and reasonably foreseeable projects.

4.1.2.1.6 Cultural Resources

Potential damage or exposure of cultural resources could occur with new construction projects. The areas under agriculture production have been so historically and are not expected to contribute to cumulative impacts to cultural resources. Land management agencies such as the USFS have plans and policies in place to protect cultural resources on their lands and therefore impacts are not expected from these activities. Implementation of the Southwestern PAs and the Section 106 consultation process, as well as other land management agency plans would reduce any adverse effects to the resources. Therefore, potential cumulative effects to cultural resources would not be significant.

4.1.2.1.7 Environmental Justice

Although much of the Proposed Action area contains census tracts with greater percentage of residents below the poverty level than the overall statewide percentages, these areas would not experience disproportionate impacts when compared to census tracts with lower poverty rates. Because Southwestern facilities are spread throughout a large geographic area, impacts of the Proposed Action are dispersed and would not cause cumulative impacts when combined with other present or future projects.

4.1.2.1.8 Noise

Proposed Action activities would be temporary, intermittent, of short duration, and dispersed throughout the Proposed Action area. No new stationary sources of permanent noise would be introduced. In addition, BMPs, such as limiting the use of noise-generating equipment next to campgrounds to daytime hours and using noise abatement devices on noisy equipment and vehicles, would be implemented. Noise from other projects would be localized, spatially distributed across a wide landscape in three states, and likely temporary, and when combined with the Proposed Action would not cumulatively impact noise.

4.1.2.1.9 Safety and Health

Safety and health impacts from the Proposed Action can be divided into physical injury risks and health risks. Public safety and health could be impacted if the public were near the work sites or came into contact with the herbicides being applied. Occupational safety and health programs are required under OSHA. Under the Proposed Action, the regulatory compliance requirements and Southwestern's guidelines and programs that are in place to be protective of both public and occupational health and safety would remain in place and continue to be reviewed and updated on a regular basis. If personnel from another project were in or adjacent to a Southwestern work site, Southwestern's management would address the situation appropriately. This is an unlikely scenario because other projects would be localized, spatially distributed across a wide landscape in three states, and occurring at differing times, and therefore, unlikely to combine with the Proposed Action to cause cumulative safety and health impacts.

4.1.2.1.10 Materials and Waste

Under the Proposed Action, the regulatory compliance requirements and Southwestern's guidelines and programs that are in place to manage materials and waste would remain in place and continue to be reviewed and updated on a regular basis. Use of materials and generation of waste is not expected to change much under the Proposed Action. No new hazardous materials or petroleum products are proposed; as such cumulative impacts to materials and waste are not likely.

4.1.2.1.11 Transportation

Machinery and personnel would continue to be transported to and from the facilities using established and maintained roadways. Access through private property would be maintained with permission of the specific landowner. Proposed Action activities would continue to occur along existing transmission lines and at substations, communication sites, and offices and are not expected to have measureable effects on transportation. While some maintenance activities may require temporary lane closures or disruptions (limited only to areas where lines cross public roadways), any such disruption would be short-term. If

such lane closures or disruptions were to impact another project in or adjacent to such closure, Southwestern's management would address the situation appropriately. This is an unlikely scenario because other projects would be localized, spatially distributed across a wide landscape in three states, and occurring at differing times, and therefore, unlikely to combine with the Proposed Action to cause cumulative transportation impacts.

4.1.2.2 No Action Alternative

Under the No Action Alternative, O&M activities would continue and changes to the vegetation management program would not occur. Cumulative impacts of the No Action Alternative when combined with past, present, and reasonably foreseeable future projects would be similar to those described for the Proposed Action.

5.0 LIST OF PREPARERS

Table 5-1. List of Preparers and Contributors

Name	Education	Certifications	Responsibility
Wendy Arjo	Ph.D. Fish and Wildlife Biology	Certified Wildlife Biologist®	Biological Resources, Cultural Resources, Cumulative Impacts
Tonya Bartels	M.S. Analytical Chemistry	None	Land Use, Noise, Environmental Justice, Transportation, Technical Editing
Michael Finley	B.S. Forestry	Certified Applicator, and Qualified Supervisor for Colorado Department of Agriculture	Subject Matter Expert for Herbicides
Brooke Hill	M.S. Wildlife Biology	None	Biological Resources
Melissa Russ	M.S. Geology	P.G., Utah, Wyoming	Water Resources, Geology and Soils, Safety and Health, Materials and Waste
Leroy Shaser	M.S. Geology	None	Air Quality, Intentional Destructive Acts, GIS

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APPENDIX A

Consultation and Public Involvement

Consultation and Public Involvement

Initial Outreach

The purpose of the initial outreach is to notify stakeholders that Southwestern intends to prepare the PEA and to ensure all relevant issues are identified and analyzed in the PEA. Initial outreach for this PEA included a scoping letter sent to the list of stakeholders below. An example scoping letter and the following responses are included in this appendix.

- Email from the U.S. Forest Service, dated June 18, 2018
- Email from the Arkansas Natural Heritage Commission, dated June 18, 2018
- Email from the U.S. Army Corps of Engineers, Kansas City District, dated June 18, 2018
- Letter from the National Park Service, dated June 19, 2018
- Email from the Oklahoma Department of Environmental Quality, dated June 20, 2018
- Letter from the Oklahoma Department of Agriculture, Food, and Forestry, dated June 22, 2018
- Letter from the Arkansas Game and Fish Commission, not dated; received by email on June 25, 2018
- Letter from the Oklahoma Military Department, dated July 17, 2018
- Letter from the Missouri Department of Natural Resources, dated July 26, 2018

Arkansas State Agencies

Arkansas Department of Environmental Quality
Arkansas Game & Fish Commission (Harold Alexander & Mud Creek WMAs)
Arkansas Natural Heritage Commission
Arkansas Pollution Control and Ecology Commission
Arkansas State Historic Preservation Office
Arkansas State Plant Board (under AR Department of Agriculture)
Arkansas Wildlife Federation

Missouri State Agencies

Missouri Department of Agriculture
Missouri Department of Natural Resources/Division of Environmental Quality
Missouri Natural Heritage Commission
Missouri State Historic Preservation Office

Oklahoma State Agencies

Oklahoma Conservation Commission
Oklahoma Department of Agriculture
Oklahoma Department of Environmental Quality
Oklahoma Department of Wildlife Conservation
Oklahoma Scenic Rivers Commission
Oklahoma State Historic Preservation Office
Oklahoma Water Resources Board

Federal Agencies

Camp Gruber Training Center
Mark Twain National Forest, MO
  Ava/Cassville/Willow Springs Ranger District
  Eleven Point Ranger District
  Poplar Bluff Ranger District

Ouachita National Forest, OK and AR
Ozark-St Francis National Forest, AR
Big Piney Ranger District, AR
National Park Service, George Washington Carver National Monument, MO
National Park Service, Buffalo National River, AR
US Army Corps of Engineers, Little Rock
US Army Corps of Engineers, Kansas City
US Army Corps of Engineers, Tulsa
USDA, Soil Conservation Service, Arkansas
USDA, Soil Conservation Service, Missouri
USDA, Soil Conservation Service, Oklahoma
USFWS, Ecological Services, Arkansas Field Office
USFWS, Ecological Services, Missouri field Office
USFWS, Ecological Services, Oklahoma Field Office

Draft EA Outreach

An NOA was published in the following newspapers to notify the public that the draft EA was available for public review and invited public comments for a period of 45 days. A copy of the NOA is included in this appendix.

- The Tulsa World
- Hughes County Tribune
- Springfield News-Leader
- Poplar Bluff Daily American Republic
- Jonesboro Sun
- Southwest Times Record

The draft EA was made available in three public libraries: Tulsa City-County Library in Tulsa, OK; The Library Center in Springfield, MO; and the Little Rock Public Library in Little Rock, AR. An example of the transmittal letter to the libraries is included in this appendix. In addition the draft EA was made available on Southwestern's website and the DOE's website. Hard copies were provided when requested. Southwestern also sent a notification letter to the stakeholders listed above. An example letter is included in this appendix. A total of two comments were received. These comments are also included in this appendix.

Agency Participation

Southwestern is in the active consultation process with SHPOs, ACHP, OAS, and tribes to update and combine the three separate PAs into one unified multi-state PA. The following communications with the SHPOs during scoping are included in this appendix:

- Response letter from the Oklahoma Historical Society, State Historic Preservation Office, dated July 5, 2018
- Response letter from the Missouri Department of Natural Resources, State Historic Preservation Office, dated July 10, 2018
- Reply letter from Southwestern to the Oklahoma Historical Society, State Historic Preservation Office, dated August 22, 2018

Southwestern initiated consultation with the USFWS, through preparation of a PBA for listed species in Missouri, Arkansas, and Oklahoma. An example letter is provided in this appendix. The USFWS concurred with the determination of "not likely to adversely affect" for all listed species except the American burying beetle (*Nicrophorus americanus*). The USFWS response is included in this appendix. The Oklahoma USFWS in coordination with the Arkansas USFWS is developing a programmatic biological opinion specific for impacts to and incidental take of the American burying beetle for the O&M and integrated vegetation management activities.

Native American Participation

Southwestern is conducting consultation with federally recognized Native American tribes according to the DOE American Indian Tribal Government Interactions and Policy (DOE Order 144.1). The following tribes were invited by Southwestern to participate as Sovereign Nations per Executive Order (EO) 13175 (Consultation and Coordination with Indian Tribal Governments) in both the EA and the National Historic Preservation Act Section 106 process. An example consultation letter and responses are included in this appendix. Responses received are indicated in parenthesis in the list of tribes below. If no response is indicated, no response was received from that tribe.

Absentee-Shawnee Tribe of Indians of Oklahoma
Osage Nation (Response received, dated September 1, 2018)
Cherokee Nation (Responses received, dated August 7, 2018 and October 3, 2018)
Chickasaw Nation
Choctaw Nation of Oklahoma
Muscogee Creek Nation
Seminole Nation of Oklahoma (Response received, dated August 1, 2018)
Delaware Nation
Wichita and Affiliated Tribes (Wichita, Keechi, Waco and Tawakonie)
Thlopthlocco Tribal Town
United Keetoowah Band of Cherokee Indians in Oklahoma
Delaware Tribe of Indians
Quapaw Tribe of Indians (Response received, dated August 3, 2018)
Caddo Nation of Oklahoma (Response received, dated July 20, 2018)
Shawnee Tribe
Eastern Shawnee Tribe of Oklahoma
Miami Tribe of Oklahoma
Alabama-Quassarte Tribal Town
Kialegee Tribal Town
Kickapoo Tribe of Oklahoma
Sac & Fox Nation
Tunica Biloxi Tribe of Louisiana
Kaw Nation of Oklahoma
Ponca Tribe of Nebraska
Ponca Tribe of Oklahoma (Response received, dated July 30, 2018)
Kickapoo Tribe of Kansas
Iowa Tribe of Kansas and Nebraska
Iowa Tribe of Oklahoma
Peoria Tribe of Indians of Oklahoma

INITIAL OUTREACH

Department of Energy
Southwestern Power Administration
One West Third Street
Tulsa, Oklahoma 74103-3502

June 8, 2018

Becky Keogh
Arkansas Department of Environmental Quality
5301 Northshore Drive
Little Rock, AR, 72118

Subject: Notification of the Intent to Prepare a Programmatic Environmental Assessment for System-wide Operations and Maintenance Activities and System-wide Vegetation Management Program

Ms. Keogh:

The Southwestern Power Administration (Southwestern) intends to prepare a programmatic environmental assessment (PEA) for System-wide Operations and Maintenance (O&M) Activities and System-wide Vegetation Management Program. Southwestern is a bureau of the U.S. Department of Energy (DOE). As one of four Power Marketing Administrations in the United States, Southwestern markets hydroelectric power in Arkansas, Kansas, Louisiana, Missouri, Oklahoma, and Texas from 24 U.S Army Corps of Engineers (USACE) multipurpose dams. The PEA will focus on Southwestern's operations in Oklahoma, Arkansas, and Missouri, which include high-voltage transmission lines, electrical substations, and a communications system that includes microwave, very high frequency (VHF) radio, and state-of-the-art fiber optics. Southwestern proposes to continue O&M and vegetation management activities under a management framework designed to provide maximum operational flexibility and enhance safety. The PEA will identify potential impacts of the proposed activities and measures to help mitigate those impacts.

To support the environmental review, Southwestern is contacting you to ensure all relevant issues are identified and analyzed. The purpose of scoping is early identification of concerns, potential impacts, relevant effects of past actions, and possible alternative actions.

Purpose and Need for Action

The purpose of the Proposed Action is to fulfill Southwestern's obligation to deliver federal hydropower to end-use customers. The need for the Proposed Action is to operate and maintain Southwestern facilities in Oklahoma, Arkansas, and Missouri; protect worker and public safety, streamline the regulatory process for right-of-way (ROW) maintenance; have a management framework to evaluate herbicides as they become available; control the spread of noxious weeds; balance environmental protection with system reliability, while maintaining compliance with the National Electric Safety Code (NESC), North American Electric Reliability Corporation (NERC), Institute of Electrical and Electronics Engineers standards, and Southwestern's directives and standards for maintaining system reliability and protection of human safety.

To protect worker safety, total elimination of weedy species at the substations and the towers is necessary to ensure that these facilities maintain grounding requirements through the ground grid to dissipate lightning. Transmission facilities must be kept clear of all tall-growing trees, brush and other vegetation that could grow too close to the conductors. The most significant impediment to the transmission line ROW O&M and also emergency response is the growth of woody vegetation (trees and shrubs) within the ROW. Trees are a major contributor of electric service interruptions. Trees must be maintained an adequate distance from the conductors. Southwestern needs to select vegetation management practices appropriate to specific conditions along the ROW. With the development of new herbicide formulations, enhanced delivery technology, and increased knowledge regarding environmental interaction, Southwestern needs a management framework that allows evaluation of new herbicides as they become available. In addition, Southwestern needs to lower safety risks of conducting vegetation management operations in remote and treacherous spans of ROW.

Proposed Action

The Proposed Action encompasses O&M activities, which also include the component of integrated vegetation management activities. The scope of the action includes substations, transmission lines, ROWs and associated access roads, fiber optic lines, communication sites, and office or maintenance complexes located in Oklahoma, Arkansas, and Missouri (Figure 1).

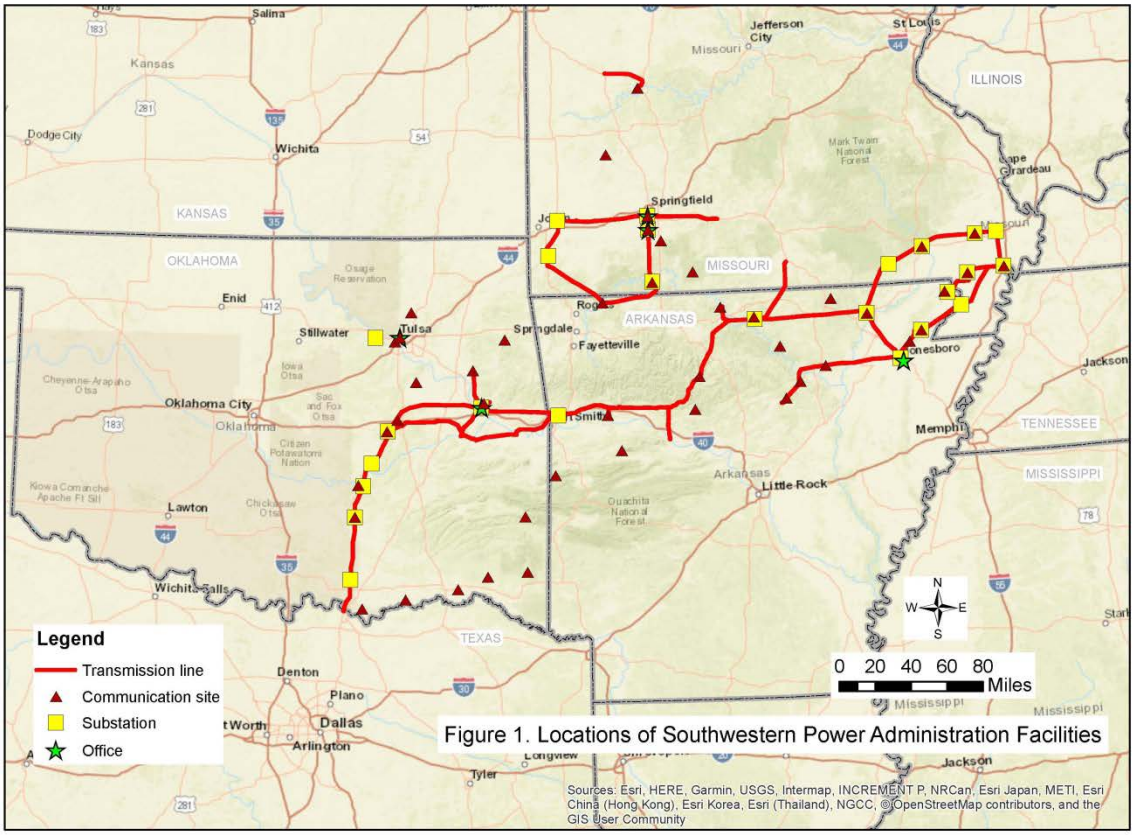


Figure 1. Locations of Southwestern Power Administration Facilities

Proposed O&M activities include aerial and ground patrols of line structures, lines, line hardware, access roads and communication sites to locate and correct problems, regular and preventive maintenance, inspections, repairs, upgrades, rebuilds, and replacements. Proposed O&M activities would occur at existing substations, transmission lines, communication system facilities, and maintenance or office-type facilities.

Proposed vegetation management activities include a combination of mechanical and manual control and herbicide treatments. As part of the Proposed Action, Southwestern has developed a management framework for evaluating and selecting herbicides to improve the range of herbicides used based on geographic regions and to increase control of undesirable vegetation over longer periods of time. The goal of the vegetation management program is to develop site-specific, environmentally sensitive, cost effective and socially responsible solutions to vegetation control. No individual method will control undesirable vegetation in a single treatment; diligence and persistence is required over a number of years to subdue vegetation such as woody plants, including trees and brush. Due to the complexity of vegetation control, the proposed management framework for herbicide use considers numerous factors, such as special geographic concerns, the type of vegetation to control, and the arrival of new herbicides coming on the market.

How to Submit Comments

Interested parties may submit written comments to: Danny Johnson, 1 W. 3rd St., Suite 1600, Tulsa, OK 74103 or Danny.Johnson@swpa.gov. To ensure consideration during the development of the PEA, please submit comments by July 25, 2018.

We look forward to hearing from you. Please contact me at 918.595.6781 or by using the contact information above if you have questions or for additional information regarding the proposed project.

Sincerely,

Danny Johnson
Director, Division of Environmental, Health, Safety & Security

Begin forwarded message:

From: "Crowe, Teresea R -FS" <teresearcrowe@fs.fed.us>
Date: June 18, 2018 at 8:58:39 AM CDT
To: "danny.johnson@swpa.gov" <danny.johnson@swpa.gov>
Cc: "Koloski, Joseph H -FS" <jkoloski@fs.fed.us>
Subject: [EXTERNAL] NOI for Southwestern Power Administration Vegetation Management Project in Missouri

Mr. Johnson:

The Forest Service recently received notification of intent to prepare a programmatic EA for operations and maintenance activities and a vegetation management program. Two letters were received, one on the Poplar Bluff Ranger District and one on the Ava/Cassville/Willow Springs Ranger District, the letter sent to the Poplar Bluff Ranger District is attached for your reference. We are aware of the lines in Butler County, Missouri that cross National Forest System lands as they are currently under a special use permit. However, we are uncertain of the exact location of the lines on the Cassville Unit in the southwest portion of Missouri. Could you send us more detailed information regarding the location of the lines in this area so we can check them against our ownership in this area?

Thank you.

From: Cindy Osborne <Cindy.Osborne@arkansas.gov>
Date: June 18, 2018 at 10:40:04 AM CDT
To: "Danny.Johnson@swpa.gov" <Danny.Johnson@swpa.gov>
Subject: [EXTERNAL] Programmatic Environmental Assessment for System-wide Operations

Dear Mr. Johnson,

Our agency is in receipt of your letter to Darrell Bowman regarding the notification of the Intent to Prepare a Programmatic Environmental Assessment for System-wide Operations and Maintenance Activities and System-wide Vegetation management Program. Our agency maintains a database of information on locations of known high quality natural communities and state and federal species of conservation concern. We also hold legal interest in 73 Natural Areas throughout the state of Arkansas. In order for us to identify potential impacts of the proposed actions, it would be helpful if we could receive GIS shapefiles depicting the locations of Southwestern Power Administration Facilities in Arkansas falling under this assessment. Are such files available?

Thank you,

Cindy Osborne
Data Manager/Environmental Review Coordinator

Please note I have a new e-mail and mailing address

Arkansas Natural Heritage Commission
a division of the Department of Arkansas Heritage
1100 North Street | Little Rock, AR 72201
office: 501.324.9762
fax: 501.324.9618
e-mail: Cindy.Osborne@arkansas.gov
NaturalHeritage.com
Facebook | Instagram
#AuthenticArkansas
#ANHC

From: "Mason, Clint D CIV USARMY CENWK (US)" <Clint.D.Mason@usace.army.mil>
Date: June 18, 2018 at 10:05:26 AM CDT
To: "Farmer, Jason W CIV USARMY CENWK (US)" <Jason.W.Farmer@usace.army.mil>
Cc: "Danny.Johnson@swpa.gov" <Danny.Johnson@swpa.gov>
Subject: [EXTERNAL] FW: Scanned Document (Signed)

Jason,
I received this letter from Southwestern Power Administration. I believe that your section will be the one to respond. Please let me know if you have any questions or are not the correct contact for this letter.

Very Respectfully,
Clint Mason, P.E.
District Asset Manager
CENWK-ODT-M
Work: 816-389-3619
Mobile: 816-854-9919

-----Original Message-----
From: Clint.D.Mason@usace.army.mil [mailto:Clint.D.Mason@usace.army.mil]
Sent: Monday, June 18, 2018 10:01 AM
To: Mason, Clint D CIV USARMY CENWK (US) <Clint.D.Mason@usace.army.mil>
Subject: Scanned Document (Signed)

United States Department of the Interior
NATIONAL PARK SERVICE
Buffalo National River
402 N. Walnut, Suite 136
Harrison, AR 72601

IN REPLY REFER TO
1.B

June 19, 2018

Mr. Danny Johnson
U.S. Department of Energy
Southwest Power Administration
1 W. 3rd Street, Suite 1600
Tulsa, OK 74103
Danny.Johnson@swpa.gov

Dear Mr. Johnson:

This letter is to inform you of our desire, as a land management agency having a Southwestern Power Administration (SWPA) transmission line right-of-way (ROW) within our boundaries, to cooperate with the SWPA in the development of the Programmatic Environmental Assessment (PEA) dealing with vegetation management on SWPA transmission line ROWs.

The National Park Service is mandated to insure the protection of those resources and values for which Buffalo National River was established. Because of the highly developed karst landscape present in the Buffalo River watershed, there exists a significant nexus between surface water and ground water. The river is home to the Snuffbox mussel (*Epioblasma triquetra*) which is listed as endangered, and the Rabbitsfoot mussel (*Quadrula cylindrica cylindrica*) which is listed as threatened under the Endangered Species Act. The Buffalo River is designated critical habitat for the Rabbitsfoot mussel. The National Park Service recognizes Arkansas Species of Greatest Conservation Need (AR-SGCN) as sensitive species and considers potential impacts to these species in similar manner to federally listed species. In terms of aquatic fauna, there are 10 additional AR-SGCN mussel species and 7 AR-SGCN fish species.

The national river is home to three endangered bat species, the Ozark Big Eared bat (*Corynorhinus townsendii ingens*), Indiana bat (*Myotis sodalis*), and Gray bat (*Myotis grisescens*), and one threatened bat, Northern Long-eared bat (*Myotis septentrionalis*). The Tri-colored bat (Perimyotis subflavus) is currently undergoing a 12-month status review by U.S. Fish and Wildlife Service to determine if it warrants listing under the Endangered Species Act (FR Doc. No. 2017-27389). Two additional bat species found at Buffalo National River are AR-SGCN species. The gray bat specializes in capturing emerging aquatic insects from streams. The Indiana, Northern Long-eared, and Tri-color bat all utilize roost trees for pup rearing purposes. While they may all feed over water, they also feed in forest openings and forest edge. The Ozark Big-eared bat is primarily a gleaner, capturing moths where they sit upon vegetation.

Diverse broadleaf vegetation is important for this species as it provides reliable foraging throughout the summer months.

There are numerous bird species within the national river boundary that are listed as AR-SGCN species. Impacts to these species should be evaluated prior to selecting a preferred alternative.

We view any activities involving herbicide applications as sensitive and appreciate your willingness to work closely with us at this early stage. National Park Service policies require the use of integrated pest management procedures to determine when and how pests are to be controlled. Use of herbicides is considered only when mechanical or other non-chemical methods are not feasible. All proposals to apply herbicides within the park require review and approval at the regional office level. The reviews are based upon site specific information regarding the pest(s), location(s), the timing of treatment(s), herbicide(s), and method(s) of application. It is critical that our agencies cooperatively work toward the most environmentally sound management strategy to accomplish SWPA's goals without placing the resources and values of Buffalo National River at risk.

Please keep us advised by contacting Chuck Bitting, Natural Resource Program Manager, of my staff at 870-365-2762 or chuck_bitting@nps.gov as this document progresses, so that we are afforded opportunities for input.

Sincerely,

Laura A. Miller
Acting Superintendent

From: Jon Roberts <Jon.Roberts@deq.ok.gov> **On Behalf Of** DEQ EnvReviews
Sent: Wednesday, June 20, 2018 8:41 AM
To: Danny Johnson <danny.johnson@swpa.gov>
Subject: [EXTERNAL] Environmental Review

Dear Mr. Johnson:

In response to your request, we have completed an environmental review of air, land and water records for the project listed below. Additional recommendations to consider as you complete your project may be found at https://go.usa.gov/xnhCE.

Project
Letter dated June 8, 2018 – Southwestern Power Administration Environmental Assessment across several counties in SE Oklahoma

Comments
No environmental concerns under DEQ jurisdiction are anticipated; however, as you assess environmental risk posed by the project please refer to DEQ's GIS data layers available for download at: http://gisdata-deq.opendata.arcgis.com/

Future requests may be submitted electronically to EnvReviews@deq.ok.gov by attaching a single pdf file containing your request and any attachments.

If you have any questions or need clarification, please contact me.

Regards,

_____
Jon A. Roberts, Senior Manager
Office of External Affairs
Oklahoma Department of Environmental Quality
P. O. Box 1677
707 N. Robinson Ave.
Oklahoma City, OK 73101-1677
Ph: (405) 702-7111
http://www.deq.state.ok.us/OEA/index.html

State of Oklahoma
Department of Agriculture, Food, and Forestry

Mary Fallin
Governor

Jim Reese
Secretary of Agriculture

June 22, 2018

Mr. Danny Johnson
Director, Division of Environmental, Health, Safety & Security
Department of Energy
Southwestern Power Administration
One West Third Street
Tulsa, OK 74103-3502

RE: Notification of Intent to prepare a Programmatic Environmental Assessment for System-wide Operations and Maintenance Activities and System-wide Vegetation Management Program

Dear Mr. Johnson:

Thank you for your June 8, 2018 letter and providing the Oklahoma Department of Agriculture, Food, and Forestry (ODAFF) with an opportunity to provide comments on your proposed Programmatic Environmental Assessment for System-wide Operations and Maintenance Activities and System-wide Vegetation Management Program.

Per your request, ODAFF has reviewed the proposed project and based on your information, we wanted to provide the following information. Please make sure you evaluate any location(s) where the use of any type of pesticides are applied directly to or adjacent to a water of the United States. If this scenario applies to your project area(s), please refer to http://ag.ok.gov/aems/agpdes.htm to see if you need coverage under the pesticide AgPDES general permit OKG687A000. Also, please ensure all appropriate entities and pesticide applicators are properly licensed and following all pesticide label requirements. For more information on these requirements, please refer to http://www.oda.state.ok.us/cps/pest.htm.

If you have any questions please feel free to contact me at 405-522-4659 or e-mail, as shown below.

Respectfully,

Jeremy Seiger

Jeremy Seiger
Director, ODAFF
Agricultural Environmental
Management Services Division
jeremy.seiger@ag.ok.gov

c: Kenny Naylor, Director, CPS

cmn.wq.2018-sa.508 sa

Arkansas Game and Fish Commission

Mr. Danny Johnson - Director, Division of Environmental Health, Safety, and Security
Southwest Power Administration
1 W. 3rd St. Suite 1600
Tulsa, OK 74103

RE: Notification of the Intent to Prepare a Programmatic Environmental Assessment for System-wide Operations and Maintenance Activities and System-wide Vegetation Management Program

Mr. Johnson,

Biologists with the Arkansas Game and Fish Commission (AGFC) have reviewed the notification of intent to prepare the subject referenced Environmental Assessment. The AGFC offers the following comments regarding this proposed project. We support the use of Integrated Vegetation Management (IVM) that includes selective herbicide use. The IVM should seek to promote native, low growing plant communities, and should avoid impacts to native, compatible flora within the right of ways. The IVM methodology should focus on treatment of individual plants, and broadcast spraying should be avoided. We request that any herbicide product used not include the systemic herbicide Picloram. Field crews applying herbicide along the powerline right-of-ways should be trained to identify beneficial native species and be able to distinguish them from noxious or otherwise incompatible woody species. For example, the right-of-way at Harold E. Alexander Spring River Wildlife Management is a known location of the ZigZag Spiderwort (*Tradescantia subaspera*), a rare endemic plant species tracked by the Arkansas Natural Heritage Commission. Herbicide should not be applied at all to this particular plant. Additional concerns are herbicide contamination in the Spring River, where the federally protected Rabbitsfoot Mussel (*Quadrula cylindrica cylindrica*) is known to occur. We recommend consultation with the United States Fish and Wildlife Service regarding proposed impacts to federally listed species. The Arkansas Game and Fish Commission appreciates the opportunity to review this notice of intent. If our agency can be of further assistance, please do not hesitate to contact us.

Thank you,

Brad Carner
Wildlife Division Chief

OKLAHOMA NATIONAL GUARD
JOINT FORCE HEADQUARTERS
3501 MILITARY CIRCLE
OKLAHOMA CITY OK 73111-4398
(405) 228-5000 OR DSN 628-5000

July 17, 2018

Danny Johnson
Director of Environmental, Health, Safety, and Security
Department of Energy, Southwestern Power Administration
One West Third Street
Tulsa, Oklahoma 74103-3502

Dear Mr. Johnson:

The Oklahoma Military Department appreciates the opportunity to review and comment on the Department of Energy's Programmatic Environmental Assessment for System-wide Operations and Maintenance Activities and System-wide Vegetation Management Program. We understand that the Programmatic Environmental Assessment will cover the plans to develop a vegetation management program and operate and maintain on Oklahoma Military Department land.

The Oklahoma Military Department does have some concerns with herbicides being sprayed on some of our land, including throughout Camp Gruber Training Center in Muskogee County Oklahoma, due to threatened and endangered species. Any pesticides sprayed will need to be approved by the Oklahoma Military Department Environmental Management Branch.

As your project unfolds, please continue to keep us informed of the plans, comments from United States Fish and Wildlife Service, and any changes. Additionally, do not hesitate to contact us if you have any questions or need assistance with our sites. Jennifer Ziegler, NEPA Manager, 405.228.5521 or Jennifer.d.ziegler.nfg@mail.mil or I can be reached at 405.228.5699 or terry.c.hale.mil@mail.mil.

Sincerely,

Terry C. Hale Jr.
Lieutenant Colonel, U.S. Army
Environmental Programs Manager

Missouri Department of NATURAL RESOURCES
dnr.mo.gov
Michael L. Parson, Governor
Carol S. Comer, Director

July 26, 2018

Mr. Danny Johnson
Southwest Power Administration
1 W. 3rd St.
Suite 1600
Tulsa, OK 74103

Dear Mr. Johnson:

The Missouri Department of Natural Resources appreciates the opportunity to review the materials for the Programmatic Environmental Assessment (PEA) for System-wide Operations and Maintenance Activities and System-wide Vegetation Management Program. The Department offers the following comments for consideration.

Where the Southwestern Power Administration has high-voltage transmission lines and communication lines that cross through Missouri State Parks property, mechanical methods of vegetation management are approved. In cases where herbicide application is the only practical alternative for vegetation management, please contact the State Park in which herbicide use is proposed directly to discuss the vegetation management plan.

We appreciate the opportunity to provide comments for the Southwest Power Administration's PEA. If you have any questions or need clarification, please contact me at the Department of Natural Resources, P.O. Box 176, Jefferson City, MO 65102 or by phone at 573-522-2656. Thank you.

Sincerely,

DEPARTMENT OF NATURAL RESOURCES

Rob Hunt
Planning Coordinator

RH/man

DRAFT EA OUTREACH

Notice of Availability
Draft Programmatic Environmental Assessment for System-wide Operations and Maintenance Activities and Integrated Vegetation Management Program

The Southwestern Power Administration (Southwestern) invites public review on the Draft Programmatic Environmental Assessment for System-wide Operations and Maintenance Activities and Integrated Vegetation Management Program.

Southwestern has prepared a draft EA to evaluate the environmental effects of operations and maintenance (O&M) activities and integrated vegetation management activities for Southwestern's operations in Oklahoma, Arkansas, and Missouri under a management framework designed to provide maximum operational flexibility and enhance safety.

A copy of the draft EA will be available for review beginning November 27, 2018 online at the following websites:

https://www.swpa.gov/
www.energy.gov/node/3793593

Review copies are also available at the Tulsa City-County Library, 400 Civic Center, Tulsa, OK 74103; The Library Center, 4653 S. Campbell Avenue, Springfield, MO 65810; and Little Rock Public Library, 100 Rock Street, Little Rock, AR 72201.

You may also request a copy of the document from the address below.

Please forward written comments to:

Danny Johnson
1 W. 3rd St., Suite 1600
Tulsa, OK 74103
Email to: Danny.Johnson@swpa.gov

THE DEADLINE FOR PROVIDING PUBLIC COMMENTS IS JANUARY 12, 2019.

Department of Energy
Southwestern Power Administration
One West Third Street
Tulsa, Oklahoma 74103-3502

November 19, 2018

Tulsa City-County Library
Attn: Research Center, Karen Bryan
400 Civic Center
Tulsa, OK 74103

Subject: Notification of Availability of a Programmatic Environmental Assessment for System-wide Operations and Maintenance Activities and Integrated Vegetation Management Program

Ms. Bryan:

The Southwestern Power Administration (Southwestern), a Power Marketing Administration within the U.S. Department of Energy (DOE), has prepared the enclosed programmatic environmental assessment (PEA) for System-wide Operations and Maintenance (O&M) Activities and Integrated Vegetation Management Program to fulfill requirements under the *National Environmental Policy Act*. The PEA focuses on Southwestern's operations in Oklahoma, Arkansas, and Missouri, which include high-voltage transmission lines, electrical substations, and a communications system that includes microwave, mobile radio, and fiber optics, in support of marketing hydroelectric power from U.S. Army Corps of Engineers (USACE) multipurpose dams.

A public notice of availability will be published in several newspapers in the three-state region. Your assistance in making this document available to the public is greatly appreciated. Please make this document available for viewing in your library (not to be removed from library) starting November 27, 2018 and ending January 12, 2019.

The PEA is available online at the following websites:

https://www.swpa.gov/

www.energy.gov/node/3793593

Interested parties may submit written comments by January 12, 2019 to: Danny Johnson, 1 W. 3rd St., Suite 1600, Tulsa, OK 74103 or Danny.Johnson@swpa.gov. If you have any questions about making this document available, please contact me at 918.595.6781 or via email.

Sincerely,

Danny Johnson
Program Manager, Office of Corporate Compliance

Department of Energy
Southwestern Power Administration
One West Third Street
Tulsa, Oklahoma 74103-3502

November 26, 2018

Becky Keogh
Arkansas Department of Environmental Quality
5301 Northshore Drive
Little Rock, AR 72118

Subject: Notification of Availability of a Programmatic Environmental Assessment for System-wide Operations and Maintenance Activities and Integrated Vegetation Management Program

Ms. Keogh:

The Southwestern Power Administration (Southwestern) is pleased to inform you that our programmatic environmental assessment (PEA) for System-wide Operations and Maintenance (O&M) Activities and Integrated Vegetation Management Program is now available for public review and comment. Southwestern is a Power Marketing Administration within the U.S. Department of Energy. The PEA, prepared to fulfill requirements under the *National Environmental Policy Act*, focuses on Southwestern's operations in Oklahoma, Arkansas, and Missouri, which include high-voltage transmission lines, electrical substations, and a communications system that includes microwave, mobile radio, and fiber optics, in support of marketing hydroelectric power from U.S. Army Corps of Engineers multipurpose dams. In the PEA, Southwestern proposes to continue O&M and vegetation management activities under a management framework designed to provide maximum operational flexibility and enhance safety. The PEA identifies potential impacts of the proposed activities and measures to help mitigate those impacts. Based on our evaluation of the action, no significant impacts were identified.

The PEA is available online at the following websites:

https://www.swpa.gov/
www.energy.gov/node/3793593

In addition, a hardcopy of the PEA is available for review at the following libraries:

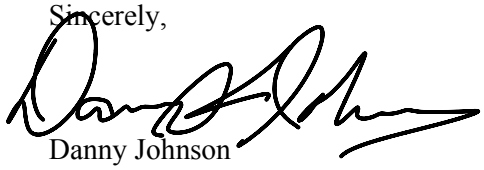
- Tulsa City-County Library, 400 Civic Center, Tulsa, OK 74103
- The Library Center, 4653 S. Campbell Avenue, Springfield, MO 65810
- Little Rock Public Library, 100 Rock Street, Little Rock, AR 72201

Interested parties may submit written comments to: Danny Johnson, 1 W. 3rd St., Suite 1600, Tulsa, OK 74103 or Danny.Johnson@swpa.gov.

To ensure consideration during the finalization of the PEA, please submit comments by January 12, 2019.

We look forward to hearing from you. Please contact me at 918.595.6781 or by using the contact information above if you have questions or for additional information regarding the proposed project.

Sincerely,



Danny Johnson
Program Manager, Office of Corporate Compliance

From: Cyndie Short [mailto:cyndie.short@swpa.gov]
Sent: Thursday, January 17, 2019 1:33 PM
To: Wendy Arjo
Subject: MDNR Review Comment for PEA Multistate O and M Transmission Veg Management SWPA

Hello Mr. Johnson,

I have a couple of comments regarding the notification dated November 26, 2018. I apologize for responding late.

1.Our Director is Carol Comer. Please note that the letter was addressed to Carol Corner.
2.I see that our comment letter was included in the appendices of the PEA, but I did not notice any mention of the Missouri Department of Natural Resources, Table Rock Lake State Park, or the coordination of approved vegetation management with park staff in the actual PEA. Did I miss this discussion or was it excluded intentionally?

Thank you for addressing these comments. Feel free to call if you need clarification from me.

Rob Hunt
Planning Coordinator
Missouri Department of Natural Resources
Phone (573) 522-2656
rob.hunt@dnr.mo.gov

Cyndie Short
Environmental Specialist | Division of Power Marketing and Transmission Strategy
CNI Technical Services
Contractor for Southwestern Power Administration
cyndie.short@swpa.gov | Office 918-595-6629
1 W 3rd St, Suite 1600, Tulsa, OK 74103

Mistie Pilcher
Environmental Specialist | Division of Environmental, Health, Safety and Security
CNI Technical Services
Contractor for Southwestern Power Administration
mistie.pilcher@swpa.gov | Office 918-595-6743
1 W 3rd St, Suite 1600, Tulsa, OK 74103

From: Holland, Keith E -FS <keholland@fs.fed.us>
Sent: Monday, December 10, 2018 1:36 PM
To: Mistie Pilcher <mistie.pilcher@swpa.gov>
Subject: [EXTERNAL] RE: SWPA Special Use Permit-Mark Twain National Forest

Copy, I just wanted to make sure we didn't have an error on the permit…looks like we are good.

Thank you!

<image001.png>

Keith Holland
Zone Realty Specialist
Heavy Equipment Coordinator

Forest Service
Mark Twain National Forest
Eleven Point Ranger District

p: 573-996-2153 x72114
f: 573-996-7745
keith.holland@usda.gov

4 Confederate Ridge Road
Doniphan, MO 63935
www.fs.usda.gov/mtnf
<image002.png><image003.png><image004.png>

Caring for the land and serving people

From: Mistie Pilcher [mailto:mistie.pilcher@swpa.gov]
Sent: Monday, December 10, 2018 9:48 AM
To: Holland, Keith E -FS <keholland@fs.fed.us>
Subject: SWPA Special Use Permit-Mark Twain National Forest

Mr. Holland:

Good morning. Danny Johnson received a phone call from you this morning regarding your inquiry about our draft Programmatic Environmental Assessment report stating that we have 7 miles of line through the Mark Twain forest. I believe that we included the proclamation boundaries ROW length as well as our special use permit ROW through the forest when we added that up, but we do just have the smaller amount on our permit as you stated. Do we need to clarify in our draft report, on were you just wanting to clarify the mileage to make sure we didn't have an error on the permit?

Thank you,

Mistie Pilcher
Environmental Specialist | Division of Environmental, Health, Safety and Security
CNI Technical Services
Contractor for Southwestern Power Administration
mistie.pilcher@swpa.gov | Office 918-595-6743
1 W 3rd St, Suite 1600, Tulsa, OK 74103

AGENCY PARTICIPATION

Oklahoma Historical Society *Founded May 27, 1893*
State Historic Preservation Office
Oklahoma History Center • 800 Nazih Zuhdi Drive • Oklahoma City, OK 73105-7917
(405) 521-6249 • Fax (405) 522-0816 • www.okhistory.org/shpo/shpom.htm

July 5, 2018

Mr. Danny Johnson, Director
Division of Environmental Safety
Dept. of Energy/Southwestern Power
One West 3rd Street
Tulsa, OK 74103

RE: File #1816-18; Proposed Programmatic Environmental Assessment for System-Wide Operations & Maintenance Activities

Dear Mr. Johnson:

Thank you for notifying our office of Southwestern Power Administration's (SWPA) intent to prepare a Programmatic Environmental Assessment (PEA) for System-wide Operations and Maintenance (O&M) Activities and for System-wide Vegetation Management Program.

However, upon review of the summaries provided for the purpose and need and the proposed action, it appears that the actions as described are very similar to the proposed Programmatic Allowances that are listed within Appendix C of the December 2016 draft *Programmatic Agreement Among The Southwestern Power Administration, The Advisory Council On Historic Preservation, The Arkansas State Historic Preservation Office, The Missouri State Historic Preservation Office, The Oklahoma State Historic Preservation Office, And The Oklahoma Archeological Survey, Regarding Maintenance Of Transmission Lines, Rights-Of-Way, Substations, And Other Facilities In Arkansas, Missouri, And Oklahoma*. Of which, we are still waiting to finalize the programmatic agreement.

What are the differences between the activities of the PEA/O&M activities and the Programmatic Agreement? If these activities are the same as listed within the draft PA, is there a need for separate agreement documents for the same activities?

Thank you for the opportunity to comment on this project. We look forward to working with you in the future. If you have any questions, please contact Catharine M. Wood, Historical Archaeologist, at 405/521-6381.

Should further correspondence pertaining to this project be necessary, please reference the above underlined file number. Thank you.

Sincerely,

Lynda Ozan
Deputy State Historic
Preservation Officer

LO:pm

July 10, 2018

Mr. Danny Johnson
Department of Energy
Southwestern Power Adminstration
1 West 3rd St. Suite 1600
Tulsa, OK 74103

Re: **SHPO Project Number: 036-MLT-18** – Notification of the Intent to Prepare a Programmatic Environmental Assessment for System-wide Operations and Maintenance Activates and System-wide Vegetation Management Program (DOE)

Dear Mr. Johnson:

Thank you for notifying our office about the above-referenced plan to establish a Programmatic Environmental Assessment (PEA) for projects subject to review under Section 106 of the National Historic Preservation Act (P.L. 89-665, as amended) and the Advisory Council on Historic Preservation's regulation 36 CFR Part 800, which require identification and evaluation of cultural resources.

We have reviewed the proposal and would like to participate in consultation for the development of the PEA. At this time we have the following comments on the proposed plan:

- The application of herbicides on monuments in cemeteries or buildings should be avoided.
- If historic properties, specifically archaeological sites, are present, then efforts to minimize traffic, avoid rutting and ground disturbance should be made. For each activity, the degree of possible soil disturbance through rutting or compaction should be considered.

We look forward to continuing to consult with your office as the development of the PEA proceeds.

If you have any questions please write Missouri Department of Natural Resources, State Historic Preservation Office, Attn: Review and Compliance, P.O. Box 176, Jefferson City, Missouri 65102, or call Amanda Burke (573) 522-4641.

Please be sure to include the **SHPO Project Number (036-MLT-18)** on all future correspondence relating to this project. If the information is provided via telephone call, please follow up in writing for our files.

Sincerely,

STATE HISTORIC PRESERVATION OFFICE

Toni M. Prawl

Toni M. Prawl, PhD
Director and Deputy
State Historic Preservation Officer

TMP:ab

Department of Energy
Southwestern Power Administration
One West Third Street
Tulsa, Oklahoma 74103-3502

August 22, 2018

Lynda Ozan
Deputy State Historic Preservation Officer
Oklahoma Historical Society, State Historic Preservation Office
Oklahoma History Center
800 Nazih Zuhdi Drive
Oklahoma City, OK 73105-7917

Subject: File #1816-18; Proposed Programmatic Environmental Assessment for System-Wide Operations and Maintenance Activities and System-wide Vegetation Management Program

Ms. Ozan:

Thank you for your letter dated July 5, 2018 regarding Southwestern Power Administration's (Southwestern's) intent to prepare a Programmatic Environmental Assessment (PEA) for System-wide Operations and Maintenance (O&M) Activities and System-wide Vegetation Management Program. This letter is in response to your questions about the differences between activities in the PEA and activities in the *Programmatic Agreement Among The Southwestern Power Administration, The Advisory Council On Historic Preservation, The Arkansas State Historic Preservation Office, The Missouri State Historic Preservation Office, The Oklahoma State Historic Preservation Office, And The Oklahoma Archeological Survey, Regarding Maintenance Of Transmission Lines, Rights-Of-Way, Substations, And Other Facilities in Arkansas, Missouri, And Oklahoma* (PA), which is not yet finalized.

In both the current cultural resource PA and the draft PA, the list of activities which may be categorically excluded or discretionarily/programmatically allowed is defined and limited by carefully-termed parameters, so as to limit the scope of the activities, and therefore lessen the potential for an impact to a historic property. In contrast, the activities in the PEA are essential activities which must be performed (regardless of Section 106 consideration) to maintain and operate the system and provide electric power delivery service to customers. The PEA activities list, when executed in the field, mostly include PA activities within the limited scope as stated on the current and draft PA. However, some PEA activities are extended beyond the scope of the current or draft PA or are not listed at all on the current or draft PA, because of the scope of disturbance. In these cases, the activities would undergo the regular Section 106 consultation process rather than the abbreviated PA process.

In summary, there is not a need for a separate agreement document for the PEA because most of its activities, when executed in the field, will be covered under the draft or current PA and those that are not, would receive separate Section 106 consultation. In other words, Southwestern would be covered under the PA for the majority of PEA activities, as stated on the covered PA activity list, and would perform Section 106 for those activities that are not stated on the covered PA activity list.

Please contact me at 918.595.6781 or Danny.Johnson@swpa.gov if you have any additional questions or need additional clarification.

Sincerely,

Danny Johnson
Program Manager, Office of Corporate Compliance

Department of Energy
Southwestern Power Administration
One West Third Street
Tulsa, Oklahoma 74103-3502

October 12, 2018

Melissa Lombardi
U.S. Fish and Wildlife Service
Arkansas Ecological Service Field Office
110 S. Amity, Suite 300
Conway, AR, 72032

Subject: Biological Assessment in support of the Programmatic Environmental Assessment for System-wide Operations and Maintenance Activities and Integrated Vegetation Management Program

Ms. Lombardi:

The Southwestern Power Administration (Southwestern) requests consultation with the U.S. Fish and Wildlife Service (USFWS) for System-wide Operations and Maintenance (O&M) Activities and Integrated Vegetation Management Program pursuant to Section 7 of the Endangered Species Act (ESA) of 1973, the Bald and Golden Eagle Protection Act (BGEPA), and the Migratory Bird Treaty Act (MBTA).

Southwestern proposes to continue O&M and vegetation management activities under a management framework designed to provide maximum operational flexibility and enhance safety. Proposed O&M activities include aerial and ground patrols of line structures, lines, line hardware, access roads, and communication sites to locate and correct problems, and perform regular and preventive maintenance, inspections, repairs, upgrades, rebuilds, and replacements. Proposed vegetation management activities include a combination of mechanical and manual control and herbicide treatments. As part of the Proposed Action, Southwestern has developed a management framework for evaluating and selecting herbicides on an on-going basis to improve the range of herbicides used based on geographic regions and to increase control of undesirable vegetation over longer periods of time. The goal of the vegetation management program is to develop site-specific, environmentally sensitive, cost effective and socially responsible solutions to vegetation control.

Attached please find a biological assessment for activities occurring in a three-state area: Oklahoma, Arkansas, and Missouri. The biological assessment was prepared to determine whether the federal action may affect listed or proposed species and designated and proposed critical habitat. It provides the best available scientific and commercial data for the federally-listed threatened or endangered species in the action area.

Please contact me by phone at 918.595.6781 or by email at Danny.Johnson@swpa.gov if you have questions or for additional information regarding the proposed project. We look forward to hearing from you.

Sincerely,

Danny Johnson
Program Manager
Office of Corporate Compliance

Melissa Russ

From: Cyndie Short <cyndie.short@swpa.gov>
Sent: Monday, February 11, 2019 11:38 AM
To: Melissa Russ
Cc: Danny Johnson; Tyler Gipson, P.E.
Subject: FW: [EXTERNAL] Programmatic EA for System-wide Operations and Maintenance Activities and Integrated Vegetation Management Program

Melissa,

Please find a statement of "not likely to adversely affect" determination for all other listed species except the ABB , from Kevin Stubbs at the USFWS.
And that he is working on the BO at this time.

Thank You
Cyndie

Cyndie Short
Environmental Specialist | Division of Power Marketing and Transmission Strategy
CNI Technical Services
Contractor for Southwestern Power Administration
cyndie.short@swpa.gov | Office 918-595-6629
1 W 3rd St, Suite 1600, Tulsa, OK 74103

From: Stubbs, Kevin <kevin_stubbs@fws.gov>
Sent: Monday, February 11, 2019 12:28 PM
To: Cyndie Short <cyndie.short@swpa.gov>
Subject: Re: [EXTERNAL] Programmatic EA for System-wide Operations and Maintenance Activities and Integrated Vegetation Management Program

Cyndie, I am incorporating the comments from the other field offices to finalize the BO. The ABB is the only species with incidental take and proposed avoidance measures allow us to concur with the not likely to adversely affect determination for all other listed species. Let me know if you have questions.

Kevin
918-382-4516

On Mon, Feb 11, 2019 at 9:16 AM Cyndie Short <cyndie.short@swpa.gov> wrote:

> Kevin
>
> Concerning the BO for BA of the Vegetation Management Programmatic Environmental Assessment (PEA); you had stated it may take a while to complete due to the back log of work from the
>
> government shut down. The consultant has said we can go ahead with the finalization of the PEA with a statement from your office, stating the BO is in progress and the other species were determined to be a "may affect not likely to adversely affect" determination.

Thank you for all your help with this issue.

Cyndie

Cyndie Short
Environmental Specialist | Division of Power Marketing and Transmission Strategy
CNI Technical Services
Contractor for Southwestern Power Administration
cyndie.short@swpa.gov | Office 918-595-6629
1 W 3rd St, Suite 1600, Tulsa, OK 74103

NATIVE AMERICAN PARTICIPATION

Department of Energy
Southwestern Power Administration
One West Third Street
Tulsa, Oklahoma 74103-3502

July 16, 2018

Erin Thompson
Tribal Historic Preservation Officer
Absentee-Shawnee Tribe of Indians of Oklahoma
2025 Gordon Cooper Dr.
Shawnee, OK 74801

Subject: System-wide Operations and Maintenance Activities and System-wide Vegetation Management Program, Arkansas, Missouri, and Oklahoma, Request for Tribal Comments Regarding Concerns of Traditional, Religious, or Cultural Importance

Ms. Thompson:

The Southwestern Power Administration (Southwestern) intends to prepare a programmatic environmental assessment (PEA) for System-wide Operations and Maintenance (O&M) Activities and System-wide Vegetation Management Program. Southwestern is one of four Power Marketing Administrations under the U.S. Department of Energy (DOE). Southwestern markets hydroelectric power in Arkansas, Kansas, Louisiana, Missouri, Oklahoma, and Texas from 24 U.S Army Corps of Engineers (USACE) multipurpose dams. The PEA will focus on Southwestern's operations in Oklahoma, Arkansas, and Missouri, which include high-voltage transmission lines, electrical substations, and a communications system compromised of microwave radios, very high frequency (VHF) radios, and fiber optics technologies. Southwestern proposes to continue O&M and vegetation management activities under a framework designed to provide maximum operational flexibility and enhance safety. The PEA will identify potential impacts of the proposed activities and measures to help mitigate those impacts.

Purpose and Need for Action

The purpose of the Proposed Action is to fulfill Southwestern's obligation to deliver federal hydropower to end-use customers. The need for the Proposed Action is to operate and maintain Southwestern facilities in Oklahoma, Arkansas, and Missouri; protect worker and public safety, streamline the regulatory process for right-of-way (ROW) maintenance; have a management framework to evaluate herbicides as they become available; control the spread of noxious weeds; balance environmental protection with system reliability, while maintaining compliance with the National Electric Safety Code (NESC), North American Electric Reliability Corporation (NERC), Institute of Electrical and Electronics Engineers standards, and Southwestern's directives and standards for maintaining system reliability and protection of human safety.

To protect worker safety, total elimination of weedy species at the substations and the towers is necessary to ensure that these facilities maintain grounding requirements through the ground grid to dissipate lightning. Transmission facilities must be kept clear of all tall-growing trees, brush and other vegetation that could grow too close to the conductors. The most significant impediment to the transmission line ROW O&M and also emergency response is the growth of woody vegetation (trees and shrubs) within the

ROW. Trees are a major contributor of electric service interruptions. Trees must be maintained an adequate distance from the conductors. Southwestern will select vegetation management practices appropriate to specific conditions along the ROW. With the development of new herbicide formulations, enhanced delivery technology, and increased knowledge regarding environmental interaction, Southwestern needs a management framework that allows evaluation of new herbicides as they become available. In addition, Southwestern will continue to lower safety risks of conducting vegetation management operations in remote and treacherous spans of ROW.

Proposed Action

The Proposed Action encompasses O&M activities, which also include the component of integrated vegetation management activities. The scope of the action includes substations, transmission lines, ROWs and associated access roads, fiber optic lines, communication sites, and office or maintenance complexes located in Oklahoma, Arkansas, and Missouri (Figure 1).

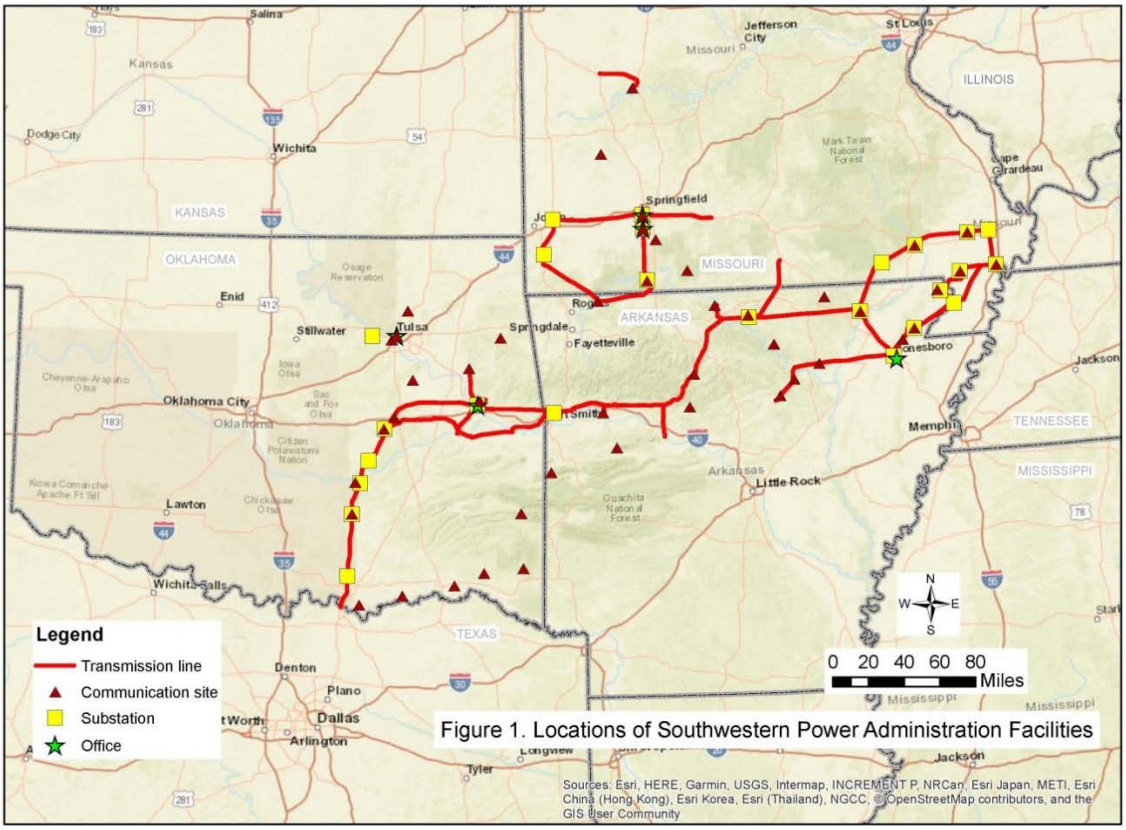


Figure 1. Locations of Southwestern Power Administration Facilities

Proposed O&M activities include aerial and ground patrols of line structures, lines, line hardware, access roads and communication sites to locate and correct problems, regular and preventive maintenance, inspections, repairs, upgrades, rebuilds, and replacements. Proposed O&M activities would occur at existing substations, transmission lines, communication system facilities, and maintenance or office-type facilities.

Proposed vegetation management activities include a combination of mechanical and manual control and herbicide treatments. As part of the Proposed Action, Southwestern has developed a management framework for evaluating and selecting herbicides to improve the range of herbicides used based on geographic regions and to increase control of undesirable vegetation over longer periods of time. The goal of the vegetation management program is to develop site-specific, environmentally sensitive, cost effective and socially responsible solutions to vegetation control. No individual method will control undesirable vegetation in a single treatment; diligence and persistence are required over a number of years to subdue vegetation such as woody plants, including trees and brush. Due to the complexity of vegetation control, the proposed management framework for herbicide use considers numerous factors, such as special geographic concerns, the type of vegetation to control, and the arrival of new herbicides coming on the market.

In accordance with 36 C.F.R. Part 800, "Protection of Historic Properties", regulations that implement Section 106 of the National Historic Preservation Act of 1966, as amended (16 U.S.C. 470f), Southwestern is contacting you to determine if your Tribe may attach traditional, religious or cultural importance to any historic resources affected by the proposed project/activity.

The goal of consultation under Section 106 is to allow your Tribe the opportunity to help identify historic properties potentially affected by these proposed activities; assess the effects of the activities on any historic resources; and consider ways to avoid, minimize or mitigate any adverse effects. We would appreciate hearing from you regarding any known archaeological, historical, or cultural resources of which you are aware at the proposed project/activity site(s) or its immediately surrounding area. In addition, most of the proposed activities are fully covered under the Section 106 programmatic agreements (PA) with the three states and in a new multistate PA that is currently under consultation with the State Historic Preservation Officers in Arkansas, Missouri, and Oklahoma, the Advisory Council on Historic Preservation, the Oklahoma Archeological Survey and interested tribes.

Southwestern respectfully requests any comments you may have on this project be forwarded to us within thirty (30) calendar days of receipt of this letter. Please be as specific as you can with any comments or information to assist us with our decision-making. Thank you in advance for your assistance with this endeavor. If you have any questions or need any additional information, please contact me at 918.595.6781. Comments may be submitted via mail to: 1 West 3rd St., Suite 1600, Tulsa, OK 74103 or by email to Danny.Johnson@swpa.gov.

Sincerely,

Danny Johnson
Director, Division of Environmental, Health, Safety & Security

Caddo Nation of Oklahoma

Post Office Box 487 ● Binger, Oklahoma 73009● 405-656-2344 ● Fax 405-656-2892

July 20, 2018

Company: Department of Energy
Description: System-Wide Operations and Maintenance(O&M) Activities and system-wide vegetation management program.
County: various
State: Oklahoma, Arkansas, and Missouri
Point of Contact: Danny Johnson, Division of Environmental Health Safety & Security, (918)595-6781, danny.johnson@swapa.gov

Dear Mr. Johnson,

The Caddo Nation of Oklahoma Cultural Preservation Department received correspondence regarding the above project. Our office is committed to protecting sites important to the Caddo Nation's tribal heritage, culture, and religion. Furthermore, we are particularly concerned with archaeological sites that may contain human burials or remains, and any associated funerary objects.

Based on descriptions of the site in the correspondence from your office and upon research of our database(s) and files, we find that the Caddo people occupied this area either historically or prehistorically. The location of the project does not appear to endanger cultural or religious sites of interest to the Caddo Nation. Please continue with the project as planned. However, should this project inadvertently uncover an archaeological site or object(s), we request that you halt all construction and ground disturbance activities and immediately contact the appropriate federal or state agencies, as well as our office.

We appreciate your initiating contact with the Caddo Nation of Oklahoma in order to obtain proper consultation. Should you have any questions, please contact our office at (405)656-2344 ext. 2081.

Sincerely,

Derek Hill
Sect. 106 Specialist
Caddo Nation of Oklahoma
P.O. Box 487
Binger, OK 73009
405-656-2344 ext. 2081
dhill@caddonation.org

Ponca Tribe of Oklahoma
Tribal Historic Preservation Office

121 White Eagle Drive ♦ (580) 763-0120 ♦♦ Fax (580) 763-0126
Ponca City, Oklahoma 74601

7/30/2018

Danny Johnson
Director, Division of Environmental, Health, Safety & Security
Department of Energy
Southwestern Power Administration
One West Third Street
Tulsa, OK 74103

SUBJECT: System-Wide Operations and Maintenance Activities and System-wide Vegetation Management Program, Arkansas, Missouri and Oklahoma

We have received and reviewed documentation concerning the project mentioned above. Additionally, we have examined other information and materials on historic resources available in our office. We have evaluated the above-referenced project's potential impact on archaeological, historic and cultural/traditional resources of the Ponca Tribe.

Based on our review, it is our opinion that if there are any earth-moving activities involved with the referenced activity will not result in the disturbance of known archaeological sites. **However, in the event of any inadvertent discovery of any American Indian remains, funerary objects, or objects of cultural patrimony, please contact the Ponca Tribe of Oklahoma immediately.**

Thank you for the opportunity to comment on this project. We look forward to working with you in the future.

Sincerely,

Halona Cabe

Halona Cabe
Tribal Historic Preservation Officer

From: Theodore Isham <isham.t@sno-nsn.gov>
Sent: Wednesday, August 1, 2018 3:15 PM
To: Danny Johnson <danny.johnson@swpa.gov>
Subject: [EXTERNAL] [BULK] SNO Repsonce to SWPA Vegetation Management Program

This
Opinion
is being provided by Seminole Nation of Oklahoma's Cultural Advisor, pursuant to authority vested by the Seminole Nation of Oklahoma General Council. The Seminole Nation of Oklahoma is an independently Federally-Recognized Indian Nation headquartered in Wewoka, OK.

In keeping with the
National Environmental Policy Act (NEPA)d, and Section 106 of the National Historic Preservation Act (NHPA), 36 CFR Part 800, this letter is to acknowledge that the Seminole Nation of Oklahoma has received notice of the proposed project at the above mentioned location.

Based on the information
provided and because the potential for cultural and natural resources that the Seminole Nation of Oklahoma deems important, the proposed project has a probability of affecting archaeological/natural resources, some of which may be eligible for listing in the National Register of Historic Places (NRHP).
The Seminole Nation
of Oklahoma asks to be participate in the development of the PA for the management of the vegetation on SWPA properties and any other documentation for the project. A face to face meeting is requested to assist in writing the PA that is proposed.

Furthermore, due to
the historic presence of our people in the project area, inadvertent discoveries of human remains and related NAGPRA items may occur, even in areas of existing or prior development. Should this occur we request all work cease and the Seminole Nation of Oklahoma
and other appropriate agencies be immediately notified.

Theodore Isham
Seminole Nation of Oklahoma
Historic Preservation Officer
PO Box 1498
Wewoka, Ok 74884
Phone: 405-234-5218
e-mail: isham.t@sno-nsn.gov

QUAPAW TRIBE OF OKLAHOMA

P.O. Box 765
Quapaw, OK 74363-0765

(918) 542-1853
FAX (918) 542-4694

August 3, 2018

Department of Energy
Southwest Power Administration
One West Third Street
Tulsa, Oklahoma 74103-3502

Re: Arkansas, Missouri and Oklahoma, Federal hydropower to end-use customers.

To whom it may concern,

The Quapaw Tribe Historic Preservation Office has received notification of the proposed project listed as Arkansas, Missouri and Oklahoma, Federal hydropower to end-use customers.

In accordance with the National Historic Preservation Act, (NHPA) [16 U.S C. 470 §§ 470-470w-6] 1966, undertakings subject to the review process are referred to in S101 (d) (6) (A), which clarifies that historic properties may have religious and cultural significance to Indian tribes. Additionally, Section 106 of NHPA requires Federal agencies to consider the effects of their actions on historic properties (36 CFR Part 800) as does the National Environmental Policy Act (43 U.S.C. 4321 and 4331-35 and 40 CFR 1501.7(a) of 1969).

The Quapaw Tribe has a vital interest in protecting its historic and ancestral cultural resources. The Quapaw Tribe requests a copy of all SHPO correspondence received for the project listed as project name please send all documents via USPS mail only.

Please contact the Quapaw Tribe Historic Preservation Office with your response to this request. Should you have any questions or need any additional information, please feel free to contact me at the number listed below. Thank you for consulting with the Quapaw Tribe on this matter.

Sincerely,

Everett Bandy

Everett Bandy
Tribal Historic Preservation Officer
Quapaw Tribe of Oklahoma
P.O. Box 765
Quapaw, OK 74363
(w) 918-238-3100

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P.O. Box 948 • Tahlequah, OK 74465-0948 • 918-453-5000 • cherokee.org

Office of the Chief

Bill John Baker
Principal Chief
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S. Joe Crittenden
Deputy Principal Chief
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August 7, 2018

Danny Johnson
Southwestern Power Administration
One West Third Street
Tulsa, OK 74103-3502

Re: System-Wide Operations and Maintenance Activities and System-Wide Vegetation Management Program, Arkansas, Missouri, and Oklahoma

Mr. Danny Johnson:

The Cherokee Nation (Nation) is in receipt of your correspondence about **System-Wide Operations and Maintenance Activities and System-Wide Vegetation Management Program, Arkansas, Missouri, and Oklahoma**, and appreciates the opportunity to provide comment upon this project. Please allow this letter to serve as the Nation's interest in acting as a consulting party to this proposed undertaking.

To initiate the Section 106 review process, this Office requests shapefiles and/or a detailed map of the Area of Potential Effects as defined by 36 CFR 800.16(d). The Nation maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office will review the project, cross referenced the project's legal description against our information, and provide comment upon the proposed undertaking. The Office will proceed with this review with the requested information.

Additionally, the Nation requests that the Southwestern Power Administration conduct appropriate inquiries with other pertinent Historic Preservation Offices regarding historic and prehistoric resources not included in the Nation's databases or records.

If you require additional information or have any questions, please contact me at your convenience. Thank you for your time and attention to this matter.

Wado,

Elizabeth Toombs

Elizabeth Toombs, Tribal Historic Preservation Officer
Cherokee Nation Tribal Historic Preservation Office
elizabeth-toombs@cherokee.org
918.453.5389

Osage Nation Historic Preservation Office

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Date: **September 1, 2018** **File: 1718-3402OK-7**

RE: **DOE, Southwestern Power Administration, System-wide Operations and Maintenance Activities and system-wide Vegetation Management Program for AR, MO, and OK, Multiple Counties, Oklahoma**

Southwestern Power Administration
Danny Johnson
One West Third Street
Tulsa, OK 74103-3502

Dear Mr. Johnson,

The Osage Nation Historic Preservation Office has received notification and accompanying information for the proposed project listed as DOE, Southwestern Power Administration, System-wide Operations and Maintenance Activities and system-wide Vegetation Management Program for AR, MO, and OK, Multiple Counties, Oklahoma. **The Osage Nation requests a copy of the draft programmatic environmental assessment (PEA) for review and comment prior to the approval of the final PEA.**

In accordance with the National Historic Preservation Act, (NHPA) [54 U.S.C. § 300101 et seq.] 1966, undertakings subject to the review process are referred to in 54 U.S.C. § 302706 (a), which clarifies that historic properties may have religious and cultural significance to Indian tribes. Additionally, Section 106 of NHPA requires Federal agencies to consider the effects of their actions on historic properties (36 CFR Part 800) as does the National Environmental Policy Act (43 U.S.C. 4321 and 4331-35 and 40 CFR 1501.7(a) of 1969).

The Osage Nation has a vital interest in protecting its historic and ancestral cultural resources. **The Osage Nation anticipates reviewing and commenting on the planned draft programmatic environmental assessment (PEA) for the proposed DOE, Southwestern Power Administration, System-wide Operations and Maintenance Activities and system-wide Vegetation Management Program for AR, MO, and OK, Multiple Counties, Oklahoma.**

Should you have any questions or need any additional information please feel free to contact me at the number listed below. Thank you for consulting with the Osage Nation on this matter.

Jess G. Hendrix
Archaeologist

627 Grandview * Pawhuska, OK 74056 Telephone 918-287-5328 * Fax 918-287-5376

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CHEROKEE NATION®
P.O. Box 948 • Tahlequah, OK 74465-0948 • 918-453-5000 • cherokee.org

Office of the Chief

Bill John Baker
Principal Chief
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S. Joe Crittenden
Deputy Principal Chief
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October 3, 2018

Danny Johnson
Southwestern Power Administration
One West Third Street
Tulsa, OK 74103-3502

Re: System-Wide Operations and Maintenance Activities and System-Wide Vegetation Management Program, Arkansas, Missouri, and Oklahoma

Mr. Danny Johnson:

The Cherokee Nation (Nation) is in receipt of your correspondence about **System-Wide Operations and Maintenance Activities and System-Wide Vegetation Management Program, Arkansas, Missouri, and Oklahoma**, and appreciates the opportunity to provide comment upon this project. Please allow this letter to serve as the Nation's continued interest in acting as a consulting party to this proposed undertaking.

The proposed undertaking lies in Cherokee Nation's Area of Interest, which includes but is not limited to the following states and counties:

- Arkansas: Baxter, Crawford, Franklin, Independence, Johnson, Lawrence, Marion, Pope, Randolph, Searcy, and Sharp counties;
- Missouri: Butler, Pemiscot, and New Madrid counties; and
- Oklahoma: Cherokee, Haskell, McIntosh, Muskogee, and Sequoyah counties.

The below summary, however, also is not an exhaustive list of cultural and historic properties, but known Nation resources directly within the Area of Potential Effect (APE). Should there be any changes to the scope of or activities within the APE, the Nation requests that Southwestern Power Administration (SWPA) re-contact this Office for additional consultation.

The Nation maintains databases and records of cultural, historic, and pre-historic resources in this area. Our Historic Preservation Office reviewed this project, cross referenced the project's legal description against our information, and found instances where this project intersects or adjoins such resources, including the CHEROKEE TRAIL OF TEARS, culturally sensitive resources, and land held by the Nation.

Thus, the Nation recommends that a cultural resources survey is conducted for the following below areas and requests a copy of the related report. The Nation requires that cultural resources survey personnel and reports meet the Secretary of Interior's standards and guidelines.

The remainder of this letter has not been included to protect and preserve the confidentiality of sites according to federal regulations 36 CFR 296.18 and Executive Order 13007.

APPENDIX B

Request for Approval of a New Herbicide

Request for Approval of a New Herbicide

Only herbicides that have gone through an evaluation and have been placed on Southwestern's Approved Herbicide List can be used by Southwestern. If a Southwestern employee wants to use an herbicide not on the approved list, this form must be completed and sent to the Environmental Program Office that will complete the evaluation process as described in Section 2.3.2 of this PEA.

Product Name _____

Active Ingredient_____

Manufacturer_____

Where would you use this product? (Mark one or more)

Rights-of-ways ☐ Substations ☐ Communication Sites ☐

What would you use this product for? (selective control, total control, noxious weeds, etc.)

_____

_____

What application method would you use?

_____

What does this herbicide offer that those on the current approved list do not?

_____

_____

_____

_____

Name_____ Phone Number_____ Date_____

APPENDIX C

Programmatic Biological Assessment

Biological Assessment for System-wide Operation and Maintenance Activities and Vegetation Management Program of the Southwestern Power Administration

Title:

Version: **Final**

Date: **October 12, 2018**

Prepared for:

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Appendix

LIST OF ABBREVIATIONS / ACRONYMS

ABB	American Burying Beetle
ANHC	Arkansas Natural Heritage Commission
APP	Avian Protection Plan
BA	Biological Assessment
BO	Biological Opinion
BGEPA	Bald and Golden Eagle Protection Act
BMP	Best Management Practice
cm	Centimeter(s)
dbh	diameter at breast height
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
GIS	Geographic Information System
GUS	Groundwater Ubiquity Score
IPaC	Information for Planning and Consultation
km	kilometer(s)
Koc	Sorption Potential
m	meter(s)
MBTA	Migratory Bird Treaty Act
MDC	Missouri Department of Conservation
mm	millimeter(s)
MODOT	Missouri Department of Transportation
NCC	Nixa Control Center
NERC	North American Electric Reliability Corporation
NESC	National Electric Safety Code
NGP	Northern Great Plains
NLEB	Northern Long-eared Bat
O&M	Operations and Maintenance
PBA	Programmatic Biological Assessment
PBO	Programmatic Biological Opinion
PEA	Programmatic Environmental Assessment
ROW	Right-of-Way
SOP	Standard Operating Policy
Southwestern	Southwestern Power Administration
U.S.	United States
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
VHF	Very High Frequency

1.0 INTRODUCTION

Southwestern Power Administration (Southwestern) is an agency of the U.S. Department of Energy (DOE). As one of four Power Marketing Administrations in the United States (U.S.), Southwestern markets hydroelectric power in Arkansas, Kansas, Louisiana, Missouri, Oklahoma, and Texas from 24 U.S. Army Corps of Engineers (USACE) multipurpose dams. Southwestern is developing a programmatic environmental assessment (PEA) that focuses on Southwestern's operations in Oklahoma, Arkansas, and Missouri, which include high-voltage transmission lines, electrical substations, and a communications system that includes microwave, very high frequency (VHF) radio, and state-of-the-art fiber optics. The PEA addresses the proposed operations and maintenance (O&M) and vegetation management activities and practices in the three states. Southwestern proposes to continue O&M and perform vegetation management activities under a new management framework designed to provide maximum operational flexibility and enhance safety at the following facilities located in Oklahoma, Arkansas, and Missouri (Figures 1-1 through 1-3):

- Four office/maintenance complexes and the Nixa Control Center (NCC)
- 24 substations
- 1,347 miles of linear physical transmission line and 1,380 circuit miles of conductor transmission line and the associated 100-foot width right-of-way (ROW)
- Approximately 6 miles of fiber optic communication line and associated corridors
- Approximately 50 communication sites (communication towers)
- Access roads/pathways to access transmission ROW

The purpose of the Proposed Action is to fulfill Southwestern's obligation to deliver federal hydropower to end-use customers. The need for the Proposed Action is to operate and maintain Southwestern facilities in Oklahoma, Arkansas, and Missouri; protect worker and public safety, streamline the regulatory process for ROW maintenance; have a management framework to evaluate herbicides as they become available; control the spread of noxious weeds; balance environmental protection with system reliability, while maintaining compliance with the National Electric Safety Code (NESC), North American Electric Reliability Corporation (NERC), Institute of Electrical and Electronics Engineers standards, and Southwestern's directives and standards for maintaining system reliability and protection of human safety.

To protect worker safety, total elimination of weedy species at the substations and the towers is necessary to ensure that these facilities maintain grounding requirements through the ground grid to dissipate lightning. Vegetation removes moisture at the substations causing issues with the ground grid. Gravel is used to maintain an insulating buffer for workers. The gravel insulates the workers from potentials that may be present in the soil during electrical faults and also provides a more stable working surface during wet periods than either soil or grass. Vegetation must be eliminated from the gravel areas as it could result in electric potentials that are hazardous to workers.

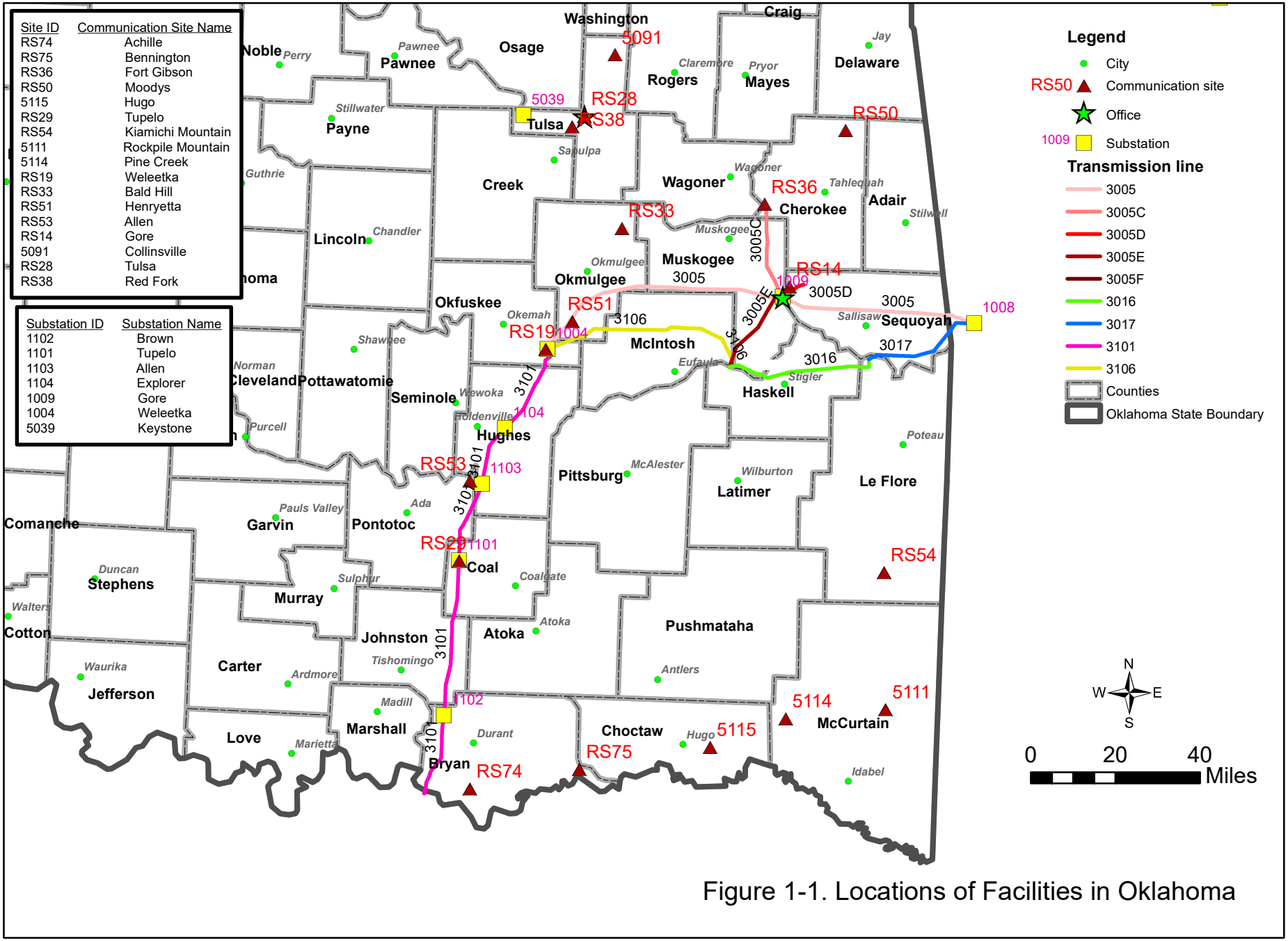
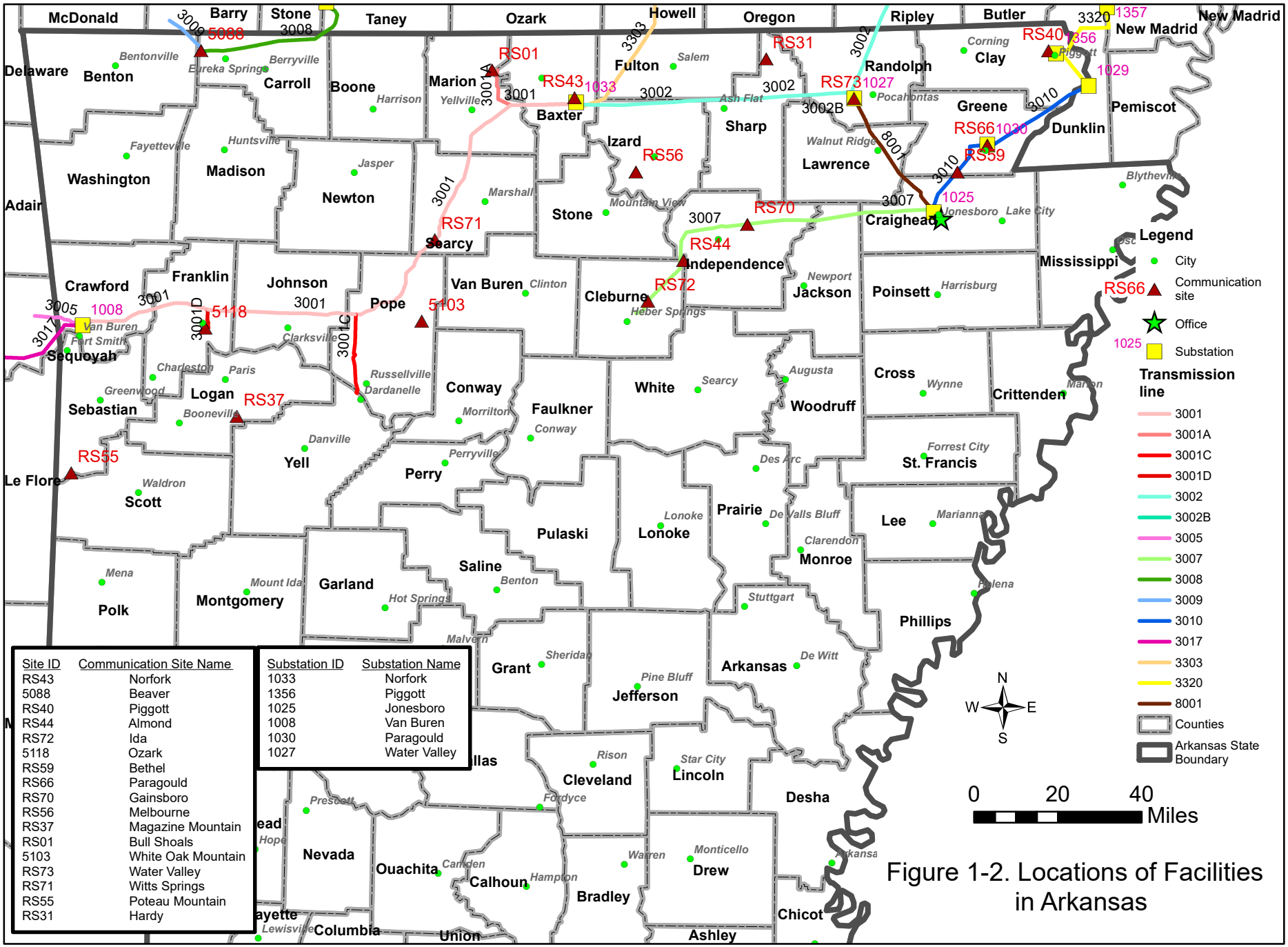


Figure 1-1. Locations of Facilities in Oklahoma



Site ID	Communication Site Name
RS43	Norfork
5088	Beaver
RS40	Piggott
RS44	Almond
RS72	Ida
5118	Ozark
RS59	Bethel
RS66	Paragould
RS70	Gainsboro
RS56	Melbourne
RS37	Magazine Mountain
RS01	Bull Shoals
5103	White Oak Mountain
RS73	Water Valley
RS71	Witts Springs
RS55	Poteau Mountain
RS31	Hardy

Substation ID	Substation Name
1033	Norfork
1356	Piggott
1025	Jonesboro
1008	Van Buren
1030	Paragould
1027	Water Valley

Figure 1-2. Locations of Facilities in Arkansas

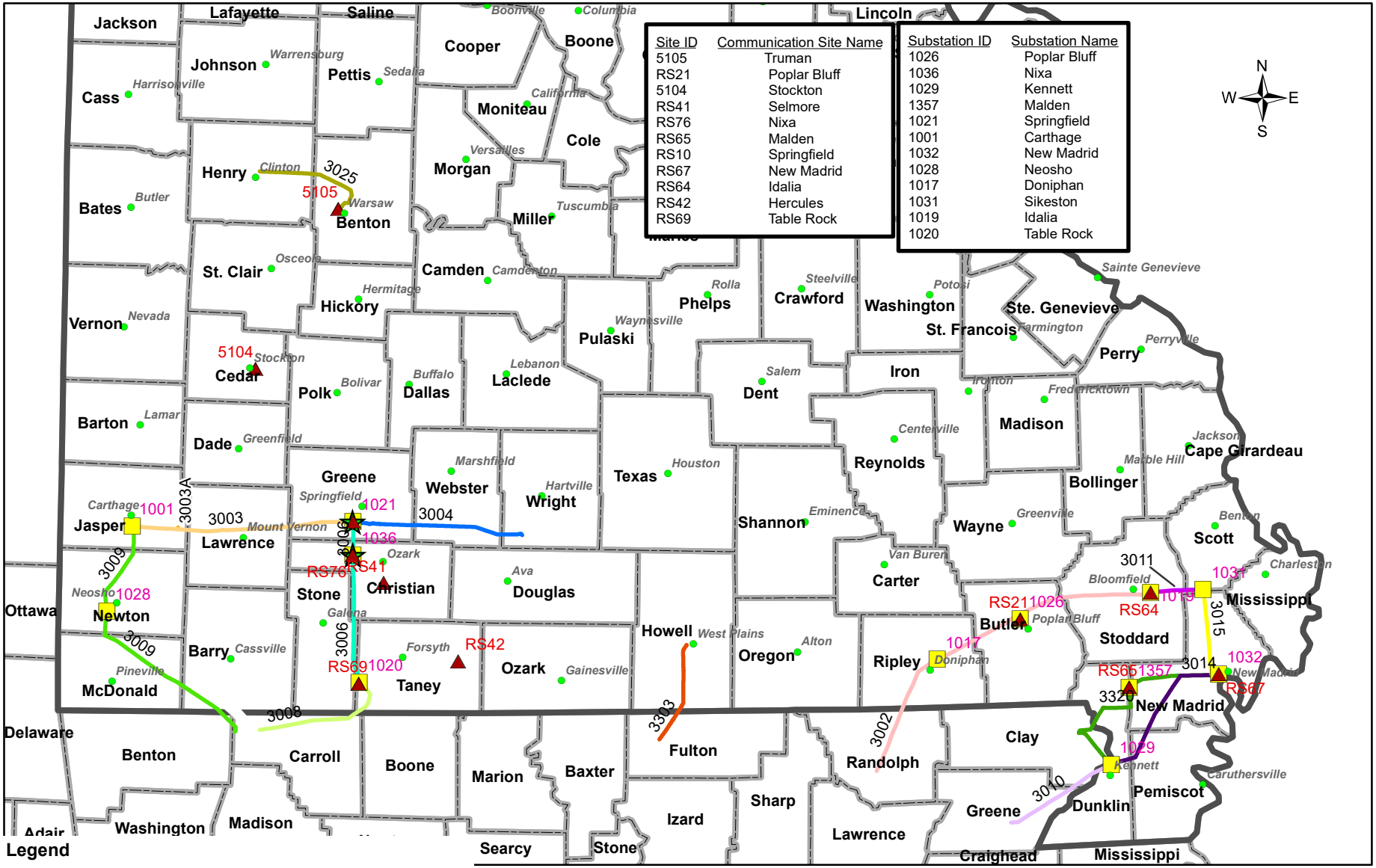


Figure 1-3. Locations of Facilities in Missouri

Transmission facilities must be kept clear of all tall-growing trees, brush and other vegetation that could grow too close to the conductors. The most significant impediment to the transmission line ROW O&M and also emergency response is the growth of woody vegetation (trees and shrubs) within the ROW. Trees are a major contributor of electric service interruptions. They cause outages in two ways: mechanical and electrical. Mechanical damage refers to entire trees or portions of trees falling and physically damaging facilities. Because of their conductive properties, electrical outages can also occur. These interruptions are caused when a portion of a tree becomes a short-circuit path for electricity to flow causing a protective device to operate which interrupts the flow of electricity. Therefore, trees must be maintained an adequate distance from the conductors. Southwestern needs to select vegetation management practices appropriate to specific conditions along the ROW. With the development of new herbicide formulations, enhanced delivery technology, and increased knowledge regarding environmental interaction, Southwestern needs a management framework that allows evaluation of new herbicides as they become available. In addition, Southwestern needs to lower safety risks of conducting vegetation management operations in remote and treacherous spans of ROW.

Section 7 of the Endangered Species Act (ESA) of 1973, as amended, requires federal agencies to use their authorities to carry out programs to conserve threatened and endangered species, and to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of listed or proposed species or result in the destruction or adverse modification of their critical habitat. A biological assessment (BA) is prepared to determine whether federal actions may affect listed or proposed species and designated and proposed critical habitat. It provides the best available scientific and commercial data for the federally-listed threatened or endangered species in the action area.

2.0 DESCRIPTION OF THE PROPOSED ACTION

The Proposed Action encompasses O&M activities, which also include the component of integrated vegetation management activities. Since the integrated vegetation management program is a large component of the O&M program the Proposed Action has been divided into the two components: 1) O&M activities for infrastructure; and 2) integrated vegetation management activities. These are discussed briefly here and in detail in Sections 2.1 and 2.2.

Proposed O&M activities include aerial and ground patrols of line structures, lines, line hardware, access roads, and communication sites to locate and correct problems, and perform regular and preventive maintenance, inspections, repairs, upgrades, rebuilds, and replacements. Proposed O&M activities would occur at existing substations, transmission lines, communication system facilities, access roads, and maintenance or office-type facilities. O&M activities are physical controls and repairs; geography has little bearing on these activities and they are performed routinely. Southwestern proposes to continue these activities; details of O&M activities are provided in Section 2.1.

Proposed vegetation management activities include a combination of mechanical and manual control and herbicide treatments. As part of the Proposed Action, Southwestern has developed a management framework for evaluating and selecting herbicides on an on-going basis to improve the range of herbicides used based on geographic regions and to increase control of undesirable vegetation over longer periods of time. The goal of the vegetation management program is to develop site-specific, environmentally sensitive, cost effective and socially responsible solutions to vegetation control. No individual method will control undesirable vegetation in a single treatment; diligence and persistence is required over a number of years to subdue vegetation such as woody plants, including trees and brush. Due to the complexity of vegetation control, the proposed management framework for herbicide use considers numerous factors, such as special geographic concerns, the type of vegetation to control, and the arrival of new herbicides coming on the market. Details of the proposed mechanical and manual control methods, as well as the management framework for herbicide use are provided in Section 2.2.

2.1 Operation and Maintenance Activities

Proposed O&M activities would occur at existing substations, transmission lines, communication system facilities, access roads, and maintenance or office-type facilities. Some portions of ROW are accessible at points where the ROW crosses existing roads; however, many areas would need to be accessed through private properties. Access through private property would be maintained with permission of the specific landowner. Access within the ROW exists through existing jeep trails or would be developed as the machinery travels over herbaceous vegetation. This access would be used by Southwestern personnel to access the target areas within the ROW. Proposed O&M activities are listed below in Table 2-1.

Table 2-1. Proposed Operations and Maintenance Activities

O&M Activities at Substations
▪ Remove, test, clean, repair, replace, modify, maintain or operate electrical equipment, and its support systems or foundations. ▪ Clean, repair, replace, maintain, modify, operate and upgrade control building facilities, fencing, access roads, parking areas, grounding, grounding grids, substation ground-cover materials, substation perimeter, gates, storage buildings, underground utilities, security systems, and pole yards. ▪ Clean up chemical spills. ▪ Prepare equipment, oil, or waste material for offsite shipment and disposal. ▪ Acquire, dispose, or transfer facility or property when use remains unchanged. ▪ Use light duty vehicles, heavy rolling equipment, and temporary storage of heavy materials. ▪ Remove facilities and equipment and restore site to adjacent natural vegetated surroundings. ▪ Perform erosion, flood or drainage control improvements. ▪ Control pests. ▪ Employ avian management practices. ▪ Perform biological or cultural resources environmental sampling activities, or environmental remediation actions.
O&M Activities at Transmission Lines
▪ Install, maintain, operate, repair, remove, and inspect or replace any transmission structure, including poles of any material or height, and their associated components such as aircraft warning devices or avian protection/deterrent devices, insulators, pole guards, cross arms, steel members, X-braces, knee braces, structure mile marker signs, dampeners, ground rods or spikes, guy-wires, anchors and foundations. ▪ Install, string, pull, splice, maintain, repair, operate, remove or replace any electrical conductor, optical ground wire, shield wire, or fiber optic cables and their connections, and place or remove aircraft warning devices or avian deterrent devices upon overhead wires. ▪ Use all-terrain vehicles, light duty four-wheel drive vehicles, trailers, and specialized heavy duty heavy rolling equipment to traverse access roads and ROWs. ▪ Perform temporary equipment storage or material staging for installation or repairs. ▪ Clean up and dispose of spills. ▪ Install, maintain, operate, repair, remove, and inspect culverts. ▪ Maintain, operate, repair, remove, and inspect access roads and their components. ▪ Repair or perform maintenance at water crossings or bank stabilization. ▪ Perform soil/vegetation disturbances or digging activities along the ROWs such as, but not limited to, drilling holes for pole placement, gathering core samples for geotechnical studies, drilling and placing deep pilings/foundations for self-supporting monopole structures, dozing, grading, blading for miscellaneous activities, installing fence post holes, digging for guy-wire anchor holes, burying transmission lines or utilities, uncovering tower legs or anchors, and performing erosion repairs. ▪ Conduct ground inspections and aerial inspections. ▪ Install, repair, or remove gates, fences, or signs. ▪ Place, move, or remove fill or rocks around culverts, towers, structures, or along ROWs. ▪ Stage and prepare for disposal of transmission line associated materials and waste for offsite disposal. ▪ Perform emergency actions to restore or repair electrical power due to storms or accidents such as clearing downed trees or powerlines, access road construction or upgrading to allow emergency actions. (This activity may take place adjacent to, or outside of, Southwestern facilities). ▪ Perform biological or cultural resources environmental sampling activities. ▪ Apply wood preservatives, fire retardants, or chemical resin compounds on wooden pole structures. ▪ Complete customer interconnections to transmission lines, and applications to encroach through ROWs for utilities or other use requests.

O&M Activities at Communication System Facilities
▪ Remove, test, clean, repair, replace, modify, maintain or operate communications equipment, and its support systems. ▪ Clean, repair, replace, maintain, modify, operate and upgrade control building facilities, fencing, access roads, parking areas, grounding, communication facility ground-cover materials, communication facility perimeter, gates, storage buildings, generator buildings, generators, underground utilities, liquid propane gas tanks. ▪ Clean up chemical spills. ▪ Prepare equipment, oil, or waste material for offsite shipment and disposal. ▪ Acquire, dispose, or transfer facility or property when use remains unchanged. ▪ Remove facilities and equipment and restore site to adjacent natural vegetated surroundings. ▪ Use heavy rolling equipment or temporarily store heavy materials. ▪ Perform erosion, flood or drainage control improvements. ▪ Control pests. ▪ Employ avian management practices. ▪ Perform biological or cultural resources environmental sampling activities, or environmental remediation actions.
O&M Activities at Maintenance or Office-Type Facilities
▪ Clean, repair, expand, replace, demolish, maintain, modify, operate, utilize, and upgrade office buildings, maintenance buildings, warehouses, emergency generators and fuel storage, waste storage buildings, equipment storage buildings, operation control centers, and miscellaneous facilities, fencing, roads, parking areas, sidewalks, gates, wastewater treatment lagoons, landscaping and utilities. ▪ Use and store light duty vehicles and heavy rolling equipment. ▪ Clean up chemical spills. ▪ Prepare equipment, oil, or waste material for offsite shipment and disposal. ▪ Acquire, dispose, or transfer facility or property when use remains unchanged. ▪ Remove facilities and equipment and restore site to adjacent natural vegetated surroundings. ▪ Control pests. ▪ Perform biological or cultural resources environmental sampling activities, or environmental remediation actions. ▪ Employ avian management practices.

2.2 Integrated Vegetation Management

As discussed in Section 2.0, Southwestern proposes a combination of mechanical and manual control as well as herbicide treatments, evaluated and selected through a management framework proposed herein, to control undesirable vegetation. Proposed vegetation management activities would occur at existing substations, transmission lines, communication system facilities, and maintenance or office-type facilities. Mechanical and manual control methods are discussed in Section 2.2.1 and the management framework for using herbicides is discussed in Section 2.2.2. The acreage associated with 100-foot ROW in each state is approximately 6,405 acres (Arkansas), 5,377 acres (Missouri), and 4,587 acres (Oklahoma).

2.2.1 Mechanical and Manual Control

Manual treatment involves the use of hand tools and hand-operated power tools to cut, clear, or prune herbaceous and woody species. Treatments include cutting undesired plants above the ground level, and pulling, grubbing, or removing undesired plants to prevent sprouting and regrowth. Manual techniques, primarily using chainsaws, can be used where equipment access is limited by terrain, soil conditions, or other environmental conditions. A chainsaw is used to control vegetation larger than 7.6 centimeters (cm) in diameter, including dense shrub growths, tree limbs, and large trees. These manual methods are initially effective on woody vegetation; however, resprouting from the stumps or other exposed woody

vegetation is common. When deciduous trees are cut, they usually resprout with more stems than before, creating even more dense vegetation. Successive cuttings significantly increase the amount and difficulty of labor needed to complete vegetation control.

Mechanical treatment involves the use of vehicles such as large wheeled-type tractors, or crawler-type equipment with attached tools specially designed to mulch, cut, uproot, or chop existing vegetation. The mechanical methods include a tractor-mounted brush hog mower used to maintain existing terrain features for cutting grass and woody vegetation. The brush hog mower cuts, chops, or shreds vegetation near the land surface and allows mulching of vegetation and onsite nutrient recycling. This tool is most effective on vegetation 7.6 cm or less in diameter. Southwestern would continue to use this method to maintain the majority of the areas within its facilities. The other mechanical methods are more easily controlled by humans; therefore, the target vegetation can be individually controlled. Large wheel-mounted or track-type equipment with rotary or mulching type attachments are utilized to cut, chop, or shred various types of vegetation, and break the connection between the roots and stems. This type of equipment is utilized for herbaceous and woody type vegetation up to 25.4 cm in diameter. Southwestern would continue to use this method to maintain fast growth vegetation, as well as non-herbicide applied sections. Most side trimming would be performed via ground equipment; however, aerial side saw trimming would be used at locations where ground equipment cannot be used, for example, inaccessible areas or river crossing areas. Generally, the cuttings from mechanical and manual vegetation control would remain onsite and deteriorate. In general, mechanical methods that disturb soil (heavy equipment or scraping actions) are not appropriate to use near water bodies or wetlands, on steep slopes, or in areas of soft soils.

Under the Proposed Action, mechanical control of the ROW floor would occur anytime throughout the year and mechanical control of trees would occur in accordance with the U.S. Fish and Wildlife Service (USFWS) recommendations for protection of bat species (see Section 6.0). The length of time between mechanical treatments would be extended as compared to current operations. Surface mowing of the 100-foot ROW would be on a 4-year cycle and side trimming would be performed on an 8-year cycle. The clearances would be visually checked on a biannual basis by aerial patrol and on a 24-month cycle by foot patrol. Isolated areas that require trimming between cycles or danger trees that present themselves would be addressed on an as-needed basis. During both aerial and foot patrols, ROW encroachments by vegetation which may cause an imminent threat of a transmission line outage would be reported to the System Dispatcher and then to the Regional Maintenance Manager for correction.

2.2.2 Management Framework for Using Herbicide Treatments

Herbicides are chemicals that kill or injure plants and can be categorized as selective or non-selective. Selective herbicides kill only a specific type of plant, such as broad-leaved plants, while non-selective herbicides kill all types of plants. Herbicides can also be classified by their mode of action, and include growth regulators, amino acid inhibitors, grass meristem destroyers, cell membrane destroyers, root and shoot inhibitors, and amino acid derivatives, which interfere with plant metabolism in a variety of ways. Southwestern uses U.S. Environmental Protection Agency (EPA) and state-registered herbicides, and appropriately licensed or certified applicators apply the herbicides following the label requirements. Southwestern's Proposed Action consists of a two-step process for herbicide determination: herbicide approval (on a programmatic scale) and site-specific herbicide selection (on a local or geographic scale).

2.2.2.1 Application Method

Herbicide application methods would include a combination of methods depending on season of the year, species needing control, and area to be treated. The application method chosen depends upon the treatment objective (removal or reduction); accessibility, topography, and size of the treatment area; characteristics of the target species and the desired vegetation; location of sensitive areas and potential environmental impacts in the immediate vicinity; anticipated costs; equipment limitations; and meteorological and vegetative conditions of the treatment area at the time of treatment. Herbicide application schedules and type are designed to minimize impacts to non-target species while still meeting vegetation control objectives. The application rates depend upon the target species, the presence and condition of non-target vegetation, soil type, depth to the water table, presence of other water sources, and the label requirements. Applications would be in accordance with "Herbicide Application Guidelines" in Southwestern's Office of Corporate Facilities Maintenance Standards, Vegetation Maintenance Program, No. MA-23, Revision 2 (2014). Application methods include:

- Power-driven vehicle-mounted mechanical sprayer – used for general brush control especially along ROW. Wind gusts must not exceed 10 miles per hour.
- Foliar spray application – can be used during the growing season to control species. Herbicide is applied directly to the target foliage using pressurized or backpack sprayers.
- Cut-stump treatment – used to prevent re-sprouting of freshly cut stumps. Applied using backpacker sprayer or Radiarc sprayer.
- Tree injection and girdle/frill method – used in the ROW to kill larger tree species.
- Basal application – used to apply herbicide directly to the lower 30-35 cm of the stem. Application occurs in the winter during the dormant season and is effective near row crops.

An adjuvant is any substance in an herbicide formulation or added to improve herbicidal activity or application characteristics. Two examples of adjuvants are dyes and surfactants. Dyes can be used to mark where herbicides are sprayed to aid the applicator in determining the area covered. Occasionally, herbicides would be diluted with seed oil, limonene, basal oil, or another surfactant when used in conjunction with the cut stump method or when used to control highly resistant species. Surfactants are wetting agents that increase surface contact and therefore, overall effectiveness of the herbicide. Adjuvants would be used at recommended label rates.

Under the Proposed Action, Southwestern hopes to extend the length of time between herbicide treatments using better formulated herbicides that are now available. Herbicide applications at each substation would occur in spring when things bloom and then would be spot-sprayed as needed. Towers would also be spot-sprayed as needed.

Herbicide applications in ROWs would occur from May through October. Regional offices would manage the applications on a rotating schedule. The system-wide maintenance plan documents which transmission lines need to be cleared each year on a 4- to 5-year rotating schedule. Clearing of a line means that either mechanical or herbicide control (or both) or that the line is free of vegetation issues. Means of control would be determined based on what is identified at each site. Ground patrols along the ROW would be conducted every 2 years and aerial surveys would be conducted every 6 months.

2.2.2.2 Herbicide Selection

Under the Proposed Action, the current Southwestern approved herbicides, as well as other potential herbicides, were evaluated. Consideration was focused on the factors that indicate the greatest likelihood of groundwater contamination. Many pesticides bind strongly to soil and are therefore immobile. A measure of how strongly a pesticide binds to soil is its sorption potential (Koc). For those that are mobile in soil, their leaching to groundwater can be thought of as a race in time between their degradation into nontoxic by-products and their transport to groundwater. If the pesticide is not readily degraded and moves freely with water percolating downward through the soil, the likelihood of it reaching groundwater is relatively high. If, however, the pesticide degrades quickly or is tightly bound to soil particles, then it is more likely to be retained in the upper soil layers until it is degraded to nontoxic by-products. Even if degradation is slow, this type of pesticide is unlikely to pose a threat to groundwater. The time it takes for a pesticide to degrade to half of its original concentration is called its half-life. The Groundwater Ubiquity Score (GUS) is an experimentally calculated value that relates pesticide half-life and Koc. The GUS can be used to rank pesticides for their potential to move to groundwater (NPIC 2018). Appendix A provides the list of herbicide selected for consideration. In cases where a generic herbicide has the equivalent percentage or less of the active ingredient as the brand name, that herbicide may be substituted.

Although an herbicide is approved for use, site-specific information, such as vegetation to be treated, hydrological data, soil composition, sensitive species, and restricted areas, must be considered when selecting an herbicide for use at a specific site. Appendix A provides the general locations where each herbicide could be used, i.e., bare ground, the ROW, and near water. However, Southwestern would determine which herbicides, if any, would be appropriate for site-specific use. Using known restricted areas (wildlife management areas, National Forests, karst habitat, known listed species' habitat, and water), a geographic information system (GIS) tool was developed to help Southwestern identify environmental restrictions in specific locations within Proposed Action areas.

3.0 CONSULTATION HISTORY

In 2006, Southwestern initiated consultation with the Oklahoma USFWS for routine maintenance, construction, and operation activities. The initial consultation included all listed species at the time and a subsequent biological opinion, but has since developed into a formal consultation specifically for the American burying beetle (ABB, *Nicrophorus americanus*) in Oklahoma. The following provides a summary of the consultation history.

- Informal consultation was initiated in 2006 through meetings and phone conversations with Southwestern staff in an effort to more efficiently process proposed maintenance actions.
- A draft Programmatic Biological Assessment (PBA), which included the ABB as well as other listed species in Oklahoma, was prepared and sent to the USFWS for review in April 2007.
- USFWS comments were provided to Southwestern and another draft PBA was prepared and sent to the USFWS in July 2007.
- Additional USFWS comments were provided. A final PBA and request for formal consultation, dated October 26, 2007, were received on October 31, 2007.
- The USFWS responded to the Southwestern request for formal consultation and agreed to initiate formal consultation in a December 20, 2007 letter.
- Preparation of the Programmatic Biological Opinion (PBO) was delayed due to workload constraints and the USFWS requested an extension in a letter dated November 25, 2008.
- Southwestern concurred with the USFWS request for an extension in a letter dated December 4, 2008.
- A draft PBO was sent to Southwestern for review in May 2009.
- Southwestern provided comments on the draft PBO in an October 13, 2009 letter.
- Comments were discussed via emails, revisions were incorporated, and the final PBO dated March 10, 2010 was sent to Southwestern.
- Sections of the PBO were revised to reflect changes in ABB science and minimization protocols and were submitted to Southwestern for review on October 10, 2014.
- Southwestern revised the October 10, 2014 draft based upon additional USFWS comments provided on March 2, 2017. The revised draft was provided to the Service on February 15, 2017 for comments and execution.

On February 21, 2018, Southwestern initiated informal consultation with the Missouri USFWS to discuss the Proposed Action and potential for a three-state BA. The listed bat species were a concern during this meeting for the Missouri USFWS. Southwestern developed a bat guidance document for vegetation management which was finalized in June 2018. On June 6, 2018, Southwestern initiated a discussion with USFWS representatives from all three states to discuss the development of the BA and concerns for listed species.

4.0 DESCRIPTION OF AFFECTED ENVIRONMENT

The Proposed Action area occupies land in southern Missouri, eastern Oklahoma, and northern Arkansas. The project encompasses three physiographic provinces: Central Lowland, Coastal Plain, and Interior Highlands (NPS 2017), as well as 10 EPA Level III ecoregions (Chapman et al. 2002, Woods et al. 2005, Wiken et al. 2011). The ecoregion descriptions in Table 4-1 were compiled from Chapman et al. (2005), Wiken et al. (2011), and Woods et al. (2005).

Table 4-1. Descriptions of Ecoregions included in the Project Areas

Ecoregion	Physiography	Potential Natural Vegetation
Arkansas Valley	The Arkansas Valley lies between the Ozark Plateau and the Ouachita Mountains in eastern Oklahoma and western Arkansas. It is a diverse area containing plains, floodplains, hills, terraces, and low mountains. The region is characterized by mild winters, hot summers, and 45 inches of precipitation annually.	Vegetation consists of oak savanna and oak-hickory-pine forests; sycamore (*Platanus occidentalis*), willow (*Salix* spp.), eastern cottonwood (*Populus deltoids*), elm (*Ulmus* spp.) on the floodplains; and the bottomlands are typically croplands or pastures.
Boston Mountains	The Boston Mountains encompass land in northwestern Arkansas and northeastern Oklahoma. They are just north of the Arkansas Valley and consist of deeply dissected mountainous plateaus. The region is characterized by mild winters, hot summers, and 48 inches of precipitation annually.	Vegetation is predominately oak-hickory forest. Shortleaf pine (*Pinus echinata*) and eastern red cedar (*Juniperus virginiana*) may be found on south- and west-facing slopes, while north-facing slopes consist of beech (*Fagus* spp.), basswood (*Tilia* spp.), hickory (*Carya* spp.), sugar maple (*Acer saccharum*), and oak (*Quercus* spp.). Non-forested flatlands are used as pasture or hayland.
Central Irregular Plains	The Central Irregular Plains ecoregion is a prairie belt running between the Cross Timbers and Ozark Highlands. The region is characterized by flat to rolling, irregular plains, low hills, and cuestas. This region occupies western Missouri and northeastern Oklahoma in the project area. Hot summers and mild to cold winters characterize this region; precipitation annually is approximately 38 inches.	Historically, vegetation was predominately tall-grass prairie, with forests and woodlands consisting of oak and hickory found on stony hilltops. Now, the region consists of grasslands, farmlands, rangelands, woodlands, and floodplain forests.
Cross Timbers	The Cross Timbers region lies on the western edge of the Central Irregular Plains in central Oklahoma. To its west is the Central Great Plains region. This large ecoregion consists of rolling plains, low hills, cuestas, and ridges. The climate for this region consists of hot summers and mild winters; annual precipitation is approximately 34 inches.	The vegetation is considered transitional, between the winter wheat fields to the west and mountains to the east. Little bluestem grasslands are dotted with blackjack oak (*Quercus marilandica*) and post oak (*Q. stellate*); other vegetation includes big bluestem (*Andropogon gerardii*), Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), elm, and black hickory (*Carya texana*).

Ecoregion	Physiography	Potential Natural Vegetation
East Central Texas Plains	The East Central Texas Plains consists of flat to rolling, irregular plains, crossed by wide rivers. In Oklahoma, the ecoregion occupies a small area on the Texas border. The region is characterized by hot summers and mild winters, with a mean annual precipitation of 37 inches.	Vegetation consists of tall-grass prairie, post oak savannas, and many croplands. Forest stands consist of oak and hickory, with little bluestem, purpletop (*Tridens flavus*), and yellow Indiangrass grasses.
Mississippi Alluvial Plain	The Mississippi Alluvial Plain Terrain consists of a broad, flat, alluvial plain broken occasionally by river terraces and levees. This region is found in far southeastern Missouri and along eastern Arkansas. Vegetation historically consisted of bottomland deciduous forest, though most has been cleared for agriculture. The region has mild winters and hot, humid summers with 55 inches of annual precipitation.	Hardwood swamp forests consist of hickory, red maple (*A. rubrum*), green ash (*Fraxinus pennsylvanica*), and river birch (*Betula nigr*a), while river swamp forests consist of bald cypress (*Taxodium distichum*) and water tupelo (*Nyssa aquatica*). Sweetgum (*Liquidambar styraciflua*), sycamore, and several oaks may be found in higher areas.
Mississippi Valley Loess Plains	The Mississippi Valley Loess Plains run from far southeastern Missouri and down through eastern Arkansas. It is bound by the Mississippi Alluvial Plain on both sides. The terrain is characterized by irregular plains and rolling hills, with dissected hills, ridges, and bluffs occurring on the Mississippi River. The region has hot summers and mild winters, with a mean annual precipitation of 56 inches.	In the east, forests consist of oaks, hickories, and loblolly (*Pinus taeda*) and shortleaf pine; in the west, oak-hickory forests occur, as well as forests containing beech, maples, southern magnolia (*Magnolia grandiflora*), and American holly (*Ilex opaca*).
Ouachita Mountains	The Ouachita Mountains region lies directly south of the Arkansas Valley region in central western Arkansas and southeastern Oklahoma, though the project only occurs in the Oklahoma portion. It is made of open hills, low mountains, and sharp east-west trending ridges. The region has mild winters and hot summers, and a mean annual precipitation of 52 inches.	Historically, the region consisted of oak-hickory-pine forests but is currently covered in loblolly and shortleaf pine. Other forest vegetation includes southern red, black, post, and white oaks as well as hickories.
Ozark Highlands	The Ozark Highlands consist of irregular terrain: from rolling plains, to steep, rocky hills, and many karst features. In the project area, the region encompasses most of southern Missouri, northern Arkansas, and a small portion of northeastern Oklahoma. This region is characterized by hot summers and mild to severe winters. Annual precipitation is around 43 inches.	Vegetation also varies from savannas and tallgrass prairies to oak-hickory-pine forest stands. Other common vegetation includes shortleaf pine, big and little bluestem (*Schizachyrium scoparium*), Indiangrass, and eastern red cedar.
South Central Plains	The South Central Plains region lies in the far southeastern and southwestern corners of Oklahoma and Arkansas, respectively. The terrain consists of dissected rolling plains, broken up by terraces, bottomlands, low hills, and cuestas. Climate consists of hot summers and mild winters, with 50 inches of mean annual precipitation.	Natural vegetation is dominated by longleaf pine (*Pinus palustris*) woodlands and shortleaf pine/hardwood forests. The bottomlands consist of water (*Quercus nigra*), willow (*Q. phellos*), and swamp chestnut oak (*Q. michauxii*), sweetgum, bald cypress, and water tupelo.

Sources: Chapman et al. 2002; Wiken et al. 2011; Woods et al. 2005

5.0 METHODOLOGY AND SPECIES COVERED

Species federally listed as endangered, threatened, candidate, or proposed, as well as nonessential experimental populations that may occur within the project area were compiled by generating an Information for Planning and Consultation (IPaC) Trust Resources report obtained online through the USFWS website (https://ecos.fws.gov/ipac). Reports were obtained for areas where transmission lines pass through each state. For those communication towers and substations that did not fall within a transmission line, a separate IPaC report was generated. This ensured that all areas were covered and potential listed species within the project area were identified (Table 5-1). Additional resources provided information on distribution and specific species habitat requirements including, but not limited to, the species' recovery plan, USFWS 5-year reviews and summaries, the Natural Heritage Program, the Missouri Department of Conversation (MDC), the Oklahoma Department of Wildlife Conservation, and the Arkansas Game and Fish Commission.

All federally listed species were evaluated based on their potential to occur within the Proposed Action area. The potential for occurrence of each species was separated into three categories:

1) Known to occur—the species was documented in the Proposed Action area by a reliable observer.

2) May occur—the Proposed Action is within the species' currently known range, and vegetation communities, soils, water quality conditions, etc., resemble those known to be used by the species.

3) Unlikely to occur—the Proposed Action occurs in the same county as the species' currently known range, but vegetation communities, soils, elevation, water conditions, etc., do not meet requirements of those known to be required by the species, or the Proposed Action is clearly outside the species' known range.

Species listed by the USFWS as endangered or threatened, and experimental, non-essential populations were assigned to one of three categories of possible effect, following USFWS recommendations. The effects determinations recommended by the USFWS include:

1) *May affect, is likely to adversely affect* – This effect determination means that the action would have an adverse effect on the species or its habitat. Any action that would result in take of an endangered or threatened species is considered an adverse effect. A combination of beneficial and adverse effects is still considered likely to adversely affect, even if the net effect is neutral or positive. Adverse effects are not considered discountable because they are expected to occur. In addition, the probability of occurrence must be extremely small to qualify as discountable effects. Likewise, an effect that can be detected in any way or that can be meaningfully articulated in a discussion of the results of the analysis is not insignificant; it is an adverse effect.

Table 5-1. Species Federally Listed as Threatened and Endangered Recorded and Potentially Occurring in the Proposed Action Area

Common Name (Species Name)	Status[1]	Habitat Requirements	Potential for Occurrence in Project Area	Note on Effects Determination
Geocarpon (*Geocarpon minimum*)	T	Slicks or slickspots from eroded areas in grasslands high in salinity. In Missouri, the species occurs in Pennsylvanian-age sandstone glades or outcrops in upland prairies in shallow depressions within rocks.	Species listed in Arkansas.	See Section 6.1
Harperella (*Ptilimnium nodosum*)	E	Sunny, rocky or gravel shoals and margins of clear, swift flowing stream sections	Species listed in Arkansas. Species range is currently in six counties south of the Proposed Action area.	No effect
Mead's milkweed (*Asclepias meadii*)	T	Moderate dry to moderately wet conditions in upland tall grass prairies or glade/barren habitat	Species listed in Missouri.	See Section 6.2
Missouri bladderpod (*Physaria filiformis*)	T	Restricted to limestone glades and dry rocky outcrops; also documented in Arkansas on a dolomite glade	Species listed in Missouri and has been found in the project area.	See Section 6.3
Virginia sneezeweed (*Helenium virginicum*)	T	Prefers low-lying fields and meadows, plains and shorelines around sinkholes, and seasonally flooded limestone ponds	Species listed in Missouri.	See Section 6.4
Pondberry (*Lindera melissifolia*)	E	Associated with margins of sinks, ponds and other depressions, as well as bottomland hardwoods and is tolerant of prolonged and regular flooding	Species listed in Arkansas and Missouri.	See Section 6.5
Running buffalo clover (*Trifolium stoloniferum*)	E	The species prefers somewhat moist habitats with filtered sunlight, such as between open forests and prairie in rich soils, and moderate or periodic disturbance from grazing, mowing, and flood scouring.	Species listed in Arkansas. No known existing populations in the state and habitat not found along the project area.	No effect

Common Name (Species Name)	Status[1]	Habitat Requirements	Potential for Occurrence in Project Area	Note on Effects Determination
Cave crayfish (*Cambarus zophonastes*)	E	Cave stream systems	Species listed in Arkansas and Missouri. In the project area, the species occurs in Benton and Washington counties, Arkansas. Line 3009 occurs in the far northeastern corner of Benton County, but is not close to any cave stream systems with known cave crayfish populations.	No effect
Curtis' pearlymussel (*Epioblasma florentina curtisii*)	E	Slow-flowing streams with shallow depths and stable substrates	Species listed in Arkansas and Missouri.	See Section 6.6
Fat pocketbook (*Potamilus capax*)	E	Typically inhabits silt, sand, or mud substrates and are found in water ranging from a few inches to 20 feet in depth	Species listed in Arkansas and Missouri.	See Section 6.7
Ouachita rock pocketbook (*Arkansia wheeleri*)	E	Stable substrates including gravel and sand in side channels of larger rivers in pools or backwaters with slow currents	Species listed in Oklahoma and may potentially occur downstream of Towers 5111, 5114, 5115, and RS54; however project activities would be located away from water sources and would not impact this species.	No effect
Neosho mucket (*Lampsilis rafinesqueana*)	E	Typically found in shallow riffles with gravel substrate and a swift current	Species listed in all three states.	See Section 6.8
Pink mucket (*Lampsilis abrupta*)	E	Inhabits rivers that are over 20 meters in width with silt, sand, gravel, or boulder substrates	Species listed in Arkansas and Missouri.	See Section 6.9
Rabbitsfoot (*Quadrula cylindrica cylindrical*)	T	Typically found in shallow water along banks in small streams to large rivers	Species listed in all three states.	See Section 6.10
Scaleshell mussel (*Leptodea leptodon*)	E	Medium to large rivers, typically in riffle areas	Species listed in Arkansas and Missouri.	See Section 6.11
Snuffbox mussel (*Epioblasma triquetra*)	E	Gravel or sand substrates with swift currents, including shores of lakes	Species listed in Arkansas and Missouri.	See Section 6.12

Common Name (Species Name)	Status[1]	Habitat Requirements	Potential for Occurrence in Project Area	Note on Effects Determination
Speckled pocketbook (*Lampsilis streckeri*)	E	Restricted to the Little Red River (Middle, South, Archey, and Devil's forks) and Big Creek in northcentral Arkansas	Species listed in Arkansas however these rivers are not located within the project area.	No effect
Spectacle case (*Cumberlandia monodonta*)	E	Buried in firm mud that lies between or under large rocks or ledges in large rivers	Species listed in Arkansas. In the project area, a single spectacle case was found in the Mulberry River in Franklin County, Arkansas although the finding is questionable.	No effect
Turgid blossom (*Epioblasma turgidula*)	E	Fresh flowing streams and rivers in the Ozark Mountain region. Historically found in the Spring Creek River of Arkansas, and the Black and White Rivers winding through Arkansas and Missouri.	Species listed in Arkansas and Missouri. Lines 3308 and 3002 cross the White River and Spring River but not near historical occurrences of the species.	No effect
Winged mapleleaf (*Quadrula fragosa*)	E	Historically found in large, fast streams and impoundments, in muddy and gravel substrates	Species listed in Oklahoma and found along the Little River upstream of towers 5111, 5114, and 5115.	See Section 6.13
American Burying Beetle (*Nicrophorus americanus*)	E	Habitat generalist, with a slight preference for grasslands and open understory oak hickory forests	Species listed in Arkansas and Missouri. Species is listed as experimental (EXPN) in southwestern Missouri.	See Section 6.14
Hine's Emerald Dragonfly (*Somatochlora hineana*)	E	Wetland habitat with slow flowing shallow water	Species listed in Arkansas and Missouri.	See Section 6.15
Arkansas River shiner (*Notropis girardi*)	T	Occurs in shallow, wide rivers and large streams with sandy substrate	Species listed in Oklahoma. Critical habitat designated and within project area (Line 3101, structures 680-681) over Canadian River, Hughes County.	See Section 6.16
Ozark cavefish (*Amblyopsis rosae*)	T	Underground caves, sinks, and wells in the Springfield Plateau Region of southwest Missouri, northwest Arkansas, and northeast Oklahoma	Species listed in all three states.	See Section 6.17

Common Name (Species Name)	Status[1]	Habitat Requirements	Potential for Occurrence in Project Area	Note on Effects Determination
Leopard darter (*Percina pantherina*)	T	Occurs in pools with rubble or boulder substrates	Species listed in Oklahoma only at tower sites 5114 and RS54. In the project area, no transmission lines cross any of the creeks or rivers the species occurs in. Critical habitat occurs in several of the streams, but the project does not encompass them. Potential habitat does not exist at the structure sites.	No effect
Ozark hellbender (*Cryptobranchus alleganiensis*)	E	Fast-moving streams in the Ozark Highlands of Missouri and Arkansas	Species listed in Missouri and Arkansas.	See Section 6.18
American alligator (*Alligator mississippiensis*)	SAT	Inhabits wetlands, lakes, and rivers throughout the southeastern U.S. The species is currently listed as threatened due to similarity of appearance to the American crocodile.	Species listed in Oklahoma with limited potential in the aquatic environment of Broken Bow Reservoir. Habitat not within the project area.	No effect
Least tern (*Sterna antillarum*)	E	Prefers open, unvegetated sand or gravel habitats near their feeding areas	Species listed in Oklahoma and Arkansas.	See Section 6.19
Piping plover (Charadrius melodus)	T	Nests along lakes, rivers, and reservoirs along open, mostly vegetation-free gravel or sand shorelines of rivers and lakes and on gravel or sand pits	Species listed in all three states.	See Section 6.20
Red knot (*Calidris canutus rufa*)	T	Breeds in the Arctic and overwinters in southern, coastal locations of the U.S. all the way to the southern tip of South America. In the central flyway, knots typically fly 2 to 3 days nonstop from Texas to the Northern Great Plains or Canada, making stopovers in Oklahoma or Arkansas rare.	Species listed in Oklahoma and Arkansas. Stop overs on migration route are rare in the project area.	No effect
Whooping crane (*Grus americana*)	E	Migratory species through the western half of Oklahoma. Feed in marshes, shallow-water wetlands, wet meadows and sometimes crop fields.	Species listed in Oklahoma. Critical habitat designated, but outside project area; limited, marginal habitat or no suitable habitat. Avian species protection is addressed through Southwestern's Avian Protection Plan. The species was discussed and analyzed under the Oklahoma 2010 PBO.	No effect

Common Name (Species Name)	Status[1]	Habitat Requirements	Potential for Occurrence in Project Area	Note on Effects Determination
Gray bat (*Myotis grisescens*)	E	Caves, preferably limestone. Summer cave habitat is usually within 2 miles of rivers, streams, reservoirs, or lakes.	Species listed in all three states.	See Section 6.21
Indiana bat (*Myotis sodalist*)	E	Winter habitat consists of caves and summer habitat in agricultural areas with fragmented forests.	Species listed in all three states.	See Section 6.22
Northern long-eared bat (*Myotis septentrionalis*)	T	Hibernates between mid-fall through mid-spring in mines or caves and spends its summers in wooded areas	Species listed in all three states.	See Section 6.23
Ozark big-eared bat (*Corynorhinus [=Plecotus)]townsendii ingens*)	E	Caves in limestone karst formations	Species listed in all three states.	See Section 6.24

[1]Federal (USFWS) status definitions:

E = Endangered. Any species considered by the USFWS as being in danger of extinction throughout all or a significant portion of its range. The ESA specifically prohibits the take of a species listed as endangered. Take is defined by the ESA as: to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to engage in any such conduct.

T = Threatened. Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. The ESA specifically prohibits the take (see definition above) of a species listed as threatened.

EXPN = A population that has been established within its historical range under section 10(j) of the ESA to aid recovery of the species. The USFWS has determined a non-essential population is not necessary for the continued existence of the species. For the purposes of consultation, non-essential experimental populations are treated as threatened species on National Wildlife Refuge and National Park land (require consultation under 7(a)(2) of the ESA) and as a proposed species on private land (no section 7(a)(2) requirements, but Federal agencies must not jeopardize their existence (section 7(a)(4))).

SAT = Similarity of appearance, threatened. Any species listed as threatened due to similarity of appearance with another species that is listed as threatened. Species listed under a similarity of appearance are not biologically endangered and are not subject to section 7 consultation.

BGEPA Bald and Golden Eagle Protection Act

ESA Endangered Species Act

MBTA Migratory Bird Treaty Act

PBA Preliminary Biological Assessment

PBO Preliminary Biological Opinion

2) *May affect, is not likely to adversely affect* – Under this effect determination, all effects to the species and its critical habitat are beneficial, insignificant, or discountable. Beneficial effects have contemporaneous positive effects without adverse effects to the species (for example, effects cannot be "balancing," so that the benefits of the action would outweigh adverse effects). Insignificant effects relate to the size of the impact and should not reach the scale where take occurs. Discountable effects are considered extremely unlikely to occur. Based on best judgment, a person would not: 1) be able to meaningfully measure, detect, or evaluate insignificant effects, or 2) expect discountable effects to occur. Determinations of "not likely to adversely affect, due to beneficial, insignificant, or discountable effects" require written concurrence from the USFWS.

3) *No effect* – a determination of no effect means there are absolutely no effects to the species and its critical habitat, either positive or negative. It does not include small effects or effects that are unlikely to occur.

Of the 35 species listed as endangered, threatened, candidate, proposed, or experimental, nonessential population in the three-state area, 24 have been documented or have the potential to occur in the Proposed Action area. They are the focus of the analysis of potential effects in Section 6.0.

6.0 ANALYSIS OF POTENTIAL EFFECTS

6.1 Geocarpon

6.1.1 Description

On July 16, 1987, the USFWS listed Geocarpon as a threatened species under the ESA. Geocarpon (*Geocarpon minimum*) is a small inconspicuous, 1 to 4 centimeters (cm) high plant (USFWS 2018a). Geocarpon is a monotypic genus with this single species, also known as tinytim and earth-fruit. This small annual plant has leaves that are opposite, scarcely succulent, and cup-shaped measuring 3 to 4 millimeters (mm) (USFWS 1993). The plant turns red or pink as it matures.

6.1.2 Life History and Current Status

This annual plant is most visible during its flowering and fruiting period from late February through early June (USFWS 2009a). Temperature and weather conditions, wet conditions, play a role in the success or germination and seed may remain viable for several years (USFWS 2009a).

Geocarpon relies on the presence of specific microhabitats. Slicks or slick spots from eroded areas in grasslands high in salinity is the preferred habitat for Geocarpon in most areas (USFWS 2018a). The species may be a pioneer species of newly cleared sandstone slicks. These slick spots are in response to sandstone glade disturbance erosion, mammalian disturbance, and/or fire and some level of disturbance is thought to be necessary for maintenance of preferred habitat (USFWS 2016a). In Missouri, the species occurs only on Pennsylvanian-age sandstone glades or outcrops in upland prairies in shallow depressions within rocks (USFWS 2009a).

Historically, the species' range included Arkansas, Missouri, Louisiana, and Texas (USFWS 2018a). When first listed, the species was found in only 28 locations in Arkansas, Louisiana, and Missouri (USFWS 1993). In 2009, 37 populations (including three plantings in Missouri) were recognized within 17 counties in four states. Twenty of the 37 populations are at least partially on public land, owned by private conservation groups such as The Nature Conservancy, or are recognized in a private conservation plan (USFWS 2009a). In 2016, the populations were documented to occur at a total of 40 sites (including three plantings in Missouri) within 19 counties in four states (USFWS 2016a). Thirteen of the 25 known populations in Missouri are partially or fully owned by the MDC, USACE, Missouri Department of Transportation (MODOT), or private conservation organizations and three populations in Arkansas are owned by the Arkansas Natural Heritage Commission (ANHC) aside from a few adjacent subpopulations on private property (USFWS 2016a). Three of the five sites in the counties within the project area in Missouri are protected. The site in Franklin County, Arkansas is not a protected area but on private lands used for pasture (USFWS 2016a).

6.1.3 Habitat Evaluation and Suitability

In Arkansas, the species is known to or believed to occur in five counties, of which only Franklin County occurs in the project area (USFWS 2018b). The ANHC recognizes five Geocarpon populations containing dozens of subpopulations (USFWS 2016a). In Missouri, the species is known to or believed to occur in seven counties, of which only Jasper, Lawrence, Greene, and Henry counties occur in the project area

(USFWS 2018b). Geocarpon is thought to be extirpated in Jasper County (USFWS 2016a). The MDC currently recognizes 22 extant naturally occurring Geocarpon populations and three plantings (USFWS 2016a).

6.1.4 Determination of Effect

Geocarpon prefers slicks in grasslands/sandstone and requires some disturbance. Current population and habitat information limits this species to potentially occurring in only one county in the project area in Arkansas: Franklin County. Line 3001 and tower 5118 are located in the central portion of Franklin County. Although activities in the ROW would avoid slicks, there is a potential for trucks to crush plants during vegetation management and some O&M activities such as pole replacement. In addition, there is a potential for herbicide treatments to impact local populations although this species would not be targeted. Information on identification of the listed plant species in the Proposed Action area would reduce the potential for direct impacts from herbicide treatments. Any potential impacts to the plant would be localized and activities are temporally limited to the vegetation cycle of 4 to 5 years. The Proposed Action *may affect but is not likely to adversely affect* Geocarpon.

6.2 Mead's Milkweed

6.2.1 Description

Mead's milkweed (*Asclepias meadii*) was listed as threatened on September 1, 1988. This perennial has a single, slender, unbranched stalk, and is approximately 20 to 40 cm high with a whitish waxy covering. A solitary umbel at the top of the stalk has greenish, cream-colored flowers (USFWS 2003a). The hairless leaves are opposite, approximately 5 to 7 cm long, 1 to 5 cm wide, also with a whitish waxy covering (USFWS 2018c).

6.2.2 Life History and Current Status

Mead's milkweed can tolerate moderately dry to moderately wet conditions in upland tallgrass prairies or glade/barren habitat (USFWS 2018c). The species persists in stable late-successional prairie in full sun (USFWS 2003a). The milkweed flowers from late May through late June with green fruit pods reaching their maximum length in late August and early September (USFWS 2018c). Miner bees (*Anthophora* spp.) and small bumblebees (*Bombus* spp.) are pollinators of this species. The seed pods mature by mid-October; however, the milkweed can also spread vegetatively. This tallgrass prairie species is long-lived, often taking up to 15 years to mature after which time it can persist indefinitely (USFWS 2018c). Prescribed burning can increase flowering, reproduction, and seedling establishment in this species (USFWS 2003a). Populations can usually be found on upper and middle portions of slopes (less than 20 percent) between 800 to 1,200 feet above sea level (USFWS 2003a).

Historically Mead's milkweed occurred throughout the eastern tallgrass prairie region of the central United States, from Kansas through Missouri and Illinois and north to southern Iowa and northwest Indiana. Currently the species is known from 171 sites in 34 counties in eastern Kansas, Missouri, south-central Iowa, and southern Illinois. Mead's milkweed has been reintroduced in Indiana and Wisconsin where it was extirpated (USFWS 2018c).

6.2.3 Habitat Evaluation and Suitability

Destruction of tallgrass prairies is the main threat to the species which includes prairie hay fields where mowing typically takes place in late June to early July, which removes immature Mead's milkweed fruits and prevents completion of the plant's life cycle (USFWS 2018d). Currently, 18 counties in Missouri have known occurrences or the potential for occurrence of the Mead's milkweed (USFWS 2018d). The majority of the populations are on the Osage Plains Physiographic region in Kansas and Missouri (USFWS 2003). Only two counties in Missouri, Benton and Henry, contain transmission lines (Line 3025) for the Proposed Action and have known populations (USFWS 2003a). Communication tower 5104 occurs in Cedar County, also within the potential range of the Mead's milkweed; however, habitat for the species does not occur on the developed site.

6.2.4 Determination of Effect

Line 3025 in Benton and Henry counties transverses through mostly pasture lands, in addition to slightly rolling hills and some hardwood forest areas. Although a section of the western portion of Line 3025 is contained within the Cherokee Plains ecoregion, the line falls outside of the Wooded Osage Plains preferred by the species. Tallgrass prairies do not occur within the ROW. If tallgrass prairies occur adjacent to the ROW, there could be a chance of short-term impacts from overspray during herbicide application. The potential for overspray however is minimized through Southwestern's Standard Operating Policy (SOP) on herbicide application which dictates environmental conditions for application. With implementation of the SOP, impacts to Mead's milkweed are not likely to occur and the Proposed Action *may affect but is not likely to adversely affect* the species.

6.3 Missouri Bladderpod

6.3.1 Description

The Missouri bladderpod was added to the Federal List of Endangered and Threatened Plants on January 8, 1987, as an endangered species. The Missouri bladderpod (*Physaria filiformis*) is a small non-woody, annual plant, about 10 to 20 cm tall, with many slender stems that grow from a cluster of leaves at the base. The leaves are less than 2.5 cm long and taper towards the stem (MDC 2018a). The stems and leaves of the bladderpod are covered with small hairs that give the plant a silvery look. Distinctive canary-yellow flowers cluster at the top of the stems and bloom from April to May. The flowers have four yellow petals and produce round green seedpods (3-mm diameter) that turn brown as they dry (USFWS 2003b).

6.3.2 Life History and Current Status

The Missouri bladderpod has always been restricted to limestone glades and dry rocky outcrops, but it has been found on a dolomite glade in Arkansas. These glades are usually open and dry, with shallow, loose soil and exposed rock (USFWS 2003b). In areas where mowing or grazing has kept the habitat open, bladderpods may also be present. The current range of the species is northern Arkansas and southern Missouri. The number of documented populations includes 76 sites in five Arkansas counties (Izard, Washington, Sharp, Garland, Hot Spring) and four counties in Missouri (Dade, Greene, Christian, and Lawrence) (USFWS 2003b). Of the currently known 76 sites, 10 in Missouri and four in Arkansas are

under public ownership or managed by a conservation organization (i.e., The Nature Conservancy in Missouri) (USFWS 2015a). While some of the currently known bladderpod sites exceed 0.5 acre in size, many are much smaller and the distributions of some populations are limited due to the availability of suitable glade habitat (USFWS 2015a).

6.3.3 Habitat Evaluation and Suitability

Although new discoveries of the Missouri bladderpod since its listing in 1987 have increased the known population by eight times, the species' habitat is threatened by woody encroachment, overgrazing, and development (USFWS 2015a). The Proposed Action does not include activities in Garland or Hot Spring counties in Arkansas and no populations have been recently documented in Johnson or Pope counties (ANHC 2018). In 1995, surveys identified a small population of this plant within the ROW in the vicinity of structure 240-242 on Line 3006 (Southwestern 2005). Surveys conducted in 1997 by Black and Veatch narrowed down the potential habitat for the Missouri bladderpod within the Southwestern ROW to about 14 miles, fragmented throughout the ROW (Southwestern 2012). These areas were surveyed in 2005. Of the 65 locations surveyed only seven showed any potential for Missouri bladderpod occurrence. Five of the seven sites would require extensive management to bring this species back, if it in fact ever existed in these areas. The two most suitable sites would require some management for this species to exist (Southwestern 2005, 2012). The USFWS noted that the nearest known bladderpod population site was approximately 6 miles north of Southwestern's Line 3003 ROW in the Halltown Quadrangle in eastern Lawrence County, Missouri. In a 2012 consultation with the USFWS, Southwestern noted that six locations along lines 3003, 3004, and 3006 (Christian, Greene, and Lawrence counties, Missouri) were found to have moderate to good habitat.

6.3.4 Determination of Effect

The population along Line 3006 that was documented in 1995 continues to persist and all O&M and vegetation management activities are avoided in this area. Under the Proposed Action, there is a potential for trucks to crush plants during vegetation management and some O&M activities such as pole replacement. In addition, there is a potential for herbicide treatments to impact local populations although this species would not be targeted. The areas containing appropriate habitat within the ROW have been previously documented and surveys would be performed prior to any activities in these known preferred habitat areas. Per the Southwestern SOP, specific locations of Missouri bladderpods would be identified and no mowing or herbicides would be used near the populations. Survey information prior to activities within the ROW would reduce potential direct impacts to the species; therefore, the Proposed Action *may affect but is not likely to adversely affect* the species.

6.4 Virginia Sneezeweed

6.4.1 Description

Virginia sneezeweed (*Helenium virginicum*) was listed as threatened on December 3, 1998 (USFWS 2010a). This herbaceous, fibrous-rooted perennial can reach almost 1.2 meters (m) in height. The flower ray petals are yellow and wedge shaped with three lobes at the ends and a central disk which is nearly ball-shaped (MDC 2015). Few narrowly linear stem leaves occur along the plant with basal leaves clustered as a rosette (USFWS 2000).

6.4.2 Life History and Current Status

Peak flowering time for the Virginia sneezeweed is from late June to early August. Seeds are dispersed in late fall and winter and germination occurs in late summer-early fall the following year (USFWS 2010a). During its first year the plant remains as a basal rosette until the second year when it bolts and produces a single flowering stem (USFWS 2000). Insect pollinators for the species include hoverflies, wasps, butterflies, and bees. The plant can tolerate disturbances from grazing and mowing (USFWS 2010a). Longevity of the species is approximately 5 years with flowering occurring two to three times, and seeds can be persistent in soil for approximately 3 years (USFWS 2000).

Currently the species is limited in distribution to two counties in Virginia and five counties in southern Missouri (MDC 2015). The species prefers low-lying fields and meadows, plains and shorelines around sinkholes, and seasonally flooded limestone ponds (USFWS 2010). Currently there are over 40 occurrences of the species in Missouri, several of which are located on lands owned by the MDC (MDC 2015).

6.4.3 Habitat Evaluation and Suitability

Four counties within the Proposed Action area have populations known to occur: Howell, Wright, Webster, and Christian (USFWS 2018e, MDC 2018b). Virginia sneezeweed may potentially occur near Line 3303 (Howell County), Line 3004 (Wright and Webster counties), and Line 3006 (Christian County). Habitat along Line 3004 and 3006 is dominated by development and pasture lands. Pasture lands also dominate the area that Line 3303 transverses.

6.4.4 Determination of Effect

Vegetation management and O&M activities can potentially impact the Virginia sneezeweed if located along the ROW through trampling of vegetation or potential inadvertent herbicide treatments. The MDC recommends several best management practices (BMPs) to protect populations of Virginia sneezeweed. They include no mowing from July through September in wetland areas (preferred habitat), and limited use of non-specific herbicides (MDC 2015). Preferred wetland habitat is limited along the ROW for these three lines and would be avoided by both mechanical and herbicide treatment if in the project area. The GIS Resource Mapper developed by Southwestern to help identify and avoid wetland areas in the ROW would be used prior to any vegetation management along these ROWs. The Proposed Action *may affect but is not likely to adversely affect* the Virginia sneezeweed with implementation of the BMPs.

6.5 Pondberry

6.5.1 Description

Pondberry (*Lindera melissifolia*), also known as southern spicebush, is a low-growing, 0.6 to 1.8 m, colony-forming deciduous shrub (MDC 2018c). The leaves are 5 to 15 cm long oval with a pointed tip, and simple and alternating. The bark is brown to dark gray. Both the bark and the leaves are aromatic (MDC 2018c). The pale yellow flowers, in clusters of 4 to 6, appear in March-April prior to the leaves (MDC 2018c). Solitary or small cluster red fruit occurs in September-October. The species was designated as endangered on July 31, 1986 (USFWS 2013a). No critical habitat has been designated.

6.5.2 Life History and Current Status

The plant can reproduce through vegetative sprouts as well as seeds, although vegetative recruitment seems to dominate. Pondberry is a dioecious species and can form short-term soil seed banks (USFWS 2013a). Seed dispersal may occur through avian as well as mammalian species.

Pondberry is usually associated with margins of sinks, ponds and other depressions, as well as bottomland hardwoods and is tolerant of prolonged and regular flooding (USFWS 2015b). In Missouri, pondberry is associated with swampy depressions with small sand dunes that are poorly drained (MDC 2018c). The species can thrive in relatively closed canopies, but are not exclusive to low-light habitat (USFWS 2013a).

The historical range of the species includes Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, Missouri, North Carolina, and South Carolina (USFWS 2018f). When pondberry was listed in 1986, the species was known from 17 extant locations in Arkansas, Georgia, Mississippi, Missouri, North Carolina, and South Carolina and considered extirpated from Alabama, Louisiana, and Florida (USFWS 2013a). Currently there are 61 extant natural pondberry populations (USFWS 2013a).

In Missouri, pondberry is found only in Sand Ponds Natural Area and Conservation Area in Ripley County, in the Missouri Lowlands Region (MDC 2018c). The species also has the potential to occur in Butler County, Missouri (USFWS 2018e).

6.5.3 Habitat Evaluation and Suitability

Altered hydrological regimes and habitat degradation/fragmentation have potentially contributed to the decline of pondberry populations (USFWS 2013a). The known population of pondberry in the Sand Ponds Natural Area and Conservation Area is not located within the Proposed Action area. Southwestern conducted surveys in Jackson and Craighead counties, Arkansas in 2015 for the pondberry in support of Line 3007 structure relocation project. No plants were found in the project area and the USFWS concurred with the *may affect not likely to adversely affect* determination on June 1, 2015.

6.5.4 Determination of Effect

Line 3002 transverses both Ripley and Butler counties, which have the potential to contain bottomland hardwoods habitat for the species. Impacts from O&M and vegetation management activities at the substations and communications towers would not occur due to the lack of preferred habitat. Potential impacts to the species may occur along the ROW during O&M activities to repair/replace lines and poles that occur near surface waters and river bottoms. Indirect impacts from siltation or erosion altering the hydrological regime may degrade habitat. Direct impacts from herbicide application and trampling of plants are unlikely as activities within areas of regular flooding are limited. BMPs to avoid wetland areas and reduce sedimentation runoff would reduce impacts to this listed species; therefore, the Proposed Action *may affect but is not likely to adversely affect* the pondberry.

6.6 Curtis' Pearlymussel

6.6.1 Description

The Curtis' pearlymussel (*Epioblasma florentina curtisii*) is a relatively small mussel, less than 3.9 cm in length. Shells are yellow-brown to brown and may have fine rays spread over the entire shell (USFWS 1986). They were listed as endangered on June 14, 1976 due to significant declines resulting from loss of habitat (USFWS 1986) and are likely now extinct (USFWS 2010b). No critical habitat has been designated for the species.

6.6.2 Life History and Current Status

The species needs slow-flowing streams with shallow depths and stable substrates to survive. Curtis' pearlymussel is found in depths of 5 to 76 cm, in gravel, cobble, or boulder substrates. It is found in riffles or runs in reaches that occur between headwater and lowland streams (USFWS 1986).

The species likely has a life cycle similar to other *Epioblasma*, whereby sperm ejected into the water is taken in by the female and the eggs are fertilized. The eggs develop into parasitic larvae (glochidia) and are released (USFWS 1986). The species' glochidia host fish is still unknown, but they likely use a darter or sculpin species, similar to other *Epioblasma* mussels. Recent *Epioblasma* research has found adult females to lure and trap host fish using their mantle tissue and valves. They release the glochidia onto the host fish before releasing them (USFWS 2010b).

Historically, the species was found in the White and Black River basins in Missouri. USFWS (1986) states the species was only found in six sites in the upper Little Black River and the Castor River. During surveys in 1988, no specimens were found in either river, and mussel species in those rivers underwent catastrophic declines (USFWS 2010b). In 1993, a single specimen was found alive, however, none have been found since (USFWS 2010b). Much of its habitat has been lost to dredging and the construction of dams (USFWS 1986).

6.6.3 Habitat Evaluation and Suitability

Line 3006 crosses Table Rock Lake to the west of the White River near Hollister, Missouri, however, the species has not been found in the White River since the early 1900s. Line 3002 crosses the Little Black River right at or very close to the stretch of river where the last live specimen was found in 1993. It also crosses the Black River between Williamsville and Poplar Bluff, where specimens were found in the 1960s. The project does not cross the Upper Castor River and is south of the South Fork Spring and Spring Rivers in Arkansas, where the species was previously observed.

6.6.4 Determination of Effect

In areas where the transmission lines cross rivers, any vegetation management and O&M activities near these water bodies may have the potential to impact the Curtis' pearlymussel. Herbicide application for most herbicides would occur at least 15 feet (4.5 m) from any surface water body and would not directly impact the species. Only herbicides with approved aquatic labels would be used near surface water bodies. Sedimentation from O&M activities including pole replacements can indirectly affect the species. Erosion controls, including a floating silt screen when poles are surrounded by water, can be used to

reduce sedimentation into surface water. Any equipment that enters waterbodies would be washed prior to activities to prevent the spread of zebra mussels. The Proposed Action *may affect but is not likely to adversely affect* the Curtis' pearlymussel.

6.7 Fat Pocketbook

6.7.1 Description

The fat pocketbook (*Potamilus capax*) is a medium-sized freshwater mussel with a smooth yellow to brown ray-less epidermis (USFWS 1989a). Individuals can reach 12.5 cm in length (LMRCC 2014). The species was listed on June 14, 1976 (USFWS 1976) due to its extirpation from previous sites; it was only found in one river system at that time (LMRCC 2014). Critical habitat for the species has not been designated.

6.7.2 Life History and Current Status

The species typically inhabits silt, sand, or mud substrates and is found in water ranging from a few inches to 6.1 m in depth (USFWS 2012a). Similar to other mussels, exact life cycle data is not known, though its reproductive organs are similar to other members of the Unionidae family and so it likely reproduces the same way (USFWS 1989a). Specimens were found gravid during the summer and early fall (USFWS 1989a), and while the host fish species is not known, the freshwater drum (*Aplondinotus grunniens*) was the only species found to be a suitable host in a laboratory study (USFWS 2012a).

Historically, the species inhabited the Mississippi River drainage from Minnesota to Arkansas. Populations also occurred in drainage systems of the Wabash River in Indiana and the St. Francis River in Arkansas. Although currently extirpated from the upper Missouri River drainage, the species has expanded its range in the St. Francis and Ohio River systems, and is also now found in the Lower Mississippi River system as well as streams and ditch channels in Arkansas and Missouri (USFWS 2012a). In Arkansas, a single specimen has been reported in the lower White River, although no data exist on population size (USFWS 2012a).

6.7.3 Habitat Evaluation and Suitability

In the project area, the species is present in the St. Francis River drainage. This drainage basin includes approximately 8,400 square miles. The species is present in many river channels, streams, and ditches in the basin (USACE 2018). The species has the potential to occur in the Proposed Action area in both Arkansas and Missouri. In Arkansas, the species may be found near lines 3010, 3014, and 3320; radio stations 40, 59, and 66; and substations 1025, 1030, and 1356. In Missouri, the species may potentially occur near lines 3014 and 3320 and substations 1029 and 1357.

6.7.4 Determination of Effect

Threats to the species include pesticide/herbicide usage, dredging, and other water activities (USACE 2018). Sedimentation from O&M activities including pole replacements can indirectly affect the species. Erosion controls, including a floating silt screen when poles are surrounded by water, can be used to reduce sedimentation into surface water. Herbicide application for most herbicides would occur at least 15 feet from any surface water body and would not directly impact species. Only herbicides with

approved aquatic labels would be used near surface water bodies. Any equipment that enters waterbodies would be washed prior to activities to prevent the spread of zebra mussels. The Proposed Action *may affect but is not likely to adversely affect* the fat pocketbook.

6.8 Neosho Mucket

6.8.1 Description

The Neosho mucket (*Lampsilis rafinesqueana*) is a medium-sized freshwater mussel, reaching 9.5 cm in length. They have an olive-yellow to brown shell with green rays (USFWS 2012b). The species has been listed as endangered since September 17, 2013 due to declining populations in much of its range, with only one population currently deemed stable (USFWS 2013b). Critical habitat was designated for the species on April 30, 2015, and occurs along the Spring River and the north fork of the Spring River in Jasper and Lawrence counties (USFWS 2018g).

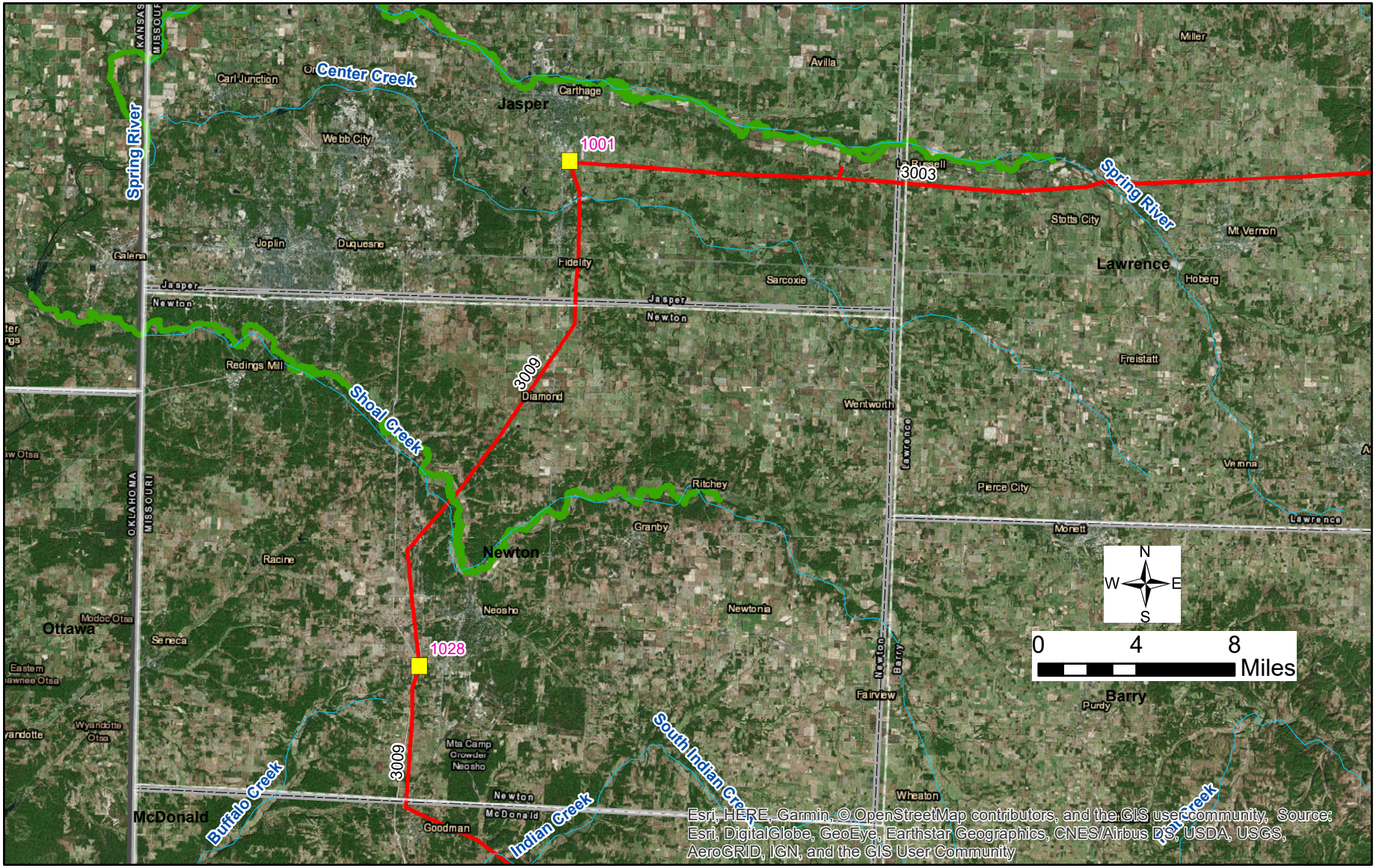
6.8.2 Life History and Current Status

Similar to other Unionidae, males release sperm into the water and are taken in by females. Larvae mature in the female and are released as parasitic larvae which further mature on a host fish. Spawning occurs in early summer, and females brood their larvae until late summer. Females possess mantle flaps that resemble a small fish and are used to lure host fish in for their parasitic larvae. Host fish include smallmouth (*Micropterus dolomieu*), largemouth (*M. salmoides*), and spotted bass (*M. punctulatus*; USFWS 2012b).

The species is typically found in shallow riffles with gravel substrate and a swift current (USFWS 2012b). Historically, this species occupied streams of the Illinois, Neosho, and Verdigris River basins. All but one of the populations is experiencing declines. The Spring River population of Kansas, Oklahoma, and Missouri is currently the only viable population of the species (USFWS 2012b).

6.8.3 Habitat Evaluation and Suitability

Critical habitat for this species exists in the Proposed Action area in Missouri. Line 3003 crosses the Spring River near Stotts City, Missouri, but not through designated critical habitat. The Spring River population is currently the only viable population of this species. Line 3009 crosses the Shoal Creek north of Neosho, Missouri through designated critical habitat (Figure 6-1).



Legend

- Neosho Mucket
- Office
- Communication site
- Substation
- Transmission line
- Drainages
- Missouri
- Counties

Figure 6-1. Neosho mucket critical habitat in relation to Southwestern infrastructure

6.8.4 Determination of Effect

O&M activities on poles/structures near the river have the potential to indirectly affect the population and critical habitat at the Spring River. Due to critical habitat along the Spring River, no equipment would be used within the river. Sedimentation from O&M activities including pole replacements can indirectly affect the species. However, no poles are located at the river edge near the critical habitat, but are approximately 0.16 kilometers (km) from the river. Erosion controls would be used to reduce sedimentation into surface water and Southwestern would avoid creating impoundments that may alter water turbidity or increase siltation. Herbicide application for most herbicides would occur at least 15 feet from any surface water body and would not directly impact species. Only herbicides with approved aquatic labels would be used near surface water bodies. The Proposed Action *may affect but is not likely to adversely affect* the Neosho mucket and would not modify critical habitat.

6.9 Pink Mucket

6.9.1 Description

The pink mucket pearly mussel (*Lampsilis abrupta*) is a relatively large freshwater mussel, reaching 10.5 cm in length (USFWS 1985a). Shells are yellowish to greenish brown with darker growth-rest lines. Younger mussels may have green rays on the shell (USFWS 1985a). The species was listed on June 14, 1976 due to a decline in populations (USWFS 1976). Critical habitat has not been designated for this species.

6.9.2 Life History and Current Status

The species inhabits rivers that are over 20 m in width with silt, sand, gravel, or boulder substrates. They are typically found in moderate to fast-flowing water, though they have also been found in standing water and been found in 0.5 to 8 m depths (USFWS 1985a). Life history for this species is mostly unknown, though it is likely similar to other members of the Unionidae family, where female take in sperm, release parasitic larvae which attach to a host fish, then eventually fall off and mature (USFWS 1985a). The host fish of this species is still unknown.

Historically, the species was found in the Tennessee, Cumberland, Ohio, and Mississippi River drainage systems, 25 river systems in total. It was widespread, though considered rare (USFWS 1985a). Currently, the species inhabits 16 river systems, from Arkansas to West Virginia (USFWS 1985a).

6.9.3 Habitat Evaluation and Suitability

In the project area, the species has been reported in rivers on the Arkansas/Missouri border: the Spring, Current, Black, and Little Black rivers (USFWS 1985a). Lines 3001, 3002, 3007, 8001; radio stations 31, 44, 56, 70, 72, 73; and substation 1027 in Arkansas are potentially within the range of the species. In Missouri, Line 3002 crosses the Black River.

6.9.4 Determination of Effect

The species is negatively affected by impoundments, siltation, and pollution (USFWS 1976). Southwestern would avoid creating impoundments that may alter water turbidity or increase siltation and

indirectly affect the species. Sedimentation from O&M activities including pole replacements can indirectly affect the species. Erosion controls, including a floating silt screen when poles are surrounded by water, can be used to reduce sedimentation into surface water. Herbicide application for most herbicides would occur at least 15 feet from any surface water body and would not directly impact species. Only herbicides with approved aquatic labels would be used near surface water bodies. Any equipment that enters waterbodies would be washed prior to activities to prevent the spread of zebra mussels. The Proposed Action *may affect but is not likely to adversely affect* the pink mucket.

6.10 Rabbitsfoot

6.10.1 Description

The rabbitsfoot (*Quadrula cylindrica cylindrica*) is a relatively large, rectangle-shaped freshwater mussel, reaching 12 cm in length. Their shells are typically smooth and yellow, green, or olive-colored, and darken with age. The species has been listed as threatened since October 17, 2013 due to population declines throughout much of its range (USFWS 2013b). Critical habitat for the species was designated on April 30, 2015 (USFWS 2015c, USFWS 2018h).

6.10.2 Life History and Current Status

The species occurs in small streams to large rivers. It is typically found in shallow water along banks, but may also occur in deeper water. Substrate habitat is typically gravel and sand. The species does not typically burrow into the substrate, but rather lies on its side (USFWS 2012b).

Similar to other Unionidae, males release sperm into the water and are taken in by females. Larvae mature in the female and are released as parasitic larvae which further mature on a host fish. Spawning occurs in early summer, and females brood their larvae until late summer. Glochidia are released together and mimic fish prey. Host fish include many species of shiner (USFWS 2012b).

Historically, this species inhabited 140 streams in the lower Great Lakes Subbasin and the Mississippi River Basin. Of those, only 51 streams currently hold populations. Populations are generally restricted to short reaches and, based on life history, it is not likely that they are able to travel to establish new populations (USFWS 2012b).

6.10.3 Habitat Evaluation and Suitability

Critical habitat for this species exists in the project area. Critical habitat occurs in the Spring River north of Carthage, Missouri (Figure 6-2). Substation 1001 and Line 3003 occur south of Spring River and the critical habitat. Line 3002 near Highway 83 in Arkansas crosses the Spring River just north of designated critical habitat. Critical habitat in the Black River starting at Pocahontas, Arkansas down to Black Creek is crossed by Line 8001 and two poles are situated on either side of the river. Although critical habitat is designated in the Buffalo River, none of the Southwestern lines cross this portion of the river.

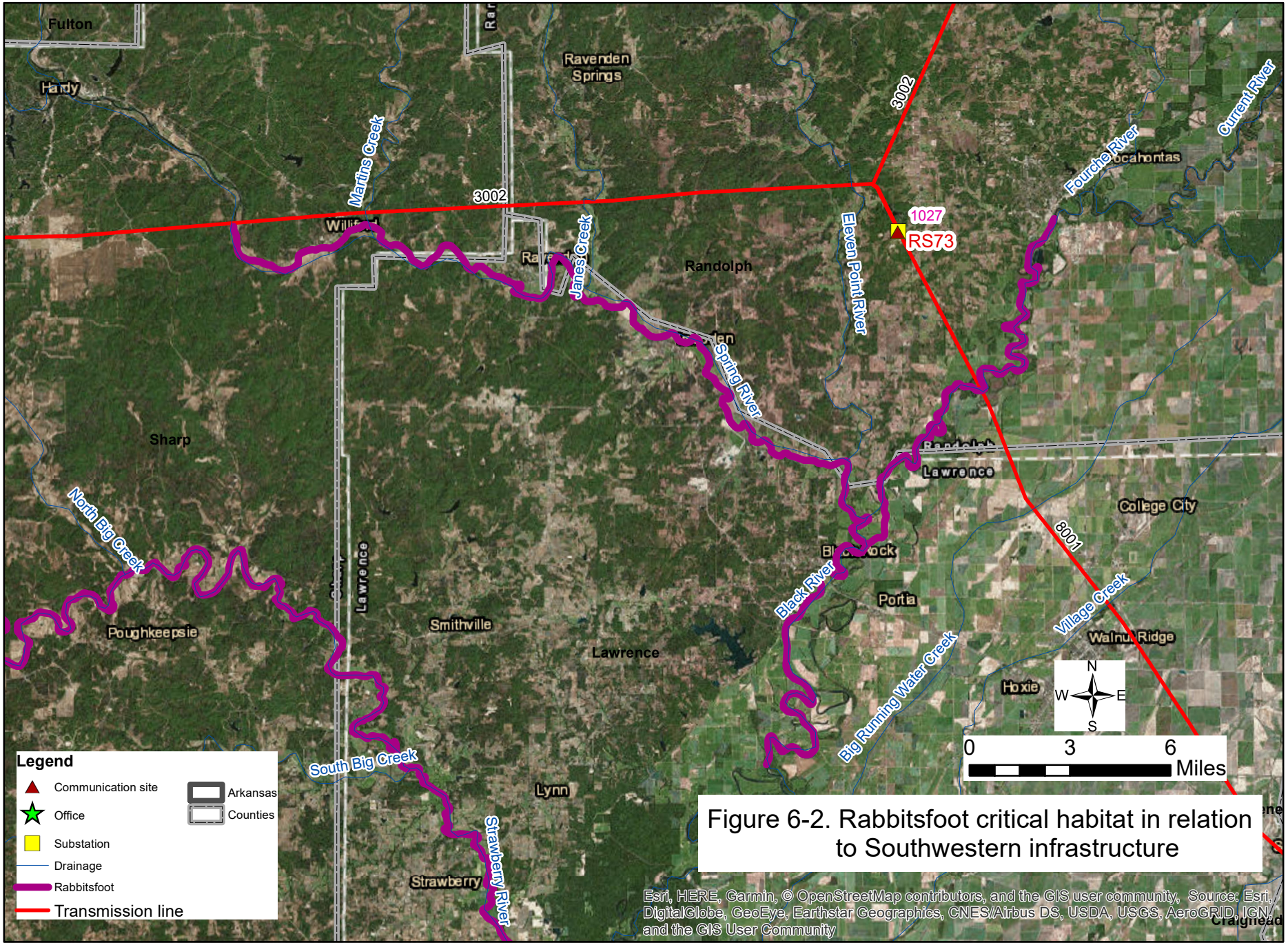


Figure 6-2. Rabbitsfoot critical habitat in relation to Southwestern infrastructure

6.10.4 Determination of Effect

For most herbicides, application would occur at least 15 feet from any surface water body and would not directly impact species. Only herbicides with approved aquatic labels would be used near surface water bodies. Southwestern would avoid creating impoundments that may alter water turbidity or increase siltation and indirectly affect the species. Sedimentation from O&M activities along the ROW including pole replacements can indirectly affect the species. Erosion controls, including a floating silt screen when poles are surrounded by water, can be used to reduce sedimentation into surface water. Any equipment that enters waterbodies would be washed prior to activities to prevent the spread of zebra mussels and equipment would not be used in the water in areas with designated critical habitat. The Proposed Action would not modify critical habitat and *may affect but is not likely to adversely affect* the rabbitsfoot.

6.11 Scaleshell Mussel

6.11.1 Description

The scaleshell mussel (*Leptodea leptodon*) is a medium-sized freshwater mussel, reaching 10 cm in length. They have a very thin, smooth yellowish-green to brown shell with faint green rays (USFWS 2001a). The species was listed as endangered on October 9, 2001 due to decreases in abundance and distribution throughout its range (USFWS 2001a). Critical habitat has not been designated for the species.

6.11.2 Life History and Current Status

This filter-feeder occurs in medium to large rivers, typically in riffle areas containing mussel beds. The mussel beds are typically diverse and occur on stable substrate in clear, good quality water (USFWS 2001a). Similar to other Unionidae, males release sperm into the water and are taken in by females. Larvae mature in the female and are released as parasitic larvae which further mature on a host fish. Spawning occurs in the fall, and females brood their larvae until late winter or early spring. The only known host fish for the scaleshell mussel are freshwater drum (USFWS 2001a).

Historically, the scaleshell mussel was found in 55 rivers in 13 eastern states (USFWS 2001a). Currently, the species is only found in 18 rivers, and is only consistently found in three of those. No specimens occur east of the Mississippi River or in the upper Mississippi River drainage (USFWS 2001a).

6.11.3 Habitat Evaluation and Suitability

The species are considered rare in the study area. They have been found recently in 11 of 25 historically used streams in the Lower Mississippi River Basin, although singly or in small numbers. Near Asherville, Missouri, Line 3002 crosses the St. Francis River, where there is suitable habitat for scaleshell mussels (USFWS 2010c). In Frog Bayou, between Rudy, Arkansas, and the Arkansas River, scaleshell habitat exists although their current status is unknown. Lines 3001 and 3005A run over the Frog Bayou in this area (USFWS 2010c). In Oklahoma, there may be populations in the Mountain Fork, Little Missouri, and Kiamichi rivers, just downstream of radio stations 5111, 5114, and 5115, respectively (USFWS 2010c).

6.11.4 Determination of Effect

In areas where the transmission lines cross rivers, any vegetation management and O&M activities near these water bodies may have the potential to impact the scaleshell mussel. For most herbicides, application would occur at least 15 feet from any surface water body and would not directly impact species. Only herbicides with approved aquatic labels would be used near surface water bodies. Sedimentation from O&M activities including pole replacements can indirectly affect the species. Erosion controls, including a floating silt screen when poles are surrounded by water, can be used to reduce sedimentation into surface water. Any equipment that enters waterbodies would be washed prior to activities to prevent the spread of zebra mussels. The Proposed Action *may affect but is not likely to adversely affect* the scaleshell mussel.

6.12 Snuffbox Mussel

6.12.1 Description

The snuffbox mussel (*Epioblasma triquetra*) is a small freshwater mussel, reaching up to 7 cm in length. Their smooth, triangle-shaped shells are yellow-greenish and darken with age. They were listed as endangered on March 15, 2012 due to significant declines range-wide (USFWS 2012c). No critical habitat is designated for this species.

6.12.2 Life History and Current Status

The species inhabits small creeks to lakes. They are found in gravel or sand substrates with swift currents, including shores of lakes (USFWS 2012c). Similar to other mussels, exact life cycle data is not known, though its reproductive organs are similar to other members of the Unionidae family and so it likely reproduces the same way. Females are gravid from September to May. There are a variety of known host fish for glochidia including darters, sculpin, and bass (USFWS 2012c). Historically, the species were found in 210 streams. Currently, the snuffbox mussel occurs in 79 streams in 14 states.

6.12.3 Habitat Evaluation and Suitability

In the project area, the species is found in five streams in the Lower Mississippi River sub-basin (USFWS 2012c). Line 8001 crosses the Black River in Arkansas, with one structure near the river, where the first live Arkansas specimen was discovered in 2005.

6.12.4 Determination of Effect

Southwestern would avoid creating impoundments that may alter water turbidity or increase siltation and indirectly affect the species. Sedimentation from O&M activities including pole replacements can indirectly affect the species. Erosion controls, including a floating silt screen when poles are surrounded by water, can be used to reduce sedimentation into surface water. Herbicide application would occur at least 15 feet from any surface water body unless herbicides had approved aquatic labels and would not directly impact species. Any equipment that enters waterbodies would be washed prior to activities to prevent the spread of zebra mussels. The Proposed Action *may affect but is not likely to adversely affect* the snuffbox mussel.

6.13 Winged Mapleleaf

6.13.1 Description

The winged mapleleaf (*Quadrula fragosa*) is a relatively small freshwater mussel (USFWS 1997a). They are dull brown with two to three broad green rays, prominent growth lines, and can reach 10 cm in length. They were listed as endangered on June 20, 1991 due to extirpation of the species in their entire range except for one population in the St. Croix River (USFWS 1991a); however, it has recently been discovered in four additional populations in three states (USFWS 2015d).

6.13.2 Life History and Current Status

Exact habitat requirements are unknown, as the species has been found in a wide variety of habitats. They have been historically found in large, fast streams and impoundments, in muddy and gravel substrates, and at depths ranging from 1.5 to 6.5 m (USFWS 1997a). Recently, the areas where they are found are in dense and diverse established mussel beds. They also appear to prefer substrates with coarse and compact sediment (USFWS 2015d). Specific matter they feed on is unknown; however, it is likely they are similar to other mussels and filter-feed on small particles of phytoplankton, zooplankton, and/or detritus suspended in the water (USFWS 1997a).

Similar to other mussel species, the winged mapleleaf males expel sperm into the water where they are taken in by females. Females brood the eggs for a period of time before they are released and find a host (USFWS 1979). The fertilized eggs are brooded typically starting in fall. The hosts for the glochidia of the winged mapleleaf are channel and blue catfish. In a warm fall, they may metamorphize quickly, but usually spend the winter on the catfish and fall off the next spring (USFWS 2015d). They must drop off near suitable habitat or they perish (USFWS 1997a).

Historic distribution of the winged mapleleaf was wide – 34 rivers in 12 Midwest states – from Arkansas to Minnesota and from central Kansas to Ohio (USFWS 1997a). Currently, five populations in five states are all that is left. The St. Croix River bordering Minnesota and Wisconsin harbors approximately 13,000 individuals; five individuals have been found in the Bourbeuse River in central Missouri; the Ouachita and Saline rivers in southcentral Arkansas contain unknown population sizes; and the Little River flowing from the far southeastern corner of Oklahoma into Arkansas also has a winged mapleleaf population of unknown size (USFWS 2015d). The species has recently been intentionally reintroduced into the Mississippi River in Minnesota and the Duck River in Tennessee (USFWS 2015d). No critical habitat for the species has been designated (USFWS 1991a).

6.13.3 Habitat Evaluation and Suitability

The winged mapleleaf has been found in the Little River in southeastern Oklahoma (USFWS 2015d). Radio station 5115, and potentially 5114, appears upstream of the Little River where specimens have been found in Oklahoma and Arkansas. The species need to be considered as a chemical spill or other disruption could travel downstream and impact the species. The species occur in small isolated populations and are subject to extirpation following a catastrophic event. The species are also at risk from exotic species such as zebra mussels. Elsewhere in Arkansas, the species has been found south of the project area. Similarly, in Missouri, the species occurs out of the project range.

6.13.4 Determination of Effect

In areas where the transmission lines cross rivers, any vegetation management and O&M activities near these water bodies may have the potential to impact the winged mapleleaf. Herbicide application would occur at least 15 feet from any surface water body, unless herbicides had approved aquatic labels, and would not directly impact species. Sedimentation from O&M activities including pole replacements can indirectly affect the species. Erosion controls, including a floating silt screen when poles are surrounded by water, can be used to reduce sedimentation into surface water. Any equipment that enters waterbodies would be washed prior to activities to prevent the spread of zebra mussels. The Proposed Action *may affect but is not likely to adversely affect* the winged mapleleaf.

6.14 American Burying Beetle

Information on the ABB is summarized from the draft Oklahoma biological opinion (BO) for the ABB, June 2017.

6.14.1 Description

The ABB is the largest silphid (carrion beetle) in North America, reaching 2.5 to 4.5 cm in length (Anderson 1982). Size, particularly pronotal width, is highly correlated with weight (Kozol et al. 1988). Pronotal width of ABBs ranged from 8.7 to 12.7 mm in a laboratory study and 8 to 12.6 mm at Block Island. The beetles are black with orange-red markings. The hardened elytra (wing coverings) are smooth, shiny black, and each elytron has two scallop shaped orange-red markings. The pronotum (hard back plate of the front portion of the thorax of insects) over the mid-section between the head and wings, is circular in shape with flattened margins and a raised central portion. The most diagnostic feature of the ABB is the large orange-red marking on the raised portion of the pronotum, a feature shared with no other members of the genus in North America (USFWS 1991b). The ABB also has orange-red frons (the upper, anterior part of the head), and a single orange-red marking on the clypeus, which is the lower face located just above the mandibles. Antennae are large, with notable orange club-shaped tips.

6.14.2 Life History and Current Status

The ABB was proposed for federal-listing in October 1988 (53 FR 39617) and designated as an endangered species on July 13, 1989 (54 FR 29652). Critical habitat has not been designated for the ABB. The Final Recovery Plan was signed on September 27, 1991. At that time (1991), only two, disjunct, natural populations occurred at the extremities of the species historic range of 35 states, i.e., four counties in Oklahoma and one small island off the coast of Rhode Island (USFWS 2008a). Since the Recovery Plan was developed in 1991, numerous other populations have been discovered, and the recovery objective of reducing the immediate threat of extinction through discovery or establishment of new populations has been met (USFWS 2008a). Currently at least four eco-regions support ABB populations estimated at greater than 1,000 ABBs (USFWS 2008a).

Historically, the geographic range of the ABB included over 150 counties in 35 states, covering most of temperate eastern North America and the southern borders of three eastern Canadian provinces (USFWS 1991b; Peck and Kaulbars 1987). Currently, the ABB is known to occur in eight states: on Block Island off the coast of Rhode Island, Nantucket Island off the coast of Massachusetts, Loess Hills in south-

central Nebraska and Sandhills in north-central Nebraska (Ratcliffe 1996, Bedick et al. 1999), Chautauqua Hills region of southeastern Kansas (Sikes and Raithel 2002), south-central South Dakota (Ratcliffe 1996), eastern Oklahoma, western Arkansas (Carlton and Rothwein 1998), northeast Texas (Godwin 2003), and Missouri. The ABBs in Missouri are part of a nonessential experimental population (under section 10(j) of the ESA) that was reintroduced in 2012.

The life history of the ABB is similar to that of other burying beetles (Kozol et al. 1988). The ABB is a nocturnal species that lives only for one year. The beetles are active in the summer months and bury themselves in the soil for the duration of the winter. Immature beetles (tenerals) emerge in late summer, over-winter as adults, and comprise the breeding population the following summer (Kozol et al. 1988). Adults and larvae are dependent on carrion for food and reproduction. They must compete for carrion with other invertebrate species, as well as vertebrate species.

Winter Inactive Period: When the nighttime ambient air temperature is consistently below 15.5°C, ABBs bury into the soil and become inactive (USFWS 1991b). In Oklahoma, this typically occurs from late September and until mid-May (USFWS 2008a), approximately 8 to 9 months. However, the length of the inactive period can fluctuate depending on temperature. Recent studies indicate that ABBs bury to depths ranging from 0 to 20 cm in Arkansas (Schnell et al. 2007), although other depths have been noted. Habitat structure (i.e., woodland vs. grassland) does not appear to be an influencing factor in over-winter survival rate in Oklahoma (Holloway and Schnell 1997).

Summer Active Period: The ABB is active in the summer months, emerging from their winter inactive period when ambient nocturnal air temperatures consistently exceed 60ºF. They are most active from 2 to 4 hours after sunset, with no captures recorded immediately after dawn (Walker and Hoback 2007, Bedick et al. 1999). During the daytime, ABBs are believed to bury under the vegetation litter. The ABB begin rearing broods soon after emergence from overwintering. During late May and early June, ABBs secure a mate and carcass for reproduction. The reproductive process takes approximately 48 to 69 days. In Oklahoma, ABBs are typically active from mid-May to late-September. Weather, such as rain and strong winds, result in reduced ABB activity (Bedick et al. 1999).

ABBs are considered feeding habitat generalists and have been successfully live-trapped in several vegetation types including native grasslands, grazed pasture, riparian zones, coniferous forests, mature forest, deciduous forest with little undergrowth, and oak-hickory forest, as well as on a variety of various soil types (Creighton et al. 1993; Lomolino and Creighton 1996; Lomolino et al. 1995; USFWS 1991b). Ecosystems supporting ABB populations are diverse and include primary forest, scrub forest, forest edge, grassland prairie, riparian areas, mountain slopes, and maritime scrub communities (Ratcliffe 1996; USFWS 1991b). The ABB readily moves between different habitats (Creighton and Schnell 1998, Lomolino et al. 1995). Adult and teneral ABBs do not need to bury carcasses for feeding and soil types are not a limiting factor for feeding habitat.

Soil conditions for suitable ABB reproductive habitat must be conducive to excavation by ABBs (Anderson 1982; Lomolino and Creighton 1996). Soils in the vicinity of captures tend to include well drained sandy loam and silt loam, with a clay component noted at most sites. Level topography and a well-formed detritus layer at the ground surface are common (USFWS 1991b). In 1996, more than 300 ABBs were captured in Nebraska habitats consisting of grassland prairie, forest edge, and scrubland

(Ratcliffe 1996). Some surveys have found certain soil types such as very xeric (dry), saturated, or loose, sandy soils to be unsuitable for carcass burial and thus are unlikely reproductive habitats.

6.14.3 Habitat Evaluation and Suitability

The ABB's uneven distribution and density, and their vulnerability to extinction are likely due to the species having specialized resource requirements with carrion being a finite resource widely scattered in space and time (Peck and Kaulbars 1987). Soils in the vicinity of captures tend to include well-drained sandy loam and silt loam, with a clay component noted at most sites. Level topography and a well-formed detritus layer at the ground surface are common (USFWS 1991b) for reproductive habitat. Lomolino and Creighton (1996) found reproductive success was higher in forest verses grassland habitat, because more carcasses were buried in the forested habitat than the grassland. Carcasses may be more difficult to secure in grassland due to the near absence of a litter layer and may be more difficult to bury due to the tendency of grassland soils to be more compact than those in forest. Intraspecific competition may play an important role in persistence of local ABB populations (Ferrari 2012).

In 2016, the known range of the ABB in Oklahoma was updated from the original 26 Oklahoma counties: a slight range expansion to the west in Osage, Noble, Pawnee, and Lincoln counties, totaling 410,898 acres, and smaller expansion in the east of 11,875 acres in Craig, Delaware, and Mayes counties. The current range of the ABB within Oklahoma is dominated by the Osage Cuestas (an irregular to undulating plain) of the Central Irregular Plains, the Arkansas Valley, the Ouachita Mountains, and the South Central Plains ecoregions (Figure 6-3).

In Arkansas, the ABB has the potential to occur in six counties of which Crawford, Franklin, and Johnson are located with the Proposed Action area. Line 3001 and a substation and communication tower fall within the current distribution of the ABB in these counties (Figure 6-4).

6.14.4 Determination of Effect

O&M activities have the potential to compact and disturb soils which would potentially injure or kill ABBs. These projects would be implemented throughout the year, potentially affecting the ABB during all phases of its lifecycle. Overwintering adults and reproductive broods may be affected through the direct loss of individual adults and larvae, and a decrease in ABB fecundity. Vegetation management in the ROW would potentially involve mowing or herbicide treatments which could reduce the availability of habitat for small bird and mammal populations thus reducing potential carcasses for the ABB. Most maintenance activities normally only entail minimal soil disturbance or compaction and may cause multiple, though often minor, disturbances over the life of the project. Approximately 859 acres of potential ABB habitat occur along the ROW in the three counties in Arkansas.

In Oklahoma, the estimated maximum soil disturbance in ABB habitat due to Southwestern activities for any given year is 4,855 acres. This estimate includes maintenance, and possible emergency actions. Planned activities could be scheduled or modified to avoid impacts to the ABB on approximately 123 acres per year. Approximately 4,732 acres per year may be subject to disturbance on short notice or during the dormant season with little avoidance possible; these acres, if disturbed under such conditions, will be considered "incidental take". This is an estimated maximum amount since actual impacts would be limited to the individual project footprints – an area usually considerably smaller than the entire ROW.

O&M activities at the communication tower and the substation are not likely to impact ABBs as the sites are already disturbed and are now graveled. Due to the potential impact to ABB from O&M and vegetation management activities along the ROW, the Proposed Action *may affect and is likely to adversely affect* the species.

6.15 Hine's Emerald Dragonfly

6.15.1 Description

The Hine's emerald dragonfly (*Somatochlora hineana*), known for its bright emerald-green eyes, was listed as endangered on January 26, 1995. Critical habitat was designated on September 5, 2007 and although is designated in Crawford County, Missouri, it does not occur in the project area (USFWS 2018i). Also known as the Hine's bog skimmer, hooker-tipped emerald, and Ohio emerald, the Hine's emerald dragonfly is one of the most endangered dragonflies (USFWS 2001b). The species measures approximately 6.3 cm long and has a metallic green body with creamy-yellow stripes on its side that distinguish it, along with the terminal male appendages and ovipositor, from other species in the genus (USFWS 2001b, USFWS 2018j). The dragonfly's wingspan reaches approximately 8 cm.

6.15.2 Life History and Current Status

Historically the species was distributed in Alabama, Indiana, and Ohio, as well as Illinois, Michigan, Missouri, and Wisconsin where it is currently found (USFWS 2018j). The species is restricted to wetland habitat with slow-flowing shallow water for larvae development. Preferred habitat for the species consists of calcareous spring-fed marshes, wetlands, streams, and sedge meadows overlaying dolomite bedrock (USFWS 2018j). Other important habitat components of these wetland areas are nearby or adjacent forest edge for shaded perching areas and open, vegetated areas for foraging (USFWS 2001b).

Females lay their eggs in the shallow water where the eggs overwinter and the larvae hatch the following spring. Oviposit sites have been documented in sedge hummocks near a marshy stream edge, seepage marshes and meadows, streamlets, small puddles, and muck bottomed pools (Vogt and Cashatt 1994 and Soluk et al. 1996 cited in USFWS 2001b). The larvae live in the water for 3 to 5 years, eating smaller aquatic insects, until they emerge as adults (USFWS 2018j). Larval mortality is high as a result of predation, sometimes starvation, and cannibalism (Satyshur 2008 cited in USFWS 2013c). In some areas there is evidence that Hine's emerald dragonfly larvae take advantage of crayfish burrows during cooler water temperatures in the late fall to early spring (USFWS 2013c). Larvae have also been shown to withstand drought conditions (USFWS 2001b).

During the three adult phases dragonfly movement behavior may change. During the pre-reproductive and post-reproductive phase an adult may make short feeding flights and fly 1 to 3 km from their emergence site (USFWS 2001b). Reproductive adults establish territories and breeding areas approximately 7 to 10 days after emergences (USFWS 2001b). Foraging flights during this time increase in length and the distance may be reduced to 1 to 2 km for the territory. Males actively patrol their territories concentrated near aquatic habitat that usually ranges from 2 to 4 m in length (USFWS 2001b). The sex ratio at emergence is approximately 1:1 and emergence is synchronous between the sexes (Foster and Soluk 2004 cited in USFWS 2013c). Adults live approximately 4 to 5 weeks and their eyes are initially brown.

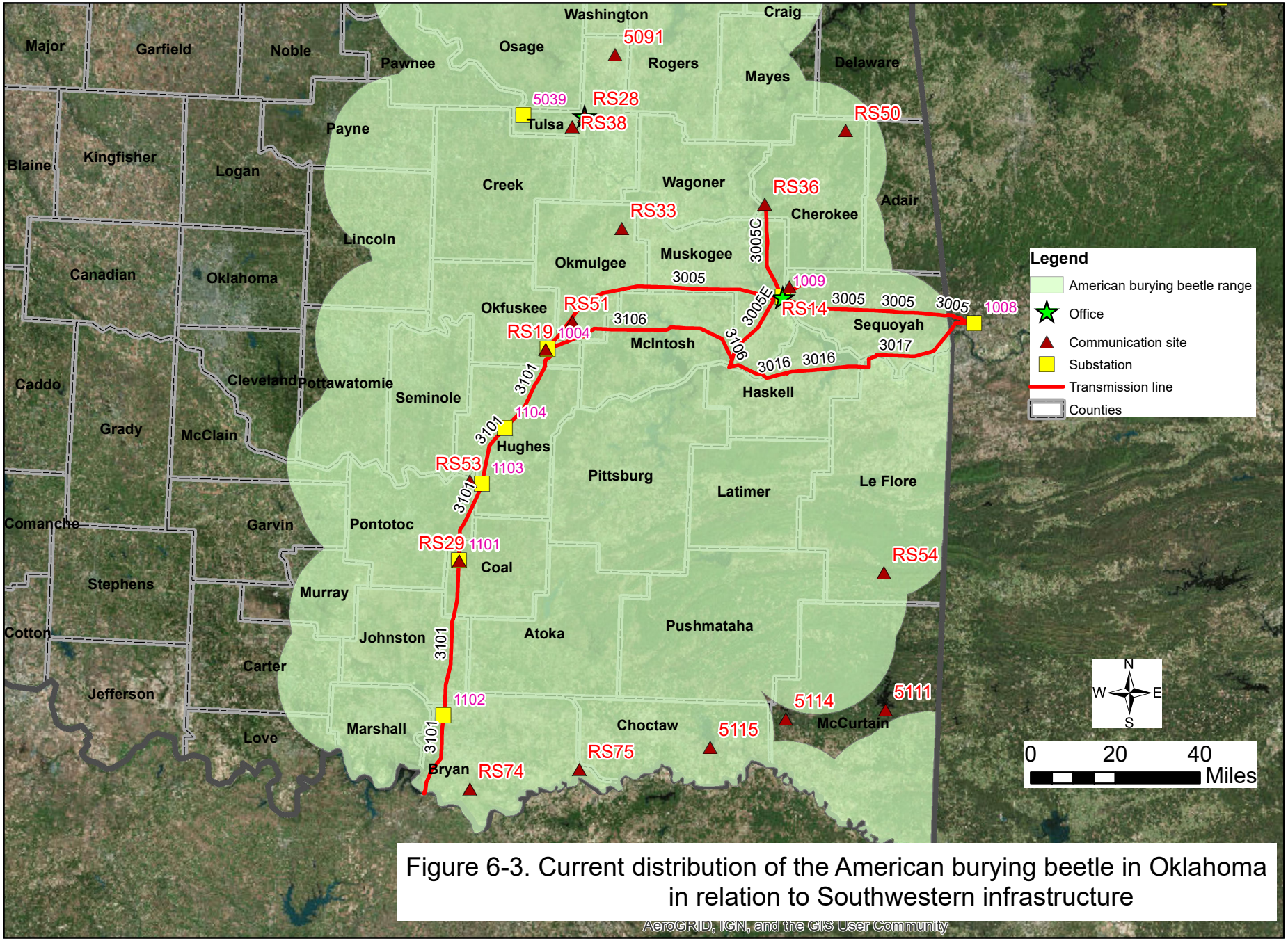


Figure 6-3. Current distribution of the American burying beetle in Oklahoma in relation to Southwestern infrastructure

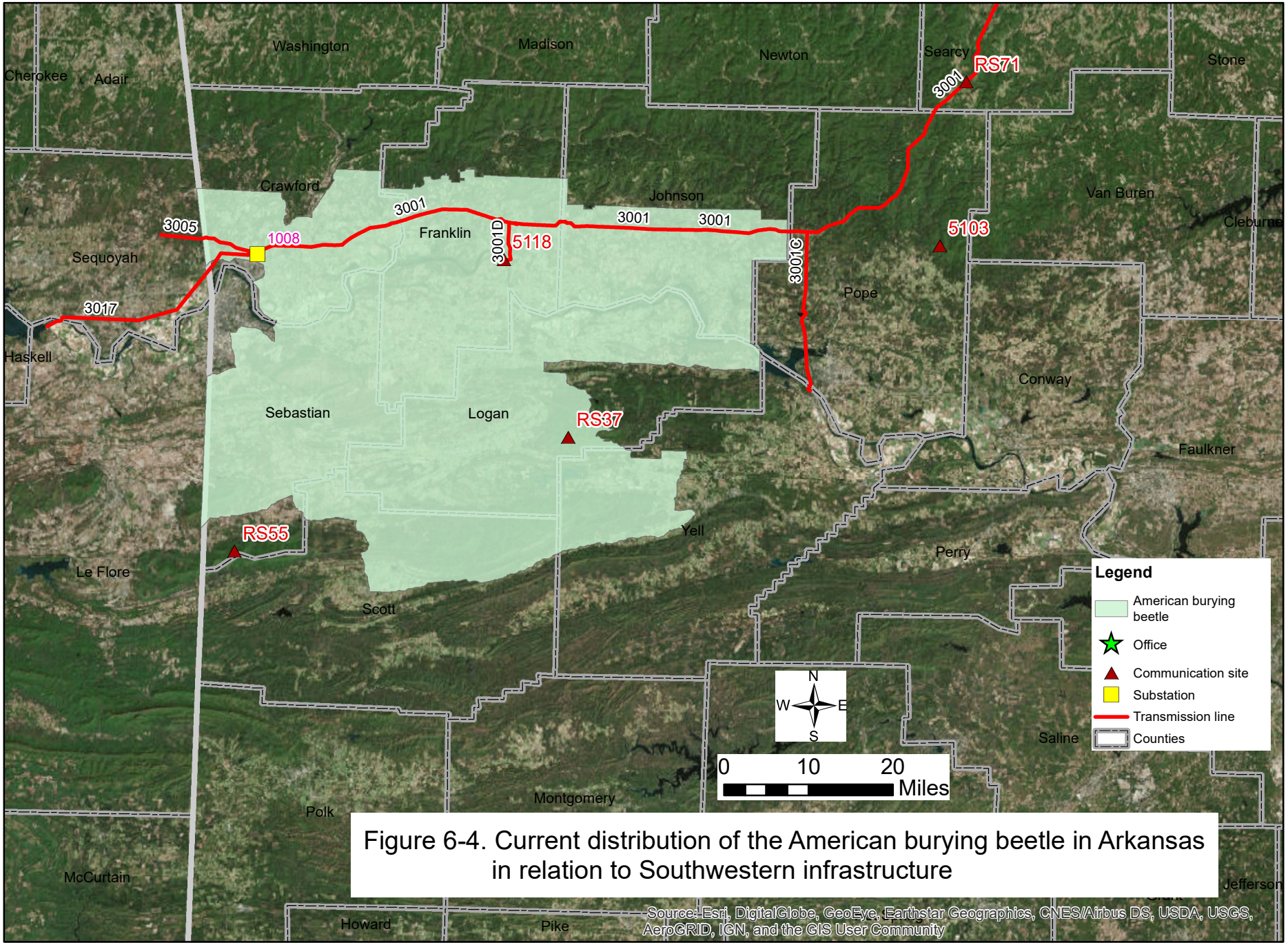


Figure 6-4. Current distribution of the American burying beetle in Arkansas in relation to Southwestern infrastructure

Dragonfly adults are predators feeding on primarily insects they capture while flying predominately in the morning.

Current known populations of the Hine's emerald dragonfly occur in Dent, Iron, Phelps, Reynolds, and Ripley counties in Missouri. Line 3002 is found in Ripley County where five sites have been documented since the recovery plan throughout the county (USFWS 2013c). Habitat for two of these sites is fully protected and managed by the MDC (Glass Lizard Fen and Overcup Fen). The Hine's emerald dragonfly sites within each occupied Missouri County are considered a subpopulation (USFWS 2013c).

6.15.3 Habitat Evaluation and Suitability

Wetland habitat and streams are found throughout the project area. In addition, the Missouri Natural Heritage database notes the Current River which runs through Ripley County as a population distribution area by watershed for the Hine's emerald dragonfly (MDC 2018b). Structures 649 and 650 on Line 3002 cross the Current River.

6.15.4 Determination of Effect

Invasive vegetation can potentially impact Hine's emerald dragonfly behavior and habitat. The encroachment of cattails (*Typha* spp.) and woody vegetation has the potential to affect adult flight behavior and movement (USFWS 2001). Encroaching vegetation can also affect the hydrology of the fens and marshes thus affecting necessary groundwater habitat for larvae. Invasive animals, such as the feral hog, could potentially destroy habitat for the Hine's emerald dragonfly by impacting wetland and fen communities through rutting behavior. Potential impacts to the Hine's emerald dragonfly may occur if wetland habitat is destroyed during O&M operations. Maintenance of the poles near the Current River may crush riparian vegetation along the river bank associated with the poles. One pole lies on the west side of the river in the floodplain. Herbicide spraying would not occur at the water's edge nor in any associated riparian habitat unless the herbicide had an approved aquatic label; therefore, potential impacts from vegetation management would be limited to removal of undesirable tree species. However, during habitat assessment and adult surveys conducted in the Upper Peninsula of Michigan, utility ROWs that are kept clear of woody vegetation appear to serve as flight corridors for the species (USFWS 2001). Vegetation management and work along this line at the structures would be sporadic and the timeframe in between visits long. Temporary short-term impacts to the species may occur during O&M operations but these would be temporally separated over a minimum of 5 years and would not significantly impact the population. Therefore, the Proposed Action *may affect but is not likely to adversely affect* the Hine's emerald dragonfly.

6.16 Arkansas River Shiner

6.16.1 Description

The Arkansas River Shiner (*Notropis girardi*) is a small, freshwater fish reaching 51 mm in length. They are a plain, silver- to white-colored fish, typically with a single small black chevron at the base of the caudal fin. The species was listed as threatened on November 23, 1998 due to reduced distribution and abundance resulting from habitat destruction and competition with non-native species (USFWS 1998).

Critical habitat is designated for the species along 523 miles (842 km) of rivers including all adjacent riparian areas within 300 feet (91 m) of each bank (USFWS 2005a).

6.16.2 Life History and Current Status

The species occurs in shallow, wide rivers and large streams with sandy substrate. They rarely occur in streams with deep water or mud or gravel substrates. Spawning occurs during the summer and typically coincides with flood flows after a heavy rain event. Eggs are non-adhesive and flow with the current until they hatch 1 to 2 days later. Larvae find a quiet backwater pool to begin foraging. Post-spawning mortality is likely high and the species likely only lives around 3 years (USFWS 1998). The Arkansas River shiner is a generalist feeder, consuming prey both suspended in the water and lying on the bottom substrate (USFWS 1998).

Historically, the species occupied streams in the western portion of the Arkansas River basin. Construction of dams has isolated populations, stopping dispersal and recruitment from occurring. Currently, almost the entire population resides in the Canadian River of Oklahoma, Texas, and New Mexico; they are considered extirpated from 80-percent of their historical range. The species is presumed extinct in Arkansas (USFWS 1998).

6.16.3 Habitat Evaluation and Suitability

In the project area, critical habitat exists in the Canadian River near Lamar, Oklahoma (USFWS 2005b). Line 3101 crosses the Canadian River at this point although no structures occur right at the river edge (Figure 6-5).

6.16.4 Determination of Effect

Threats to the species include habitat loss or alteration and water quality degradation (USFWS 1998). O&M activities occurring along Line 3101 at the Canadian River have the potential to impact water quality. Potential impacts due to erosion during pole maintenance can indirectly affect the species. Erosion controls, including a floating silt screen when poles are surrounded by water, can be used to reduce sedimentation into surface water. Activities, even when replacing the pole near the Current River, would occur away from and out of the water body. O&M activities would occur at a localized area and would be temporally spaced occurring at 5 years or longer intervals. The Proposed Action *may affect but is not likely to adversely affect* the Arkansas River shiner.

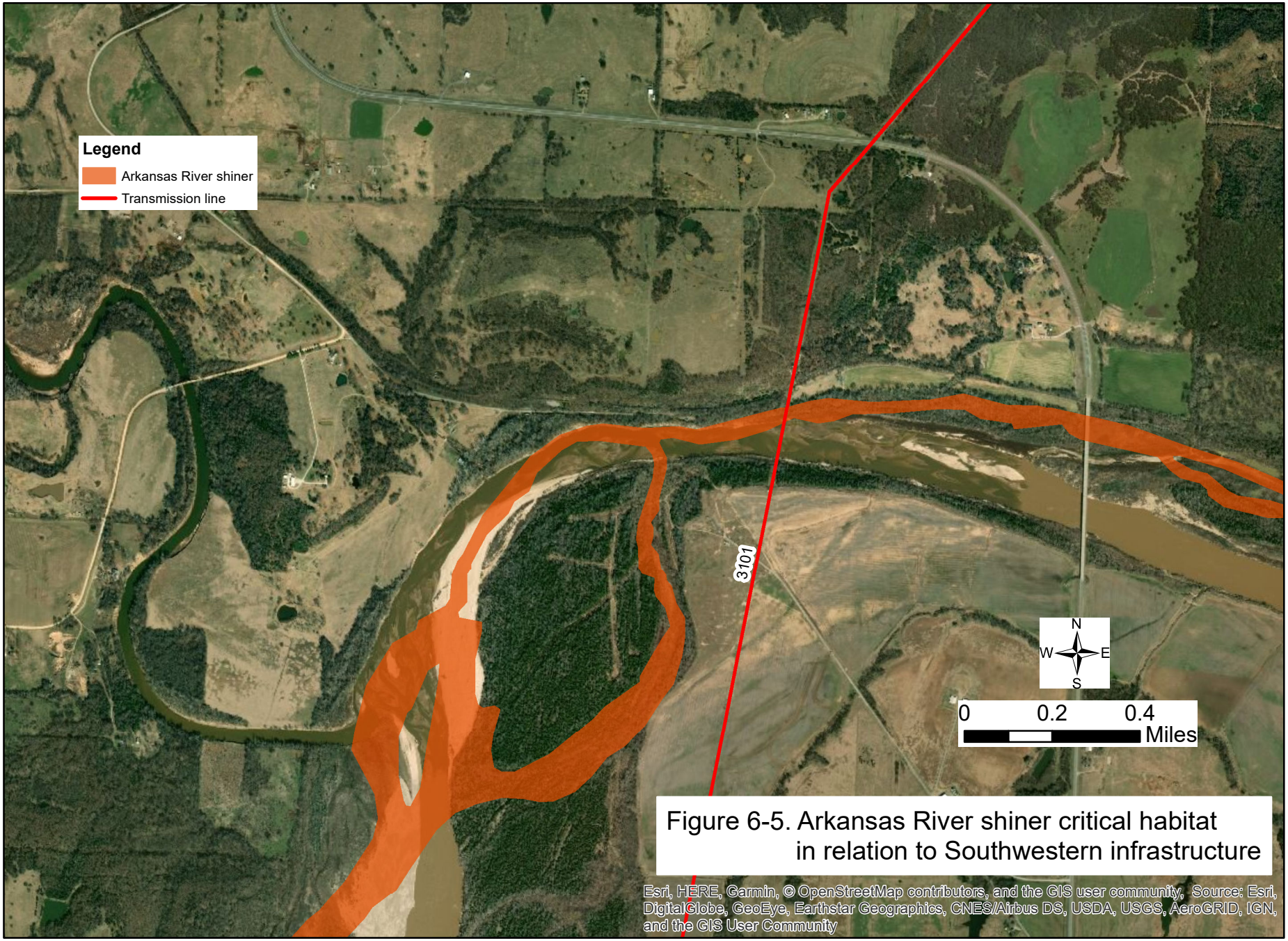


Figure 6-5. Arkansas River shiner critical habitat in relation to Southwestern infrastructure

6.17 Ozark Cavefish

6.17.1 Description

The Ozark cavefish (*Amblyopsis rosae*) is a small fish with translucent skin. They lack pigment as well as eyes as a result of inhabiting underground water systems. As so, they appear pinkish in color, with blood and organs visible through the skin. They can grow to approximately 75 mm in length (USFWS 2011a). They are similar in appearance to both the northern (*A. spelaea*) and southern (*Typhlichthys subterraneus*) cavefishes (USFWS 1989b), though the three species inhabit caves in different regions (Willis and Brown 1985). Genetic analyses suggest four subspecies of the Ozark cavefish, each with small, isolated populations; though population connectivity is not well known (USFWS 2011a). The cavefish was listed as threatened throughout its range on November 1, 1984 as a result of declines in population from habitat alteration and exotic collectors (USFWS 1984).

6.17.2 Life History and Current Status

Ozark cavefish are found in underground caves, sinks, and wells in the Springfield Plateau Region of southwest Missouri, northwest Arkansas, and northeast Oklahoma. Forty-one sites in the tri-state area are considered active cavefish sites (USFWS 2011a). Cavefish are found in waters that are "high-quality," with low levels of toxic metals (Willis and Brown 1985, Graening and Brown 2000) and that depend on nutrient flow from outside of the cave, such as bat guano or leaf litter (USFWS 1989b). No critical habitat has been designated for this species, in part so as not to reveal the locations of cavefish populations to exotic collectors (USFWS 1984).

Specific habits of the species are not well known. Breeding habits are not known at all; it is not known how eggs are cared for and young of the year have been observed in January and July, suggesting there is no specific breeding season (USFWS 2011a). There are conflicting studies as to whether or not cavefish and gray bats are found in correlation with each other (USFWS 2011a) although USFWS (1989b) defines a commensalistic relationship between the cavefish and bats, as the guano provides food and increased energy and nutrients into the water system. Ozark cavefish feed primarily on plankton, but will also eat amphipods, isopods, crayfish, salamander larvae, and bat guano (USFWS 1989b).

The most recent population estimate is 213 Ozark cavefish (USFWS 2011a). However, this is limited to the fish biologists are able to reach and there may be fish currently living in inaccessible areas (USFWS 1989b, USFWS 2011a). Many sites contain incredibly low densities of fish, between 1 and 12 individuals, though one particular cave, Cave Springs in Benton County, Arkansas, was found with 100 individuals (Willis and Brown 1985). Cave Springs Cave and Logan Cave (also located in Benton County, Arkansas) hold 80 percent of the known population (USFWS 2011a).

6.17.3 Habitat Evaluation and Suitability

Ozark cavefish are tied only to wells and caves of the Springfield Plateau Region. They live in this area year-round throughout their lifetime. Cavefish habitat is located directly below many of the lines, substations, and radio stations in the project area.

In Arkansas, confirmed sightings have occurred in Benton County (Graening and Brown 2000, Graening et al. 2010); transmission Line 3009 runs through the far northeast corner of this county. Other sightings have occurred in the state, though not in recent years and historic sites are not considered active (USFWS 2011a).

In Missouri, confirmed and unconfirmed sightings have been made in seven of the nine counties, in the southwest corner of the state (Graening and Brown 2010). The project runs through all of those nine counties. Lines 3003, 3003A, 3004, 3006, and 3009; radio stations 41, 42, 69, and 76; and substations 1001, 1020, 1021, 1028, and 1036 are in these counties. However, USFWS (2011a) does not consider McDonald or Taney counties as currently harboring populations of the species.

In Oklahoma, confirmed sightings of the cavefish have not occurred in the project area (Graening et al. 2010). However, unconfirmed sightings have occurred in Cherokee and Sequoyah counties (although not recently [USFWS 2011a]), and radio stations 14, 36, and 50; substations 1009 and 5092; and transmission Lines 3005, 3005C, 3005D, and 3017 occur in these counties.

6.17.4 Determination of Effect

Potential project threats to the species include spills, which can leak into the groundwater system. Contaminants such as herbicides (among other man-made chemicals) may cause abnormalities and increased cancer risks, although little is known about effects on cave-dwelling organisms (USFWS 2011a). The Ozark cavefish is highly specialized and may not recover well from small changes in its environment (USFWS 1989b). While project activities would not occur in cave systems, activities on the surface may impact groundwater systems, which may impact water quality for cavefish. Dispersal of the species occurs only during periods of cave flooding. Impacts to the species from O&M activities would be limited since disturbance would occur mainly aboveground. Herbicide usage for vegetation management though has the potential to impact the species. In Greene, Newton, and Lawrence counties in Missouri where the cave fish has been confirmed, Southwestern limits their use of herbicides to only Garlon 3A on woody plants under their SOPs. Southwestern personnel are also trained to identify karst features and herbicide application is kept at a minimum of 15 feet from the feature. The Proposed Action *may affect but is not likely to adversely affect* the Ozark cavefish with implementation of these BMPs.

6.18 Ozark Hellbender

6.18.1 Description

The Ozark hellbender (*Cryptobranchus alleganienis bishopi*) is a large, stream-dwelling salamander. Adults are typically 29 to 51 cm (USDA 2003), though may reach lengths of 73 cm (Johnson and Briggler 2004). Their coloration varies but is mostly brown with dark splotches with a yellowish-brown belly; they may appear more reddish-brown when breeding. They are dorso-ventrally flattened and spend much of their time under rocks (Johnson and Briggler 2004). They are similar in appearance to the Eastern hellbender (*Cryptobranchus alleganienis alleganienis*) and are not easily distinguished from each other if found out of their current range (USFWS 2011b). The species was listed on October 6, 2011 however no critical habitat has been designated for the Ozark hellbender.

6.18.2 Life History and Current Status

Ozark hellbenders are found in fast-moving streams in the Ozark Highlands of Missouri and Arkansas. They require particular levels of flow, dissolved oxygen, and temperature in these streams to survive. The streams must also contain gravel beds or large rocks, as they spend most of their time under rocks (USFWS 2012d). They come out from under the rocks at night to feed; crayfish make up most of their diet (USDA 2003), though they also forage on small fish and insects (Johnson and Briggler 2004), and even their own eggs (USFWS 2011b).

Males make their nests under rocks or logs (USFWS 2012d). Eggs are laid and fertilized externally, typically sometime between September and January; males guard the 138 to 450 eggs for around 80 days. Juveniles take 5 to 8 years to sexually mature, and the species can live for 25 to 30 years (USDA 2003).

Their distribution is limited to streams in southern Missouri and northern Arkansas. They are restricted to five rivers (Spring, White, Black, Eleven Point, and Current) and three tributaries off of those main rivers. The most recent population estimate was 590 individuals, down 70 percent from historic population estimates (USFWS 2012d). The species was listed as endangered in 2011 throughout its limited range (USFWS 2011b). Dispersal of the species is limited, with a majority of marked individuals moving less than 30 m between captures in one study (USDA 2003).

6.18.3 Habitat Evaluation and Suitability

Ozark hellbenders are tied to fast-moving, clear, gravel-bed streams of particular flow, dissolved oxygen, and temperature in the Ozark Highlands of Missouri and Arkansas. Populations are not found elsewhere. Several of the streams the species are found in are within the project area. In Arkansas, Line 3002 crosses the Eleven Point River in Randolph County. In Missouri, the Current River runs through Line 3002 outside of Doniphan, Missouri in Ripley County. Though the Current River has not been surveyed well or in recent years, the only hellbenders found in this river were in Shannon County, north of the project area (USDA 2003).

6.18.4 Determination of Effect

One of the primary threats to the species is habitat degradation (USFWS 2012d). As previously mentioned, hellbenders require specific water qualities to survive. Reduced water quality from hazardous waste, agricultural runoff, etc., may negatively impact the species. The Ozark hellbender is a strictly aquatic species. Impacts from O&M activities would be limited to any work that occurs within the waterbodies or that has the potential to alter water quality. Increased sedimentation from construction at the lines which cross the Current and Eleven Point rivers could increase erosion into the rivers. Erosion control measures would reduce short-term impacts to the species. Activities at the lines would be infrequent and temporally separated. Herbicides would not be used in the water. Impacts from the Proposed Action *may affect but is not likely to adversely affect* the species.

6.19 Least Tern

6.19.1 Description

The least tern (*Sternula antillarum*) is a small, migratory shorebird. It is the smallest tern in North America, at just 21 to 23 cm in length (USFWS 2013d). The species has a black head and eye stripe, creating a white triangle on the forehead. Their backs and wings are gray above and white below. Legs are orange-yellow, and their orange bill is tipped with black (USFWS 1990). Males and females are similar in appearance.

6.19.2 Life History and Current Status

The interior population has been listed as endangered since May 28, 1985. This population breeds from Texas all the way up into Montana and from Colorado to Indiana (USFWS 1990). Other populations of the species include the endangered California least tern, restricted to the Pacific Ocean, and the "coastal" least tern, which nests along the Gulf of Mexico, Atlantic Coast, and in the Caribbean (USFWS 2013d). No critical habitat has been designated for this species (USFWS 1985b).

This ground-nesting species prefers open, unvegetated sand or gravel habitats near their feeding areas (USFWS 2013d). A majority of interior least terns spend their time on river habitats, though other habitats utilized include sand pits, reservoirs, salt flats, industrial sites, and rooftops (USACE 2006). They typically prefer to nest away from trees or other structures that could harbor predators (USFWS 2013d). The species nests in colonies from 2 to over 1,200 individuals (USFWS 2013d) and their nests can be very close or hundreds of meters apart (USFWS 1990). They spend approximately 4 to 5 months at breeding colonies, which encompasses courtship, breeding, incubating, and, finally, rearing chicks. Chicks are semi-precocial but must be fed by their parents until they learn to fly and forage for themselves (USFWS 2009b).

Least terns are mainly piscivores but have also been found to feed on aquatic invertebrates. They forage in a variety of different habitats, but typically over shallow water and within 7 miles of their colony (USFWS 2013d). Terns forage by hovering over shallow water and then diving to capture their prey (USFWS 1990).

Migration routes or timing are not exactly known, though researchers believe the species follows major rivers south to the Gulf. They appear to travel in small groups, foraging and resting along the way (USFWS 2013d). The species overwinters along the Gulf of Mexico and south all the way to northern Brazil (USFWS 1985b). Little is known about their non-breeding habits or habitats, other than that they are observed along coastal habitat, including bays, estuaries, and the mouths of rivers (USFWS 2013d). Once they reach the coast, they are indistinguishable from the "coastal" population.

During the last range-wide survey (2005), 17,591 interior least terns were counted (USACE 2006). On the Arkansas River system in Oklahoma and Arkansas, 2,129 adults were observed. This survey likely underestimated the total number as it did not account for imperfect detection nor did it cover all possible least tern nesting sites. Water levels play a significant role in where least terns can nest. For example, during the 2005 range-wide survey (USACE 2006), some areas had high numbers of birds, but only because of very low lake levels during that particular year. The species is considered "biologically

recovered" by the authors of the most recent 5-year review (USFWS 2013d). The species has seen increases and due to their resiliency they have recovered well.

6.19.3 Habitat Evaluation and Suitability

Least terns are tied to shallow water habitats for foraging, and to open, sand or gravel areas for breeding. The project area does include habitat least terns use, and indeed, the species has been documented breeding along rivers within the project area.

During the 2005 range-wide survey, least terns were found on several rivers in Oklahoma and Arkansas. A small number of the species was observed on the North Canadian River west of Eufaula Lake. Line 3106 occurs just north of the river and the lake. In addition, east of Eufaula Lake on the Canadian River (before it reaches the Arkansas River), higher concentrations of the species have been documented. Line 3016 runs across the river in this stretch. In these areas, the Canadian River appears to be characterized by broad sandy banks. Terns have been found nesting in the Tulsa, Oklahoma area on the Arkansas River. Radio stations RS28 and RS38 as well as substations 5039 and 5048 may be very close to nesting sites, depending on the exact nesting locations. As the Arkansas River continues into Arkansas, breeding sites continue to occur. However, no lines cross the river in the project area in Arkansas. Least terns nest all along the Red River on the Texas/Oklahoma border, but no Southwestern facilities are located directly on the river. The only known nesting sites in Missouri are on the Mississippi River outside of the project area.

6.19.4 Determination of Effect

O&M activities have the potential to disturb nesting species although activities would be limited in duration. While activities in the project area could potentially disturb the species, as stated in USFWS (2013d), due to the species' flexibility about habitat changes, the sheer number of established breeding colonies, and the increase in population size, it is unlikely a visit to sites every once in a while would impact the species at all. Vegetation removal on sandbars would likely benefit the species as they prefer open habitats. Therefore, the Proposed Action *may affect but is not likely to adversely affect* the least tern.

6.20 Piping Plover

6.20.1 Description

The piping plover (*Charadrius melodus*) is a small, migratory shorebird with two distinct looks: one each for the breeding and non-breeding seasons. On the non-breeding grounds, they have a gray back and head, while their underparts are white. Their bill is black and their legs are pale orange. While breeding, their bill is orange tipped with black, their legs are bright orange, and they have a black band across the forehead and around the neck. Both sexes have a similar appearance. They are approximately 16.5 to 17.5 cm long and weigh 46 to 64 grams. Three distinct breeding populations are recognized: the Atlantic Coast, the Great Lakes, and the Northern Great Plains (NGP). The Great Lakes population is classified as endangered while the other two populations are threatened. During migration and on the wintering grounds, all populations are considered threatened (USFWS 1988). The NGP population of piping plovers were listed as threatened on January 10, 2001 (USFWS 2016b) with critical habitat designated on the breeding grounds.

6.20.2 Life History and Current Status

The species nests along lakes, rivers, and reservoirs from the Midwest to the Atlantic Coast. These ground-nesters typically arrive on the breeding grounds in April, with first-year birds arriving up to one month later (USFWS 2016b). Nesting and chick-rearing last around 46 days, though can be longer if a pair loses a nest and then produces a second nest (USFWS 2016b). Piping plovers migrate south as early as mid-July. Juveniles migrate south several weeks later, and most are gone from the breeding grounds by late August (USFWS 1988).

Migration through the central portion of the U.S. is "not well defined" (USFWS 2016b) and "poorly understood" (USFWS 1988). Piping plovers appear to travel alone or in small groups and do not appear to use the same sites year after year (USFWS 2016b). Therefore, it is difficult to predict where or even when they may stop, or for how long. However, they likely stop where their preferred habitat and prey are readily available. Piping plovers overwinter along the Gulf of Mexico and further south into Mexico, the Bahamas, and Cuba. It appears that the Atlantic Coast and Great Lakes populations largely overwinter along the Atlantic Coast while the NGP population mostly overwinters along the Gulf of Mexico (USFWS 2009b).

Piping plovers forage on invertebrates found on exposed shorelines, typically within 5 m from the water (USFWS 1988). Their federal status prohibits any gut analyses to be performed, which would provide a clearer picture of their diet, but they have been observed foraging on available macroinvertebrates on the habitats they prefer (USFWS 2016b). Summer habitat for the species consists of open, mostly vegetation-free gravel or sand shorelines of rivers and lakes and on gravel or sand pits (USWFS 2016b). Winter habitat is similar.

The current population estimate for the NGP population is 4,622 individuals (2006), up from 2,953 (1991), however, researchers have shown that the birds are difficult to accurately survey due to their cryptic nature, dispersal ability, and their geographically large breeding area. In addition, the amount of available habitat changes frequently, as does the amount of birds in a given area (USFWS 2016b).

6.20.3 Habitat Evaluation and Suitability

The piping plover is tied to open, sand or gravel shorelines throughout its range. While migration stopover sites and their usage are unknown, the project area does include some habitat that could potentially be used by the species. Substations 5039 and 5048, and radio towers RS28 and RS38 are situated close to the Arkansas River, whose sandbars or shorelines could provide stopover habitat for the species. This area of the river is used by nesting least terns, whose habitat requirements are similar to the piping plover's; though no nesting piping plovers have been found. Similar habitat also exists where Line 3016 crosses the Canadian River and where Line 3005F crosses the Arkansas River.

6.20.4 Determination of Effect

While piping plovers have been documented migrating through Arkansas (USFWS 2014), the project area does not appear to encompass any habitat the species may use. Similarly, the species has been documented in Missouri, though not in the project area. Noise from O&M activities near the Arkansas and Canadian rivers may cause short-term displacement of the plovers resting in stopover habitat.

Invasive plants encroaching into piping plover habitat could lead to habitat degradation and loss (USFWS 2009b). Vegetation removal under the vegetation management activities would likely benefit the species, as this provides more available habitat for the species to stop at. Short-term impacts from the Proposed Action *may affect but is not likely to adversely affect* migrating piping plovers.

6.21 Gray Bat

6.21.1 Description

The gray bat (*Myotis grisescens*) is listed as endangered (41 FR 17740; April 28, 1976) throughout the entire project area and is one of the largest species in the genus *Myotis* in eastern North America (USFWS 2009c). The species can be distinguished from other bats by the unicolored fur on their back and from other myotis species from the wing membrane attachment to the ankle instead of at the toe (USFWS 2016a). The fur is usually brownish gray most of the year but can turn as light rusty brown shade in summer (MDC undated). The gray bat weighs 7 to 16 grams and is approximately 76 to 127 mm in length with a wingspan of 275 to 300 mm (ODWC 2011a).

6.21.2 Life History and Current Status

The primary range of gray bats is concentrated in the cave regions of Alabama, Arkansas, Kentucky, Missouri and Tennessee, with smaller populations found in adjacent states (USFWS 2009c). This species, with a few exceptions, is one of the few species of bats in North America that inhabit caves year around (USFWS 2009c). Winter hibernaculum consists of vertical caves with temperatures ranging from 5.5 to 10.5°C. These caves trap large volumes of cold air and often contain multiple entrances and good air flow (USFWS 2015d).

Summer habitat for the species consists of limestone caves, especially within 2 miles of rivers, streams, reservoirs, or lakes (USFWS 2016c). Summer cave temperatures range from 14 to 24°C, trap warm air, and provide restricted rooms or domed ceilings. Maternity caves often have a stream flowing through them (USFWS 2015d). Pregnant females roost in maternity colonies in caves separate from males and young females from late May to June. Each female gives birth to a single young in June after an average gestation period of 64 days (USFWS 2009c). Mothers and young rejoin the bachelor colonies in July and August. Gray bats exhibit great loyalty to their roosting and hibernating sites and philopatry of Indiana bat maternity colonies to their summer range is well documented (USFWS 2009c).

Food consists of flying aquatic and terrestrial insects such as moths, mayflies, flying beetles and Asiatic oak weevils in the summertime where abundant in forested cliffs along rivers (MDC undated). Summer forage correlates with open water of lakes, reservoirs, or streams (USFWS 2009c) as well as wetlands and some forested areas (ODWC 2011a). Forested areas along the banks of streams and lakes provide important protection as young often feed and take shelter in forest areas near the entrance to cave roosts (USFWS 2015d).

The gray bat distribution is limited in geographic range to limestone karst areas of the southeastern U.S and is mainly found in Alabama, northern Arkansas, Kentucky, Missouri, and Tennessee (USFWS 2016c). Wide population fluctuations of gray bats have been documented at many maternity sites across the species' range, but there have been significant population increases in some of the major hibernacula

(USFWS 2009c). Sasse et al. (2007) analyzed data from 48 gray bat maternity sites involving three subpopulations in Missouri, Arkansas, and Oklahoma between 1978 and 2002, and calculated that 79 percent of the colonies were stable or increasing across three subpopulations in this portion of the species' range. Researchers estimate that the species increased from approximately 1,575,000 to roughly 2,678,000 in 2002 and to about 3,400,000 in 2004 (USFWS 2009c). Approximately 95 percent of hibernating bats can be found in eight caves: three in Missouri and one in Arkansas (Harvey 1994).

In Missouri, where about 20 percent of the total population resides, Elliott (2008) reported that gray bats had been documented in at least 219 caves or about 3.5 percent of all Missouri caves mostly located south of the Missouri River particularly in the Ozark region (MDC undated). In Oklahoma, the gray bat is a migratory species that occurs from April through September. In the summer, nine colonies of gray bats are known to occupy caves in forested habitats in Ottawa, Delaware, Cherokee and Adair counties (ODWC 2011a).

In Arkansas, approximately 222,000 bats hibernate in only four caves (Harvey 1994) with over 75 percent of these in a single Baxter County Bonanza Cave in the Ozark National Forest. Important hibernacula in the state which have seen increases in numbers include Blanchard Springs Caverns, Arkansas from 33 in 1985, to 128,005 in 2006; and Cave Mountain Cave, Arkansas from 205 in 1988, to 139,740 in 2006 (USFWS 2009c). Ten maternity colonies are known in Arkansas with nine of them occurring on private lands (Harvey 1984).

6.21.3 Habitat Evaluation and Suitability

The gray bat is tied to limestone caves throughout its life cycle with foraging availability near stream, lakes, and reservoirs required during the summer months. Foraging areas often are forested to provide shelter for the foraging bats. Substations, even those near rivers and reservoirs, lack suitable foraging habitat around the facilities to attract gray bats. Communication towers are situated at elevational advantage points, and although they are often surrounded by forested areas, they are not situated near water sources.

Known cave habitat and rock outcroppings occur along portions of the transmission lines. Structure 229 in Arkansas is located near a cave known to provide habitat for the Indiana bat and potentially the gray bat. In Arkansas, structures 154-143 (Independence County) cross the Foushee Cave Natural Area managed by the ANHC. The area is known for providing habitat for species such as the Northern Long-eared Bat (NLEB), gray bat, and the Indiana bat, as well as the Foushee Cave snail. A few rock outcrops and a coal mine occur along sections of the transmission lines in Oklahoma and may have the potential to provide habitat for the gray bat. Line 3005 (structures 311-335) that contains rocky outcroppings occurs just east of the Illinois River and may provide foraging habitat during the summer months.

Along the ROW within the counties of Greene, Christian, Stone, and McDonald in Missouri are four known occupied gray bat caves: one occurs within 1 mile and the other three within 0.5 mile (0.8 km) of the ROW (Marquardt 2018). The site in Christian County is a Priority 2 maternity cave. Maternity caves were defined in the USFWS recovery plan for priority protection with Priority 1 obtaining the greatest protection for caves vital to the recovery of the species. Priority 2 caves are protected with gates, fences, or signage (USFWS 2009c). No known gray bat summer use or caves or hibernaculum sites occur within

or immediately adjacent to the ROW in Arkansas (Inebnit 2018). In Oklahoma, there are three known hibernacula or summer caves used within and/or adjacent to the existing ROWs (Fuller 2018).

6.21.4 Determination of Effect

The gray bat has experienced population declines over the past century as a result of habitat loss (the clearing of forests along streams and lakes), past pesticide use, and human disturbance of their breeding and hibernating caves since they congregate in only a few caves (ODWC 2011a). Although pesticide contamination has been well documented in some populations of gray bats, Elliott (2008) suggested that the continued increase of gray bats coincided with the reduced use of pesticides in southern Missouri where the landscape was mostly covered in forest, pasture, and hay fields. Sasse (2007) noted that gray bats at four maternity caves in Arkansas remain exposed to pesticide residues but at lower levels than previously reported by others.

No direct impacts from O&M activities and vegetation management would occur as these activities do not occur in or near known occupancy caves. Potential indirect effects may occur from a reduction in vegetation near water sources where bats may forage. Impacts from vegetation management may occur if located near known caves. O&M ground disturbing activities within 0.4 km of the caves may cause runoff that would reduce water quality in karst habitat. Surface disturbing activities in the vicinity of hibernacula may affect bat populations if those activities result in changes to the temperature and air flow.

Southwestern developed a bat decision guidance document (*Vegetation Management –Endangered Species Act Bat Decision Guide;* Southwestern 2018) for vegetation management along the ROW. Maintenance and tree trimming along the existing ROW are not likely to impact bats at the known sites in Missouri and Arkansas (Inebnit 2018, Marquardt 2018). Erosion control measures to protect water quality in karst areas would be implemented to reduce potential impacts to the gray bat. In addition, SOPs developed by Southwestern restrict the use of herbicides within 15 feet of a cave or karst feature. The USFWS recommends no tree trimming around any rivers or streams from May 1 through September 15 to avoid impacts to aquatic foraging areas and disturbance of the species in Oklahoma (Fuller 2018). With implementation of the bat guidance document, seasonal tree trimming restrictions, and the protection of water quality, the Proposed Action *may affect but is not likely to adversely affect* the gray bat.

6.22 Indiana Bat

6.22.1 Description

The Indiana bat (*Myotis sodalist*) was listed as endangered on March 11, 1967 (41 FR 17740) and critical habitat designated on September 24, 1976 (41 FR 41914); however, critical habitat does not occur in the project area. This small bat weighs 0.25 ounce and has a wingspan between 228 and 280 mm. Although this species is similar to other related bat species, it can be distinguished as the Indiana bat by comparing characteristics such as the structure of the foot and color variations in the fur (USFWS 2006).

6.22.2 Life History and Current Status

In the winter, Indiana bats hibernate in caves or sometimes abandoned mines. For hibernation, they require cool, humid caves with stable temperatures, under 10°C but above freezing (USFWS 2006).

Hibernation begins in mid to late October and extends to the following April (USFWS 2008b). During the summer months, the bats migrate to summer habitat in wooded areas where they usually roost on dead or dying trees under lose bark. During summer, females roost in larger groups of up to 100 bats or more, while males roost alone or in small groups (USFWS 2006). Females give birth to one pup in the maternity colonies and the young bats remain with the colony throughout their first summer. By early mid-September, most bats begin their migration back to their hibernacula and are hibernating by early November (USFWS 2008b).

Most Indiana bat maternity colonies have been found in agricultural areas with fragmented forests. Most females from the major hibernacula in Indiana, Kentucky, and Missouri migrate north for summer, into agricultural landscapes of the Midwest (Gardner and Cook 2002, Whitaker and Brack 2002 cited in USFWS 2008b). Primary roost trees are typically large (>23 cm diameter at breast height [dbh]) with loose, exfoliating bark and a high degree of solar exposure. Male bats are much less constrained and may use smaller trees (as small as 6.3 cm). Roost trees for both males and females are most often snags (i.e., dead trees) with variable amounts of exfoliating bark, which allow bats to roost between the bark and bole of the tree. However, live trees with peeling bark (especially shagbark hickory [*Carya ovata*]) are also used, as well as some trees with cavities and crevices. Snags of a wide variety of tree species are used for roosting, including maple (*Acer* spp.), hickory (*Carya* spp.), ash (*Fraxinus* spp.), oak (*Quercus* spp.), elm (*Ulmus* spp.), pine (*Pinus* spp.), hemlock (*Tsuga candensis*), among others (USFWS 2008b). Habitats in which maternity roosts occur include riparian zones, bottomland and floodplain habitats, wooded wetlands, and upland communities (USFWS 2007).

Indiana bats feed on aquatic and terrestrial insects while foraging in forested stream corridors, upland and bottomland forests and wooded edges, forested wetlands, and impounded bodies of water at night (USFWS 2006, USFWS 2008b). Studies indicate that adults and older juveniles typically forage within 2.5 miles of their diurnal roost sites although they may fly many miles to forage. Proximity to foraging area from the daily roost is important for young bats (USFWS 2008b). Indiana bats tend to avoid vast open spaces, so wooded corridors linking roosting sites with foraging areas are important in areas where forests are fragmented (USFWS 2008b). Although distance to water probably is not a factor in day-to-day roost selection, accessible sources of water might affect location of the home range of a colony on a broader landscape; i.e., colonies may locate in areas of more abundant, accessible sources of water (USFWS 2008b).

Indiana bats are found over most of the eastern half of the U.S. (USFWS 2006). The estimated range population of the Indiana bat in 2017 was 530,705 bats occurring in 229 hibernacula in 17 states (USFWS 2017). Missouri contained the largest population of the species at 217,884 with two of the top ten largest hibernacula: Sodalis Nature Preserve and Cookstove (USFWS 2017).

6.22.3 Habitat Evaluation and Suitability

Unlike the gray bat, habitat use by Indiana bats varies throughout the year with bat caves and roost trees providing habitats. Substations, even those near rivers and reservoirs, lack suitable foraging habitat around the facilities to attract Indiana bats. Communication towers are situated at elevational advantage points, and although they are often surrounded by forested areas, they are not situated near water sources. Within the ROW of Line 3007 in Arkansas is a cave known to provide winter habitat for bats although it

is used infrequently and screening has been placed on the cave. Although current summer range for the Indiana bat occurs in a few counties in southern Missouri (two counties), eastern Oklahoma (one county), and northern Arkansas (six counties) where the project area occurs, the majority of the summer range is located outside the project area (USFWS 2007). Forested habitat occurs along portions of the ROWs. Only Clay County in Arkansas within the project area is known to have maternity colonies (USFWS 2007). Barry County in Missouri is the only county in the project area that contains a Priority 2 recovery area which contributes to the long-term conservation and recovery of the species (USFWS 2008b).

Based on correspondence with the USFWS in support of the bat guidance document, there are no known Indiana bat hibernaculum or roost trees within 1 mile (1.6 km) of the ROW in Missouri (Marquardt 2018, Southwestern 2018). Within Arkansas and Oklahoma, there are no known hibernacula or roost trees within or adjacent to the ROW for the Indiana bat (Fuller 2018, Inebnit 2018, Southwestern 2018); however, in Arkansas there are a few known hibernacula within close proximity to the ROW.

6.22.4 Determination of Effect

O&M activities conducted during the summer time may cause short-term impacts to Indiana bats from noise and human presence in potential foraging and roosting areas. During summer, female and juvenile Indiana bats roost almost always in trees, as do adult males. Adult females, however, apparently used a crevice in a utility pole in Indiana, and adult males were found under metal brackets on utility poles in Arkansas (USFWS 2008b). Removal of trees may affect summer roosting for the Indiana bat. The Indiana bats usually prefer taller trees from 16 to 26 m (52 to 85 feet; USFWS 2008b). Vegetation management includes vertical clearance and maintenance of trees (trimming) depends on the tree species and re-sprouting as well as the mandatory electrical clearance. Trees removed are usually smaller diameter trees (<22.8 cm) and trees over 15 m (50 feet) in height would not be found within the ROW due to continual maintenance. Trees that are trimmed are usually live and not snags. Pesticide use within or near suitable habitat could harm Indiana bats directly (via dermal contact or ingestion) or indirectly by reducing prey availability of foraging bats.

Tree trimming and felling would unlikely impact the species in the fall and spring near caves near the ROW (Inebnit 2018). In the Proposed Action area, there are no known Indiana bat hibernacula or roost trees within or immediately adjacent to the ROWs (Fuller 2018, Inebnit 2018, Marquardt 2018, Southwestern 2018). During spring migration, Indiana bats in the Arkansas area have been known to use forested habitat within the ROW and potentially for maternity areas. The USFWS recommended that tree trimming and felling within the ROW occur from September 15 through March 1 to reduce potential impacts. The bat guidance document specifically notes areas in Arkansas where seasonal trimming should occur (Southwestern 2018). With implementation of the bat guidance document, and seasonal tree trimming restrictions, the Proposed Action *may affect but is not likely to adversely affect* the Indiana bat.

6.23 Northern Long-eared Bat

6.23.1 Description

The northern long-eared bat (NLEB; *Myotis septentrionalis*) was federally listed as threatened on April 2, 2015 due to declines in population caused by white-nose syndrome. The bat is distinguished from other *Myotis* species by its long ears. This medium-sized bat has a body length of 76 to 94 mm and wing span

of 228 to 254 mm (USFWS 2016e). Fur coloring ranges from tawny to pale browns on the underside to medium to dark brown on the back.

6.23.2 Life History and Current Status

This migratory bat species hibernates between mid-fall through mid-spring in mines or caves and spends its summers in wooded areas (USFWS 2016d). Suitable spring staging/fall swarming habitat, which is most typically within 5 miles of a hibernaculum, consists of the variety of forested/wooded habitats where they roost, forage, and travel (USFWS 2016d).

Hibernacula are characterized by high humidity and minimal air flow with relatively constant, cool temperatures (0 to 9ºC; USFWS 2016d). NLEBs roost as individuals or small groups using significant cracks and crevices for roosting often returning to the same hibernacula annually. This species is active in the winter with individuals often moving between hibernacula throughout the winter (USFWS 2016d).

NLEBs use a wide variety of forested/wooded habitats in the summer, which may also include some adjacent and interspersed non-forested habitats, as well as linear features such as fencerows, riparian forests, and other wooded corridors (USFWS 2016d). They roost underneath bark, in cavities, or in crevices of both live trees and snags (typically ≥ 7.6 cm dbh). NLEBs are known to use a wide variety of tree species and a network of roost trees based on presence of cavities or crevices or presence of peeling bark (USFWS 2016d). Most bats within a maternity colony give birth from late May or early June to late July, depending where the colony is located within the species' range (USFWS 2016e). Colonies usually range from 30 to 60 bats. NLEBs forage through the understory of forested areas feeding on moths, flies, leafhoppers, caddisflies, and beetles or by gleaning motionless insects from vegetation (USFWS 2016d).

The USFWS estimates that the range-wide population of NLEBs is comprised of about 6.5 million adults. Population estimates for summer adult populations were determined using total forested acres and occupancy rates as well as other assumptions. Occupancy rates in Missouri are estimated to be 26.2 percent and in Arkansas are estimated at 65.3 percent. From these rates summer populations in the two states are estimated at 285,948 in Missouri and 431,925 in Arkansas (USFWS 2016f).

6.23.3 Habitat Evaluation and Suitability

Line 3006 in Missouri occurs in townships with known hibernaculum and Line 3009 in Newton County occurs in the township with known/occupied maternity roost trees (USFWS 2016d). In Arkansas, lines 3008, 3001, and 3007 bisect areas with known hibernaculum although the exact relation to the line is unknown (USFWS 2016f). Potential habitat for hibernacula may be located near the project areas in forested habitat outside of the ROW and at substations for summer roosting. According to the USFWS, however, no known hibernaculum or roost trees occur within 0.4 km (0.25 mile) of the ROW in Missouri (Marquardt 2018, Southwestern 2018) and no known NLEB roost trees or hibernacula occur within or immediately adjacent to the existing ROW in Oklahoma and Arkansas (Fuller, 2018, Inebnit 2018, Southwestern 2018). Along the ROW within the counties of Greene, Christian, Stone, and McDonald in Missouri are four known occupied gray bat caves which also contain NLEB (Marquardt 2018, Southwestern 2018).

6.23.4 Determination of Effect

On January 14, 2016, the USFWS finalized the 4(d) rule for the NLEB, which tailors protections to areas affected by white-nose syndrome during the bat's most sensitive life stages (USFWS 2018k). The USFWS programmatic BO analyzed several activities that may affect the NLEB including timber harvest and herbicide usage. Tree removal without a permit is prohibited: 1) within 0.25 mile of known hibernaculum; and 2) within a 150-foot radius of the maternity roost tree from June 1 through July 31. The 2016 BO (USFWS 2016e) was developed for federal agencies to fulfill their project-specific section 7(a)(2) responsibilities.

Disturbance associated with O&M and vegetation management activity could cause NLEB to flee or abandon daytime roosts, which increases the likelihood of predation. This may also result in females aborting or not being impregnated depending on the time of year (USFWS 2016e). O&M ground disturbing activities within 0.25 mile of the caves may cause runoff that would reduce water quality in karst habitat. Bats may also be directly exposed to herbicides or other pesticides sprayed in roosting areas. Although some adverse effects to NLEBs are reasonably certain to occur from herbicides and other pesticide use, due to the wildly dispersed nature of the treatments both temporally and spatially, a relatively small number of bats may be impacted. Southwestern would use all herbicides in accordance to their labels and application would not occur in water sources. Southwestern has implemented a bat guidance document for the four listed bat species. Implementation of the guidance, including guidance for emergency situations that would require after the fact consultation, would reduce potential impacts to listed species and as noted by USFWS, the maintenance activities would comply with the final 4(d) rule for the species (Southwestern 2018). Southwestern initiated the NLEB 4(d) rule streamlined consultation form on June 19, 2018 developed by USFWS. Southwestern will annually submit the form for the proposed activities based upon the bat guidance document. The Proposed Action *may affect* the NLEB however maintenance activities comply with the 4(d) rule.

6.24 Ozark Big-eared Bat

6.24.1 Description

The Ozark big-eared bat (*Plecotus townsendii ingens*) is a federally endangered medium-sized bat weighing 7 to 13 grams and measuring approximately 90 to 116 mm (USFWS 1995). The facial glands on either side of the snout and the long ears (over 2.5 cm) are distinct characteristics of this species. Depending on the age of the individual, the fur tends to be light brown to dark brown for immature bats. The Ozark big-eared bat was listed on November 30, 1979 (Federal Register, Vol. 44, No. 232) due to limited and reduced distribution, vulnerability to human disturbance, and small population size (USFWS 2011c).

6.24.2 Life History and Current Status

Like the gray bat, the Ozark big-eared bat prefers caves year-round, usually in limestone karst formations. Although the species is not migratory, they may move to different caves between seasons (ODWC 2011b). Hibernaculum consists of locations with moderate to high humidity (60 to 97 percent) and relatively cold temperatures 13 ºC (USFWS 1995). The vegetation around these sites is usually dominated by mature hardwood forests of beech, hemlock, hickory, and maple (USFWS 1997b). The bats usually

occupy areas near the entrance to caves which leave them extremely vulnerable to disturbance. Hibernacula form between October and November with both sexes occupying caves in clusters from 2 to 135 individuals (USFWS 2011c). Bats have been found to awaken throughout the winter and move among caves (USFWS 1995). The formation of maternity colonies occurs between late April and early June and bats usually return to the same maternity colony. Females give birth to a single offspring in May or June after a 2- to 3-month gestation period (USFWS 2011c).

The Ozark big-eared bats emerge from their caves later in the day than most bats, usually after sunset (USFWS 1995). Moths make up a large portion of the diet of night-flying insects found during foraging effort along forested-edged habitat. While forested habitat provides cover for both predator and prey, open habitat allows for easy foraging detectability at greater distances. Foraging distance from the cave increases as the maternity period progresses due to the need to nurse young less frequently (USFWS 1995).

The species' historic range included Oklahoma, Missouri, and Arkansas; however, the bats are no longer known to occur in Missouri (USFWS 1995). The current range of the Ozark big-eared bat includes the Ozark Highlands and Boston Mountains ecoregions of northeastern Oklahoma and northwestern and north-central Arkansas (USFWS 2011c). Their present distribution is confined to Delaware, Cherokee and Adair counties in Oklahoma and Washington, Crawford, Madison, Franklin, and Marion counties in Arkansas. In Delaware and Adair counties, 10 known caves are essential to the continual existence of the species and another 38 caves in Oklahoma have been found with limited or transient use (USFWS 1995). In Arkansas, only four caves, in Marion and Washington counties, are known to harbor the species (USFWS 1995). Some limited-use caves occur in other counties in the state.

The Ozark big-eared bat has been found in limestone and sandstone habitat in the Ozark National Forest of Washington, Franklin, and Crawford counties, Arkansas (USFWS 1995). The bats use sites that are nothing more than a pile of large sandstone slabs with a partially darkened area under them; therefore deep valley areas with multiple sandstone benches could potentially provide habitat (USFWS 1995). The current population is estimated to be 1,600 to 4,000 with more than half this number occurring in Oklahoma (USFWS 1995, USFWS 2011c, ODWC 2011b).

6.24.3 Habitat Evaluation and Suitability

The Ozark big-eared is tied to limestone caves throughout its life cycle with foraging availability near forest edges required during the summer months. The project area contains only one known cave within the ROW; however, activities would not occur within the caves. Known cave habitat and rock outcroppings occur along portions of the transmission lines. Along the ROW for Line 3007 in Arkansas is a cave known to provide habitat for the Indiana bat and potentially the gray bat. In Arkansas, structures 154-143 along line 3007 are located in the Foushee Cave Natural Area managed by the Arkansas Natural Heritage Commission. The area is known for providing habitat for species such as the NLEB, gray bat, and the Indiana bat, as well as the Foushee Cave snail. A few rock outcrops and a coal mine occur along sections of the transmission lines in Oklahoma and may have the potential to provide habitat for the gray bat.

No known Ozark big-eared bat summer use caves or hibernaculum sites occur within or immediately adjacent to the ROW in Arkansas and tree trimming and felling are unlikely to impact the species (Inebnit

2018). A few known Ozark big-eared bat caves occur near the Lee Creek Reservoir within 300 m of the ROW in Arkansas (Inebnit 2018). No known Ozark big-eared bat summer use caves or hibernaculum sites occur within or immediately adjacent to the ROW in Oklahoma (Fuller 2018). The species does not occur in Missouri.

6.24.4 Determination of Effect

Current impacts to the Ozark big-eared bat include loss of forested foraging habitat from development, timber harvest, and ROW construction (USFWS 1995). No direct impacts from O&M activities and vegetation management would occur as these activities do not occur in or near caves. Indirect impacts could occur if forested habitat near the cave sites which provide cover for the bats and prey species was greatly reduced. The ROW has already been developed for the Proposed Action area and tree removal is limited to selective trees and species spatially spread across the species' range. Although there are a couple of known caves located within 300 m of the ROW in Arkansas, the USFWS did not recommend seasonal restriction on maintenance activities (Inebnit 2018). In addition, no seasonal restrictions were recommended (Fuller 2018, Inebnit 2018, Southwestern 2018) in Oklahoma. SOPs developed by Southwestern restrict the use of herbicides within 15 feet of a cave or karst feature and would reduce the potential impact to this species. Implementation of the SOPs for herbicide application in karst areas would reduce potential impacts to this species and therefore the Proposed Action *may affect but is not likely to adversely affect* the Ozark big-eared bat.

7.0 CUMULATIVE EFFECTS

Other uses of specifically the ROWs could cause potential cumulative effects. Portions of the ROW traverse U.S. Forest Service ground and wildlife management areas that are used for recreation and also have land management activities. In addition, portions of the ROW are adjacent to agricultural fields or urban neighborhoods. The Proposed Action is spatially distributed across three states, O&M activities are limited in duration across these areas, and vegetation management is limited to a 4- to 5-year cycle of activities. Due to the temporal and spatial distribution of the Proposed Action it is highly unlikely that project activities would occur simultaneously with other U.S. Forest Service, agriculture, or urban construction or development. No cumulative effects are expected to occur to listed species from other land management activities.

8.0 MITIGATION AND MONITORING

Southwestern would implement BMPs from the bat guidance document, as well as from its SOPs to offset or decrease the environmental effects of implementing the Proposed Action. Southwestern has developed and would implement a bat guidance document for vegetation management to comply with the ESA. The guidance document provides seasonal timing restrictions, as noted throughout the BA, for the protection of bat roosting areas. Usage of the step-wise bat guidance document, including consultation for emergency activities, would assist Southwestern in minimizing impacts to listed bat species. Southwestern would continue to survey for the Missouri bladderpod in those areas that have been determined suitable habitat. Other BMPs developed by Southwestern in their SOPs include:

- During O&M activities near rivers and streams, BMPs and spill control procedures would be used to prevent contamination and increased erosion to the river. Servicing of heavy equipment would be performed outside of the riparian zone.
- Herbicide application would be in accordance with the label and by personnel with applicator licenses.
- No herbicide would be sprayed within 15 feet of karst features.
- No herbicide would be sprayed within 15 feet of water bodies. Herbicides approved for aquatic use should be used near sensitive water receptors or open water bodies.
- Appropriate herbicides would be selected based on site characteristics using the GIS mapper tool and the PEA for vegetation management.

Southwestern will attempt to minimize disturbance to areas outside of the required maintenance footprints of the proposed projects whenever practicable and feasible and utilize the most current version or equivalent of the *Best Management Practices for American Burying Beetle in Oklahoma*. Southwestern proposes to include detection surveys at the project site prior to ground disturbance or may assume presence in lieu of detection surveys. If a detection survey is conducted and no ABBs are found, then Southwestern could conclude that the project would be unlikely to adversely affect the ABB for the allowable time periods as specified within the USFWS survey guidelines. If a survey revealed the presence of ABBs or Southwestern assumes presence, then Southwestern would incorporate appropriate avoidance and minimizations measures and determine if the project may affect ABBs. If potential take of ABBs cannot be avoided and the action and associated incidental take is not addressed in this BA, Southwestern will initiate Section 7 consultation with the USFWS. Southwestern could assume ABBs are present for any project, avoid the need to conduct surveys, and proceed with consultation with the USFWS. All impact avoidance measures would be performed in accordance with the protocols established by the Oklahoma Ecological Services Office of the USFWS. Southwestern has established an agreement with the USACE Tulsa District for the utilization and tiering of 100 ABB mitigation acres (out of 2,000 total acres) belonging to USACE Tulsa District associated with ABB mitigation lands established by and through the 2016 USACE/Southwestern *Final Biological Opinion for Operating Multipurpose Projects on the Red River, Arkansas River, Petit Jean River, and Canadian River from Eufaula Lake to the Arkansas River Confluence, and all of the McClellan Kerr Arkansas River Navigation System (MKARNS) within the Tulsa and Little Rock Corps Districts* for projects resulting in a determination of *likely to adversely affect*.

O&M activities may also occur under emergency actions to restore or repair electrical power due to storms or accidents. These actions may include clearing downed trees or powerlines, access road construction or upgrading to allow emergency actions to occur. Most maintenance activities normally only entail minimal soil disturbance or compaction, but some emergency actions (such as clearing of ROWs after ice storms or tornados) could involve significant soil disturbance. While up to 4,831 acres in Oklahoma and 859 acres in Arkansas could be unavoidably impacted under worst case and emergency scenarios, most of the anticipated impacts would be infrequent and temporary in duration.

Southwestern is committed to working towards the overall goal of reducing avian mortality for migratory birds, eagles, raptors, and federally listed endangered or threatened avian species and to preventing interactions which result in outages and potential loss in system reliability. Southwestern has developed an Avian Protection Plan (APP) which provides guidelines for reducing avian mortality risks and incorporates existing laws and executive orders. Under the APP, Southwestern uses a tiered approach in conducting transmission system avian evaluations to identify areas that have an increased likelihood for collisions or electrocutions which can guide O&M activities (e.g., retrofitting of structures, creation of nesting platforms, avian protection devices). BMPs for communication towers and office facilities are also outlined in the APP to further prevent impacts to avian species. In addition, Southwestern recently developed an avian collision risk model to identify high risk areas along its transmission lines. The model noted approximately 5.3 percent of the lines are a high risk, based on specific attributes important to avian species, but the model has not been validated. The model could be used to focus mitigation efforts under the APP to those high risk areas.

9.0 REFERENCES

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APPENDIX A

List of Herbicides Selected for Consideration

List of Herbicides Selected for Consideration

Table 1. List of Adjuvants

Adjuvant	Type	Notes
Activator 90	Nonionic surfactant	Mixes well with most herbicides without affecting the water pH. Mix at 2 pints per 100 gallons of water.
Basal oil	Surfactant	Use with Garlon 4.
Elite Champion	Nonionic Surfactant	For right-of-way, mix 0.5-2 quarts per 100 gallons.
Grounded	Surfactant	Blend of surfactants and aliphatic hydrocarbons designed for soil/gravel with no organic matter. Use for bare ground applications (substations and towers) at a rate of 2 pints per acre.
Hi-Light	Marking adjuvant	Use on bare ground at 16 ounces per 100 gallons. For woody plant applications, use 24 ounces per 100 gallons.
Induce	Nonionic surfactant	Mixes well with most herbicides without affecting the water pH. Mix at 2 pints per 100 gallons of water.
Metholated Seed Oil (MSO)	Surfactant	Best used for the woody plant applications, especially when pine trees are present. The rate is 2 pints per acre.
Redriver 90	Fatty acid ionic Surfactant	For right-of-way, mix 0.5-2 quarts per 100 gallons.

Table 2. Herbicides Considered for Use Under the Proposed Action

Trade Name	Active Ingredient	Herbicide Characteristic and Target Vegetation	Pesticide Movement Rating	Wetland/ Aquatic Use (Yes/No)2	Bare Ground Only	ROW Only	Bare Ground or ROW
4 # Amine	47.3% dimethylamine salt of 2,4-dichlorophenoxyactic acid	Selective post emergent for broadleaf weeds in desirable grasses and gravel/rock areas	Moderate	Yes			X
Accord XRT[1]	53.6% glyphosate	Non-selective broad spectrum systemic herbicide for control of annual/perennial weeds and woody plants.	Extremely Low	No			X
Arsenal Powerline[1]	27.8% imazapyr	Controls a broad-spectrum of troublesome vines and brambles, brush and tree species, and grasses and broadleaf weeds	High	No			X
Arsenal[1]	27.8% isopropylamine salt of imazapyr	Non-selective control most annual and perennial grass and broadleaf weeds in addition to many brush and vine species. Readily absorbed through emergent leaves and stems.	High	Yes			X
Cleantraxx	40.3% oxyfluorfen 0.85% penoxsulam	Pre-emergent broadleaf and grass weeds for hard surface/gravel areas	Extremely Low	No	X		
Credit Systemic Extra[1]	41% glyphosate	Non-selective	Extremely Low	No			X
Diuron 4L	40.7% diuron	Pre-emergence control of broadleaf weeds and annual grasses, as well as certain woody brush seedlings	Moderate	No	X		

Trade Name	Active Ingredient	Herbicide Characteristic and Target Vegetation	Pesticide Movement Rating	Wetland/ Aquatic Use (Yes/No)2	Bare Ground Only	ROW Only	Bare Ground or ROW
Endurance[1]	65% prodiamine	Pre-emergence control of broadleaf weeds and annual grasses, as well as certain woody brush seedlings	Extremely Low	No	X		
Escort XP[1]	60% metsulfuron methyl	Selective post emergent for broadleaf and woody plants in desirable grasses	High	No		X	
Garlon 3A[1]	44.4% triclopyr (salt)	Selective post emergent for broadleaf and woody plants in desirable grasses	Moderate	No			X
Garlon 4[1]	61.6% triclopyr (ester)	Selective post emergent for broadleaf and woody plants in desirable grasses	Moderate	No			X
Karmex-DF[1]	80% diuron	Long-term non-selective herbicide for control of most annual and some perennial weeds	Moderate	No			X
Krenite S[1]	41.5% ammonium salt of fosamine	Selective for woody species	Low	No		X	
Mastiff PGR[1]	48.1% flurprimidol	Growth regulator on established trees. Injected into individual trees.	Very High	No		X	
Method 240SL	25% potassium salt of aminocyclopyrachlor	Selective pre and post emergent for broadleaf and woody plants, can be used near water. Works best with Esplanade.	Very High	No	X		

Trade Name	Active Ingredient	Herbicide Characteristic and Target Vegetation	Pesticide Movement Rating	Wetland/ Aquatic Use (Yes/No)2	Bare Ground Only	ROW Only	Bare Ground or ROW
Milestone VM	40.6% triisopropanolammonium salt of 2-pyridine carboxylic acid, 4-amino-3,6-dichloro	Selective post emergent broadleaf weed and some woody, no grazing restrictions; good for desirable grasses under power lines.	Low	No		X	
Mojave 70 EG	7.78% imazapyr 32.2% diuron	Pre-emergent use for broadleaf weeds and grasses. Can be used near water.	High Moderate	No	X		
Oust Extra[1]	56.25% sulfometuron methyl 15% metsulfuron methyl	Selective post emergent for woody plants and broadleaf weeds in desirable grasses.	Moderate High	No			X
Oust XP[1]	56.25% sulfometuron methyl	Selective broad-spectrum broadleaf weed and grass control.	Moderate	No			X
Pathfinder II[1]	13.6% triclopyr	Selective for basal bark and cut-stump treatments	Low	No		X	
Polaris	27.7% imazapyr	Non-selective post emergent all weeds, grasses and woody. Best used with pre-emergent.	High	Yes	X		
Profile 2CS	21.8% paclobutrazol	Selective post emergent and tree growth regulator for management of shoot growth and the reduction of biomass when trees are pruned	High	No		X	
Remedy Ultra	60.45% triclopyr (ester)	Selective post emergent for woody plants and some broadleaf weeds	Moderate	No			X

Trade Name	Active Ingredient	Herbicide Characteristic and Target Vegetation	Pesticide Movement Rating	Wetland/ Aquatic Use (Yes/No)2	Bare Ground Only	ROW Only	Bare Ground or ROW
Rodeo[1]	53.8% glyphosate	Non-selective post emergent all weeds, grasses and woody with no soil residual activity. Best used with pre-emergent.	Extremely Low	Yes	X		
Roundup Pro[1]	41.0% glyphosate	Non-selective post emergent broadleaf and woody plants with no soil residual activity. Best used with pre-emergent.	Extremely Low	No	X		
Sahara DF[1]	62.2% diuron 7.78% imazapyr	Non-selective, pre-emergent	Moderate	No			X
Streamline	39.5% aminocyclopyrachlor 12.6% metsulfuron methyl	Selective post emergent for woody plants. Spot treat only.	Very High	No		X	
Topsite 2.5G[1]	0.5% imazapyr 2% diuron	Non-selective	Moderate	No		X	
Tordon 101M	24.4% picloram 39.6% 2,4-D	Selective post emergent for broadleaf and some woody. Works best when mixed with Garlon 4 for better results. Restricted Use	Very High Moderate	No		X	
Tordon 22K	24.4% picloram	Selective post emergent broadleaf weed and some woody, no grazing restrictions; good for desirable grasses under power lines. Restricted Use	Very High	No		X	
Transline	40.9% clopyralid	Selective post emergent for broadleaf and woody	Very High	No		X	

Trade Name	Active Ingredient	Herbicide Characteristic and Target Vegetation	Pesticide Movement Rating	Wetland/ Aquatic Use (Yes/No)2	Bare Ground Only	ROW Only	Bare Ground or ROW
Vastlan	54.72% triclopyr choline	Selective post emergent for broadleaf and woody, has aquatic label and can be used in wetland area.	Very High	Yes			X
Vista[1]	26.2% fluroxypyr	Selective post emergent for broadleaf, specific for kosha	Moderate	No			X

[1] Herbicide is currently used (No Action Alternative) and would continue to be used under the Proposed Action.
[2] Southwestern does not spray herbicides directly on surface water, nor do they spray within 15 feet from any water's edge. Herbicides approved for aquatic use should be used near sensitive water receptors or open water bodies.
ROW-Right-of-way

Table 3. Recommended Combinations of Herbicides Considered for Use Under the Proposed Action

Proposed Combinations	Herbicide Characteristic and Target Vegetation	Wetland/ Aquatic Use (Yes/no)	Bare Ground Only	ROW Only
Cleantraxx and Roundup	Bare Ground application with existing grasses/weeds	No	X	
Esplanade and Method	Bare Ground application with existing weeds	Yes	X	
Esplanade and Rodeo	Bare Ground application with existing grasses/weeds	Yes	X	
Mojave and Rodeo	Bare Ground application with existing grasses/weeds	Yes	X	
Mojave and Diuron	Bare Ground application with existing grasses/weeds	No	X	
Polaris and Vastland	Bare Ground application with existing grasses/weeds	Yes	X	
Tordon 22K and Milestone	Selective application for weeds and woody	No		X
Transline and Milestone	Selective application for weeds and woody	No		X
Vastland and Amine	Selective application for weeds and woody	Yes		X

APPENDIX B

Vegetation Management Endangered Species Act Bat Decision Guide

Vegetation Management Endangered Species Act Bat Decision Guide

This appendix contains Southwestern's 2018 Vegetation Management Endangered Species Act Bat Decision Guide (*Southwestern Power Administration, Vegetation Management Endangered Species Act Bat Decision Guide. Vegetation management endangered species act guidance document for Southwestern Power Administration's (SWPA) transmission line right of way maintenance activities*).

SOUTHWESTERN POWER ADMINISTRATION

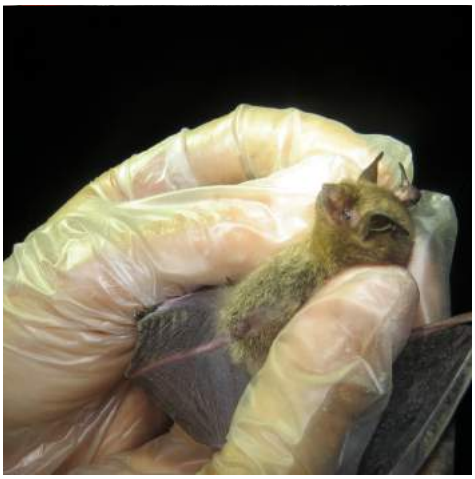
VEGETATION MANAGEMENT

ENDANGERED SPECIES ACT

BAT DECISION GUIDE

Vegetation management endangered species act guidance document for Southwestern Power Administration's (SWPA) transmission line right of way maintenance activities

Missouri, Arkansas, and Oklahoma


Southwestern Power Administration

1 West 3rd Street, Suite 1600

Tulsa, Oklahoma 12204

Tectonic
PRACTICAL SOLUTIONS. EXCEPTIONAL SERVICE.

Southwestern Power Administration
1 West 3rd Street, Suite 1600
Tulsa, Oklahoma 12204

March 23, 2018

Attn: Mistie Pilcher, Environmental Specialist
(via email: mistie.pilcher@swpa.gov)

RE: PROFESSIONAL ENVIRONMENTAL SERVICES
VEGETATION MANAGEMENT ESA BAT DECISION GUIDE REPORT
MISSOURI, ARKANSAS AND OKLAHOMA
TECTONIC WO# 8869-GSA-05

Dear Ms. Pilcher:

Tectonic Engineering & Surveying Consultants (Tectonic) and Titley Scientific, LLC (Titley) are pleased to submit the attached drafts of the Vegetation Management Endangered Species Act Bat Decision Guide (Guide), full and field versions, dated March 2018. Our services consisted of reviewing Southwestern Power Administration's utility line right of way footprint in Missouri, Arkansas, and Oklahoma, coordination with U.S. Fish and Wildlife Service Ecological Services Field Offices in Region 2, 3 and 4, and formation of the Guide for use by SWPA field personnel. Background information regarding threatened and endangered species within the range of the utility, methods, the Guide, USFWS correspondence, and assumptions and limitations of the Guide are included in the report.

We have prepared this report in accordance with local practices accepted by Ecological Services Field Offices in Region 2, 3, and 4 of the U.S Fish and Wildlife Service. As you move forward with project planning, please keep in mind that the USFWS has the sole authority to regulate any action which may affect species listed in the Endangered Species Act.

The attached report should be read in its entirety. We appreciate the opportunity to provide you with our environmental services, and have sincerely enjoyed our continued work together.

Please do not hesitate to contact me with any questions or concerns.

Sincerely,
TECTONIC ENGINEERING & SURVEYING CONSULTANTS P.C.

Kristofer Mierisch, RPA
Project Archaeologist

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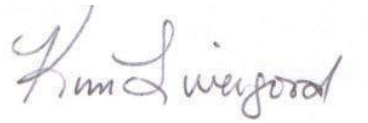
Equal Opportunity Employer

TITLEY SCIENTIFIC, LLC.

Vona Kuczynska
Wildlife Biologist



Kim Livengood
Senior Ecologist

Vegetation Management Endangered Species Act Bat Decision Guide

MISSOURI, ARKANSAS, AND OKLAHOMA

1.0 PROJECT DESCRIPTION AND BACKGROUND

Tectonic Engineering and Surveying Consultants P.C. (Tectonic) and Titley Scientific, LLC (Titley) designed a Vegetation Management Endangered Species Act Bat Decision Guide ("Guide") for Southwestern Power Administration's (SWPA) transmission line right of way maintenance activities. SWPA's utility infrastructure spans over 1,000 miles in southern Missouri, northern Arkansas, and eastern Oklahoma and crosses three distinct United States Fish and Wildlife (USFWS) Regions: Missouri in Region 2, Arkansas in Region 3, and Oklahoma in Region 4. Each Region has an Ecological Field Station charged with providing guidance for projects that are required to comply with Endangered Species Act regulations. It is our understanding that SWPA maintenance activities along the right of way (ROW) in the three states include routine live vegetation trimming and limbing to keep new vegetation growth from entering near the transmission infrastructure. Additionally, SWPA maintenance activities require occasional felling of dead standing trees.

To assist SWPA with federal Endangered Species Act bat regulations compliance, Tectonic and Titley created the Vegetation Management Endangered Species Act Bat Decision Guide. The Guide can be used by office and field personnel as a reference tool to quickly assess if a proposed maintenance activity that involves tree trimming, cutting, or felling is compliant with federal regulations for federally listed threatened and endangered bat species in Missouri, Arkansas, and Oklahoma.

The Guide provides a step-wise guide that leads to one of two conclusions:

- **"No Effect"** determination,
    - which means that the proposed maintenance activity is likely to have no impact to federally listed bats and **may be conducted**

OR

- **"May Affect"** determination
    - which means the activity may impact a federally listed species and should not be conducted without further review.
    - "May Affect" determinations may result in a delay to the maintenance activity until the late fall or early winter timeframe. Performing the activity within the prescribed timeframe results in a "No Effect" determination, and the activity **may be conducted.**

- In other cases, "May Affect" determinations may require additional USFWS consultation, such as conducting a bat habitat assessment, emergence surveys, or mist net surveys to establish if threatened and endangered habitat and/or species are present.

The Guide considers multiple variables to establish if the maintenance activity is likely to have a "No Effect or May Affect" determination. Tectonic and Titley considered:

- Threatened and endangered bat species range and transmission line footprint
- Timing of activity
- Suitability of the tree(s) and/or habitat slated for maintenance
- USFWS recommendations for each federally listed species as they pertain to routine maintenance activities.

The Guide employs a step-wise guide, range maps, and supplemental photographs to provide a comprehensive tool that can be used by field personnel to determine if trees may be removed when maintenance activity is desired.

The remaining sections of this document provide a short background on federally listed bats that occur within the transmission line footprint, detailed methods outlining tools and rationale used to create the Guide, copies of USFWS recommendations provided to us via email, as well as the Guide for each of the three States. It is recommended to contact USFW and any other relevant agencies on an annual basis to confirm the status of the relevant regulations against the current regulations that this guide was based on. Please read the document in entirely before using the Guide.

2.0 FEDERALLY-LISTED BATS IN MISSOURI, ARKANSAS, AND OKLAHOMA

Four bats protected by the Endangered Species Act occur in the state of Missouri, Arkansas, and Oklahoma:

- the endangered Indiana bat (*Myotis sodalis*)
    - spend the winter in caves (hibernacula).
    - roost in trees during the summer months (approximately May to September).
- the endangered gray bat (*Myotis grisescens*)
    - spend the winter in caves (hibernacula).
    - spend the entire year in caves and move to summer caves from their hibernacula
    - The locations of winter and summer caves for these species are often not available to the public.
- the endangered Ozark big-eared bat (*Corynorhinus townsendii ingens*)
    - spend the winter in caves (hibernacula).
    - spend the entire year in caves and move to summer caves from their hibernacula
    - . The locations of winter and summer caves for these species are often not available to the public.
- the threatened northern long-eared bat (*Myotis septentrionalis*).
    - spend the winter in caves (hibernacula).
    - roost in trees during the summer months (approximately May to September).

All four species spend the winter in caves (hibernacula). Consultation with the USFWS is required to determine if a project footprint is within or near known caves used by threatened or endangered bats. Similarly, the location of Indiana and northern long-eared bat summer maternity sites is unavailable to the public and the information can only be obtained by request to the USFWS.

We recognize that there are many different interpretations of species ranges, and nearly every entity or regulatory agency has a different way of tracking the potential range and occurrence of bat species. For the purposes of this Guide, we used range maps available through the USFWS Species Profiles available online at www.ecos.fws.gov. Maps for the Indiana bat and northern long-eared bat were downloaded from the USFWS Species Profile websites in January 2018. Maps for the gray and Ozark big-eared bat were downloaded on March 18, 2018.

- **Figure 1** depicts the range of the northern long-eared and Indiana bat within the Ozark Central Region Unit.

- **Figure 2** depicts the range of the gray bat, and Figure 3 depicts the range of the Ozark big eared bat.

Figure 1. Aerial overview and USFWS range maps for the Indiana and northern long-eared bat within the Ozark Central Region Unit. Orange represents the overlap range of the Indiana and northern long-eared bat. Blue solely represents the range of the northern long-eared bat.

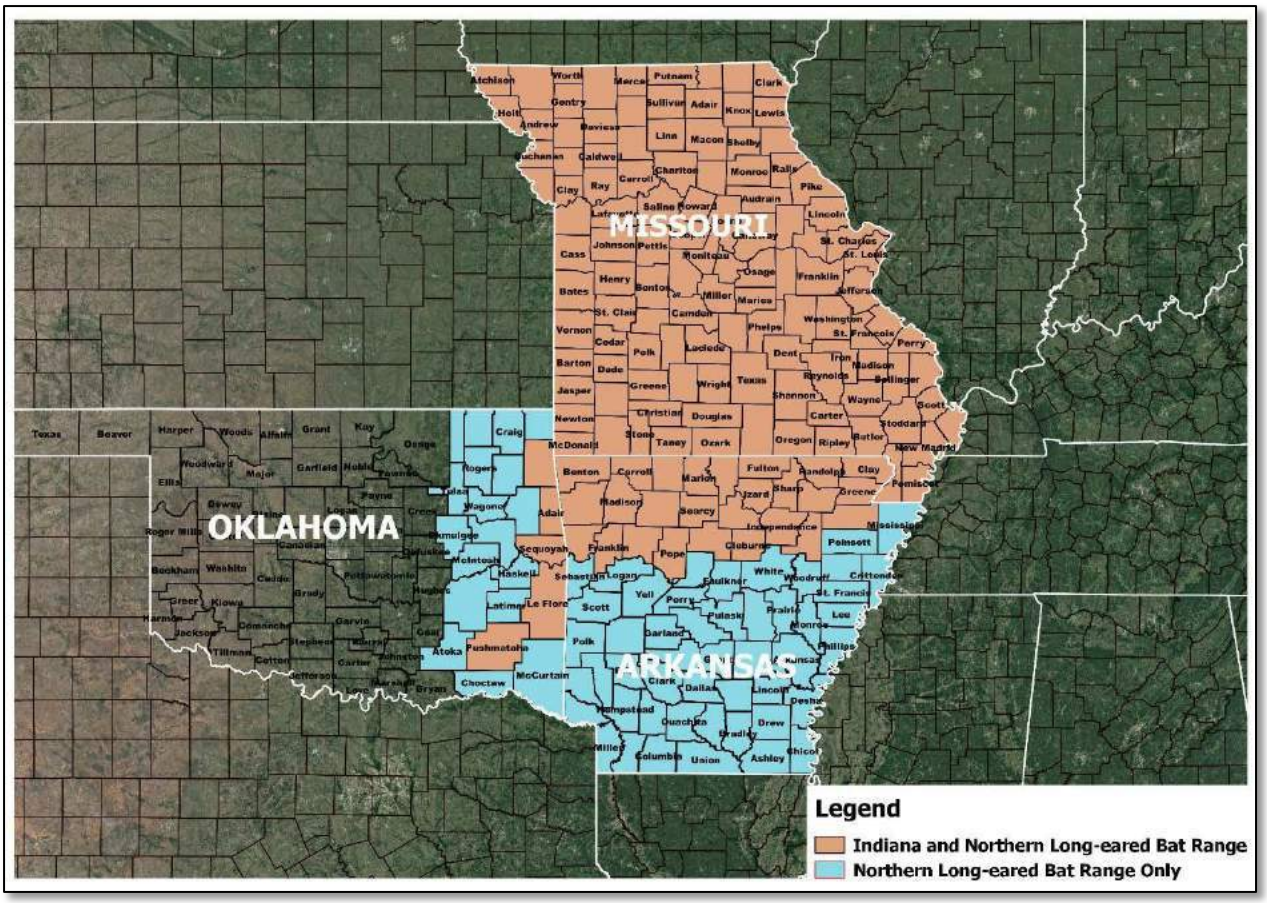


Figure 2. Aerial overview and USFWS range map for the gray bat. Orange represents the limits of the range.

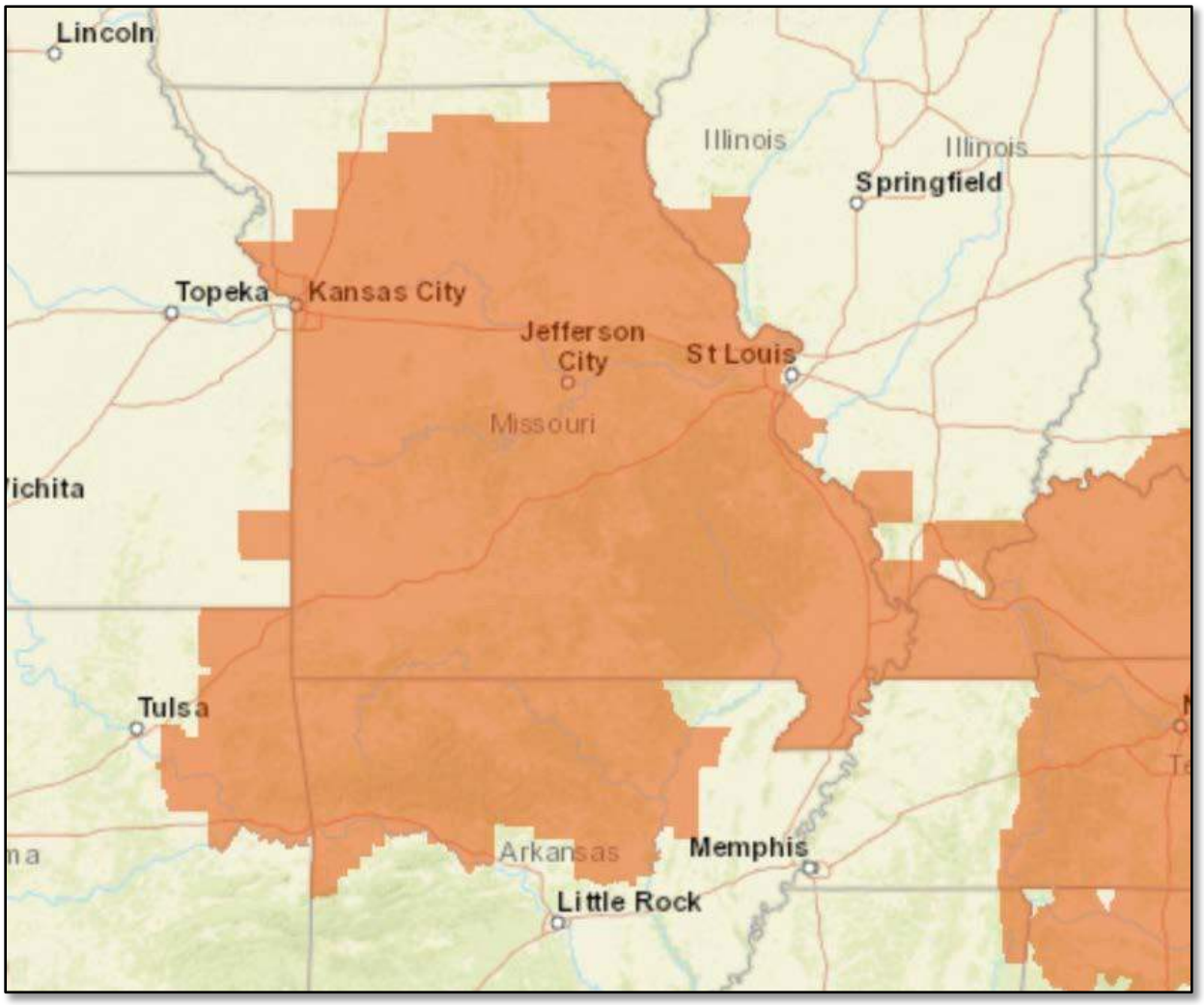
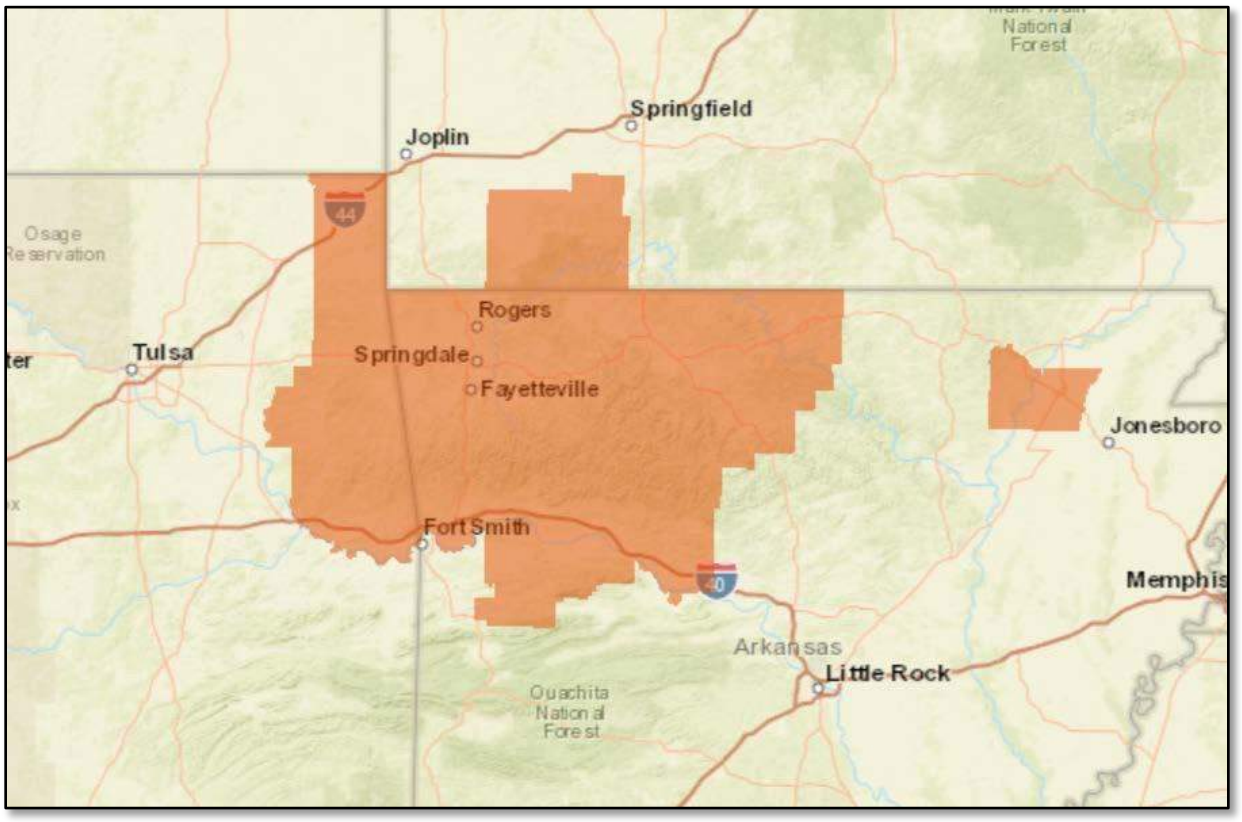


Figure 3. Range of the Ozark big-eared bat in Missouri, Oklahoma, and Arkansas. Orange represents the limits of the range.



3.0 GUIDE METHODS

Due to changes in species occurrence, latitude, temperature, and other environmental habitat variables within the Regions, regulations and recommendations for threatened and endangered species vary from Region to Region. **To account for differences in recommendations from each USFWS Region, stand-alone guides have been provided for Missouri, Arkansas and Oklahoma.**

To create the Guide, Tectonic and Titley reviewed the location of the utility transmission line footprint in Missouri, Arkansas and Oklahoma. We then coordinated with U.S. Fish and Wildlife Service (USFWS) Ecological Services Field Offices in Region 2, 3 and 4 regarding regulations and tree maintenance recommendations for each federally listed species. Copies of recommendations provided by each Field Office are provided in Section 6 of the report. Using the gathered data, a step-wise guide was created to assess if the proposed activity could have a "No Effect" or a "May Affect" determination. To assist maintenance crews with limited experience in identifying suitable roost trees, we have also utilized the 2017 Range-wide Indiana Bat Summer Survey Guidelines document to create a supplementary guide that provides examples of suitable roost trees for the Indiana and northern long-eared bat as well as an approximate diameter reference for minimum size of suitable trees. Each state Guide has an enclosed Map 1 and 2

that provides species range information for the Indiana and the northern long-eared bat as they relate to the project right-of-way. We have included the general locations of known northern long-eared bat hibernacula and summer maternity roost colonies in Missouri and Arkansas. These resources are available online through the USFWS website provided in the Citation section of the report.

4.0 ASSUMPTIONS AND LIMITATIONS

This report has been prepared for the exclusive use of Southwestern Power Administration. The intent of our services was to create a Vegetation Management Endangered Species Act Bat Decision Guide that would assist SWPA in their efforts to comply with federal Endangered Species Act regulations. Tectonic and Titley are not responsible for independent conclusions or recommendations made by others. Furthermore, written consent must be provided by Tectonic and Titley should anyone other than our client wish to excerpt or rely on the contents of this report and Guide. Tectonic and Titley are not responsible for surveys, calculations, or plans that were prepared by others.

The Guide was created in accordance with the Endangered Species Act regulations outlined in the 2017 Range-wide Indiana Bat Summer Survey Guidelines document, and in accordance with local practices accepted by the Missouri, Arkansas, and Oklahoma Sub-Office of the USFWS. Please note that the USFWS has the sole authority to regulate any action which may affect a species protected by the Endangered Species Act. The Guide does not supersede any state or federal regulations pertaining to threatened and endangered species. It is the sole responsibility of the SWPA to receive updated information regarding threatened and endangered species to ensure compliance with the Endangered Species Act. Tectonic and Titley are in no way responsible for any intentional or unintentional misuse and misunderstanding of the Guide. Tectonic and Titley are also not responsible for defining what situations constitute the need for hazardous and/or immediate tree maintenance activities due to human safety. Any questions regarding federally listed bats and maintenance activities should be directed to the appropriate Sub-Office of the USFWS.

5.0 CITATIONS

(1). 2017 Range-wide Indiana bat Summer Survey Guideline: https://www.fws.gov/midwest/endangered/mammals/inba/surveys/pdf/2017INBASummerSurveyGuidelines9May2017.pdf

(2). Species Profiles and available range-maps from the USFWS:

Indiana bat. https://ecos.fws.gov/ecp0/profile/speciesProfile.action?spcode=A000

Northern long-eared bat. https://ecos.fws.gov/ecp0/profile/speciesProfile.action?spcode=A0JE

Gray bat https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=A04J

Ozark big-eared bat https://ecos.fws.gov/ecp0/profile/speciesProfile?spcode=A075

(3). Northern long-eared bat known hibernacula and maternity colonies in Missouri and Arkansas.

https://www.fws.gov/Midwest/endangered/mammals/nleb/nlebRangeMap.html

6.0 COPIES OF USFWS RECOMMENDATIONS (VIA EMAIL)

USFWS Recommendations – Missouri

Received from Shauna Marquardt on February 2, 2018:

NLEB:

No known NLEB hibernacula or roost trees within 1/4 mile of the ROWs you provided. Maintenance activities would comply with the final 4(d) rule for the NLEB.

Indiana bat:

There are no known Indiana bat hibernacula or roost trees within 1 miles of the ROWs you provided. Gray bat:

There are 4 known occupied gray bat sites near the ROWs your provided. One is within 1 mile and 3 are within 1/2 mile. The counties are Greene, Christian, Stone, and McDonald. The site in Christian Co. is a priority 2 maternity cave. All of these gray bat caves also contain NLEB, but that has no effect on compliance with 4(d) measures.

Maintenance (defined as trimming and limbing trees along existing ROWs) is not likely to impact bats in these known sites.

Non-bat caves:

For additional consideration, I also checked the presence of caves in general within 1 mile, 1/2 mile, and 1/4 mile of the ROW. There are many. Really only the caves within 1/4 mile could be impacted by ground disturbing activities, if such activities were to be a part of maintenance. This would likely be peripheral to

actual trimming, but soil disturbance that causes runoff because of use of heavy equipment is one example. There are 8 caves within 1/4 mile of the ROW in McDonald, Taney, Stone, and Greene counties. Proper water quality protections should always occur in karst areas.

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
~
Shauna Marquardt
Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Missouri Ecological Services Field Office
101 Park DeVille Drive, Suite A
Columbia, MO 65203
573/234-5035 (office)
573/234-2181 (fax)
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

USFWS Recommendations – Arkansas

Received from Thomas Inebnit on January 16, 2018:

NLEB:

After review of our collective data, I can tell you that there are no known NLEB hiberacula or roost trees within and/or immediately adjacent to the existing ROWs you provided. Therefore, regardless of my recommendations, these maintenance activities do comply with the final 4d rule for the NLEB and can technically proceed at any time of year.

IBAT:

There are no known IBAT hibernacula or roost trees within and/or "immediately adjacent" to the existing ROWs you provided. Although there are a couple known IBAT hibernacula (data suggests infrequent use) within close proximity, I don't believe trimming or felling within an existing ROW would have a measurable affect to IBATs in the fall or spring around these caves. However, recent tracking data have shown that multiple IBATs have used forested habitat near some of your ROW (kml attached) during spring migration and possibly even as a maternity area (data is insufficient to confirm this to date). For this particular area, I would recommend trimming and/or felling within your ROWs to occur from September 15 to March

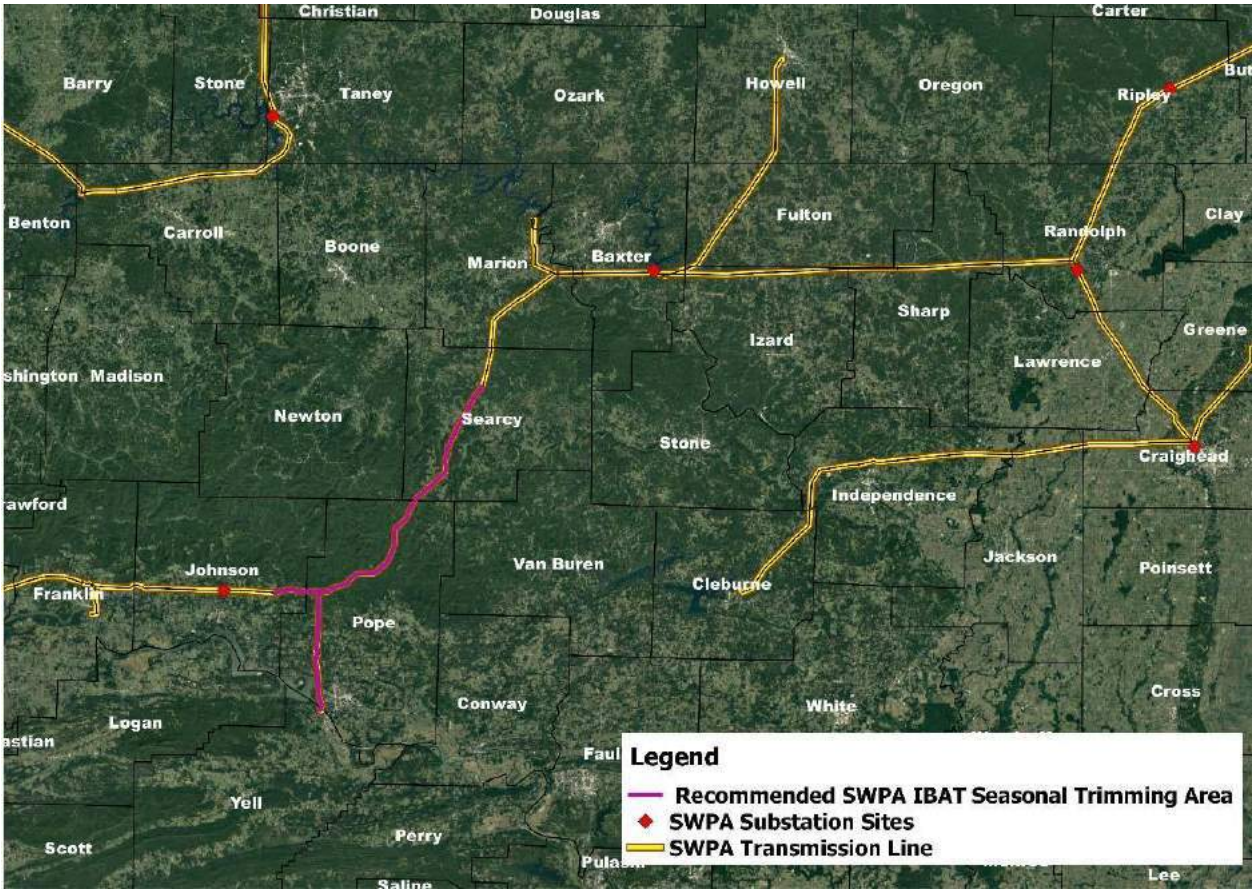
1. These dates would avoid disturbing IBATs while they are using trees during the spring or summer seasons.

GBAT:

There are no known GBAT hibernacula or summer use caves within and/or "immediately adjacent" to the existing ROWs you provided. Although there are multiple GBAT caves located within a close proximity to your ROWs, I don't believe trimming or felling within an existing ROW would have a measurable affect to GBATs, especially for these particular caves. I would not recommend seasonal restrictions based on GBAT records.

OBE
B:

There are no known OBEB hibernacula or summer use caves within and/or "immediately adjacent" to the existing ROWs you provided. Although there are a couple OBEB caves located within a close proximity to your ROWs (i.e., near Lee Creek Reservoir; cave is within 300 meters of ROW), I don't believe trimming or felling within an existing ROW would have a measurable affect to OBEB. I would not recommend seasonal restrictions based on OBEB records.



Tommy Inebnit
Energy Projects Biologist/Bat Biologist
U.S. Fish & Wildlife Service

Arkansas Field Office
110 South Amity Road, Suite 300
Conway, Arkansas 72032
(501) 513-4483 - work
(501) 513-4480 - fax

USFWS Recommendations – Oklahoma

Received from Brian Fuller on March 5, 2018:

NLE
B:

After review of our collective data, I can tell you that there are no known NLEB hiberacula or roost trees within and/or immediately adjacent to the existing ROWs you provided. Therefore, regardless of my recommendations, these maintenance activities do comply with the final 4d rule for the NLEB and can technically proceed at any time of year.

IBA
T:

There are no known IBAT hibernacula or roost trees within and/or "immediately adjacent" to the existing ROWs you provided. We have a confirmed IBAT acoustic call in the area I labeled Indiana bat area on the kmz file I sent. I don't believe trimming or felling within an existing ROW would have a measurable affect to IBATs outside of the maternity season, but will recommend tree trimming restrictions for the maternity season of may 15th through July 1.

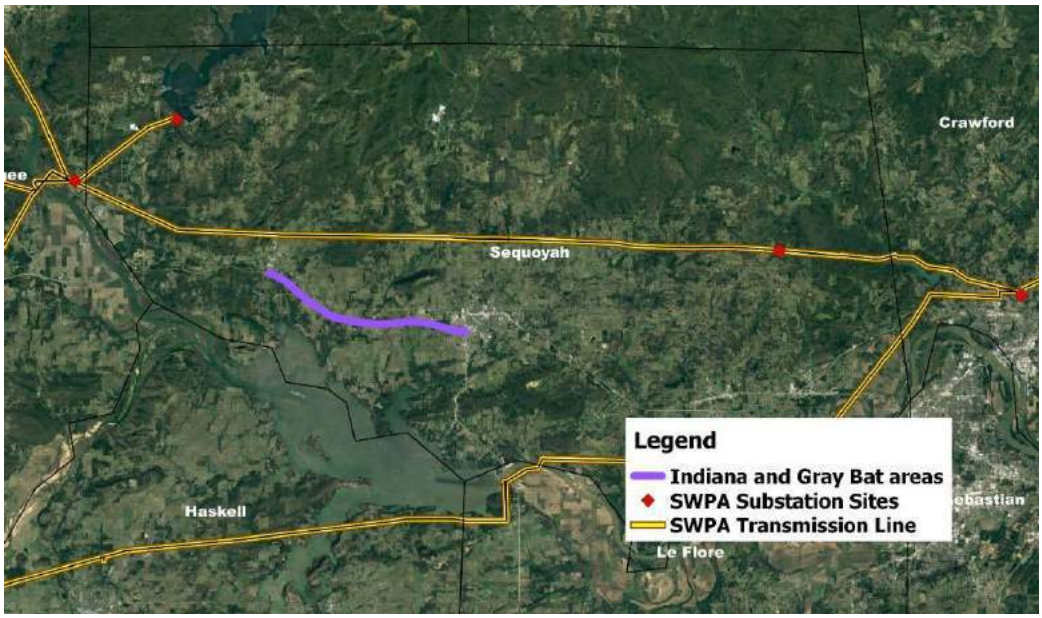
GBAT
:

There there are 3 GBAT hibernacula or summer use caves within and/or "immediately adjacent" to the existing ROWs you provided, see attached KMZ file for location, it is labeled

gray bat area. I recommend no tree trimming around any streams or rivers during the months of May through September 15th to avoid any impacts to aquatic foraging habitat during the active season.

OBE
B:

There are no known OBEB hibernacula or summer use caves within and/or "immediately adjacent" to the existing ROWs you provided. I would not recommend seasonal restrictions based on OBEB records.



Brian Fuller
U.S. Fish & Wildlife Service
Threatened and Endangered Species Biologist
Oklahoma Ecological Service Field Office
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email: brian_fuller@fws.gov
Phone: 918-382-4514

STEPWISE THREATENED AND ENDANGERED SPECIES GUIDE FOR TREE MAINTENANCE ACTIVITIES

MISSOURI

BACKGROUND INFORMATION

Four federally protected bat species occur in the state of Missouri: the endangered Indiana bat (*Myotis sodalis*), gray bat (*Myotis grisescens*), Ozark big-eared bat (*Corynorhinus townsendii ingens*), and the threatened northern long-eared bat (*Myotis septentrionalis*). All four species spend the winter in caves (hibernacula). Only the Indiana bat and the northern long-eared bat roost in trees during the summer months (May to September); the gray and Ozark big-eared bat move to summer caves.

The enclosed Map 1 and 2 of the Appendix provides species range information for the Indiana and the northern long-eared bat in Missouri as they relate to the project right-of-way (ROW). Additionally, Document 1 provides the general locations of known northern long-eared bat hibernacula and summer maternity roost colonies in Missouri.

THREATENED AND ENDANGERED BAT SPECIES PRESENCE NEAR THE ROW:

According to the USFWS, there are no records of northern long-eared bat or Indiana bat hibernacula or roost trees within 1 mile of the ROW. Additionally, there are no known Ozark big-eared bat hibernacula within 1 mile of the ROW.

There are four known occupied gray bat sites near the existing right of way in Missouri. One cave is within 1 mile, 3 are within ½ mile of the right of way. The caves occur in Greene, Christian, Stone, and McDonald Counties. The site in Christian County is a Priority 2 Maternity Cave.

USFWS Recommendations

Tree maintenance, defined as tree pruning and limbing, is not likely to impact the aforementioned sites and tree maintenance activities along the right of way and **are provided a "No Effect" determination in Missouri.** Proper water quality and soil runoff protections should always occur in and surrounding karst areas.

Other activities, such as felling of trees, could result in a "May Affect" determination. Follow the enclosed Stepwise Guide to determine if the proposed project activity could result in a "May Affect" determination for federally listed bats in Missouri and steps that should follow after a determination has been made.

NON-THREATENED AND ENDANGERED BAT SPECIES PRESENCE NEAR THE ROW:

According to the USFWS, non-federally and state listed bat caves occur within 1/4th mile of the right-of- way in McDonald, Taney, Stone, and Greene Counties in Missouri.

Best Management Practices:

Please keep in mind that many non-federally protected bats in Missouri roost in trees from May through September. Conducting tree maintenance activities after September and before May of each year will limit potential harm or death to tree roosting bats.

STEPWISE THREATENED AND ENDANGERED SPECIES GUIDE
FOR TREE MAINTENANCE ACTIVITIES IN MISSOURI

Question 1 – Are the tree(s) a *hazard to human safety?

(*Emergency actions where imminent threat precludes any available opportunity for endangered resources review)

Yes – Incidental take of Indiana and northern long-eared bat trees is not prohibited. Proceed with maintenance activity.

No – Go to Question 2.

Question 2 – Will the activity require any felling of live or dead standing trees?

Yes – Go to Question 3.

No – The activity will require only pruning and limbing. Activity has "No Effect" determination.

Question 3 – Are the tree(s) within 1000 feet of a forest or woodland habitat?

Yes – Go to Question 4.

No – Individuals trees ≥ 1000 feet from woodlands are not likely to be used by Indiana or northern long-eared bats as summer roosting habitat. Activity has "No Effect" determination. Proceed with maintenance activity.

Question 4 – Are the tree(s) considered suitable for roosting?

Suitable roost trees are any live or dead tree(s) equal ≥ 3 inches in diameter at breast height (DBH). To be considered suitable, live trees must have exfoliating (peeling) bark along the branches or trunk. Smooth barked trees are not suitable. Dead standing trees are suitable if they have >30% remaining sloughing bark, and/or contain cracks and crevices.
See Figure 1 – Tree DBH Guide and Figures 2-3 Examples of Suitable Trees for more information.

Yes – Continue to Question 5.

No – Activity has "No Effect" determination. Proceed with maintenance activity.

Unsure? – Do not proceed. Take photographs and write down the location of each tree and report information to appropriate staff.

Question 5 – Will the project require felling of 10 or more suitable trees?

Yes – Continue to Question 6.

No – Do not fell suitable trees. Project component may need to conduct emergence surveys at potential roost trees prior to tree felling. Record the location and take a photograph of each tree. Coordination with the Missouri USFWS prior to emergence survey is likely to be required.

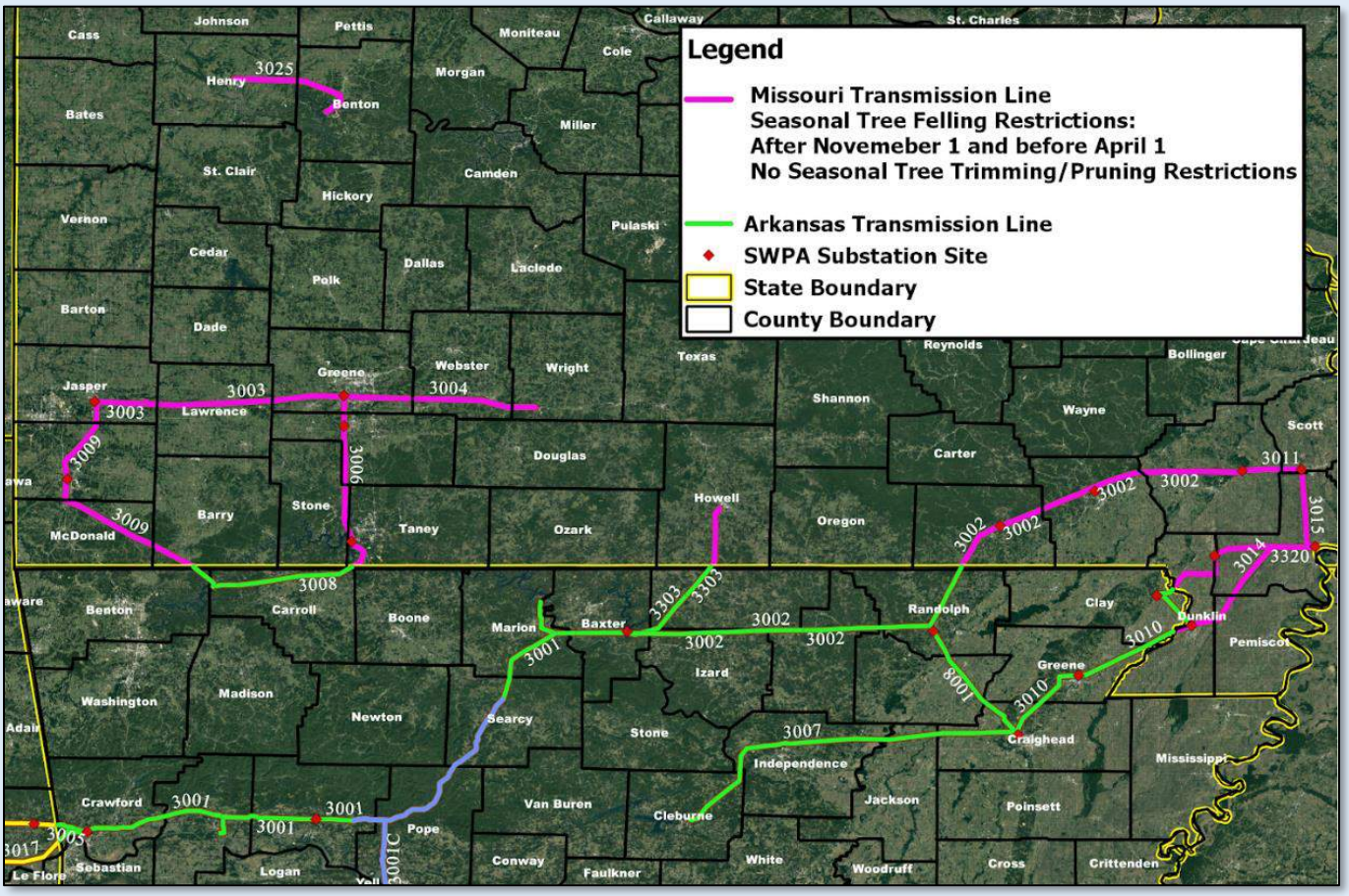
Question 6 – Can the trees be cleared during November 1 to April 1 timeframe? (reference Missouri Map 2)

Yes – Fell trees during the November 1 to April 1 frame. Clearing trees outside this time frame is likely to require coordination with the USFWS.

No – Do not fell trees. A bat habitat assessment is likely required. If suitable habitat is present, a presence/absence survey is likely to be required. Record the general location and take photographs of the trees and surrounding habitat. Contact SWPA Environmental staff. SWPA Environmental staff will coordinate with USFWS for next steps.

Missouri Map 1. Aerial overview and USFWS range maps for the Indiana and northern long-eared bat within the Missouri Ozark Central Region Unit. Orange represents the overlap range of the Indiana and northern long-eared bat. Blue solely represents the range of the northern long-eared bat. Yellow represents existing SWPA transmission lines.

Missouri Map 2. Aerial overview map showing SWPA line numbers line and recommended seasonal trimming restrictions within the Missouri Ozark Central Region Unit.



U.S. Fish and Wildlife Service

Known Northern Long-eared Bat Hibernacula and Maternity Roost Trees in Missouri

Missouri Ecological Services Field Office

- The final 4(d) rule for the northern long-eared bat (NLEB) went into effect on February 16, 2016 and identifies prohibitions that focus on protecting the bat's sensitive life stages in areas affected by white-nose syndrome (WNS). ***Missouri is entirely within the range of the NLEB and WNS zone***.
- The townships listed below and depicted on the map contain one or more NLEB known hibernacula or known maternity roost trees.
- The list and map will be updated and released as new information becomes available.

Township and Range	One or more hibernacula	One or more roost trees
T21N R22W	Yes	No
T21N R23W	Yes	No
T21N R31W	Yes	No
T22N R17W	Yes	No
T22N R23W	Yes	No
T22N R27W	Yes	No
T22N R32W	Yes	No
T23N R01E	No	Yes
T23N R13W	Yes	No
T23N R18W	Yes	No
T23N R22W	Yes	No
T23N R23W	Yes	No
T23N R26W	Yes	No
T24N R01E	No	Yes
T24N R02W	Yes	No
T24N R03W	Yes	No
T24N R04W	Yes	No
T24N R05W	Yes	No
T24N R11W	Yes	No
T24N R13W	Yes	No
T24N R16W	Yes	No
T24N R22W	Yes	No
T24N R24W	Yes	No
T24N R32W	No	Yes
T25N R01E	Yes	No

Township and Range	One or more hibernacula	One or more roost trees
T25N R03W	Yes	No
T25N R04W	Yes	No
T25N R11W	Yes	No
T25N R20W	Yes	No
T25N R22W	Yes	No
T25N R23W	Yes	No
T25N R24W	Yes	No
T26N R01E	Yes	No
T26N R01W	Yes	No
T26N R02E	Yes	No
T26N R10W	Yes	No
T26N R21W	Yes	No
T26N R22W	Yes	No
T26N R23W	Yes	No
T27N R01E	Yes	No
T27N R02W	Yes	No
T27N R06W	Yes	No
T27N R22W	Yes	No
T28N R01W	Yes	No
T28N R05W	Yes	No
T28N R06W	Yes	No
T28N R21W	Yes	No
T29N R02W	Yes	No
T29N R03W	Yes	No
T29N R04W	Yes	No
T29N R05W	Yes	No
T30N R03W	Yes	No
T30N R04W	Yes	No
T30N R05W	Yes	No
T30N R27W	Yes	No
T31N R03W	Yes	No
T31N R05W	Yes	No
T31N R06W	Yes	No
T32N R06W	Yes	No
T32N R09W	Yes	No
T32N R15W	Yes	No
T32N R18W	Yes	No
T33N R02W	No	Yes
T33N R15W	Yes	No

Township and Range	One or more hibernacula	One or more roost trees
T33N R17W	Yes	No
T34N R01W	Yes	No
T34N R04E	Yes	No
T34N R10W	Yes	No
T34N R11E	Yes	No
T34N R11W	Yes	No
T34N R12W	Yes	No
T34N R18W	Yes	No
T35N R01W	Yes	No
T35N R05W	Yes	No
T35N R07E	Yes	No
T35N R10E	Yes	No
T35N R10W	No	Yes
T35N R11E	Yes	No
T35N R11W	Yes	No
T35N R12W	Yes	Yes
T35N R17W	Yes	No
T35N R18W	Yes	No
T36N R01W	Yes	No
T36N R09W	Yes	No
T36N R10E	Yes	No
T36N R10W	Yes	No
T36N R12W	Yes	No
T36N R13W	Yes	No
T36N R15W	Yes	No
T36N R17W	Yes	No
T36N R18W	Yes	No
T37N R01E	Yes	No
T37N R02W	Yes	No
T37N R09E	Yes	No
T37N R09W	Yes	No
T37N R10W	Yes	No
T37N R11W	Yes	No
T37N R12W	Yes	No
T37N R16W	Yes	No
T37N R17W	Yes	No
T37N R22W	Yes	No
T38N R01E	Yes	No
T38N R02W	Yes	No

DOCUMENT 1 - continued

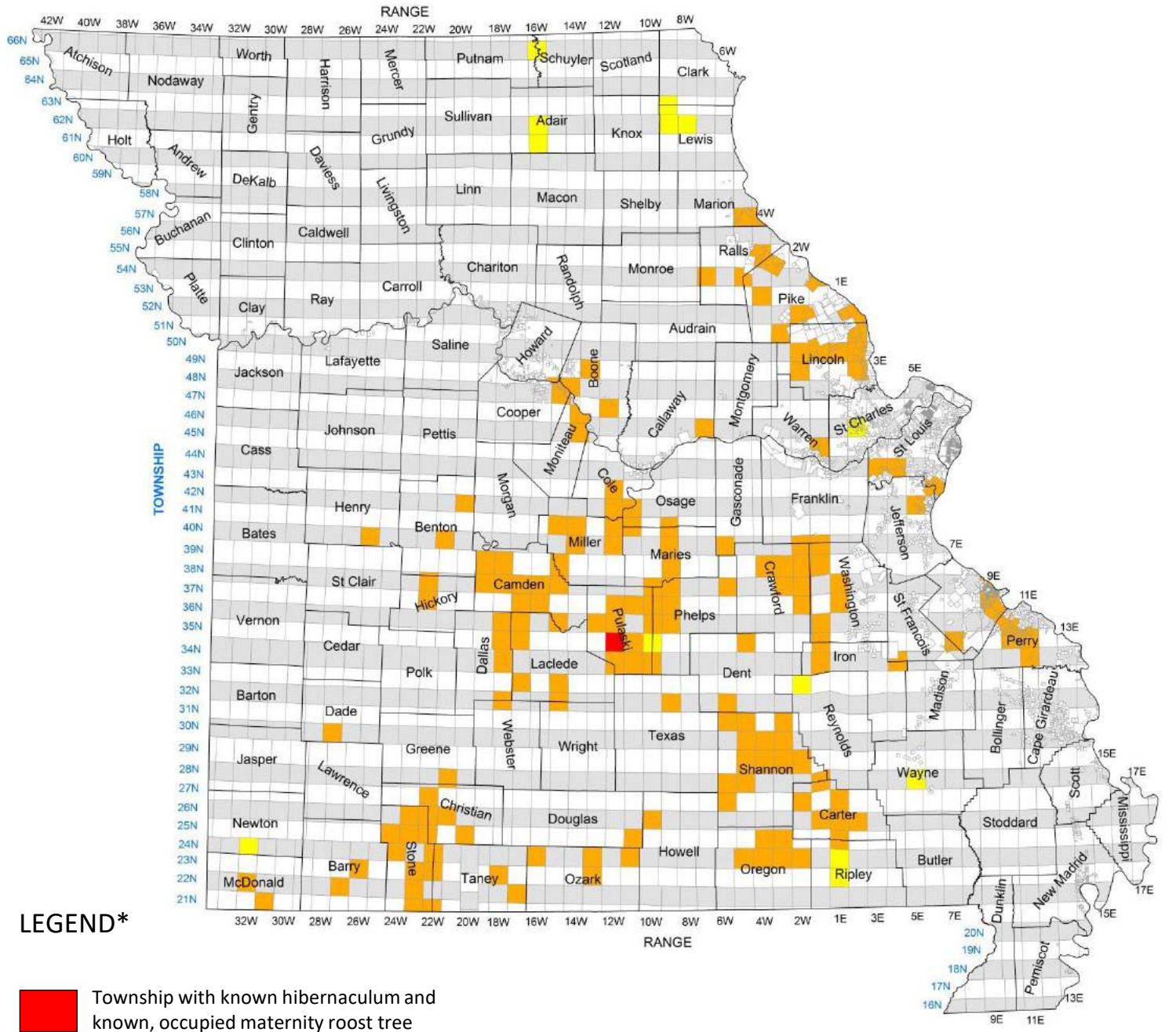
Township and Range	One or more hibernacula	One or more roost trees
T38N R03W	Yes	No
T38N R06W	Yes	No
T38N R09E	Yes	No
T38N R09W	Yes	No
T38N R10W	Yes	No
T38N R15W	Yes	No
T38N R16W	Yes	No
T38N R17W	Yes	No
T38N R18W	Yes	No
T38N R19W	Yes	No
T38N R22W	Yes	No
T39N R01W	Yes	No
T39N R02W	Yes	No
T39N R03W	Yes	No
T39N R04W	Yes	No
T39N R09W	Yes	No
T39N R15W	Yes	No
T39N R18W	Yes	No
T39N R19W	Yes	No
T40N R01W	Yes	No
T40N R02W	Yes	No
T40N R06W	Yes	No
T40N R09W	Yes	No
T40N R12W	Yes	No
T40N R14W	Yes	No
T40N R21W	Yes	No
T40N R25W	Yes	No
T41N R09W	Yes	No
T41N R11W	Yes	No
T41N R12W	Yes	No
T41N R14W	Yes	No
T41N R15W	Yes	No
T42N R05E	Yes	No
T42N R11W	Yes	No
T42N R12W	Yes	No
T42N R20W	Yes	No
T43N R06E	Yes	No
T43N R07E	Yes	No
T43N R12W	Yes	No

DOCUMENT 1 - continued

Township and Range	One or more hibernacula	One or more roost trees
T44N R03E	Yes	No
T44N R04E	Yes	No
T45N R01W	Yes	No
T46N R02E	No	Yes
T46N R07W	Yes	No
T46N R14W	Yes	No
T47N R12W	Yes	No
T47N R13W	Yes	No
T47N R14W	Yes	No
T48N R14W	Yes	No
T48N R15W	Yes	No
T48N R15W	Yes	No
T49N R02E	Yes	No
T49N R02W	Yes	No
T49N R13W	Yes	No
T49N R15W	Yes	No
T50N R01E	Yes	No
T50N R01W	Yes	No
T50N R02E	Yes	No
T50N R02W	Yes	No
T51N R02E	Yes	No
T51N R03W	Yes	No
T52N R02E	Yes	No
T52N R02W	Yes	No
T53N R04W	Yes	No
T54N R01W	Yes	No
T54N R05W	Yes	No
T54N R07W	Yes	No
T55N R04W	Yes	No
T57N R04W	Yes	No
T57N R05W	Yes	No
T61N R16W	No	Yes
T62N R08W	No	Yes
T62N R09W	No	Yes
T62N R16W	No	Yes
T63N R09W	No	Yes
T66N R16W	No	Yes

U.S. Fish and Wildlife Service

Known Northern Long-eared Bat Hibernacula and Maternity Roost Trees in Missouri



LEGEND*

- Township with known hibernaculum and known, occupied maternity roost tree
- Township with known hibernaculum
- Township with known, occupied maternity roost tree

NOTE: map is based on species occurrence information and is subject to change as new data become available.

* Refer to the final 4(d) rule for the northern long-eared bat for an explanation of terms.

UPDATED: 3/24/16

Figure 2. Examples of live trees with exfoliating bark. Examples include shagbark hickory (A), white oak (B), silver maple (C), honey locust (not pictured).

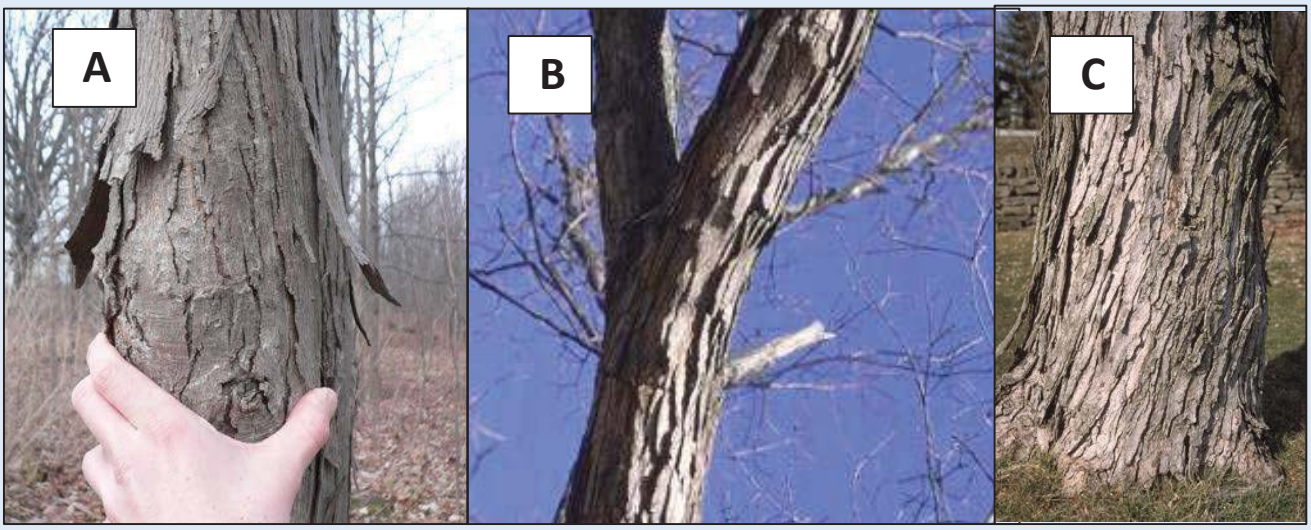
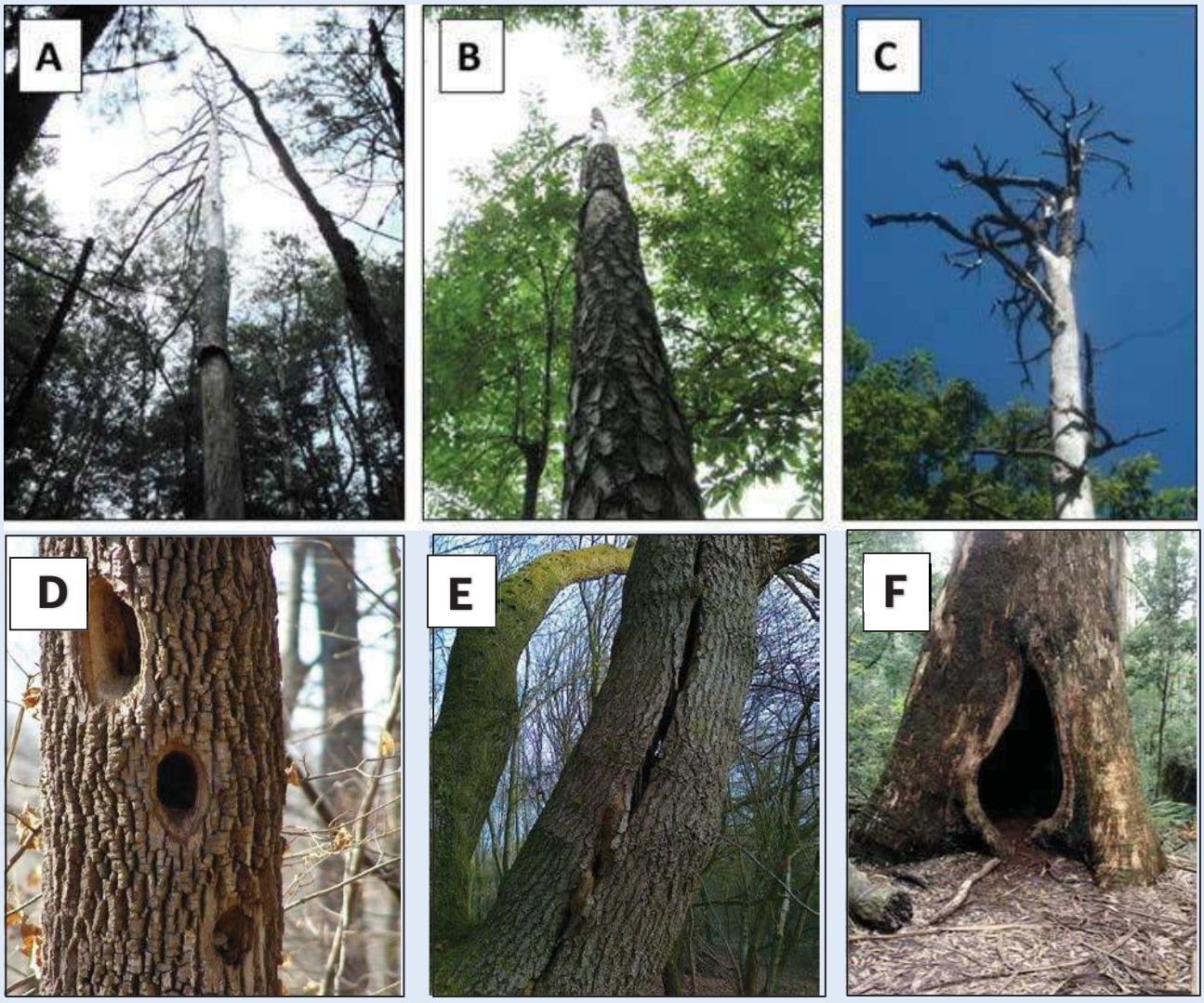


Figure 3. Examples of dead standing trees with sloughing bark (A - C), cavities (D), cracks (E), and hollows (F). Only dead standing trees with ≥ 30% remaining bark are considered suitable as roost trees.



STEPWISE THREATENED AND ENDANGERED SPECIES GUIDE FOR TREE MAINTENANCE ACTIVITIES

ARKANSAS

BACKGROUND INFORMATION

Four federally protected bat species occur in the state of Arkansas: the endangered Indiana bat (Myotis sodalis), gray bat (Myotis grisescens), Ozark big-eared bat (Corynorhinus townsendii ingens), and the threatened northern long-eared bat (Myotis septentrionalis). All four species spend the winter in caves (hibernacula). During the summer months (mid-April to September) the Indiana bat and the northern long-eared bat move from hibernacula to woodlands to roost in trees. The gray and Ozark big-eared bat move from winter hibernacula to summer cave roosts.

The enclosed Map 1 and 2 of the Appendix provide species range information for the Indiana and the northern long-eared bat in Arkansas as they relate to the project right-of-way (ROW). Additionally, Document 1 provides a map of areas in Arkansas with known northern long-eared bat hibernacula and summer maternity roost colonies.

THREATENED AND ENDANGERED BAT SPECIES PRESENCE NEAR THE ROW:

According to the USFWS, there are no records of gray bat hibernacula within and/or immediately adjacent to the ROW. Additionally, the USFWS indicated that there are no northern long-eared bat hibernacula or roost trees records near the existing ROW.

Indiana bats have been documented near the ROW in Johnson, Pope, and Searcy Counties. An Ozark big-eared bat cave occurs near the Lee Creek Reservoir in Sebastian County, within 985 feet/300 meters of the existing ROW.

USFWS Recommendations: Tree maintenance, defined as tree pruning, limbing, *and* felling is not likely to impact the gray, Ozark big-eared, and northern long-eared bat in Arkansas. The USFWS indicated that no maintenance restrictions are required for these three species.

Due to Indiana bat records near the ROW in Johnson, Pope, and Searcy Counties, the USFWS recommends seasonal restrictions for trimming/felling within these counties. All tree maintenance activities within these counties should occur from September 15 to March 1. Additionally, maintenance crews should use proper protocols during ground disturbance activities, such as soil disturbance that causes no runoff from heavy equipment use. Proper water quality protections should always occur in karst areas.

Best Management Practices: Please keep in mind that many non-federally protected bats in Arkansas roost in trees from May through September. Conducting tree maintenance activities after September and before May of each year will limit potential harm or death to tree roosting bats

STEPWISE THREATENED AND ENDANGERED SPECIES GUIDE
FOR TREE MAINTENANCE ACTIVITIES IN ARKANSAS

Question 1 – Are the tree(s) a *hazard to human safety?

(*Emergency actions where imminent threat precludes any available opportunity for endangered resources review)

Yes – Incidental take of Indiana and northern long-eared bat trees is not prohibited. Proceed with maintenance activity.
No – Go to Question 2.

Question 2 – Will the project require felling of 10 or more trees?

Yes – Activity has a "May Affect" Determination. Do not fell trees. A bat habitat assessment may be required. Record the general location and take photographs of the trees and surrounding habitat. Coordination with the USFWS is likely required.
No – Go to Question 3.

Question 3 – Are the tree(s) within Pope, Johnson, or Searcy County?

Yes – Go to Question 4.
No – Activity has a "No Effect" determination. Proceed with maintenance activity.

Question 4 – Are tree maintenance activities proposed to occur during (within) the March 1 to September 15 timeframe? (reference Arkansas Map 2)

Yes – Go to Question 5.
No – Activity has a "No Effect" determination. Proceed with maintenance activity.

Question 5 – Are the tree(s) within 1,000 feet of a forest or woodland habitat?

Yes – Go to Question 6.
No – Individuals trees ≥ 1000 feet from woodlands are not likely to be used as summer roosting habitat. Activity has "No Effect" determination. Proceed with maintenance activity.

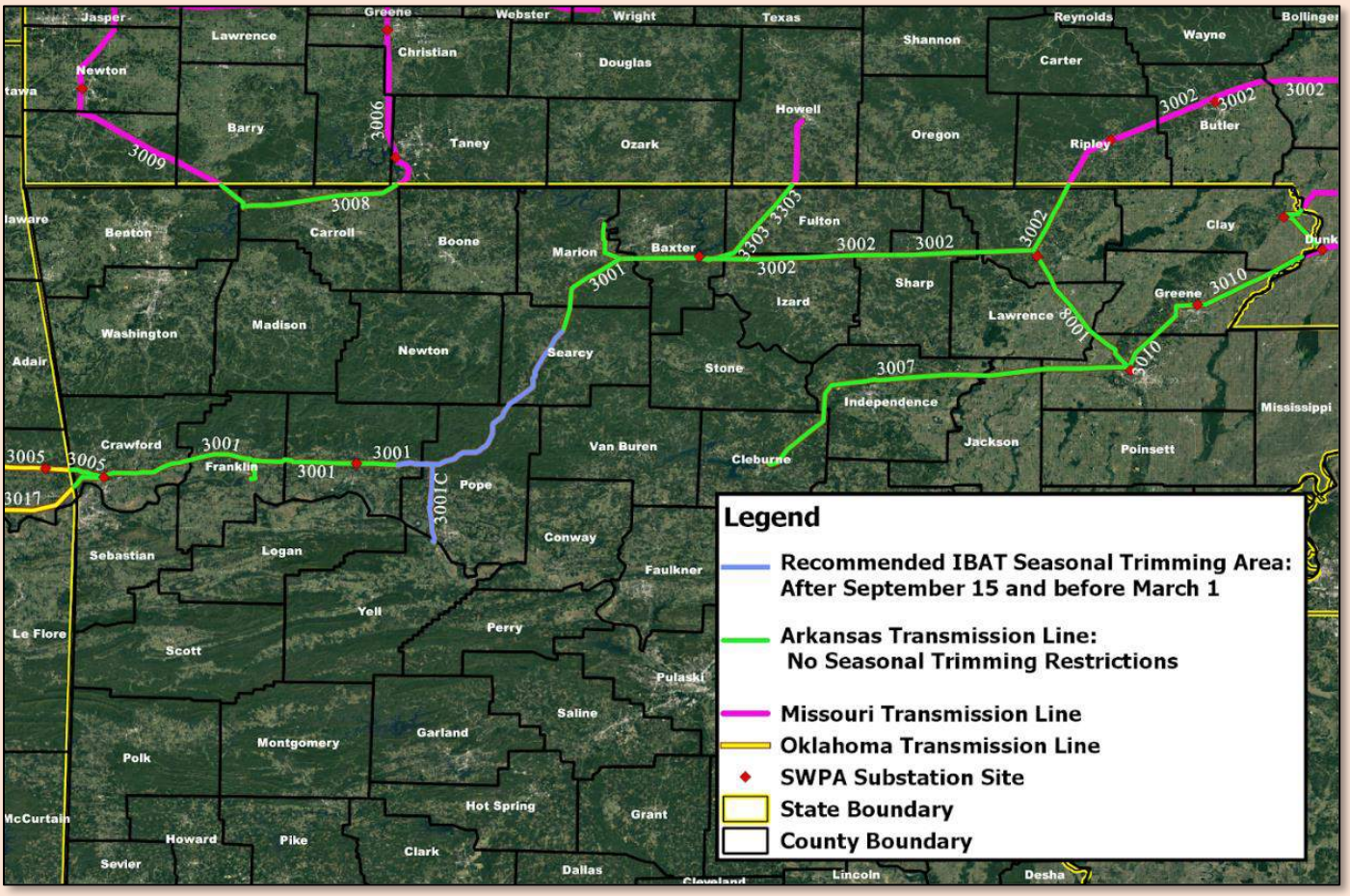
Question 6 – Are the tree(s) considered suitable for roosting?

Suitable roost trees are any live or dead tree(s) equal ≥ 3 inches in diameter at breast height (DBH). To be considered suitable, live trees must have exfoliating bark along the branches or trunk. Smooth barked trees are not suitable. Dead standing trees are suitable if they have >30% remaining sloughing bark, and/or contain cracks and crevices. See Figure 1 – Tree DBH Guide and Figures 2-3- Examples of Suitable Trees for more information.

Yes – Activity has a "May Affect" determination. Do not conduct tree maintenance activity until after September 15 and before March 1 **OR** have a qualified biologist conduct an emergence survey to determine if bats are using potential roost trees. If trees are unoccupied, tree maintenance is likely allowed. USFWS coordination will be required prior to emergence surveys.
No – Activity has "No Effect" determination. Proceed with maintenance activity.
Unsure? – Do not proceed. Take photographs and write down the location of each tree and report information to appropriate staff.

Arkansas Map 1. Aerial overview and USFWS range maps for the Indiana and northern long-eared bat within the Arkansas Ozark Central Region Unit. Orange represents the overlap range of the Indiana and northern long-eared bat. Blue solely represents the range of the northern long-eared bat. Yellow represents existing SWPA transmission lines.

Arkansas Map 2. Aerial overview map showing SWPA line numbers, line sections with recommended timing restrictions for the Indiana bat, and line sections with no seasonal trimming restrictions within the Arkansas Ozark Central Region Unit.

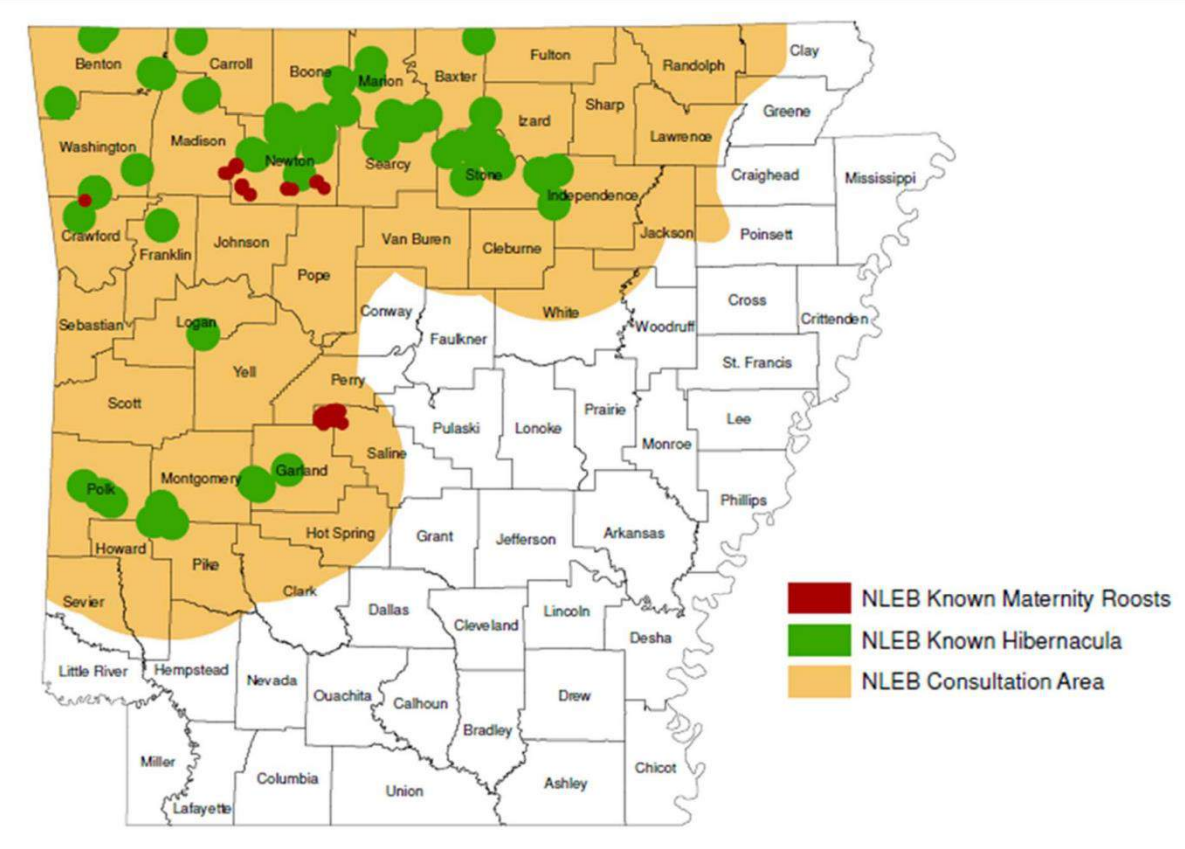


DOCUMENT 1

Northern Long-eared Bat Consultation Area and Final 4(d) Rule Guidance Flowchart for Arkansas

Is the project within the NLEB Consultation Area (CA)?

- **No** → The FWS has no data to support NLEB presence in this area. Therefore, a No Effect determination can be made.
- **Yes** → Does the project have a federal nexus (federally funded action, federal permit, or action carried out by federal agency)?
  - **No** → Please follow the attached "Key to the Northern Long-Eared Bat 4(d) Rule for **Non-Federal Activities**" document for further guidance.
  - **Yes** → Please follow the attached "Key to the Northern Long-Eared Bat 4(d) Rule for **Federal Actions that May Affect Northern Long-Eared Bats**" document for further guidance.



This flow chart was created by the Arkansas ES Field Office of the U.S. Fish and Wildlife Service to provide consistency and streamline the decision making process for any actions under Sections 7 or 10 of the Endangered Species Act. The **recommendations** provided in this guidance pertain specifically to actions occurring in Arkansas and should not be used to assess projects in other states. Furthermore, please note the following NLEB season dates that should be used when following the Service recommendations provided in the attached Keys: Active Season (March 15 – November 14); Spring Staging (March 15 – April 30); Pup Season (May 15 – July 31); Fall Swarming (August 15 – November 14); Winter Season/Hibernation (November 15 – March 14). Any updates to these documents will be posted on the Arkansas ES Field Office website at http://www.fws.gov/arkansas-es/. If you need any further assistance please call Tommy Inebnit at 501-513-4483.

LAST UPDATED: February 2, 2016

Key to the Northern Long-Eared Bat 4(d) Rule
for Federal Actions that May Affect Northern Long-Eared Bats
A separate key is available for non-Federal Activities

Federal agency actions that involve incidental take not prohibited under the final 4(d) rule may result in effects to individual northern long-eared bats. Per section 7 of the Act, if a federal agency's action may affect a listed species, consultation with the Service is required. This requirement does not change when a 4(d) rule is implemented. However, for this 4(d) rule, the Service proposed a framework to streamline section 7 consultations when federal actions may affect the northern long-eared bat but will not cause prohibited take. Federal agencies have the option to rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities by using the framework. This key will help federal agencies determine if their actions may cause prohibited incidental take of northern long-eared bats as defined in the 4(d) rule under the Endangered Species Act and if separate section 7 consultation may be necessary. Also, the framework for streamlining northern long-eared bat section 7 consultation is provided.

1. Is the action area (i.e., the area affected by all direct and indirect project effects) located wholly outside the White-nose Syndrome Zone? For the most current version of the White-nose Syndrome Zone map, please see
www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf

Yes, the action area is located wholly outside the white-nose syndrome zone. Incidental take (see Definitions below) of northern long-eared bats is not prohibited in areas outside the White-nose Syndrome Zone. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if they use the framework described below. This framework is optional, if the federal agency chooses not to follow the framework, standard section 7 consultation procedures apply.

No, the action area is located partially or wholly inside the white-nose syndrome zone.
Continue to #2

2. Will the action take place within a cave or mine where northern long-eared bats hibernate (i.e., hibernaculum) or could it alter the entrance or the environment (physical or other alteration) of a hibernaculum?

Yes, the action will take place within a northern long-eared bat hibernaculum or it could alter the entrance or the environment (physical or other alteration) of a hibernaculum.
Take (see Definitions below) of northern long-eared bats within hibernacula is prohibited, including actions that may change the nature of the hibernaculum's environment or entrance to it, even when the bats are not present. If your activity includes work in a hibernaculum or it could alter its entrance or environment, please contact the Service's

Ecological Services Field Office located nearest to the project area. To find contact information for the Ecological Services Field Offices, please see www.fws.gov/offices.

No, the action will not take place within a northern long-eared bat hibernaculum or alter its entrance or environment.
Continue to #3

3. Will the action involve tree removal (see definition below)?

No, the action does not include tree removal.
Incidental take (see Definitions below) from activities that do not involve tree removal and do not take place within hibernacula or would not alter the hibernaculum's entrance or environment (see Question #3), is not prohibited. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if they use the framework described below. This framework is optional, if the federal agency chooses not to follow the framework, standard section 7 consultation procedures apply.

Yes - continue to #4

4. Is the action the removal of hazardous trees for protection of human life or property?

Yes, the action is removing hazardous trees.
Incidental take (see Definitions below) of northern long-eared bats as a result of hazardous tree removal is not prohibited. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if they use the framework described below. This framework is optional, if the federal agency chooses not to follow the framework, standard section 7 consultation procedures apply.

No, the action is not removing hazardous trees.
Continue to #5

5. Will the action include one or both of the following: 1) removing a northern long-eared bat known occupied maternity roost tree or any trees within 150 feet of a known occupied maternity roost tree from June 1 through July 31; or 2) removing any trees within 0.25 miles of a northern long-eared bat hibernaculum at any time of year?

No
Incidental take (see Definitions below) from tree removal activities is not prohibited unless it results from removing a known occupied maternity roost tree or from tree removal activities within 150 feet of a known occupied maternity roost tree from June 1 through July 31 or results from tree removal activities within 0.25 mile of a hibernaculum at any time. The federal agency can rely upon the finding of the programmatic biological opinion for the final 4(d) rule to fulfill their project-specific section 7 responsibilities if they use the framework described below. This framework is optional, if the federal

agency chooses not to follow the framework, standard section 7 consultation procedures apply.

Yes
Incidental take (see Definitions below) of northern long-eared bats is prohibited if it occurs as a result of removing a known occupied maternity roost tree or removing trees within 150 feet of a known occupied maternity roost tree during the pup season from June 1 through July 31 or as a result of removing trees from within 0.25 mile of a hibernaculum at any time of year. This does not mean that you cannot conduct your action; however, standard section 7 consultation procedures apply. Please contact your nearest Ecological Services Field Office. To find contact information for the Ecological Services Field Offices, please see www.fws.gov/offices

How do I know if there is a maternity roost tree or hibernacula in the action area?
We acknowledge that it can be difficult to determine if a maternity roost tree or a hibernaculum is in your project area. Location information for both resources is generally kept in state Natural Heritage Inventory databases – the availability of this data varies state-by-state. Many states provide online access to their data, either directly by providing maps or by providing the opportunity to make a data request. In some cases, to protect those resources, access to the information may be limited. A web page with links to state Natural Heritage Inventory databases is available at www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html.

When looking for information on the presence of maternity roost trees or hibernacula within your project area, our expectation is that the federal action agency will complete due diligence to determine if date is available. If information is not available, document your attempt to find the information and send it with your determination under step 1 of the framework (see below).

We do not require federal agencies to conduct surveys; however, we recommend that surveys be conducted whenever possible. Surveys will help federal agencies meet their responsibilities under section 7(a)(1) of the Act. Active participation of federal agencies in survey efforts will lead to a more effective conservation strategy for the northern long-eared bat. In addition, should the Service reclassify the species as endangered in the future, an agency with a good understanding of how the species uses habitat based on surveys within its action areas could have greater flexibility under section 7(a)(2) of the Act. Recommended survey methods are available at www.fws.gov/midwest/endangered/mammals/nleb.

Optional Framework to Streamline Section 7 Consultation for the Northern Long-Eared Bat:

The primary objective of the framework is to provide an efficient means for U.S. Fish and Wildlife Service verification of federal agency determinations that their proposed actions are consistent with those evaluated in the programmatic intra-Service consultation for the final 4(d) rule and do not require separate consultation. Such verification is necessary because incidental take is prohibited in the vicinity of known hibernacula and known roosts, and these locations are continuously updated. Federal agencies may rely on this Biological Opinion to fulfill their project-specific section 7(a)(2) responsibilities under the following framework:

1. For all federal activities that may affect the northern long-eared bat, the action agency will provide project-level documentation describing the activities that are excepted from incidental take prohibitions and addressed in this consultation. The federal agency must provide written documentation to the appropriate Service Field Office when it is determined their action may affect (i.e., not likely to adversely affect or likely to adversely affect) the northern long-eared bat, but would not cause prohibited incidental take. This documentation must follow these procedures:

    a. In coordination with the appropriate Service Field Office, each action agency must make a determination as to whether their activity is excepted from incidental taking prohibitions in the final 4(d) rule. Activities that will occur within 0.25 mile of a known hibernacula or within 150 feet of known, occupied maternity roost trees during the pup season (June 1 to July 31) are not excepted pursuant to the final 4(d) rule. This determination must be updated annually for multi-year activities.
    b. At least 30 days in advance of funding, authorizing, or carrying out an action, the federal agency must provide written notification of their determination to the appropriate Service Field Office.
    c. For this determination, the action agency will rely on the definitions of prohibited activities provided in the final 4(d) rule and the activities considered in this consultation.
    d. The determination must include a description of the proposed project and the action area (the area affected by all direct and indirect project effects) with sufficient detail to support the determination.
    e. The action agency must provide its determination as part of a request for coordination or consultation for other listed species or separately if no other species may be affected.
    f. Service concurrence with the action agency determination is not required, but the Service may advise the action agency whether additional information indicates consultation for the northern long-eared bat is required; i.e., where the proposed project includes an activity not covered by the 4(d) rule and thus not addressed in the Biological Opinion and is subject to additional consultation.
    g. If the Service does not respond within 30 days under (f) above, the action agency may presume its determination is informed by best available information and consider its project responsibilities under section 7(a)(2) with respect to the northern long-eared bat fulfilled through this programmatic Biological Opinion.

2. Reporting

    a. For monitoring purposes, the Service will assume all activities are conducted as described. If an agency does not conduct an activity as described, it must promptly report and describe such departures to the appropriate Service Field Office.
    b. The action agency must provide the results of any surveys for the northern long-eared bat to the appropriate Service Field Office within their jurisdiction.
    c. Parties finding a dead, injured, or sick northern long-eared bat must promptly notify the appropriate Service Field Office.

If a Federal action agency chooses not to follow this framework, standard section 7 consultation procedures will apply.

Section 7(a)(1) of the Act directs Federal agencies, in consultation with and with the assistance of the Secretary (a function delegated to the Service), to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Service Headquarters provides to federal action agencies who choose to implement the framework described above several conservation recommendations for exercising their 7(a)(1) responsibility in this context. Conservation recommendations are discretionary federal agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. Service Headquarters recommends that the following conservation measures to all Federal agencies whose actions may affect the northern long-eared bat:

1. Perform northern long-eared bat surveys according to the most recent Range-wide Indiana Bat/ northern long-eared bat Summer Survey Guidelines. Benefits from agencies voluntarily performing northern long-eared bat surveys include:

    a. Surveys will help federal agencies meet their responsibilities under section 7(a)(1) of the Act. The Service and partners will use the survey data to better understand habitat use and distribution of northern long-eared bats, track the status of the species, evaluate threats and impacts, and develop effective conservation and recovery actions. Active participation of federal agencies in survey efforts will lead to a more effective conservation strategy for the northern long-eared bat.
    b. Should the Service reclassify the species as endangered in the future, an agency with a good understanding of how the species uses habitat based on surveys within its action areas could inform greater flexibility under section 7(a)(2) of the Act. Such information could facilitate an expedited consultation and incidental take statement that may, for example, exempt taking associated with tree removal during the active season, but outside of the pup season, in known occupied habitat.

2. Apply additional voluntary conservation measures, where appropriate, to reduce the impacts of activities on northern long-eared bats. Conservation measures include:
    a. Conduct tree removal activities outside of the northern long-eared bat pup season (June 1 to July 31) and/or the active season (April 1 to October 31). This will minimize impacts to pups at roosts not yet identified.

b. Avoid clearing suitable spring staging and fall swarming habitat within a 5-mile radius of known or assumed northern long-eared bat hibernacula during the staging and swarming seasons (April 1 to May 15 and August 15 to November 14, respectively).
c. Manage forests to ensure a continual supply of snags and other suitable maternity roost trees.
d. Conduct prescribed burns outside of the pup season (June 1 to July 31) and/or the active season (April 1 to October 31). Avoid high-intensity burns (causing tree scorch higher than northern long-eared bat roosting heights) during the summer maternity season to minimize direct impacts to northern long-eared bat.
e. Perform any bridge repair, retrofit, maintenance, and/or rehabilitation work outside of the northern long-eared bat active season (April 1 to October 31) in areas where northern long-eared bats are known to roost on bridges or where such use is likely.
f. Do not use military smoke and obscurants within forested suitable northern long-eared bat habitat during the pup season (June 1 to July 31) and/or the active season (April 1 to October 31).
g. Minimize use of herbicides and pesticides. If necessary, spot treatment is preferred over aerial application.
h. Evaluate the use of outdoor lighting during the active season and seek to minimize light pollution by angling lights downward or via other light minimization measures.
i. Participate in actions to manage and reduce the impacts of white-nose syndrome on northern long-eared bat. Actions needed to investigate and manage white-nose syndrome are described in a national plan the Service developed in coordination with other state and federal.

Definitions

"Incidental take" is defined by the Endangered Species Act as take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." For example, harvesting trees can kill bats that are roosting in the trees, but the purpose of the activity is not to kill bats.

"Known hibernacula" are defined as locations where one or more northern long-eared bats have been detected during hibernation or at the entrance during fall swarming or spring emergence. Given the challenges of surveying for northern long-eared bats in the winter, any hibernacula with northern long-eared bats observed at least once, will continue to be considered "known hibernacula" as long as the hibernacula remains suitable for northern long-eared bat.

"Known occupied maternity roost trees" is defined in the 4(d) rule as trees that have had female northern long-eared bats or juvenile bats tracked to them or the presence of female or juvenile bats is known as a result of other methods. Once documented, northern-long eared bats are known to continue to use the same roosting areas. Therefore, a tree will be considered to be a "known occupied maternity roost" as long as the tree and surrounding habitat remain suitable for northern long-eared bat. The incidental take prohibition for known occupied maternity roosts trees applies only during the during the pup season (June 1 through July 31).

"Take" is defined by the ESA as 'to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any endangered species. Purposeful take is when the reason for the activity or action is to conduct some form of take. For instance, conducting a research project that includes collecting and putting bands on bats is a form of purposeful take.

"Tree removal" is defined in the 4(d) rule as cutting down, harvesting, destroying, trimming, or manipulating in any other way the trees, saplings, snags, or any other form of woody vegetation likely to be used by northern long-eared bats.

Figure 2. Examples of live trees with exfoliating bark. Examples include shagbark hickory (A), white oak (B), silver maple (C), honey locust.

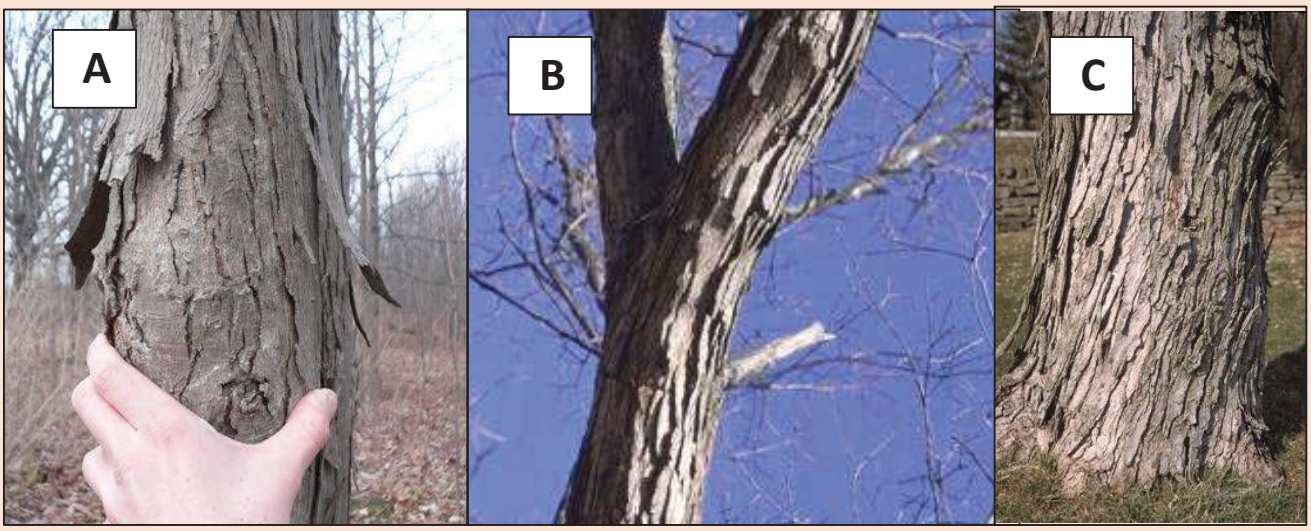
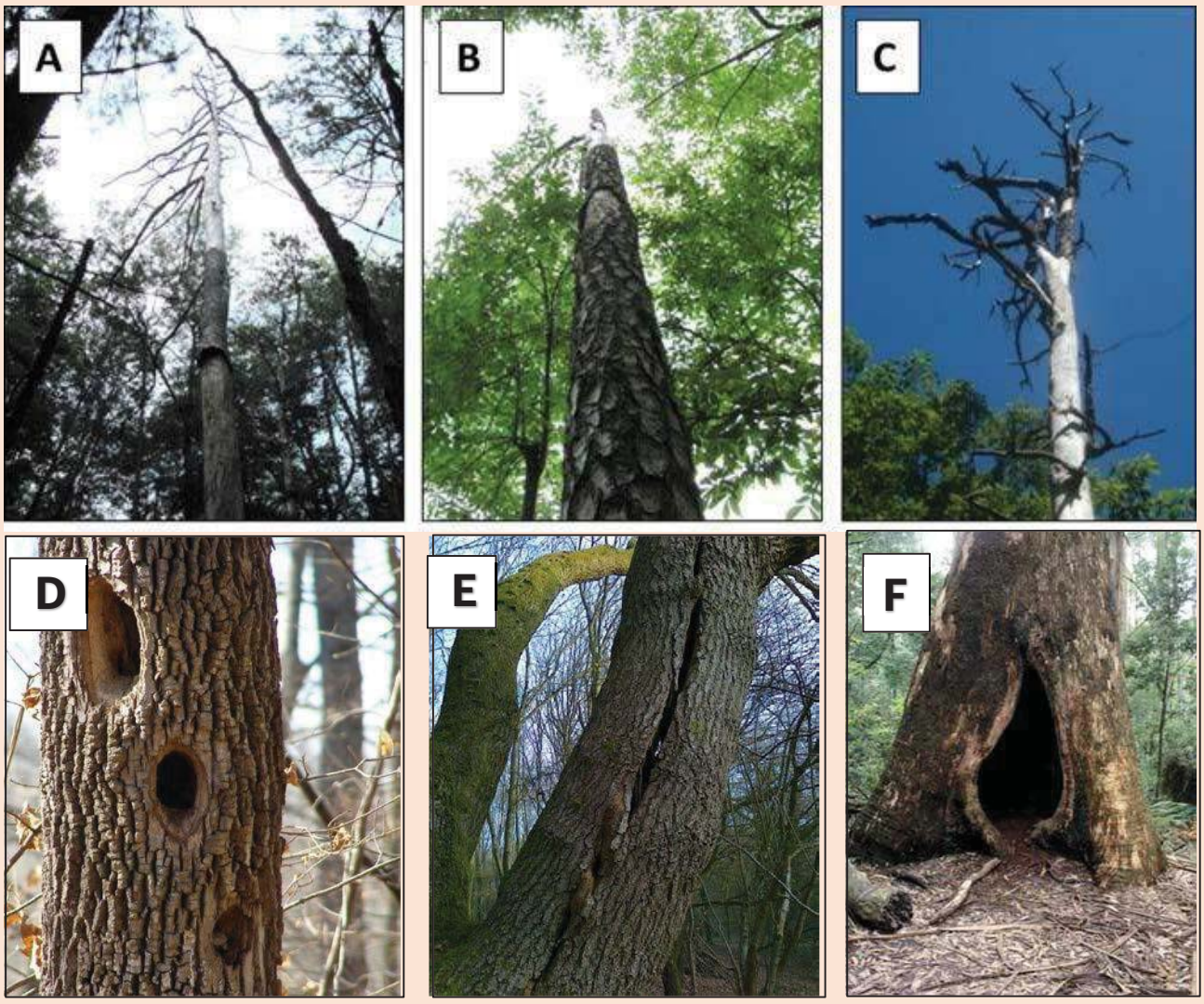


Figure 3. Examples of dead standing trees with sloughing bark (A - C), cavities (D), cracks (E), and hollows (F). Only dead standing trees with ≥ 30% remaining bark are considered suitable as roost trees.



STEPWISE THREATENED AND ENDANGERED SPECIES GUIDE FOR TREE MAINTENANCE ACTIVITIES

OKLAHOMA

BACKGROUND INFORMATION

Four federally protected bat species occur in the state of Oklahoma: the endangered Indiana bat (*Myotis sodalis*), gray bat (*Myotis grisescens*), Ozark big-eared bat (*Corynorhinus townsendii ingens*), and the threatened northern long-eared bat (*Myotis septentrionalis*). All four species spend the winter in caves (hibernacula). Only the Indiana bat and the northern long-eared bat roost in trees during the summer months (May to September); the gray and Ozark big-eared bat move to summer caves.

The enclosed Map 1 and 2 of the Appendix provides species range information for the Indiana and the northern long-eared bat in Oklahoma as they relate to the project right-of-way (ROW).

THREATENED AND ENDANGERED BAT SPECIES PRESENCE NEAR THE ROW:

According to the USFWS, there are no records of northern long-eared or Ozark big-eared bats within or immediately adjacent to the ROW in Oklahoma. Indiana bats occur in Sequoyah County. Additionally, there are three known occupied gray bat hibernacula or summer caves near the ROW in Sequoyah County.

The gray bat range includes: Sequoyah, Adair, Cherokee, Delaware, Mayes, Muskogee, Wargoner, Craig, and Ottawa Counties in Oklahoma.

USFWS Recommendations

Tree maintenance, defined as tree pruning, limbing, *and* felling of individual trees could result in a "May Affect" determination. Follow the enclosed Stepwise Guide to determine if the proposed project activity could result in a "May Affect" determination for federally listed bats in Missouri and the steps that should follow after a determination has been made.

Due to the presence of Indiana bats near the existing ROW in Sequoyah County, **the USFWs recommends tree maintenance activities to occur after July 1 and before May 15 in Sequoyah County. There are no tree maintenance recommendations for the Indiana bat outside of Sequoyah County.** To prevent disturbance to foraging gray bats, the USFWS recommends tree clearing restrictions surrounding any streams and rivers adjacent to the ROW. Tree maintenance activities near water resources should occur after September 15 and before May 1.

Proper water and soil quality protections should always occur in and surrounding karst areas.

NON-THREATENED AND ENDANGERED BAT SPECIES PRESENCE NEAR THE ROW:

No information provided.

Best Management Practices:

Please keep in mind that many non-federally protected bats in Oklahoma roost in trees from May through September. Conducting tree maintenance activities after September and before May of each year will limit potential harm or death to tree roosting bats

STEPWISE THREATENED AND ENDANGERED SPECIES GUIDE
FOR TREE MAINTENANCE ACTIVITIES IN OKLAHOMA

Question 1 – Are the tree(s) an immediate *hazard to human safety?

(*Emergency actions where imminent threat precludes any available opportunity for endangered resources review)

Yes – Incidental take of Indiana, gray, and northern long-eared bat trees is not prohibited. Proceed with maintenance activity.
No – Go to Question 2.

Question 2 – Is the proposed maintenance activity in Sequoyah County?

Yes – Go to Question 3.
No – Go to Question 6.

Question 3 – Will the project require pruning or felling trees within 1,000 feet of a forest or woodland?

Yes – Go to Question 4. Individuals trees ≥ 1000 feet within woodlands may to be used as summer roosting habitat by Indiana bats.
No – Go to Question 6.

Question 4 – Is the proposed activity going to occur during the May 15 to July 1 timeframe?

Yes – Go to Question 5.
No – Activity has "No Effect" determination. Proceed with maintenance activity.

Question 5 – Are the tree(s) considered suitable for roosting?

Suitable roost trees are any live or dead tree(s) equal ≥ 3 inches in diameter at breast height (DBH). To be considered suitable, live trees must have exfoliating bark along the branches or trunk. Smooth barked trees are not suitable. Dead standing trees are suitable if they have >30% remaining sloughing bark, and/or contain cracks and crevices. <u>See Figure 1 – Tree DBH Guide and Figures 2-3- Examples of Suitable Trees.</u>

Yes – Conduct an emergence survey on potential roost trees. USFWS coordination will be required prior to emergence surveys.
No – Go to Question 6.
Unsure – Do not proceed. Take photographs and write down the location of each tree and report information to appropriate staff.

Question 6 – Is the proposed activity in Adair, Cherokee, Craig, Delaware, Mayes, Muskogee, Ottowa, or Wagoner County (within the range of the gray bat)?

Yes – Go to Question 7.
No – Activity has "No Effect" determination. Proceed with maintenance activity

Question 7 – Will the project require tree maintenance activities directly adjacent to aquatic resources such as streams or rivers?

Yes – Go to Question 8.
No – Removal of trees has "No Effect" to gray bats. Proceed with maintenance activity.

Question 8 – Is the proposed activity going to occur during the May 1 to September 15 timeframe?

Yes – Do not proceed with maintenance activities. Activity "May Affect" foraging gray bats.
No – Proceed with maintenance activity. Removal of trees has "No Effect" to gray bat

Oklahoma Map 1. Aerial overview and USFWS range maps for the Indiana and northern long-eared bat within the Oklahoma Ozark Central Region Unit. Orange represents the overlap range of the Indiana and northern long-eared bat. Blue solely represents the range of the northern long-eared bat. Yellow represents existing SWPA transmission lines.

Oklahoma Map 2. Aerial overview map showing SWPA line numbers line and recommended seasonal and spatial trimming restrictions within the Oklahoma Ozark Central Region Unit

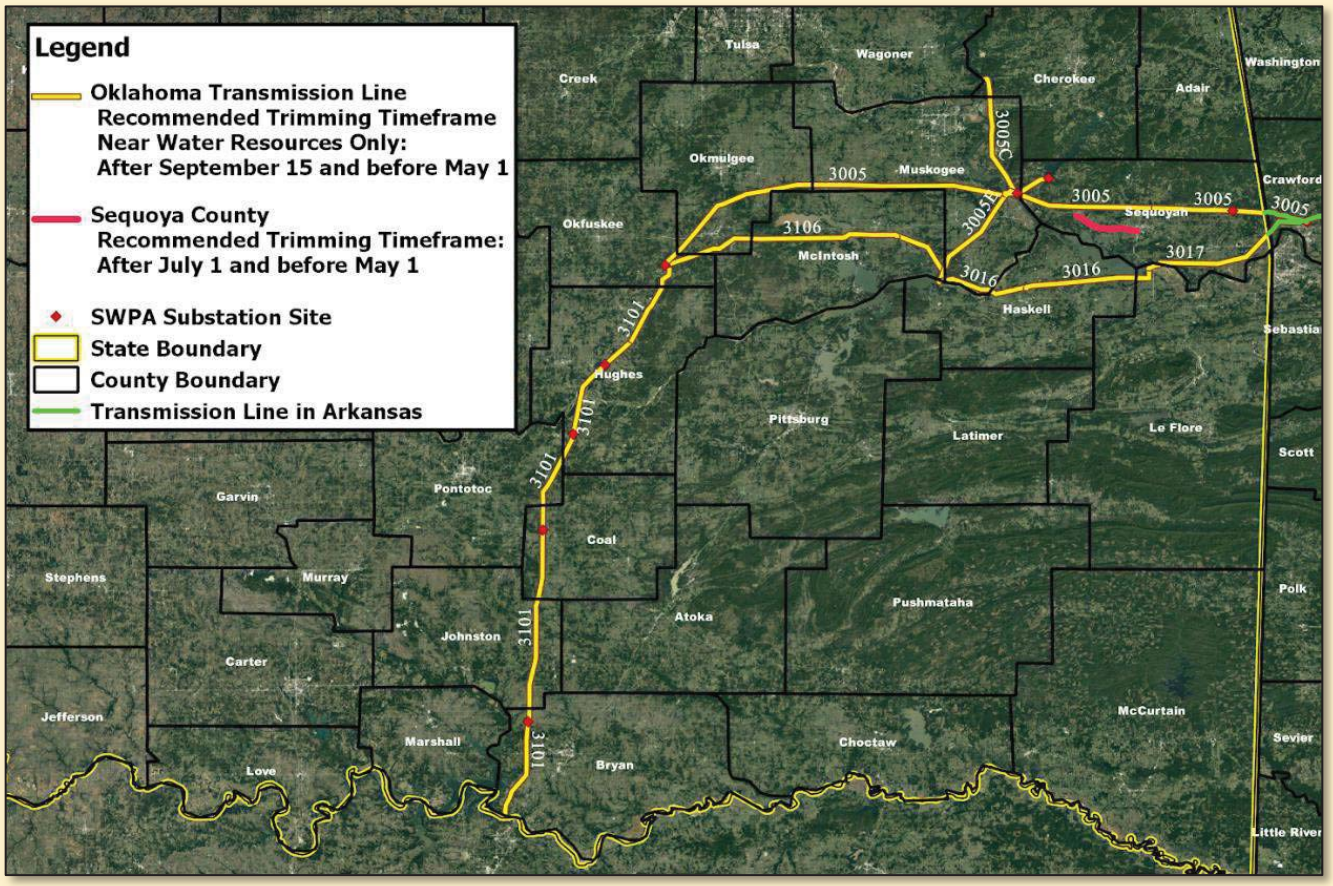


Figure 2. Examples of live trees with exfoliating bark. Examples include shagbark hickory (A), white oak (B), silver maple (C), honey locust.

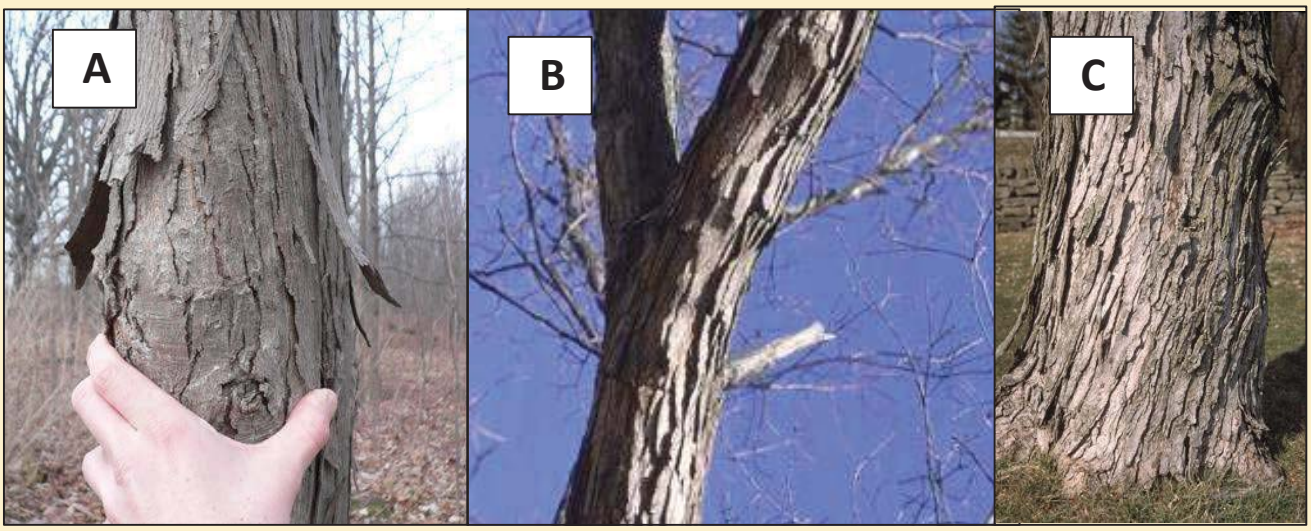


Figure 3. Examples of dead standing trees with sloughing bark (A - C), cavities (D), cracks (E), and hollows (F). Only dead standing trees with ≥ 30% remaining bark are considered suitable as roost trees.

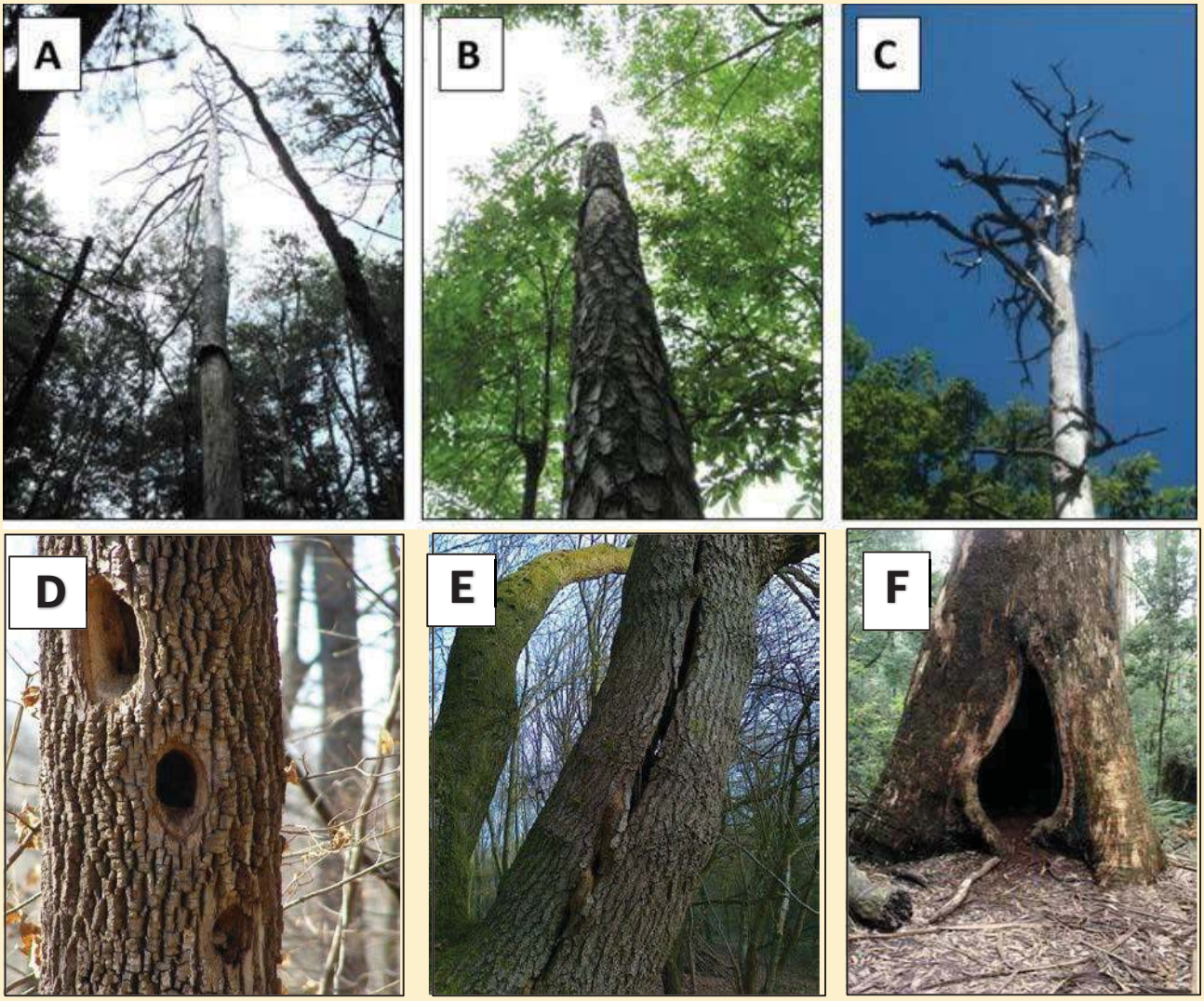
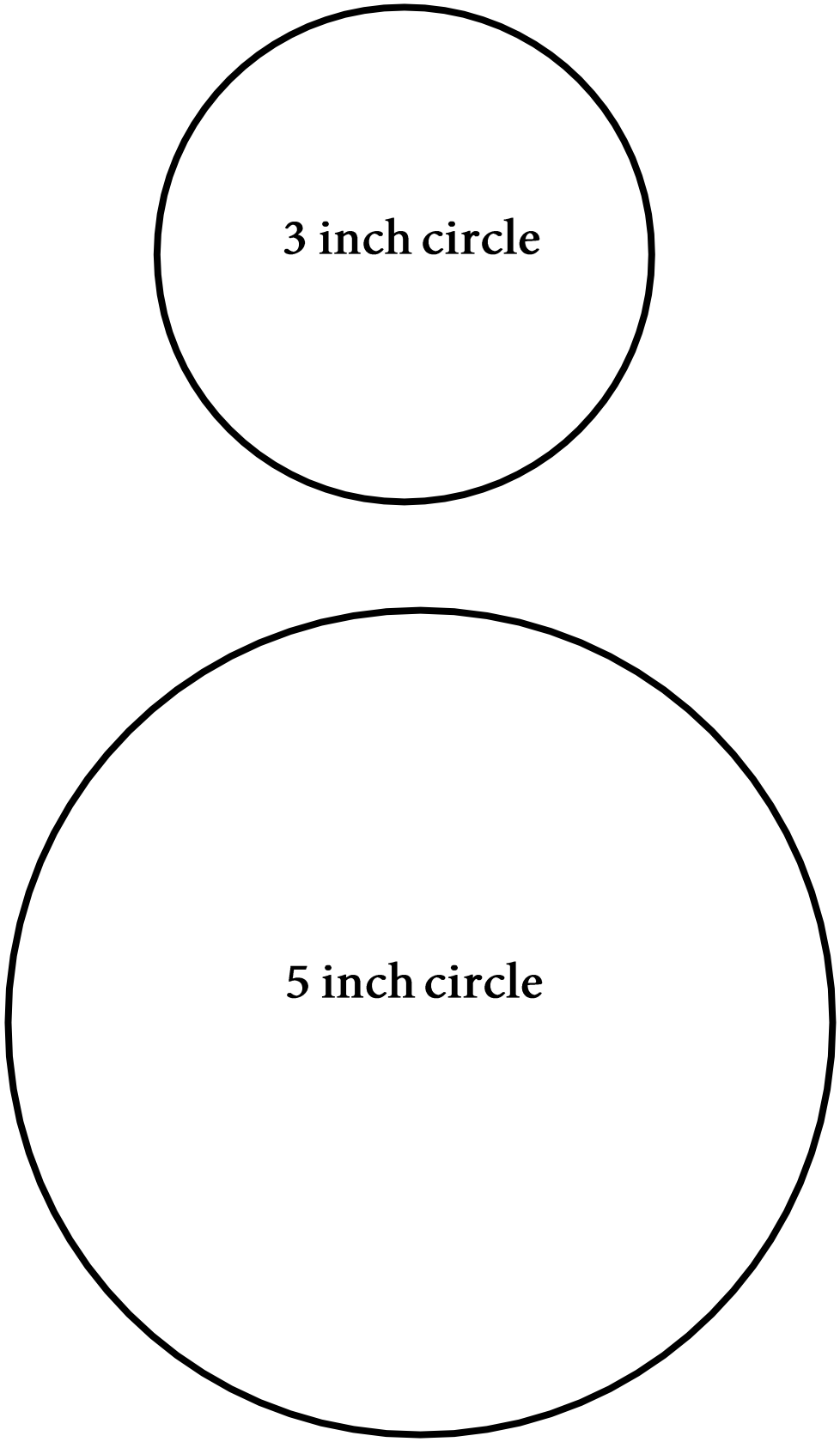


Figure 1. Example of minimal live or dead tree trunk diameter that is considered suitable as northern long-eared bat (3'' circle) and Indiana bat (5'' circle) roost trees.



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