Spire STL Pipeline Project

Biological Assessment

FERC Docket Nos. CP17-40-000 and CP17-40-001

July 2017

Public Information

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Acronyms and Abbreviations

Action	the issuance of a Notice to Proceed to Spire
AIMA	Agricultural Impact Mitigation Agreement
ATWS	additional temporary workspace
BA	Biological Assessment
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CPP	Clean Power Plan
dBA	A-weighted decibels
Dth/d	dekatherms per day
ESA	Endangered Species Act
E&SC	erosion and sediment control
E&SCP	erosion and sediment control plan
EI	Environmental Inspector
EIA	Energy Information Administration
Enable MRT	Enable Mississippi River Transmission, LLC
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
GAI	GAI Consultants, Inc.
HDD	horizontal directional drill
ILCS	Illinois Compiled Statutes
IPAC	USFWS Information, Planning, and Conservation System
LGC	Laclede Gas Company
M&R	metering and regulating
MAOP	maximum allowable operating pressure
MDNR	Missouri Department of Natural Resources
MLV	mainline valve
MP	milepost
NLAA	not likely to adversely affect
NMSZ	New Madrid Seismic Zone

NPDES	National Pollutant Discharge Elimination System
PHMSA	Pipeline and Hazardous Materials Safety Administration
Plan	FERC's Upland Erosion Control, Revegetation, and Maintenance Plan
Procedures	FERC's Wetland and Waterbody Construction and Mitigation Procedures
Project	Spire STL Pipeline Project
psig	pounds per square inch gauge
REX	Rockies Express Pipeline LLC
RIFO	Rock Island Field Office
RTE	rare, threatened, and endangered
RQD	rock quality designations
Spire	Spire STL Pipeline LLC
USACE	United States Army Corps of Engineers
USC	United States Code
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey

1.0 Introduction

The purpose of this Biological Assessment ("BA") is to review the extent to which the Spire STL Pipeline Project ("Project") may affect any rare, threatened, or endangered ("RTE") species of plants or wildlife pursuant to the Endangered Species Act [("ESA"); 16 United States Code ("USC") 1531 et seq.] as a result of the Federal Energy Regulatory Commission ("FERC") issuance of a Certificate of Public Convenience and Necessity ("Certificate") pursuant to Section 7(c) of the Natural Gas Act [15 USC 717f(c)] which would allow Spire STL Pipeline LLC ("Spire") to construct and operate the Project in Scott, Greene, and Jersey Counties, Illinois; and St. Charles and St. Louis Counties, Missouri.

1.1 Regulatory Background

Section 7(a)(2) of the ESA requires any federal agency that authorizes or approves a project, which may include the issuance of a license, contract or permit for a non-federal project, to determine whether or not the project may jeopardize the continued existence of federally-protected species or result in the destruction or adverse modification of federally-designated critical habitat for any federally-protected species. Federally-protected species are species currently listed as threatened or endangered under the ESA.

Section 9 of the ESA requires federal actions that may not result in jeopardy or adverse modification of critical habitat for a federally-protected species, but would result in the incidental take of any threatened or endangered species, to obtain authorization for incidental take from the United States Fish and Wildlife Service ("USFWS"). Incidental take is any take that is otherwise prohibited, as long as such taking is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity [50 Code of Federal Regulations ("CFR") 17.3].

Take, as defined in Section 3 of the ESA, means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct. Harm is an act that kills or injures wildlife and may include significant habitat modification or degradation that significantly impairs essential behavioral patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Harass means to perform an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering (50 CFR 17.3).

1.2 Roles and Responsibilities

For the purposes of this BA, the issuance of a Notice to Proceed to Spire for the construction and operation of the Project is considered a federal action ("Action"); therefore, FERC is considered the federal action agency consulting with the USFWS on the potential effects of the Action on federally-protected species and federally-designated critical habitat. Spire is considered a non-federal applicant requiring authorization from FERC prior to construction and operation of the Project. FERC designated Spire as its non-federal representative (50 CFR 402.08) to conduct informal consultation and prepare this BA.

This BA was prepared by GAI Consultants, Inc. ("GAI") at the request of, and in collaboration with, Spire. This BA was prepared to assist FERC to comply with statutory requirements to use the best scientific and commercial

information available to review the potential effects of the Action on federally-protected species and federally-designated critical habitat in accordance with ESA implementing regulations [50 CFR 402; 16 USC 1536 (c)].

FERC will transmit this BA to the USFWS as part of an initiation package requesting, in writing, initiation of formal consultation based on the effects determinations contained in this BA (50 CFR 402.14).

1.3 Consultation History

June 8, 2016 – GAI contacted the USFWS' Rock Island Field Office ("RIFO") via phone and email to initiate an informal review of the Project in an effort to identify survey needs and RTE species.

June 30, 2016 – GAI sent an email to the USFWS' Two Rivers National Wildlife Refuge requesting information about potential Project effects to migratory birds.

July 8, 2016 – GAI and Spire met with the UFWS' RIFO to discuss the Project and RTE species.

August 2, 2016 – GAI contacted the USFWS' RIFO via phone and email to discuss and transmit information regarding surveys for the decurrent false aster (*Boltonia decurrens*).

August 12, 2016 – GAI sent a letter to the USFWS' RIFO requesting technical assistance on RTE species records and survey requirements for the Indiana bat (*Myotis sodalis*), northern long-eared bat (*Myotis septentrionalis*), gray bat (*Myotis grisescens*), tree nesting migratory birds and bald eagles (*Haliaeetus leucocephalus*), Higgins eye pearlymussel (*Lampsilis higginsii*), Spectaclecase (*Cumberlandia monodonta*), pallid sturgeon (*Scaphirhynchus albus*), Illinois cave amphipod (*Gammarus acherondytes*), decurrent false aster, and running buffalo clover (*Trifolium stoloniferum*).

September 29, 2016 – GAI sent a letter to the USFWS' RIFO requesting additional information and review of initial effects determinations and proposed survey protocol for RTE species. The letter indicated the Project is not likely to adversely affect ("NLAA") the least tern (*Sternula antillarumor*), piping plover (*Charadrius melodus*), Higgins eye pearlymussel, or pallid sturgeon due to the use of horizontal directional drill ("HDD") crossing methods for the Mississippi and Missouri Rivers. The letter also indicated the Project is not likely to adversely affect the red knot (*Calidris canutus*) due to lack of habitat of the species in the Project footprint, and will not affect the Illinois cave amphipod due to the species not being present in counties crossed by the Project. The letter concludes that GAI will conduct habitat and/or species surveys for all remaining previously-identified federal RTE species, and will also include the eastern prairie fringed orchid *(Platanthera leucophaea*) and Mead's milkweed (*Asclepias meadii*).

September 30 to November 7, 2016 – GAI and the USFWS' RIFO exchanged emails on the review of the September 29, 2017 letter.

December 8, 2016 – The USFWS' RIFO sent a letter to GAI requesting additional information on HDD methods to support the preliminary NLAA determinations for the least tern, piping plover, red knot, Higgins eye pearlymussel, and pallid sturgeon. The letter indicated surveys should be conducted for the following species that may occur in the counties crossed by the Project: decurrent false aster, eastern prairie fringed orchid, Mead's milkweed, running buffalo clover, Indiana bat, northern long-eared bat, gray bat, and bald eagle. The letter also recommended seasonal tree clearing restrictions for migratory birds and the development of a migratory bird habitat impact analysis.

January 4, 2017 – FERC, the USFWS RIFO, Spire, and GAI held a conference call to discuss summer presence/absence bat surveys, RTE species surveys, and preparation of a BA.

January 20, 2017 – GAI sent an email to the USFWS' RIFO providing a schedule for draft BA preparation.

January 25, 2017 – GAI sent a letter to the USFWS' RIFO providing information on HDD methods supporting NLAA determinations for the least tern, piping plover, red knot, Higgins eye pearlymussel, and pallid sturgeon. The letter also included additional information and a negative survey result for decurrent false aster. The letter also indicated GAI will conduct habitat and/or species surveys for the eastern prairie fringed orchid, Mead's milkweed, running buffalo clover, Indiana bat, northern long-eared bat, gray bat, and bald eagle. The letter committed to seasonal tree clearing restrictions for migratory birds and included a migratory bird habitat impact analysis.

February 7, 2017 – GAI contacted the USFWS' RIFO via phone and email requesting technical assistance on summer presence/absence bat survey site locations.

February 14, 2017 – The USFWS' RIFO returned the call and discussed the summer presence/absence bat survey and preparation of a draft BA.

March 23, 2017 – The USFWS RIFO, Spire, and GAI held a conference call to discuss preparation of the BA.

April 13, 2017 – Telephone call with GAI Consultants and K. Lundh and T. Crabill of U.S. Fish and Wildlife Service to discuss decurrent false aster surveys and other RTE surveys.

June 29, 2017 – The USFWS RIFO, Spire, and GAI held a meeting to discuss preparation of the BA.

July 13, 2017 – The USFWS and GAI held a conference call to discuss preparation of the BA.

1.4 Purpose and Need

The Project is designed to provide approximately 400,000 dekatherms per day ("Dth/d") of year-round transportation service from an interconnect with Rockies Express Pipeline LLC ("REX") in Scott County, Illinois to markets in the St. Louis metropolitan area, eastern Missouri, and southwestern Illinois. Its purpose is to provide additional firm interstate pipeline capacity and access to additional supply basins to serve homes and businesses in the St. Louis metropolitan area and surrounding counties. The Project will enhance reliability and supply security, and will reduce reliance upon older and less favorable natural gas pipelines and propane peak-shaving infrastructure.

The Project was initially developed in response to strategic supply planning and reliability enhancement objectives of the Foundation Shipper, LGC. Spire has executed a precedent agreement with LGC as the Foundation Shipper for 350,000 Dth/d - representing a substantial amount of the Project's total capacity. Accordingly, at present, 87.5 percent of the anticipated firm capacity from the Project is committed to the Foundation Shipper and the remaining 12.5 percent is unsubscribed.

Spire held an Open Season for the Project from August 1, 2016 through August 19, 2016. Spire is negotiating with other prospective shippers that expressed interest in the Project during or after the Open Season and it is hopeful that additional precedent agreements will be executed as the Project progresses throughout the regulatory process.

1.4.1 Purpose and Needs Relating to the Greater St. Louis Area and Eastern Missouri

The Project will meet the needs of the foundation shipper, Laclede Gas Company ("LGC"), and other shippers in the greater St. Louis area and eastern Missouri that may have a desire to convert to natural gas or diversify their pipeline capacity entitlements and associated natural gas supply by providing access to REX and the supply basins attached thereto. As the local gas distribution company with responsibility to provide natural gas service to residential, commercial, and industrial customers, LGC currently serves approximately 650,000 customers in the St. Louis metropolitan area and surrounding counties in eastern Missouri.

The St. Louis market is constrained in terms of interstate natural gas pipeline capacity to LGC's city gate and access to diverse natural gas supplies. Currently, LGC holds firm transportation service entitlements (i.e., transportation capacity) on three interstate pipelines that directly connect to its LDC system, with over 87 percent of its total firm city-gate transportation capacity under contract with Enable MRT. To supplement its flowing supply during the winter season and on peak days, LGC also holds on and off-system storage assets. In addition, LGC relies on a liquid propane facility behind its city gate that is used to enrich the British thermal unit content of natural gas received in order to meet critical peak system requirements during limited periods of highest demand when demand exceeds LGC's flowing supply and storage withdrawal capabilities.

In addition to physical gas transportation capacity constraints, the St. Louis market currently lacks competitively-priced firm access to the supply basins that are attached to the REX pipeline system in the Rocky Mountains and Appalachian region. The prolific nature of the production connected to REX has been well documented, and the United States Department of Energy, Energy Information Administration ("EIA") has projected substantial growth in these basins compared to other sources of domestic gas production over the next several decades (EIA 2016a).

The older pipelines serving the St. Louis market primarily provide access to gas supply basins in Kansas, Oklahoma, Texas, and the Gulf Coast area. On the whole, those traditional supply basins have been largely static or declining in recent years. Furthermore, as a result of the geographic proximity of those supply basins to developing new markets for natural gas such as liquefied natural gas and Mexican exports, increased competition for supply out of those regions is likely to further increase gas supply price risk to the St. Louis market absent alternative sources. In addition, current transportation paths to the St. Louis area generally involve multiple pipelines and, consequently, "rate stacking" in order to access those traditional supply sources. As those basins decline over

time, markets such as St. Louis need access to newer and growing supply basins located in other regions of the country to ensure affordable and reliable supply.

Meanwhile, the REX pipeline - one of the newest and largest pipeline systems in the United States, with substantial capacity spanning supply basins in the Rocky Mountains all the way to the Appalachian region - has initiated a series of construction projects to enable its interstate pipeline system to source and deliver gas bi-directionally in order to provide firm deliveries from prolific supply basins in the eastern United States to markets as far west as central Illinois.[1] In addition, REX will perform yard and station piping modifications at its existing Blue Mound Compressor Station in Christian County, Illinois pursuant to 18 CFR 2.55(a). The project will occur entirely within the station fence line on previously approved and disturbed areas. The modifications will enable REX to provide east-to-west transportation in REX Zone 3, on a firm primary basis, to delivery locations as far west as Scott County, Illinois. The Blue Mound Compressor Station piping modifications are independent of the Rockies Express Zone 3 Capacity Enhancement Project. These modifications will enable REX to make deliveries from the east at the new Spire interconnect on a primary firm basis.

The Project's presence as a new transportation path for gas to the greater St. Louis area will not only provide direct benefits in linking that region to prolific new supply, but will also provide critical infrastructure reliability and diversity benefits that enhance overall natural gas supply security in the region. Currently over 87 percent of the firm pipeline transportation capacity into the St. Louis market area is currently provided by a single pipeline. The Project will significantly enhance the overall supply security of natural gas in the St. Louis area and surrounding counties by providing an additional physical source of flowing supply to the region. In the event of a planned or unplanned service outage on the current pipelines delivering into the region, LGC will be in a substantially better position to protect its system operations. Additionally, direct access to supplies from the REX pipeline system will include supply from both the Eastern United States and Rocky Mountain production areas, thus providing LGC and other Project shippers with multiple gas sourcing options and consequently enhanced supply reliability as well as economic benefits.

Moreover, a significant portion of St. Louis' current supply source crosses an area of seismic activity referred to as the New Madrid Seismic Zone ("NMSZ"). According to the United States Geological Survey ("USGS"), the NMSZ is the most active seismic area in the United States east of the Rocky Mountains (USGS 2009). Due to the geologic conditions in the NMSZ, earthquakes in that region have the potential to damage an area approximately 20 times larger than earthquakes in California and most other active seismic areas (MDNR 2017).

Given concerns about the potential for extended service interruptions, and the potentially devastating impacts of such service interruptions and loss of access to critical gas supplies to its service area in the event of such an incident, LGC has sought to diversify its pipeline transportation service paths and contract with an additional pipeline transporter whose geographic path to LGC's system avoids the NMSZ. The Project fulfills this need.

An additional purpose of the Project for the Foundation Shipper is its ability, through the introduction of a new firm source of flowing gas supply to the St. Louis area, to eliminate LGC's current dependence on propane for peak

[1] See, e.g., *Rockies Express Pipeline LLC*, 154 FERC ¶ 61,139 (2016) (authorization of Zone 3 Capacity Enhancement Project); *Rockies Express Pipeline LLC*, 150 FERC ¶ 61,161 (2015), *reh'g denied*, 155 FERC ¶ 61,018 (2016) (authorization of Zone 3 East-to-West Project).

shaving. Approximately 0.9 billion cubic feet of natural gas equivalent of liquid propane is currently stored in LGC's propane underground storage facility for potential vaporization in winter months. As noted above, LGC currently relies on propane injection to meet its system needs on the coldest days of the year. LGC's propane facilities are aged, and the use of propane is increasingly difficult from an operational standpoint given that the propane-enriched gas is not compatible with certain uses of gas, such as compressed natural gas for vehicular and other end use applications. In addition, firm transportation of propane to the St. Louis market is limited; only a single pipeline delivers propane to St. Louis and the firm capacity on that pipeline is fully committed to shippers other than LGC, making it increasingly difficult to acquire large quantities of propane on a timely basis (e.g., during an emergency like severe sustained cold weather). Thus, the Project will fulfill LGC's need to reduce reliance on, and ultimately replace, this propane peak shaving operation with greater access to firm supplies of natural gas that are available even on the coldest days of the year.

1.4.2 Other Purposes and Needs to be Served by the Project

Another purpose of the Project is to provide natural gas transportation infrastructure to support potential growth in demand for natural gas in the industrial and power generation sectors. As projected by EIA, the demand for natural gas is expected to rise steadily over the next several decades, and particularly so in the electric power sector. As EIA recently reported, these increases are spurred by environmental benefits of natural gas versus coal in electric generation. After experiencing significant increases in demand in recent years, EIA predicts a temporary leveling off of demand as both the price of natural gas and use of renewable energy sources increase. This trend, however, is expected to reverse (EIA 2016b):

> Throughout the 2020s and 2030s, electricity generation using natural gas increases again. Because natural gas-fired electricity generation produces fewer carbon dioxide emissions than coal-fired generation, natural gas is expected to play a large role in compliance with the Clean Power Plan ("CPP") for existing generation from fossil fuels, which takes effect in 2022. The electric power sector's total consumption of natural gas from 2020 through 2030 is 6 Tcf greater in the AEO2016 [Annual Energy Outlook 2016] Reference case than in a case where the Clean Power Plan is not implemented (No CPP).

Although the Clean Power Plan is an anticipated driver of the growth in demand for natural gas for electric generation, EIA still predicts steady growth for that sector's natural gas demand even without the Clean Power Plan. Missouri remains heavily dependent upon coal-fired power generation (EIA 2016c). It can be expected that gas-fired generation will increasingly replace coal-fired generation in Missouri.

The environmental advantages of natural gas compared to other fossil fuels offer other important benefits for the region to be served by the Project. In July 2016, the U.S. Environmental Protection Agency ("USEPA") finalized its 2010 primary National Ambient Air Quality Standards designations for sulfur dioxide, which identified Alton Township, Illinois – a town near the Project's proposed route – as one of several nonattainment areas for sulfur dioxide in the nation (USEPA 2016). The Project will offer the opportunity for energy conversion from more environmentally impactful fuel sources to cleaner-burning natural gas, potentially resulting in significant environmental benefits to the region.

2.0 Description of the Action

The Action being evaluated by this BA under ESA Section 7 includes the Action and all interrelated and interdependent actions. Interrelated actions are those that are part of the larger action and depend on the larger action for their justification (50 CFR 402.02). These actions are typically associated with the larger action. Interdependent actions are those that have no independent utility apart from the Action under consideration (50 CFR 402.02). These actions typically occur because the larger action occurred first. Therefore, the Action includes construction, operation, and maintenance of the Project.

2.1 Project Location and Description

The proposed Project will consist of approximately 65 miles of new, greenfield, 24-inch-diameter steel pipeline in two segments. The first segment (referred to as the "24-inch pipeline" portion of the Project) will originate at a new interconnect with the REX pipeline in Scott County, Illinois and extend approximately 59 miles through Greene and Jersey Counties in Illinois before crossing the Mississippi River and extending east through St. Charles County, Missouri. The 24-inch pipeline then crosses the Missouri River into St. Louis County, Missouri, and terminates at a new interconnect with LGC. The second segment of new, greenfield pipeline (referred to as the "North County Extension"), will consist of a 24-inch-diameter steel pipeline which will extend approximately six miles from the LGC interconnect through the northern portion of St. Louis County and terminate at a new interconnect with Enable Mississippi River Transmission, LLC ("Enable MRT") and LGC. The total length of the Project pipeline will be approximately 65 miles. The overall design capacity of the Project pipeline is expected to be 400,000 Dth/d. No compression will be required. The Project also includes the construction of three new metering and regulating ("M&R") stations that provide interconnects with (1) REX in Illinois, (2) LGC in Missouri, and (3) Enable MRT and LGC in Missouri. The Project location is shown in Figure 1. Additional information on these Project components described herein can be found in Spire's Amendment Certification application, which was filed with the FERC on April 21, 2017 (Spire 2017).

The Project will remove approximately 59.0 acres of upland forest and 0.8 acres of forested wetland, with approximately 30.0 acres of upland forest and 0.3 acres of forested wetland as a permanent loss due to maintenance and operation of the Project within the 50-foot permanent right-of-way. However, the maintained corridor in forested wetlands will be reduced to approximately 30 feet wide, since Spire will selectively trim trees within 15 feet of the pipeline that have roots that could compromise the integrity of the pipeline coating in accordance with the FERC Wetland and Waterbody Construction and Mitigation Procedures ("FERC Procedures") (FERC 2013b). In addition, this acreage excludes forested areas between Spire's proposed HDD entry and exit locations which will not be cleared during construction or operation. This acreage differs from the forested land use acreage reported in Resource Report 8 of Spire's Amendment Certification application filing (April 2017), as those acreages included the forested areas crossed by the HDDs by Spire's 50-foot permanent easement.

Rex Receipt Station

MLV-1

MLV-2

MLV-3

Laclede/Lange Delivery Station

Chain of Rocks Station

Scott County

Pike County

Greene County

Calhoun County

ILLINOIS

MISSOURI

PROJECT LOCATION

REFERENCE: WORLD STREET MAP, ESRI, 2017
ACCESSED : 07/2017

GREENE, JERSEY AND SCOTT COUNTIES, IL
ST.CHARLES AND ST.LOUIS COUNTIES, MO

LEGEND

- 24-inch Pipeline
- North County Extension
- Access Road
- Facility
- County Boundary
- State Boundary

0 2 4 8 Miles

FIGURE 1
BIOLOGICAL ASSESSMENT

gai consultants

SPIRE STL PIPELINE PROJECT

spire

DRAWN BY: PK DATE: 7/7/2017
CHECKED: JAD APPROVED: JAD

C:\Users\kudlup\Desktop\Priya\2016\Spire\MXD\Mist Net Report\Figure 1 Spire Location.mxd

2.1.1 Pipeline Facilities

A summary of the proposed pipeline facilities is presented in Table 1.

Table 1. Pipeline Facilities Associated with the Project

Pipeline	Pipeline Diameter (inch) and Type	Milepost ("MP") [1]	County, State	Approximate Length (miles)
24-Inch Pipeline	24, New	0.0R - 3.5	Scott, Illinois	3.8
		3.5 - 29.4	Greene, Illinois	25.8
		29.4 – 45.4	Jersey, Illinois	16.1
		45.4 - 58.1	St. Charles, Missouri	12.8
		58.1 – 59.2	St. Louis, Missouri	0.7
			Subtotal[2]	**59.2**
North County Extension	24, New	0.0 - 6.0	St. Louis, Missouri	6.0
			Total[2]	**65.2**

Notes:

[1] MP designations begin at 0.0 for each pipeline facility and are described geographically from north to south for the 24-inch pipeline and west to east for North County Extension.

[2] May not equal the sum of the column due to rounding.

2.1.1.1 24-Inch Pipeline

The proposed 24-inch pipeline includes approximately 59.2 miles of 24-inch-diameter steel pipeline and will deliver gas from the REX pipeline in Scott County, Illinois, to the proposed North County Extension and LGC's existing facilities in St. Louis County, Missouri. The proposed 24-inch pipeline will be designed for a maximum allowable operating pressure ("MAOP") of 1,440 pounds per square inch gauge ("psig"). The pipeline generally runs from north to south across the Illinois and Missouri counties shown in Table 1. Spire proposes that the 24-inch pipeline will cross the Mississippi River and Missouri River via two HDDs.

2.1.1.2 North County Extension

The proposed North County Extension includes approximately six miles of 24-inch-diameter steel pipeline and will deliver gas from the proposed 24-inch pipeline to a new M&R station and interconnect with Enable MRT and LGC in St. Louis County, Missouri. The proposed North County Extension will be designed for a MAOP of 1,440 psig. The pipeline generally runs from west to east. Spire proposes that the North County Extension will cross Coldwater Creek and Spanish Lake Park via two HDDs.

2.1.1.3 Cathodic Protection and AC Mitigation System

An impressed current cathodic protection system with remote groundbeds is proposed for the 24-inch pipeline and North County Extension. Based on field investigations, five remote groundbeds will be required on the 24-inch pipeline, and one remote groundbed will be required for the North County Extension. Spire also proposes to implement an AC mitigation system in areas where the pipeline parallels high-voltage electric transmission lines. AC mitigation systems will be installed within the permanent easement or facilities.

2.1.2 Aboveground Facilities

No major aboveground facilities are proposed for the Project. Ancillary aboveground facilities on the proposed Project include M&R stations, pig launchers/receivers, and mainline valves ("MLVs"), as described below and further detailed in Table 2.

2.1.2.1 M&R Stations

M&R stations typically include a fenced control building and a permanent access road, along with a supply line and a discharge line from the associated pipeline, an emergency bypass line, and communication equipment for supervisory control. The stations proposed to be constructed as part of the Project (Figure 1) include:

- REX Receipt Station: The new M&R station is proposed to be located at the start of the proposed 24-inch pipeline in Scott County, Illinois, at the interconnect with the REX pipeline;
- Laclede/Lange Delivery Station: The new M&R station is proposed in St. Louis County, Missouri, at the interconnects between the 24-inch pipeline, LGC's existing facilities, and the North County Extension; and
- Chain of Rocks Station: This new M&R station is proposed to be located on the proposed North County Extension in St. Louis County, Missouri, and will include interconnects with Enable MRT's existing Chain of Rocks facility and LGC.

2.1.2.2 Mainline Valves

Spire also proposes to construct MLVs at three locations along the proposed 24-inch pipeline route, with spacing of the MLV facilities meeting the requirements of the United States Department of Transportation ("USDOT") Pipeline and Hazardous Materials Safety Administration ("PHMSA"). MLVs allow the associated pipeline to be segmented for safety, operations, and maintenance purposes. They are typically sited away from populated areas to allow for safe and rapid gas evacuation if needed. Permanent access roads for the MLVs on the 24-inch pipeline will be located within the permanent easement. No MLVs are proposed along North County Extension. Proposed MLVs and other aboveground facility locations are provided in Table 2.

Table 2. Aboveground Facilities Associated with the Project

Facility Name	Approximate MP	County, State	Description
24-Inch Pipeline			
REX Receipt Station	0.0R	Scott, Illinois	Construction of a new M&R facility at the interconnect with the REX pipeline.
MLV 1	15.7	Greene, Illinois	Located within the proposed permanent easement.
MLV 2	34.7	Jersey, Illinois	Located within the proposed permanent easement.
MLV 3	46.2	St. Charles, Missouri	Located within the proposed permanent easement.
Laclede/Lange Delivery Station	59.2	St. Louis, Missouri	Construction of a new M&R facility at the interconnects between the proposed 24-inch pipeline, LGC's existing facilities (for delivery to LGC), and the North County Extension.
North County Extension			
Chain of Rocks Station	6.0	St. Louis, Missouri	Construction of a new M&R facility and interconnects with Enable MRT and LGC.

2.2 Land Requirements

Land requirements will include both temporary and permanent impacts. Temporarily impacted areas will consist of those areas necessary to facilitate construction including the construction right-of-way, additional temporary workspace ("ATWS"), staging areas, and temporary access roads. Permanent impact areas will include the new permanent easement associated with the proposed 24-inch pipeline, North County Extension, and cathodic protection, new M&R stations, associated ancillary facilities, and new permanent access roads.

The construction right-of-way (including temporary workspaces), permanent easement, and ATWS, aboveground facilities, temporary and permanent access roads, and staging areas will total approximately 1,004.5 acres. Of this, approximately 415.2 acres will be permanently maintained for operation of the Project facilities. Tables 3 and 4 include a summary of all Project-related land requirements that will be affected by the construction and operation of the Project.

spire

Table 3. Land Requirements for Pipeline Facilities

Facility/County, State	Land Affected During Construction (acres) [1,2]	Land Affected During Operation (acres)
24-Inch Pipeline		
Pipeline		
Scott, Illinois	41.13	22.92
Greene, Illinois	280.87	156.42
Jersey, Illinois	173.82	97.53
St. Charles, Missouri	133.49	77.34
St. Louis, Missouri	6.67	4.47
Subtotals[3]	**635.97**	**358.67**
ATWS[4]		
Scott, Illinois	12.48	0.00
Greene, Illinois	87.46	0.00
Jersey, Illinois	49.28	0.00
St. Charles, Missouri	56.35	0.00
St. Louis, Missouri	3.92	0.00
Subtotals[3]	**209.49**	**0.00**
Cathodic Protection		
Greene, Illinois	1.12	0.76
Jersey, Illinois	0.41	0.27
St. Charles, Missouri	0.41	0.28
Subtotals[3]	**1.95**	**1.31**
Access Roads		
Scott, Illinois	0.73	0.10
Greene, Illinois	4.16	0.00
Jersey, Illinois	4.53	0.03
St. Charles, Missouri	3.06	2.29
St. Louis, Missouri	2.13	0.00
Subtotals[3]	**14.61**	**2.42**
Subtotals for 24-Inch Pipeline[3]	**862.01**	**362.40**
North County Extension		
Pipeline		
St. Louis, Missouri	59.41	36.54
ATWS[4]		
St. Louis, Missouri	30.25	0.00

Table 3. Land Requirements for Pipeline Facilities (Continued)

Facility/County, State	Land Affected During Construction (acres) [1,2]	Land Affected During Operation (acres)
North County Extension (continued)		
Cathodic Protection		
St. Louis, Missouri	0.45	0.30
Access Roads		
St. Louis, Missouri	2.35	0.00
Subtotals for North County Extension[4]	**92.47**	**36.83**
Staging Areas		
Scott, Illinois	27.82	0.00
Jersey, Illinois	2.83	0.00
St. Charles, Missouri	2.87	0.00
Subtotals[3]	**33.53**	**0.00**
Totals[3]	**988.01**	**399.23**
Acreage Affected in Illinois[3]	686.64	278.03
Acreage Affected in Missouri[3]	301.37	121.21

Notes:

1 Construction workspace through field delineated and desktop waterbodies and wetlands has been reduced to 75 feet as required and where practicable.

2 Land affected during construction is inclusive of operational impacts (permanent).

3 May not equal the sum of the column due to rounding.

4 ATWS consists of all workspaces denoted as ATWS on the Construction Alignment Sheets, which includes workspaces that will be temporarily utilized during construction of the associated aboveground facilities.

2.2.1 Pipeline Facilities

Spire anticipates a typical 90-foot temporary construction right-of-way width, which will include a 50-foot permanent easement. An additional 25 feet of ATWS will be required through agricultural areas, and ATWS will be required to facilitate construction in certain areas, such as crossings of roads, railroads, waterbodies, and wetlands. The construction right-of-way will be reduced to 75 feet at waterbodies and wetlands. Spire will not clear land between the HDD entry and exit locations for the proposed crossings of the Mississippi River, Missouri River, Coldwater Creek, and Spanish Lake Park.

A summary of the proposed land requirements for the pipeline facilities is provided in Table 3.

2.2.2 ATWS

ATWS areas typically are required at road, railroad, waterbody, and wetland crossing locations and for areas requiring specialized construction techniques, including agricultural land. ATWS to facilitate the hydrostatic tests have also been identified at road crossings closest to potential municipal water sources. The configurations and sizes of ATWS areas are based on site-specific conditions and vary in accordance with the construction methodology, crossing type, and other construction needs. ATWS requirements are summarized in Table 3.

2.2.3 Access Roads

Spire proposes to use and/or modify existing access roads as well as develop new access roads to access the Project during construction and operation. Public roads will be used to access the right-of-way where possible. Spire has identified approximately 5.6 miles of access roads for use during construction, with an anticipated width of 25 feet. Of these, approximately 4.8 miles are proposed for temporary use, and 0.8-mile will be permanently maintained for operation of the Project to provide permanent access to the REX Receipt Station and MLV sites. A summary of the land affected by access roads is included in Table 3.

2.2.4 Staging Areas

Spire does not anticipate the need for additional contractor yards. Spire has identified potential sites to be utilized for staging areas. Staging areas may be utilized for a variety of purposes including equipment and materials staging, parking, and mobilization. These areas would be temporarily utilized during the duration of construction Locations and acreages of the proposed staging areas are provided in Table 3.

2.2.5 Aboveground Facilities

A summary of estimated land requirements for aboveground facilities is provided in Table 4.

Table 4. Land Requirements for Aboveground Facilities

Facility	County, State	Property Size (acres)[1]	Land Affected During Construction (acres)[2, 3]	Land Affected During Operation (acres)[2]
24-Inch Pipeline				
REX Receipt Station	Scott, Illinois	39.88	5.02	5.02
MLV 1	Greene, Illinois	N/A	N/A	N/A
MLV 2	Jersey, Illinois	N/A	N/A	N/A
MLV 3	St. Charles, Missouri	N/A	N/A	N/A
Laclede/Lange Delivery Station	St. Louis, Missouri	39.47	3.99	3.99

Table 4. Land Requirements for Aboveground Facilities (Continued)

Facility	County, State	Property Size (acres)[1]	Land Affected During Construction (acres)[2, 3]	Land Affected During Operation (acres)[2]
North County Extension				
Chain of Rocks Station	St. Louis, Missouri	39.03	7.51	6.97
	Totals[4]	**118.38**	**16.52**	**15.98**
	Acreage Affected in Illinois[4]		5.02	5.02
	Acreage Affected in Missouri[4]		11.50	10.96

Notes:

N/A - not applicable.

1 The land affected during operation is the portion of the tract that will be required for the permanent easement.

2 MLVs are located within the permanent easement. The construction and operation acreage is accounted for within the operational acreages of the pipeline.

3 Certain ATWS included in Table 3 consist of workspaces that will be temporarily utilized during construction of the associated aboveground facilities. This acreage is not included here to avoid duplication

4 May not equal the sum of the column due to rounding.

2.2.6 Mainline Valves

Spire proposes that MLVs will generally be installed and operated within the proposed permanent easement associated with the pipeline. Each MLV will consist of a 50-foot by 60-foot graveled area and will be fenced within the permanent easement. Spire has located MLVs near existing public roads where permanent access roads to these sites will be constructed.

2.3 Construction Procedures

The Project will be designed, constructed, and operated in compliance with applicable federal, state, and local regulations and codes. This includes, but is not limited to, the following:

- USDOT 49 CFR 192, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards, Including All References (6/6/2015) and standards, or portions thereof, incorporated by reference under 49 CFR 192.7 as of 7/7/15;
- Occupational Safety and Health Administration 29 CFR 1926;
- Illinois Commerce Commission - Gas Pipeline Safety Program;
- Illinois Gas Pipeline Safety Act [220 Illinois Compiled Statutes (“ILCS”) 20];

- Illinois Gas Transmission Facilities Act (220 ILCS 25);
- Missouri Title 4 CSR. Division 240, Chapter 40 Public Service Commission - Gas Utilities and Gas Safety Standards; and
- Missouri Department of Transportation Engineering Policy Guide, Section 643.3: Policy, Standards and Regulations pertaining to utility facilities located on or across state highways.

The Project will also be designed, constructed, and operated in accordance with numerous applicable national specifications issued by these organizations: American Association of State Highway and Transportation Officials; American Gas Association; American National Standards Institute; American Petroleum Institute; American Society of Mechanical Engineers; American Society of Testing Materials; National Association of Pipe Coating Applications; and National Fire Protection Association.

Spire will comply with FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan* ("Plan" FERC 2013a) and FERC's Procedures (FERC 2013b) in conjunction with the Agricultural Impact Mitigation Agreement ("AIMA") for Illinois as a minimum standard during construction. Where deviations from the Plan and Procedures (FERC 2013a and 2013b) are necessary for site-specific reasons, these locations have been provided to FERC. Some ATWS for topsoil segregation in agricultural lands are located within 50 feet of wetlands where the adjacent upland consists of cultivated or rotated cropland as permitted in FERC Procedures (FERC 2013b).

Spire will adequately train construction personnel in the environmental restrictions and/or requirements applicable to their particular job duties. Construction management personnel and environmental inspectors ("EI") will be provided with the appropriate environmental information/materials specific to the Project. This training will focus on FERC's Plan and Procedures (FERC 2013a and 2013b) as well as other regulatory requirements such as the AIMA, endangered species, cultural resources, and wetlands.

Spire anticipates commencing initial construction activities in January 2018, and expects to place the pipelines and facilities into service November 1, 2018. Anticipated construction dates for each Project facility are included in Table 5.

Table 5. Anticipated Construction Dates

Facility	Anticipated Construction Start	Anticipated Construction End
24-inch Pipeline[1, 2]	January 2018	November 2018
North County Extension[2, 3]	January 2018	November 2018
REX Receipt Station[2]	May 2018	September 2018
Laclede/Lange Delivery Station[2]	May 2018	September 2018
Chain of Rocks Station[2]	May 2018	September 2018

Table 5. Anticipated Construction Dates (Continued)

Notes:

1 Construction at the Mississippi River, Missouri River, and federal property crossings are anticipated to begin in April 2018 and continue through September 2018.

2 Tree clearing will be completed prior to May 1, 2018, in accordance with approvals by applicable agencies.

3 Construction at the Coldwater Creek and Spanish Lake Park crossings are anticipated to begin in April 2018 and May 2018, respectively, and to continue through September 2018.

Spire plans to employ the following construction procedures; however, deviations are possible based on actual field conditions or to comply with regulatory requirements as further identified during the consultation and permitting process.

2.3.1 Pipeline

Spire will adhere to FERC's Plan and Procedures (FERC 2013a and 2013b) during construction of the pipeline facilities, unless otherwise noted, in addition to its Design and Construction Standards that outlines safety and integrity standards, among others. In agricultural areas, Spire's workspaces include the 90-foot construction right-of-way and the additional 25 feet of width granted in the FERC Plan, which accommodates topsoil segregation.

In accordance with FERC's Plan and Procedures (FERC 2013a and 2013b), one EI will be employed by Spire for each construction spread during construction and restoration. Spire will provide training for its EIs as part of its Environmental Training Program. The number and experience of EIs assigned to each construction spread will be appropriate for the length of the construction spread and the number/significance of resources affected. EIs shall have peer status with all other activity inspectors. EIs shall have the authority to stop activities that violate the environmental conditions of the Certificate, state and federal environmental permit conditions, or landowner requirements; and to order appropriate corrective action.

Spire will commence cleanup operations immediately following backfill operations. Final grading, topsoil replacement, and installation of permanent erosion and sediment control ("E&SC") structures will be completed within 20 days after backfilling the trench (10 days in residential areas). If seasonal or other weather conditions prevent compliance with these timeframes, temporary E&SCs would be maintained (temporary slope breakers and sediment barriers) until conditions allow completion of cleanup.

2.3.1.1 Typical Pipeline Construction Procedures

The construction procedures below will be followed for the Project.

Surveying

Prior to the commencement of ground disturbing activities, a civil survey crew will stake the outside limits of the construction right-of-way, the centerline location of the pipeline, highway and railroad crossings, and any ATWS, such as staging areas or at waterbody crossings. The "One Call" system for each state will be contacted and underground and foreign utilities will be located and flagged within the construction right-of-way.

Clearing and Grading

The construction right-of-way will be cleared of obstructions (i.e., trees and stumps, brush, logs, and large rocks) according to FERC's Plan and Procedures and Spire's Erosion and Sediment Control Plans. At no time will Spire or its contractor clear or alter any areas outside of the boundaries of the pipeline corridor as shown on the Project alignment sheets. Timber will be stacked adjacent to the right-of-way in accordance with landowner preferences. Brush and slash will be stacked or chipped. All stumps will be disposed of to the satisfaction of the property owner and/or company representative in accordance with applicable law. When feasible, vegetation in wetlands will be cut to ground level, leaving the root systems intact. Where necessary, to contain disturbed soils during clearing and grading in upland areas, and to minimize potential impacts of waterbodies and wetlands, temporary erosion control devices will be installed prior to initial ground disturbance and will be maintained throughout construction.

Trenching

Trenching involves excavation of a ditch for pipeline placement, and is accomplished through the use of a track-mounted backhoe, or similar equipment. Most of the Project Area is not expected to have shallow bedrock, therefore extensive blasting is not anticipated to be needed for construction. Large stones in the trench will be broken apart with conventional rock-trenching methods. Generally, the trench will be excavated at least 12 inches wider than the diameter of the pipe, though the width may increase depending on the stability of the native soils. Spire's intention is that the trench will be excavated to a sufficient depth to allow five feet of soil cover between the top of the pipe and the final land surface after backfilling. Pipeline cover may be greater than five feet at road, waterbody, wetland, or railroad crossings. In areas prone to flooding, the minimum depth of cover is increased to seven feet to mitigate the buoyancy effect. Per 49 CFR Part 192, depth of cover will be a minimum of two feet in areas of consolidated rock; however, Spire proposes a minimum depth of three feet of cover in these areas. Specifications for the depth of cover are included on the Construction Alignment Sheets in Appendix 1-B. Excavated soils will typically be stockpiled along the right-of-way on the side of the trench away from the construction traffic and pipe assembly area.

Stringing

Following preparation of the trench, the new pipe will be strung and distributed along the construction right-of-way parallel to the trench. Depending on available workspace, steel pipe will be procured in nominal double random and/or triple random lengths, or joints, and may be fabricated off-site and transported to the right-of-way in differing lengths or configurations. The individual joints will be transported to the right-of-way by

truck and placed along the excavated trench in a single, continuous line. At waterbody crossings, the amount of pipe required to span the waterbody will be stockpiled in ATWS on one or both banks of the waterbody.

Pipe Bending

Some induction bends may be used, and some bending of the pipe will be required to allow the pipeline to follow natural grade changes and direction changes of the construction right-of-way. Prior to welding, selected joints will be bent in the field by track-mounted hydraulic bending machines.

Pipe Assembly and Welding

Following stringing and bending, the joints of pipe will be placed on temporary supports, adjacent to the trench. The ends will be carefully aligned and welded together using multiple passes for a full penetration weld. Welders and welding procedures will be qualified according to the applicable standards. To ensure that the assembled pipe will meet or exceed the design strength requirements, the completed welds will be visually inspected and tested for integrity using non-destructive examination methods such as radiography or ultrasound, in accordance with American Petroleum Institute standards. Welds displaying unacceptable slag inclusions, void spaces, or other defects will be repaired or cut and re-welded. Following welding, the joints will be epoxy coated. The coating on the completed pipe section will be inspected and any damaged areas will be repaired.

Pipe Lowering

Prior to lowering the pipe, the trench will be inspected to ensure it is free of rocks or other debris that could damage the pipe or the coating. In rocky areas, a layer of soil or sand may be placed on the bottom of the trench to protect the pipe. Concrete-coated pipe or concrete weights will be used if required for negative buoyancy in areas of saturated soils. The completed section of pipe will be lowered into the trench by side-boom tractors or equivalent equipment.

Padding and Backfilling

Previously excavated materials will be pushed back into the trench using bladed equipment or backhoes. The coated pipe, with or without the use of protective products (e.g., rockshield), requires a minimum of six inches of clean backfill padding around all sides of the pipe. A padding bucket or similar soil sifting device will be used to obtain suitable padding material from the subsoil. Topsoil will not be used as padding material.

Where the previously excavated material contains large rocks or other materials that could damage the pipe or coating, clean fill or protective coating will be placed around the pipe prior to backfilling. Segregated topsoil, where applicable, will be placed after backfilling the trench above the subsoil. Following backfilling in agricultural land, grassland, and open land, or in specified areas, a small crown may be left to account for any future soil settling that may occur. Excess soil will be distributed evenly on the right-of-way, only in upland areas, while maintaining existing contours and will be in accordance with landowner and agency requirements.

Hydrostatic Test and Final Tie-In

Both pipeline facilities will be hydrostatically tested to ensure that it is capable of safely operating at the design pressure. Test segments of the pipeline will be capped and filled with water and pressurized to a minimum of 1.25 to 1.5 times (based on location class) the designed operating pressure for a minimum of eight hours in accordance with the PHMSA requirements prior to being placed in service. Loss of pressure that cannot be attributed to other factors, such as temperature changes, will be investigated. Leaks detected will be repaired and the segment will be retested. Upon completion of the test, the water may be pumped to the next segment for testing or the water may be discharged in accordance with state permitting requirements. Test water will be discharged through an energy-dissipating device in compliance with National Pollutant Discharge Elimination System ("NPDES") permit conditions. Spire plans to discharge hydrostatic test water onsite in accordance with state permitting requirements or to tanks for offsite disposal. Once a segment of pipe has been successfully tested and dried, the test cap and manifold will be removed, and the pipe will be connected to the remainder of the pipeline.

Cleanup and Restoration

Spire will adhere to the restoration guidelines as described in FERC's Plan and Procedures (FERC 2013a and 2013b) and applicable permit authorizations. The surface of the construction right-of-way disturbed by construction will be graded to match original contours and to be compatible with surrounding drainage patterns, except at those locations where permanent changes in drainage will be required to prevent erosion, scour and possible exposure of the pipeline. Temporary and permanent E&SC measures, including silt fencing, water bars, and vegetation will be installed at that time. Private and public property, such as fences, gates, driveways, and roads that have been disturbed by pipeline construction will be restored at minimum, to a level meeting their pre-construction condition and function. In most upland locations, excluding actively cultivated cropland, an herbaceous vegetative cover will be reestablished by spreading a grass seed and hydro/straw-mulch mixture over the disturbed surface.

2.3.1.2 Special Construction Procedures

Steep Slopes/Rugged Topography

Spire does not anticipate significant areas of steep slope due to the topography of the landscape in the vicinity of the Project Area. The majority of construction will occur on relatively flat or gently rolling topography. Steep slopes may be encountered during construction in Illinois at bluffs near the Mississippi River and stream valley slopes in Scott County. In areas where steep slopes exist, the pipeline has been routed to cross slopes as perpendicular as possible to avoid or minimize side-slope construction. E&SC measures, as well as revegetation, would be performed in accordance with the Plan and Procedures (FERC 2013a and 2013b) and applicable permits. On steep slopes, temporary E&SC measures may require closer spacing and more frequent maintenance until permanent post-construction E&SC measures can be established. Following pipeline installation and trench backfill, excavated material is placed back in the cut and compacted to restore the approximate original ground contours, and the disturbed areas are stabilized.

Residential Areas

Where residences are located in close proximity to the edge of the construction right-of-way, Spire will attempt to reduce construction workspace areas as practicable to minimize inconvenience to property owners.

Active Croplands

In order to avoid and minimize affects to topsoil, Spire proposes to perform topsoil segregation in active croplands over the entire width of the construction right-of-way as well as the subsoil stockpile areas.

Road Crossings

The majority of road crossings will be completed using conventional boring methods.

Railroad Crossings

Railroad crossings will be completed using conventional boring methods.

Utility Crossings

Precautions will be taken to identify existing pipelines, avoid damage, and safely cross foreign pipelines during construction.

Blasting

Spire has identified locations where blasting may be required on the Project. To minimize blasting, large stones in the trench will generally be broken apart with conventional rock-trenching methods where possible.

Wetlands

Crossing of wetlands will be done in accordance with state and federal permits and the FERC Procedures (FERC 2013b), unless variances are requested by Spire and approved by FERC. Saturated wetlands will be crossed utilizing timber mats to avoid rutting. Tree stumps and root systems will be removed from areas directly over the trenchline. In the absence of safety-related construction or operational constraints, stumps and root systems will be left in place in the rest of the construction right-of-way. Spire will segregate the topsoil up to one-foot in depth in wetlands where hydrologic conditions permit. Segregated topsoil will be placed back in the trench following subsoil backfilling.

Hydrological conditions along the construction corridor in areas proposed for conventional open ditch construction will likely dictate the use of either conventional open ditch lay or open ditch push/pull lay methods. Selection of the most appropriate method will depend on site-specific weather conditions, inundation, soil saturation, and soil stability at the time of construction. Selection of the appropriate method will be decided during construction by the construction supervisor and/or the Spire representative depending on conditions at the time of construction. Restoration and monitoring of wetland crossings will be conducted in accordance with FERC's Procedures (FERC 2013b). In unsaturated wetlands most vegetation will be replaced by seeding. Saturated wetlands will typically be allowed to revegetate naturally.

Waterbodies

Crossing of waterbodies will be done in accordance with state and federal permits and FERC's Procedures (FERC 2013b), unless variances are requested by Spire and approved by FERC. Construction methods at waterbodies will vary with the characteristics of the waterbody encountered and will be consistent with permit conditions that will be outlined in the regulatory permit approvals. Intermediate waterbodies (between 10 and 100 feet wide) and minor waterbodies (less than 10 feet wide) will be crossed by the open cut/conventional lay or dry ditch crossing (flume) methods. If waterbodies do not contain discernible flow at the time of construction, the waterbody may be crossed using the open-cut crossing method. In accordance with the FERC Procedures (FERC 2013b), the duration of construction at open cut crossings will be limited to 24 hours across minor waterbodies and 48 hours across intermediate waterbodies, unless rock-breaking measures are required. The crossing method is subject to change depending upon the actual conditions encountered at the time of construction.

For waterbodies that are greater than 100 feet wide, Spire will utilize trenchless technologies to install the pipeline. In waterbodies equal to or less than 100 feet wide, pipe will be installed to provide a minimum of five feet of cover from the waterbody bottom to the top of the pipeline, except in consolidated rock, where a minimum of three feet of cover will be utilized. In waterbodies more than 100 feet wide, pipeline depth of cover will be at least five feet with the exception of a three-foot depth of cover in consolidated rock. Trench spoil will be placed on the bank above the high water mark for use as backfill. Excavated material not required for backfill will be disposed of at an upland site within the herein described limits of disturbance or otherwise disposed of at a commercial disposal facility. Waterbody banks will be returned to pre-construction grade.

In areas where HDD is the proposed crossing method, no tree clearing will occur between the HDD entry and exit points. A gyroscopic guidance system is anticipated to be utilized for the HDDs. This guidance system does not require the installation of a tracer wire along the HDD alignment on the ground surface. As such, no ground disturbance is anticipated for utilizing this guidance system. Spire's HDD contractor and inspectors will complete regular inadvertent return walks throughout the duration of the drill which would require foot traffic along the HDD alignment. A summary of the proposed HDDs is included in Table 6.

Winter Construction

Spire has prepared a Winter Construction Plan with guidelines for stabilization and construction procedures as limited construction activities are anticipated to occur during winter months.

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Table 6. Summary of Planned HDDs

Facility/ Length of Pipe (feet)	Entry Location		Exit Location		Sensitive Resources to be Avoided			Approximate Duration of Drilling	Proposed Nighttime Drilling
	MP	Town/County, State	MP	Town/County, State	MP	Resource Type	Resource Name		
24-Inch Pipeline									
5,900	45.0	Elsah, Jersey County, Illinois	46.2	Rivers, St. Charles County, Missouri	45.1	Road	Illinois State Route 100	Not to exceed 15 weeks	Estimated 3 shifts of night time work during pullback
					45.1	Special Land Use	Sam Vadalabene Great River Road Bike Trail		
					45.1	Special Land Use	Meeting of the Great Rivers Scenic Route		
					45.1	Waterbody	UNT to Mississippi River (NHD-915)		
					45.3	Waterbody	Mississippi River (NHD-921)		
					45.6	Special Land Use	Upper Mississippi Conservation Area		
					45.7	Wetland	PFO1Ah (NWI-105)		
					45.9	Waterbody	Luesse Lake (NHD-924/NWI-505)		
					46.1	Wetland	PFO (WMO-WJW-001)		
3,302	57.7	Rivers, St. Charles County, Missouri	58.4	Spanish Lake, St. Louis County, Missouri	57.1	Special Land Use	Consolidated North County Levee	Not to exceed 15 weeks	Estimated 2 shifts of night time work during pullback
					57.9	Waterbody	UNT to Missouri River (SMO-TMA-001)		
					57.9	Wetland	PFO/PEM (WMO-TMA-001 and WMO-TMA-001A)		
					58.0	Waterbody	Missouri River (SMO-CDK-001)		
North County Extension									
3,321	1.6	Spanish Lake, St. Louis County, Missouri	2.2	Spanish Lake, St. Louis County, Missouri	1.7	Road	US-67/Missouri State Route 367 (Lewis and Clark Blvd.)	Not to exceed 15 weeks	Estimated 2 shifts of night time work during pullback
					1.8	Wetland	PEM (WMO-JJP-125)		
					1.9	Waterbody	Coldwater Creek (SMO-JJP-020)		
					1.9	Waterbody	UNT to Coldwater Creek (SMO-JJP-032)		

Table 6. Summary of Planned HDDs (Continued)

Facility/ Length of Pipe (feet)	Entry Location		Exit Location		Sensitive Resources to be Avoided			Approximate Duration of Drilling	Proposed Nighttime Drilling
	MP	Town/County, State	MP	Town/County, State	MP	Resource Type	Resource Name		
North County Extension (Continued)									
3,568	3.8	Spanish Lake, St. Louis County, Missouri	4.5	St. Ferdinand, St. Louis County, Missouri	2.0	Special Land Use	Fort Bellefontaine County Park	Not to exceed 15 weeks	Estimated 2 shifts of night time work during pullback
					4.0	Special Land Use	Spanish Lake Park		
					4.1	Wetland	Sunfish Lake (NWI-185)		
					4.3	Special Land Use	Emerald Greens Golf Course		
					4.3	Wetland	PUBGh (NWI-186)		

2.3.2 Aboveground Facilities

The duration of construction for each aboveground facility is approximately five months. Spire intends to implement FERC's Plan and Procedures (FERC 2013a and 2013b) as a minimum standard. Grading and foundation work will be required to prepare the site and skid-mounted structures will be installed. Access roads will be installed as required to provide permanent access to each site, and gravel or stone will be installed within fenced areas. Sites may require stormwater retention basins or additional grading for stormwater controls. Designs will be included in the Stormwater Pollution Prevention Plan in accordance with state or local requirements.

Surface areas disturbed will be restored in a timely manner. In addition to construction drawings and/or applicable environmental permits that are provided to the contractor(s), an EI will oversee the implementation of E&SC measures and advise the contractor in the upgrade and maintenance of the measures throughout construction.

2.4 Operation and Maintenance

Spire will operate and maintain the newly constructed pipeline facilities in accordance with the requirements of FERC, USDOT's PHMSA at 49 CFR 192, all other applicable legal requirements, and industry-proven practices and techniques. The facilities will be operated and maintained in a manner such that pipeline integrity is protected to ensure a safe, continuous supply of natural gas reaches its ultimate destination. Maintenance activities will include regularly scheduled gas-leak surveys and measures necessary to repair any potential leaks. The latter may include repair or replacement of pipe segments. All fence posts, signs, marker posts, aerial markers, and decals will be maintained to ensure the pipeline locations will be visible from the air and ground. The pipeline and aboveground facilities will be patrolled on a routine basis, and personnel qualified to perform both emergency and routine maintenance on interstate pipeline facilities will handle maintenance.

2.4.1 Pipelines

Pipeline facilities will be maintained and inspected in accordance with applicable pipeline safety regulations. Operational activity on the pipelines will be limited primarily to maintenance of the rights-of-way and inspection, repair, and cleaning of the pipelines. Vegetation maintenance will be conducted in accordance with FERC Plan and Procedures (FERC 2013a and 2013b). Maintenance functions will include the following:

- periodic seasonal vegetation management of the Project right-of-way in accordance with the timing restrictions outlined in FERC's Plan and Procedures (FERC 2013a and 2013b);
- terrace repair, backfill replacement, and drain tile repair as necessary;
- periodic inspection of water crossings; and
- maintenance of a supply of emergency pipe, leak repair clamps, sleeves, and other equipment needed for repair activities.

Erosion problems on the pipeline right-of-way will be reported to the local operations supervisor. These reports may originate from landowners or company personnel performing routine patrols. Corrective measures will be conducted as needed.

2.4.2 Vegetation Maintenance

A typical post-construction permanent easement width of 50 feet will be maintained for the right-of-way. Maintaining a right-of-way is necessary for the following reasons:

- access for routine pipeline patrols and corrosion surveys;
- avoid pipeline damage from large roots;
- access in the event that emergency repairs of the pipeline are needed;
- visibility during aerial patrols; and
- to serve as a visual indicator to the public of an underground pipeline utility and easement.

Operational vegetation maintenance of Spire's full permanent right-of-way in uplands may be conducted on a frequency of approximately once every three years (10-foot-wide maintenance can occur as necessary) at uplands in accordance with the FERC Procedures to maintain an herbaceous to low scrub-shrub cover state. Routine vegetation mowing will be completed outside the migratory bird nesting season, which is April 15 through August 1 in accordance with the recommendations set forth in FERC's Plan (FERC 2013a).

Within wetlands, Spire will only maintain the 10-foot corridor centered over the pipelines, allowing the balance of Spire's permanent easement to revert to its natural, pre-construction vegetated cover state. Additionally, within wetlands, Spire reserves the right to selectively cut and remove trees located within 15 feet of the pipeline with roots that may compromise the integrity of the pipeline coating. Spire will not use herbicides or pesticides on its right-of-way unless requested by landowners. Spire will utilize herbicides or pesticides at aboveground facilities that are adjacent to agricultural lands in Illinois in accordance with the AIMA. No herbicides or pesticides will be used within 100 feet of a wetland or waterbody unless otherwise approved by applicable federal, state, and local agencies and directly affected landowners.

Post-construction management of the right-of-way will be conducted in accordance with FERC Plan and Procedures (FERC 2013a and 2013b) and Spire's Noxious Weeds/Invasive Species Control and Mitigation Plan. Vegetation maintenance (with respect to the control of invasive plant species) is detailed in these plans.

Following construction of the pipeline facilities, areas used for temporary workspace and ATWS will be allowed to revert to their pre-construction land use/land cover with no further vegetation maintenance by Spire. Additionally, crop production will be allowed to continue in agricultural areas, immediately following construction or the following growing season.

2.4.3 Aboveground Facilities

Spire will operate and maintain the proposed aboveground facilities in accordance with standard procedures designed to ensure the integrity of the facilities and to provide its shippers and the general public with a safe and dependable natural gas supply. Responsibilities of Spire will include the following:

- Safe operation and maintenance of pipeline and aboveground facilities to provide the required gas flow;
- Inspection and maintenance of the pipeline system;
- Regular monitoring of the right-of-way;
- Development and implementation of an ongoing program of safety and environmental compliance;
- Regulatory compliance maintenance inspections;
- Administration; and
- Landowner relations.

Areas within the permanent easement outside the facility fence line will be maintained through routine vegetation maintenance or allowed to revert to preexisting conditions.

2.5 Measures to Avoid and Minimize Adverse Effects

The following descriptions of avoidance and minimization measures are part of the Project design and will be implemented by Spire during construction, operation, and maintenance of the Project:

- Seasonal tree clearing – Spire proposes to conduct clearing activities within non-cultivated areas prior to April 1, 2018, if regulatory permits are received on schedule and allow for sufficient time to conduct clearing activities within the Project Area. Spire is requesting approval to conduct clearing between April 1 and April 30, followed by a clearing restriction from May 1 to July 31 (for tree-nesting migratory birds), and resume on August 1, if necessary. Post-construction operational and routine vegetation mowing or tree clearing in the permanent right-of-way would occur outside the migratory bird nesting season (April 15 through August 1) as prescribed in the FERC Plan (FERC 2013a).
- Minimize limits of disturbance – The Project has been routed in open areas and was colocated along existing road and pipeline corridors, where practical, to avoid impacts to forests and known and unknown Indiana bat roost trees. Approximately one-third of the 24-inch pipeline in Illinois is colocated with existing rights-of-way. Colocating will further reduce effects to the forest or other land uses, including through the contiguous forest north of the Mississippi River, thereby minimizing new fragmentation to other relatively undisturbed tracts of interior forest.
- Avoidance of riparian areas and wetlands wherever practical – The Project Area has been generally reduced to 75 feet wide at streams and wetlands. Stream crossings and impacts have been minimized wherever practical by routing or shifting the Project Area to avoid paralleling streams.

- Soil segregation – Topsoils will be segregated during earth disturbance activities in the Plan Area in accordance with the FERC Plan and AIMA for Illinois (FERC 2013a). Soil segregation and erosion and sediment controls (described below) are general measures that encourage native plant and animal communities.
- Erosion and sedimentation controls – The E&SC Plan ("E&SCP") will reduce potential for adverse impacts from stormwater runoff during construction. E&SC devices will be outlined in E&SCPs which will incorporate the FERC Plan (FERC 2013a) and state and local regulations.
- Invasive Species Control – Spire has prepared a Noxious Weeds/Invasive Plant Control Mitigation Plan. Implementation of this plan will avoid and/or minimize adverse effects from noxious and invasive plant species.
- HDD Crossings – The trenchless crossings (HDD) of the Mississippi River, Missouri River, Coldwater Creek, and Spanish Lake Park would minimize the potential effects of the Project on shorelines, islands, and aquatic habitat in the Mississippi and Missouri Rivers. No in-stream construction or disturbance to the streambed is anticipated at these locations.
- If decurrent false aster is found during surveys, Spire will confer with the USFWS on methods to attempt to avoid and minimize effects individuals and populations to the greatest extent practicable. Measures would include:
    - Topsoil stripping (i.e., topsoil would be removed, stockpiled, and re-deposited on disturbed areas) such that the seed bed is maintained at the locations where the species is found,
    - Construction equipment paths and staging areas would be designed to avoid decurrent false aster to the greatest extent practicable, and
    - Operational maintenance (i.e., mowing) in areas where the species is determined to be present would not be conducted during the May – October growing period (MDOC 2015).

2.6 Action Area

An action area is the area that may be affected directly or indirectly by a federal action and not merely the immediate area involved in the action (50 CFR 402.02). An action area includes considerations for interrelated and interdependent actions.

An action area includes the limit of measurable or detectable changes in land, air, and water, or other measurable factors that may elicit a response in the species or critical habitat (USACE 2007). Thus, an action area is not limited to the action, but encompasses the physical, chemical, and biological changes that will occur because of the action. Action areas should consider the action in context of the baseline conditions and the sensitivities and capabilities of the considered species and their habitat.

2.6.1 Factors Considered

For this Project, the area directly and indirectly affected by the Action is the Project Area where all construction, operation, and maintenance activities will occur, and the area outside the Project Area that may be affected by

stressors that typically extend beyond the Project Area, such as fugitive dust, lighting, changes to water quality, and noise:

- Fugitive dust and changes in air quality outside the Project Area are expected to be minimal. Spire will implement the Fugitive Dust Control Plan (Spire 2017). The Plan will implement dust control measures such as water suppression, temporary stabilization of spoil piles, sweeping, and other techniques. The Project is designed to meet the requirements of the Clean Air Act of 1970 (42 USC 7401 et seq.) as well as regulations set by Illinois and Missouri.

- Any increase in ambient lighting outside the Project Area is expected to be temporary and/or minimal. Lights may be utilized during early morning and early evening hours in periods of fewer daylight hours (autumn/winter) and may be visible from immediately outside the Project Area. Project construction activities will be conducted during daylight hours with the exception of short-term activities such as HDD crossings, critical maintenance, or other Project-mandated activities required to meet schedule or safety requirements. The three minor aboveground M&R facilities will employ ambient security lighting during the operational phase of the Project. The security lighting will be permanent, but is not expected to increase ambient lighting far from the intended purpose of lighting the M&R facilities within the Project Area

- Changes to water quality will be limited to the Project Area. The Project, as proposed, will not cause permanent impacts on any surface waterbodies. Construction at waterbodies will be conducted in accordance with applicable state and local regulations and guidance manuals and FERC Procedures (FERC 2013b), unless variances are requested by Spire and approved by FERC. Spire proposes to limit waterbody impacts by generally reducing the construction right-of-way width to 75 feet at the waterbody crossings. A successful HDD crossing will result in no planned impacts to the banks, bed, or water quality of the waterbodies being crossed. Spire will implement the HDD Contingency Plan in the unlikely event of inadvertent returns. Hydrostatic test water for the 24-inch pipeline hydrostatic test will be discharged in compliance with NPDES permit conditions and state regulations. No water treatment (chemicals or inhibitors) are necessary during or after the hydrostatic testing.

- Construction noise may extend beyond the Project Area. Noise may be generated from construction, operation, and maintenance equipment, and will vary in timing, intensity and duration.

Overall, noise was identified as the potential stressor likely to extend the farthest distance from the Project Area and would include the areas of effects generated by any other potential stressors. Noise has been used to determine the action area in recent USFWS Biological Opinions ("BOs;" e.g., USFWS 2015a).

2.6.2 Determination of the Action Area

Because noise may extend beyond the Project Area, the limit to which noise attenuates to ambient levels was used to determine the limits of the Action Area. Site preparation and construction activities are expected to generate the most noise. The estimate for the limit to which noise attenuates to ambient levels was based on the following:

- Based on the Construction Noise Model (Spire 2017), the maximum constant construction noise level is expected to be 110 A-weighted decibels ("dBA") at the HDD entry and exit locations. While blasting is

proposed at two locations, between MPs 44.94 and 44.95 and MPs 58.24 through 58.62, the instantaneous and short duration of the stressor was not considered to be the maximum noise level. The maximum noise level for most other construction equipment is assumed to be at or below 95 dBA (FHWA 2006).

- Current ambient noise surrounding the Project Area averages 53 dBA based on measurements taken at the HDD entry and exit locations and the proposed aboveground facilities (Spire 2017).
- Construction equipment noise typically has a drop-off rate of 6 dB per doubling of distance from the source (USEPA 1971). For acoustically absorptive or soft sites (dirt, grass, crops, snow, or scattered bushes and trees) an excess ground attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the geometric spreading, the excess ground attenuation results in an overall drop-off rate of 7.5 dB per doubling of distance from the source (FHWA 2009; WSDOT 2016; Caltrans 2016).

The following base 10-Log equation (WSDOT 2016; Caltrans 2016) was used to determine the distance at which construction or traffic noise will attenuate to background or ambient sound levels:

$D = Do * 10^{[(\text{construction noise - ambient sound level in dBA})/\alpha]}$

Where:

D = the distance from the noise source

Do = the reference measurement distance (50 feet in this case)

α = 25 for soft ground and 20 for hard ground. For point source noise, a spherical spreading loss model is used. These alpha (α) values assume a 7.5 dBA reduction per doubling distance over soft ground and a 6.0 dBA reduction per doubling distance over hard ground.

$D = 50 * 10^{((110 - 53)/25)}$

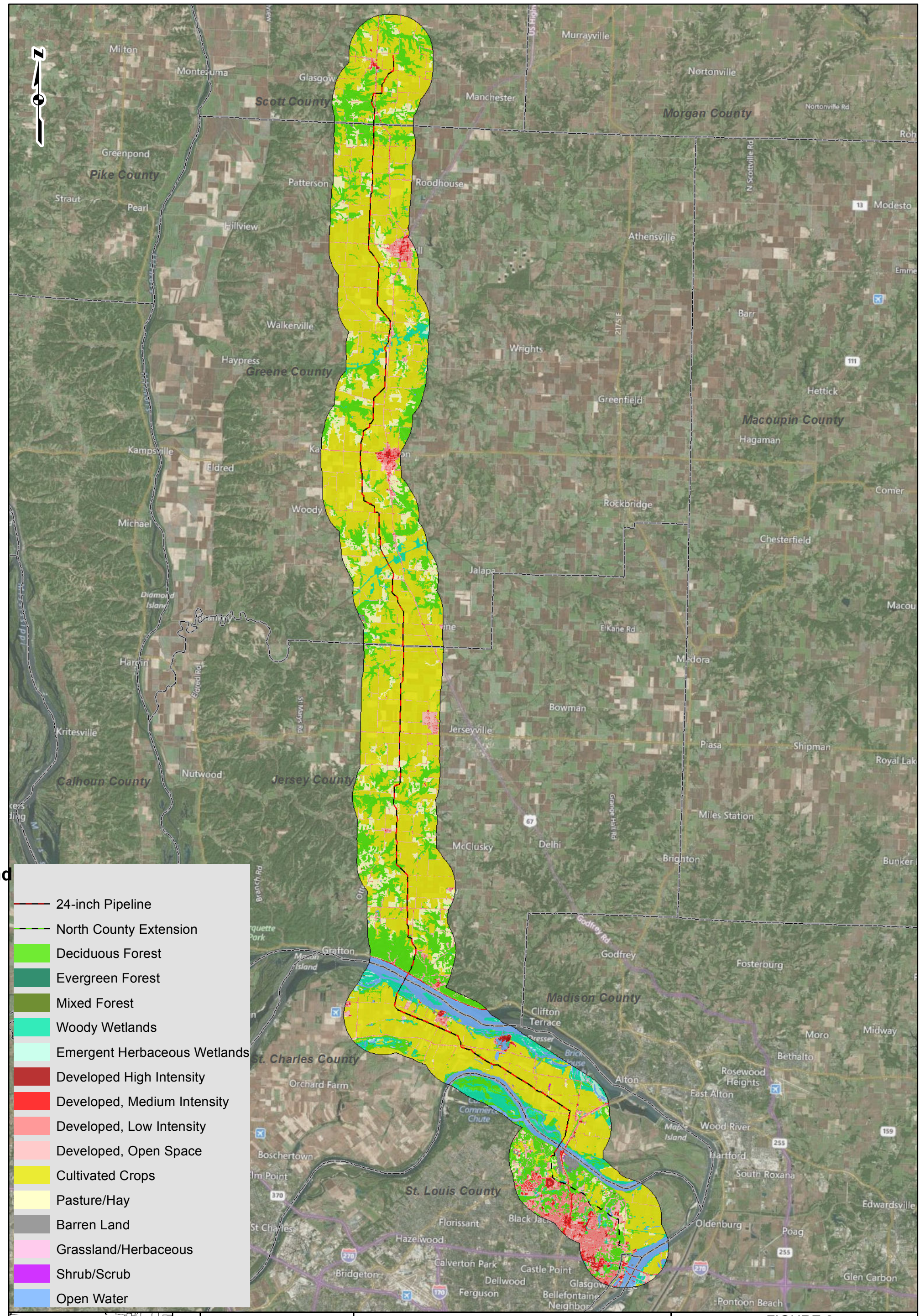
$D = 50 * 10^{(57/25)}$

$D = 50 * 10^{(2.3)}$

D = 50 * 190.5

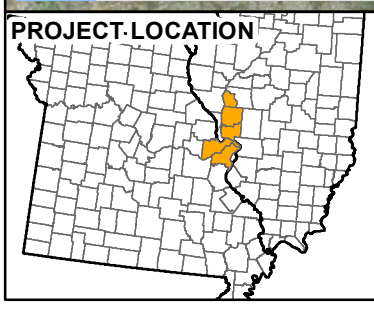
D=9,525 feet

In summary, the Action Area was defined as the Project Area and all lands within 9,525 feet (1.8 miles) of the Project Area that could experience an increase in ambient noise levels. Thus, the Action Area was not defined as the extent of effects on species and habitat; rather, it was determined by the geographical effects of the Action on the species environment. The Action Area for the Project is shown in Figure 2.



Legend

- 24-inch Pipeline
- North County Extension
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Woody Wetlands
- Emergent Herbaceous Wetlands
- Developed High Intensity
- Developed, Medium Intensity
- Developed, Low Intensity
- Developed, Open Space
- Cultivated Crops
- Pasture/Hay
- Barren Land
- Grassland/Herbaceous
- Shrub/Scrub
- Open Water



REFERENCE:BING MAPS ROAD, © 2014 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS, ACCESSED : 07/2017

GREENE, JERSEY AND SCOTT COUNTIES, IL
ST.CHARLES AND ST.LOUIS COUNTIES, MO

LEGEND

- 24-inch Pipeline
- North County Extension
- Action Area
- County Boundary
- State Boundary

0 2 4 8 Miles

FIGURE 2
ACTION AREA

gai consultants

SPIRE STL PIPELINE PROJECT

spire

DRAWN BY: PK DATE: 7/7/2017
CHECKED: JAD APPROVED: JAD

C:\Users\kudlup\Desktop\Priya\2016\Spire\MXD\BA\Figure 2 Action Area Habitat _07072017.mxd

2.6.3 Description of the Action Area

Land cover types in the Project Area and Action Area were delineated using ArcGIS® (ESRI Corp, Redlands California) and the 2011 National Land Cover Database ("NLCD" Homer et al. 2015). In an effort to increase the accuracy of estimates of forested land cover in the Project Area, the NLCD forest layers were substituted with the Project land use forest layers (Spire 2017) to provide a more accurate assessment of forest cover within the Project Area. Other land cover types remain uncorrected for comparison purposes. Cover types were grouped into the following categories:

Forested – the forested land cover type included four subcategories, including deciduous, evergreen, woody wetland, and mixed forest:

- Deciduous Forest – areas dominated by trees generally greater than five meters tall, and greater than 20 percent of total vegetation cover. More than 75 percent of the tree species shed foliage simultaneously in response to seasonal change.
- Evergreen Forest – areas dominated by trees generally greater than five meters tall, and greater than 20 percent of total vegetation cover. More than 75 percent of the tree species maintain their leaves all year. Canopy is never without green foliage.
- Woody Wetlands – areas where forest or shrubland vegetation accounts for greater than 20 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
- Mixed Forest – areas dominated by trees generally greater than five meters tall, and greater than 20 percent of total vegetation cover. Neither deciduous nor evergreen species are greater than 75 percent of total tree cover.

Non-Forested – non-forested land cover type included 11 subcategories:

- Barren Land (Rock/Sand/Clay) – areas of bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits and other accumulations of earthen material. Generally, vegetation accounts for less than 15 percent of total cover.
- Developed, Open Space – areas with a mixture of some constructed materials, but mostly vegetation in the form of lawn grasses. Impervious surfaces account for less than 20 percent of total cover. These areas most commonly include large-lot, single-family housing units; parks; golf courses; and vegetation planted in developed settings for recreation, erosion control, or aesthetic purposes.
- Developed, Low Intensity – areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 20 to 49 percent of total cover. These areas most commonly include single-family housing units.
- Developed, Medium Intensity – areas with a mixture of constructed materials and vegetation. Impervious surfaces account for 50 to 79 percent of the total cover. These areas most commonly include single-family housing units.

- Developed, High Intensity – highly developed areas where people reside or work in high numbers. Impervious surfaces account for 80 to 100 percent of the total cover. Examples include apartment complexes, row houses and commercial/industrial
- Open Water – areas of open water, generally with less than 25 percent cover of vegetation or soil.
- Emergent Herbaceous Wetlands – areas where perennial herbaceous vegetation accounts for greater than 80 percent of vegetative cover and the soil or substrate is periodically saturated with or covered with water.
- Shrub/Scrub – areas dominated by shrubs; less than five meters tall with shrub canopy typically greater than 20 percent of total vegetation. This class includes true shrubs, young trees in an early successional stage, or trees stunted from environmental conditions.
- Grassland/Herbaceous – areas dominated by graminoid or herbaceous vegetation, generally greater than 80 percent of total vegetation. These areas are not subject to intensive management such as tilling, but can be utilized for grazing.
- Pasture/Hay – areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops, typically on a perennial cycle. Pasture/hay vegetation accounts for greater than 20 percent of total vegetation.
- Cultivated Crops – areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20 percent of total vegetation. This class also includes all land being actively tilled.

Acreages of each cover type in the Project Area and Action Area are shown in Table 7.

Table 7. Land Cover Types in the Project Area and Action Area

Land Cover Type	Project Area[1, 2] (acres)	Project Area (percent)	Action Area (acres)	Action Area (percent)
Forested				
Deciduous Forest	58.99	6.0	30,075.20	19.0
Evergreen Forest	0.00	0.0	6.51	<0.1
Mixed Forest	0.00	0.0	33.97	<0.1
Woody Wetlands	0.79	<0.1	6,125.75	3.9
Non-Forested				
Developed, High Intensity	0.19	<0.1	471.50	0.3
Developed, Medium Intensity	4.18	0.4	1,486.79	0.9
Developed, Low Intensity	22.19	2.3	6,523.37	4.1
Developed, Open Space	61.50	6.2	7,201.96	4.6
Cultivated Crops	731.58	74.2	85,121.78	53.8
Grasslands/Herbaceous	0.25	<0.1	192.40	0.1
Pasture/Hay	91.20	9.3	12,277.48	7.8
Emergent Wetlands	9.26	0.9	533.38	0.3
Shrub/Scrub	0.05	<0.1	24.69	<0.1
Barren Land	3.80	0.4	592.93	0.4
Open Water	1.50	0.2	7,557.35	4.8
Forested Totals	**59.78**	**6.1**	**36,241.43**	**22.9**
Non-Forested Totals	925.70	93.9	121,983.63	77.1
Total	**985.48**	**100.0**	**158,225.06**	**100.0**

Notes:

1 Project Area acreage reported here is for the area that will have above ground disturbance, which excludes areas between HDD entry/exit locations, where no tree clearing will occur.

2 In an effort to increase the accuracy of estimates of forested land cover (deciduous forest and woody wetlands) in the Project Area, the NLCD forest layers were substituted with the Project land use forest layers (Spire 2017) to provide a more accurate assessment of forest cover within the Project Area. Data for emergent wetlands, shrub/scrub, and open water were also utilized from Spire's field delineations. Other land cover types remain uncorrected for comparison purposes.

Forested land occupies approximately 23 percent of the Action Area and six percent of the Project Area (Table 7). Non-forested cover types in the Action Area that may provide value to traveling or foraging bats, depending on size and juxtaposition on the landscape, include low intensity development (4.1%) and open space (4.6%), cultivated crops (53.8%), grassland/herbaceous (0.1%), pasture/hay (7.8%), emergent wetlands (0.3%), shrub/scrub (0.02%), and open water (4.8%).

3.0 Species Considered

Based on a review of the USFWS Information, Planning, and Conservation ("IPaC") System project planning tool, as well as conversations with the USFWS RIFO, Spire identified 12 federally-listed species that may occur in the vicinity of the Action Area (Table 8).

Table 8. Species Considered and Effects Determinations

Common Name (*Scientific Name*)	Federal Status	Critical Habitat	Determination[1]	Justification for Determination
Least Tern (*Sterna antillarum*)	Endangered	Not Designated	May affect, but is not likely to adversely affect.	Least terns nest on barren to sparsely vegetated sandbars along rivers, sand and gravel pits, lake and reservoir shorelines, and occasionally gravel rooftops. Least terns are likely to nest along the Mississippi and Missouri Rivers within the Project Area. Spire anticipates minimizing the potential for adverse effects to least terns through the use of the HDD of the Mississippi and Missouri Rivers. Information on HDD is provided in Spire's letter to the USFWS RIFO dated January 25, 2017 (Appendix A).
Piping Plover (*Charadrius melodus*)	Threatened	Not in Action Area	May affect, but is not likely to adversely affect	Piping plovers utilize wide, flat, open, sandy beaches for habitat and often nest along small creeks or wetlands. Piping plovers are likely to nest along the Mississippi and Missouri Rivers within the Project Area. Spire anticipates minimizing the potential for adverse effects to piping plovers through the use of the HDD of the Mississippi and Missouri Rivers. Information on HDD is provided in Spire's letter to the USFWS RIFO dated January 25, 2017 (Appendix A).
Red Knot (*Calidris canutus*)	Threatened	Not Designated	May affect, but Is not likely to adversely affect	Red knots utilize large waterbodies with gravel and/or sandy edges. The species is not likely to breed in the area and may only be present as a transient species seeking out foraging opportunities. Regardless, Spire anticipates minimizing the potential for adverse effects to red knots through the use of the HDD of the Mississippi and Missouri Rivers. Information on HDD is provided in Spire's letter to the USFWS RIFO dated January 25, 2017 (Appendix A).
Higgins Eye Pearlymussel (*Lampsilis higginsii*)	Endangered	Not Designated	No effect	Higgins eye pearlymussels were included Spire's letter to the USFWS RIFO dated January 25, 2017 (Appendix A); however Spire has determined that the species range does not overlap the Project Area.
Pallid Sturgeon (*Scaphirhynchus albus*)	Endangered	Not Designated	May affect, but Is not likely to adversely affect	Pallid sturgeons are a bottom-oriented, large river obligate fish inhabiting the Mississippi and Missouri rivers and some tributaries. Habitat includes floodplains, backwaters, chutes, sloughs, islands, sandbars, main channel waters, and are often associated with sandy and fine bottom materials. The range of the species is scarce in the Mississippi and Missouri Rivers. Regardless, Spire anticipates minimizing the potential for adverse effects to pallid sturgeons by the HDD of the Mississippi and Missouri Rivers. Information on HDD is provided in Spire's letter to the USFWS RIFO dated January 25, 2017 (Appendix A).
Indiana bat (*Myotis sodalis*)	Endangered	Not in Action Area	May affect, and is likely to adversely affect	Spire anticipates adverse effects to the species based on an effects analysis included in the following sections of this BA.

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Table 8. Species Considered and Effects Determinations (Continued)

Common Name (Scientific Name)	Federal Status	Critical Habitat	Determination1	Justification for Determination
Northern long-eared bat (*Myotis septentrionalis*)	Threatened	Not Designated	May affect, and is likely to adversely affect	Spire anticipates adverse effects to the species based on an effects analysis included in the following sections of this BA.
Gray bat (*Myotis grisescens*)	Endangered	Not Designated	May affect, but is not likely to adversely affect	Habitat for gray bat consists of streams, rivers, lakes, and reservoirs, caves, and abandoned mines. Because no caves or abandoned mine portals are known to occur in the Action Area and none were found during the portal searches (where access was obtained), it is unlikely that the Project will affect any roosting or hibernating habitat for the species. In addition, because the Project will minimally affect the other types of habitat utilized by the gray bat, such as for foraging and traveling (i.e. rivers, streams, lakes, and reservoirs), the overall effects of the Project on gray bats are expected to be insignificant and/or discountable. No gray bats were captured during the summer mist net survey (GAI 2017).
Decurrent false aster (*Boltonia decurrens*)	Threatened	Not Designated	May affect, and is likely to adversely affect	Spire anticipates adverse effects to the species based on an effects analysis included in the following sections of this BA.
Eastern prairie fringed orchid (*Platanthera leucophaea*)	Threatened	Not Designated	No effect	Habitat for eastern-prairie fringed orchid consists of early to mid-successional habitats such as grass and sedge dominated areas including mesic prairies, sedge meadows, bogs, and fens with full sun exposure. The species is also found in areas with very low or no disturbance to the substrate and areas with little or no woody vegetation competition. Based on initial biological surveys, Spire determined that three potential habitat locations in Illinois warranted species-specific surveys for eastern prairie fringed orchid. Based on Project changes, one location was eliminated in June 2017. Surveys were conducted in June 2017. No eastern prairie fringed orchid was found. A final report is in preparation for submittal to USFWS in July 2017.
Mead's milkweed (*Asclepias meadii*)	Threatened	Not Designated	No effect	Habitat for Mead's milkweed includes dry-mesic to mesic upland tallgrass prairies, barrens, igneous glades, and railroad rights-of-way with full sun exposure. The species is also found in areas of late-successional prairie habitats, usually found in undisturbed habitats with high diversity of native vegetation. Based on initial biological surveys, Spire determined that two potential habitat locations in Illinois warranted species-specific surveys for Mead's milkweed. Surveys were conducted in June 2017. No Mead's milkweed was found. A final report is in preparation for submittal to USFWS in July 2017.

Notes:

[1] Effects Determinations are provided here as a summary. Effects analyses for species likely to experience adverse effects are included in Section 4.0. Definitions of Effects Determinations are included in Section 5.0.

3.1 Preliminary Determinations

3.1.1 No Effect

A determination that the Action will not affect the Higgins eye pearlymussel was made based on the species range. The species was included Spire's letter to the USFWS RIFO dated January 25, 2017 (Appendix A) as a species not likely to be affected by the Action; however Spire has determined that the species range does not overlap the Project Area; thus, the determination was changed.

A determination that the Action will not affect the eastern prairie fringed orchid and Mead's milkweed was based on the results of negative field surveys for the species and its habitat. The results of the plant surveys are in preparation for submittal to USFWS.

3.1.2 Not Likely to Adversely Affect

A determination that the Action may affect, but is not likely to adversely affect, was made for the following three species based on the results of negative field surveys: gray bat. The results of the mist net survey is available in the Project mist net survey report (GAI 2017).

A determination that the Action may affect, but is not likely to adversely affect, was made for the following four species based on the minimization of adverse effects through the use of HDD of the Mississippi and Missouri Rivers: least tern, piping plover, red knot, and pallid sturgeon. Information on HDD is provided in Spire's letter to the USFWS RIFO dated January 25, 2017 (Appendix A).

In order to determine that HDD is a sufficient minimization measure to reach a determination that the Action is not likely to adversely affect these species, a review of the HDD geotechnical borings was completed. Two main aspects of the HDD design indicate that the approach for completing the river crossings via HDD is deemed highly feasible based on the following factors:

3.1.2.1 Geological Features and Construction Methods

Mississippi River

Spire conducted four geotechnical borings at the Mississippi River; land-based bores and bores conducted within the river. Soil conditions on the north side drill site (the HDD will be advanced from the north side of the crossing towards the south side) was composed of a 23.5-foot-thick layer of soils consisting of soft to medium stiff clayey silt with fine gravel, loose rock fragments and silts. When borings drilled straight down, bedrock was encountered at approximate elevation of 423.5 feet. Bedrock consisted of predominately limestone and shale with layers of mudstone, siltstone and sandstone.

When soils are present in a soft or loose state, it presents difficulty in providing sufficient strength to resist the required fluid pressures necessary to complete an HDD installation. These conditions are present at the beginning and end of the HDD. When these materials are present, the required drilling fluid pressures can exceed the strength of the soil resulting in the formation of hydraulic fracturing. To mitigate this potential issue, Spire has incorporated temporary conductor casings on the entry and exit locations due to the presence of loose soils near

the ground surface. Casings will be installed a minimum length of 85 feet on the north side of the river and 275 feet on the south side of the river. The temporary conductor casings will terminate in favorable soils at depth and will provide an open pathway for drilling fluid flow back to the HDD entry/exit locations. Once the HDD installation is completed, the temporary conductor casings will be removed from the bore. These casings will be removed and grouted upon the completion of pullback operations.

Bedrock materials are also important for a successful drill. Rock quality designations ("RQD") is a technique for determining the quality of rock that is recovered when taking core samples. Heavily weathered, jointed, fractured bedrock with RQDs less than 60 percent present challenges in terms of constructability of an HDD installation. The bedrock recovered from the bores along the HDD alignment presented at RQDs of over 60 percent which indicates that the bedrock along the alignment of the pipeline is well suited for HDD installation providing decreased installation risks associated with bore instability, raveling, and loss of drilling fluids to the overlaying geotechnical materials.

Missouri River

Spire conducted five geotechnical borings at the Missouri River; land-based bores and bores conducted within the river. Soil conditions on the north side drill site (the HDD will be advanced from the north side of the crossing towards the south side) was composed of a 45-foot-thick layer of soils consisting of very loose to medium dense sand or silt and very soft to medium stiff silts before transitioning to medium dense to very dense sand. When borings drilled straight down, bedrock was encountered at approximate elevation of 293 feet. Bedrock consisted of mudstone and limestone.

When soils are present in a soft or loose state, it presents difficulty in providing sufficient strength to resist the required fluid pressures necessary to complete an HDD installation. These conditions are present at the beginning and end of the HDD. When these materials are present, the required drilling fluid pressures can exceed the strength of the soil resulting in the formation of hydraulic fracturing. To mitigate this potential issue, Spire has incorporated temporary conductor casings on the entry and exit locations due to the presence of loose soils near the ground surface. Casings will be installed a minimum length of 200 feet on the north side of the river and while not anticipated, a small length of temporary casing on the south side of the river may be required. The temporary conductor casings will terminate in favorable soils at depth and will provide an open pathway for drilling fluid flow back to the HDD entry/exit locations. Once the HDD installation is completed, the temporary conductor casings will be removed from the bore. These casings will be removed and grouted upon the completion of pullback operations.

Bedrock materials are also important for a successful drill. RQDs are a technique for determining the quality of rock that is recovered when taking core samples. Heavily weathered, jointed, fractured bedrock with RQDs less than 60 percent present challenges in terms of constructability of an HDD installation. The bedrock recovered from the bores along the HDD alignment presented at RQDs of over 60 percent for the majority of the crossing, which indicates that the bedrock along the alignment of the pipeline is well suited for HDD installation providing decreased installation risks associated with bore instability, raveling, and loss of drilling fluids to the overlaying geotechnical materials.

3.1.2.2 Drilling Fluid Pressure

Spire evaluated the potential for hydraulic fracturing along the proposed HDD crossings of the Mississippi and Missouri Rivers by completing drilling fluid pressure calculations. Spire applied a factor of safety of 2.0 to the cavity expansion calculation, per the recommendations of the United States Army Corps of Engineers. Based on those calculations Spire has determined that the required drilling fluid pressure for the installation is below the recommended allowable pressure for installation. For both the Mississippi and Missouri River crossings, the allowable drilling fluid pressure was found to be significantly higher than the required drilling fluid pressure for the installation. This indicates that the risk for hydraulic fracturing is greatly reduced because the rock type that the drill will be conducted in is able to support the HDD and associated mud pressures. As part of standard construction practice, Spire has developed an HDD Contingency Plan in the event of an inadvertent release of drilling mud. As part of the plan, drilling pressures would be monitored at all times. In the event of an inadvertent release, Spire would implement the procedures in its plan and coordinate with the USFWS as appropriate.

HDD Summary

No fatal deterrents have been identified with the alignment or the proposed HDD at the Mississippi and Missouri Rivers. Based on the required installation length and diameter, there are nine successfully completed HDD installations of similar lengths within North America for the Mississippi River crossing and 29 for the Missouri River crossing. The proposed HDD installation has been designed based on the use of the drill and intersect method of construction, where drill rig spreads are established on both sides of the crossing to drill individual pilot bores that meet within a target intersect zone beneath the Mississippi and Missouri Rivers. While not anticipated, if an attempted HDD installation is unsuccessful, the proposed HDD alignment could be modified beneath the Mississippi and/or Missouri Rivers using the same general location to accommodate an additional HDD attempt, depending on the condition/cause contributing to the original HDD failure. Prior to attempting a second HDD crossing, a risk mitigation workshop should be held with all parties to determine the cause of the initial failure and any mitigation measures that could be adopted to reduce the risk(s) during the second HDD attempt.

A determination that the Action of may affect, and is likely to adversely affect, was made for the following two species based on the results of a positive field survey and subsequent effects analysis included in the following sections of this BA (3.2 and 3.3): northern long-eared bat and Indiana bat.

A determination that the Action of may affect, and is likely to adversely affect, was made for the following species based on an assumption of presence and subsequent effects analysis included in the following sections of this BA (3.4): decurrent false aster.

3.2 Northern Long-eared Bat

Based on technical assistance provided by the USFWS RIFO, Spire is aware that no summer or winter records of northern long-eared bats were previously known from the Action Area. Spire conducted a mist net survey from May 15 to June 1 and June 13 to June 19, 2017. One adult female northern long-eared bat was captured. The details of the survey, including roost tree and emergence count data, are included in the Project mist net survey report (GAI 2017). The mist net report contains confidential information on the locations of Indiana bats, and

therefore is not included as an Appendix to this BA. The capture record indicates that northern long-eared bat summer maternity habitat exists within the Action Area, and is assumed to support one maternity colony located within three miles of the capture location (GAI 2017).

Spire proposes to clear all trees prior to April 1, 2018, to avoid adverse effects to the species, assuming regulatory permits are received on schedule and allow for sufficient time to conduct clearing activities within the Project Area. However, Project tree clearing could occur during periods of northern long-eared bat occupation, between April 1 and October 15. Project tree clearing may occur between April 1 and April 30, followed by a tree clearing restriction from May 1 to July 31 (for tree-nesting migratory birds), and resume on August 1, if necessary.

Adverse effects, similar to those described for the Indiana bat in the following sections of this BA, are anticipated as a result of tree clearing activities, if conducted after April 1. These adverse effects will not extend beyond the individuals of the maternity colony determined to be present within the Action Area, and will not affect regional or range-wide populations.

Incidental take of northern long-eared bats as a result of Project tree clearing is not prohibited under Section 9 of ESA because the Project design meets the conservation requirements of the final rule, under Section 4(d) of ESA, for the species (81 FR 1900). Specifically, the Project is not within 150 feet of any known, occupied maternity roosts or within 0.25-mile of any known, occupied hibernacula.

3.3 Indiana Bat

The Indiana bat is a temperate, insectivorous, migratory bat that hibernates in caves and mines, and summers in wooded areas. It was not described as a separate species until 1928 (Miller and Allen) due to its strong resemblance to the little brown bat (*Myotis lucifugus*). The Indiana bat can be best distinguished from similar *Myotis* by its short inconspicuous toe hairs, smaller foot, distinctly keeled calcar, and more uniform dull fur (Barbour and Davis 1974; and Whitaker and Hamilton 1998).

3.3.1 Status

The Indiana bat was originally listed as being in danger of extinction under the Endangered Species Preservation Act of 1966 (32 FR 4001, March 11, 1967), and is currently listed as endangered under the ESA. At the time of listing, the bat's range-wide population was estimated at 880,000 individuals (Clawson 2002). Causes of historic decline in populations include human land use and alterations to winter habitat, such as saltpeter mining, cave tourism, and entrance modifications that affect airflow (USFWS 2007).

A recovery plan for the species was developed in 1983. The objectives of the recovery plan were to protect hibernacula, maintain, protect, and restore summer maternity habitat, and monitor population trends through winter surveys (USFWS 1983). Agency drafts of a revised recovery plan were developed in 1999 and 2007, but never finalized. The objectives of the 2007 Draft Recovery Plan were to protect hibernacula, maintain a population equal to the 2005 estimate (457,000 individuals), and document a positive growth rate over 10 years (USFWS 2007). The plan listed the Recovery Priority of the Indiana bat at a level of eight, which means the species had a moderate degree of threat and high recovery potential.

The range-wide population increased from 2001 through 2007 and recovery criteria for the species were being met (USFWS 2007; and USFWS 2013); however, White Nose Syndrome ("WNS") quickly reversed the gain and populations are declining, particularly in the Northeast and Appalachia Recovery Units (Thogmartin et al. 2012). The USFWS conducted the most recent 5-year review of the Indiana bat in 2009. Due to the WNS epizootic, the analysis downgraded the recovery potential for the bat and determined the species has a high degree of threat and a low recovery potential, and remains endangered (USFWS 2009) with a Recovery Priority at a level of five. The high degree of threat determination indicates that extinction is almost certain in the immediate future because of rapid population decline or habitat destruction. The USFWS began another five-year review in 2011 (76 FR 44564).

The most recent range-wide estimate of the population was 523,636 bats (USFWS 2015c). The estimate includes 167,000 bats from a new Indiana bat hibernaculum that was discovered in Missouri in 2012. A recent study predicted WNS capable of causing severe reductions in population size and local and regional extirpation of the species (Thogmartin et al. 2013).

Given the 2015 range-wide Indiana bat population estimate of 523,636, it can be estimated that there are approximately 3,273 to 5,236 maternity colonies range-wide, assuming a 50:50 sex ratio (Humphrey et al. 1977) and an average maternity colony size of 50 to 80 adult females (USFWS 2007; and Whitaker and Brack 2002). The USFWS (2007) listed records of 269 known maternity colonies in 16 states, only six to eight percent of the maternity colonies assumed to be in existence. While it is assumed that additional maternity colonies have been discovered since USFWS (2007), the locations of the majority of the Indiana bat maternity colonies on the landscape remain unknown.

3.3.2 Distribution

The Indiana bat's summer range includes most of the eastern woodlands from the central Mississippi Valley, eastern Alabama, and northern Florida to New England, but not along the Atlantic Coast (Barbour and Davis 1974). The majority of the winter population (94 percent) occurs in limestone caves and mines in Indiana, Missouri, Kentucky, and Illinois (USFWS 2015c). Smaller winter populations occur in Arkansas, Oklahoma, Ohio, Tennessee, Alabama, Virginia, Michigan, West Virginia, Pennsylvania, North Carolina, New York, New Jersey, and Vermont.

The Action Area is in the Ozark-Central Recovery Unit, which is near the center of the range for the Indiana bat. The Indiana bat population in the Ozark-Central Recovery Unit ("RU") has declined since 1990 (USFWS 2007). Based on biannual population assessments of known Indiana bat hibernacula, between the years of 2013 and 2015 the population in Illinois has declined by 4.7 percent and the population in Missouri has increased by 0.8 percent (USFWS 2015c). However the discovery of a previously unknown P1 hibernaculum in Missouri has increased the overall baseline size of the population in the Ozark-Central Recovery Unit.

Based on USFWS (2007), there were 48 records of maternity colonies in 39 counties in Illinois and Missouri. In Illinois, there were 28 records of maternity colonies in 20 counties, including Adams (2), Alexander, Bond, Cass, Ford, Henderson, Jackson (3), Jersey, Macoupin, Monroe (4), Pike (2), Pulaski, Randolph, Saline, Schuyler, Scott, St. Clair, Union, Vermilion, and Washington (2; USFWS 2007). The Action Area includes parts of Jersey and Scott Counties. In Missouri, there were 20 records of maternity colonies in 19 counties, including Chariton, Gasconade,

Iron, Jefferson, Knox (2), Lewis, Linn, Macon, Madison, Marion, Mercer, Monroe, Nodaway, Pulaski, Scotland, St. Francois, St. Genevieve, Sullivan, and Wayne (USFWS 2007). The Action Area does not pass through any of these Missouri counties.

In 2005, the USFWS developed a new system of classification for Indiana bat hibernacula. The classifications are: Priority 1 ("P1"), which contain a population of >10,000 bats; Priority 2 ("P2"), which contain 1,000-9,999 bats; Priority 3 ("P3"), which contain 50-999 bats; and Priority 4 ("P4"), which contain 1-49 bats (USFWS 2007). Based on the most recent hibernacula distribution (USFWS 2015c), 27 are P1, 56 are P2, 166 are P3, and 270 are P4 (USFWS 2007).

In 2015, 46.2 percent of the range-wide population (241,748 bats) used hibernacula in Illinois and Missouri. A total of 56,055 Indiana bats, or 10.7 percent of the range-wide population hibernated in Illinois (USFWS 2015c). Illinois has at least 16 known extant hibernacula across 11 counties, including Adams, Alexander, Hardin, Jackson, Jersey, Jo Davies, La Salle, Monroe, Pike, Pope, and Union (USFWS 2007). The closest known Indiana bat hibernaculum to the Action Area in Illinois is a P3 site in Jersey County. A total of 185,693 Indiana bats, or 35.5 percent of the range-wide population hibernated in Missouri (USFWS 2015c). Missouri has at least 40 known extant hibernacula across 18 counties, including Barry, Boone, Camden, Carter, Crawford, Dent, Franklin, Iron, Laclede, Marion, Oregon, Pike, Pulaski, Shannon, St. Louis, Taney, Texas, and Washington (USFWS 2007). The closest known Indiana bat hibernaculum in Missouri is a P3 site in St. Louis County, approximately 26 miles from the Action Area.

3.3.3 Critical Habitat

Critical habitat for the Indiana bat was designated on September 24, 1976 and included 11 caves and two abandoned mines in six states (41 FR 41914, September 24, 1976). Of these hibernacula, one is in Illinois and six are in Missouri. No known critical habitat for the Indiana bat is in the Action Area. The nearest critical habitat for the Indiana bat includes a cave in Washington County, Missouri (approximately 50 miles from the Action Area), a cave in Franklin County, Missouri (approximately 60 miles from the Action Area), and a cave in Crawford County, Missouri (approximately 70 miles from the Action Area).

3.3.4 Life History

The Indiana bat hibernates in caves and mines in the winter and migrates to summer habitat in the spring. Depending on weather conditions, hibernation for Indiana bats typically lasts from October through April (Hall 1962; and LaVal and LaVal 1980), although it may be extended from September to May in northern areas including New York, Vermont, and Michigan (Kurta et al. 1997; and Hicks 2004). Both males and females return to hibernacula in late summer or early autumn to mate and enter hibernation.

Summering Indiana bats (males and females) roost in trees in riparian, bottomland, and upland forests. Roost trees generally have exfoliating bark, which allows the bat to roost between the bark and bole of the tree, and have solar exposure in an open canopy. Tree cavities, hollow portions of tree boles, crevices, and splits from broken tops have been used on a very limited basis, usually by individual Indiana bats. A variety of tree species are used for roosts (3D/Environmental 1995; Kurta 2004; and Britzke et al. 2003); however, structure is probably more important than species in determining if a tree is a suitable roost site. Suitable roost trees typically have a

large diameter, exfoliating bark, and prolonged solar exposure with no apparent importance in regard to the tree species or whether it is upland or bottomland (Whitaker and Brack 2002; Kurta 2004; Winhold 2007; and Whitaker and Sparks 2008).

Indiana bats arrive at maternity roosts in April and early May in the Midwest, with substantial numbers in mid-May (Humphrey et al. 1977). Most documented Indiana bat maternity colonies have 50 to 100 adult bats (USFWS 2007). Indiana bats exhibit strong fidelity to their traditional summer maternity habitat (Kurta et al. 2002; Kurta and Murray 2002; Winhold et al. 2005; and Whitaker and Sparks 2008). Roost trees are often located on forest edges or openings with open canopy and open understory (USFWS 2007). Most have been found in forest types similar to oak-hickory and elm-ash-cottonwood communities. Important summer roosting and foraging habitat for the Indiana bat is often in floodplain or riparian forests, but may also be in more upland areas.

A variety of suitable roosts are needed within a colony's traditional summer range. Maternity colonies often use multiple roost trees in a season (Kurta et al. 1993; Foster and Kurta 1999; Kurta and Murray 2002; and Whitaker and Sparks 2008), and may switch often. Roost longevity is variable because they are often dead and dying trees. Gardner et al. (1991b) evaluated 39 roost trees and found that 31 percent were no longer suitable the following summer, and 33 percent of those remaining were unavailable by the second summer.

Indiana bat maternity sites generally consist of one or more primary maternity roost trees that are used repeatedly by large numbers, and varying numbers of alternate roosts that may be used less frequently and by smaller numbers of bats. Trees in excess of 16 inches Diameter at Breast Height (dbh) are considered optimal for maternity colonies (3D/Environmental 1995), but trees in excess of 8.6 inches dbh are used as alternate roosts (USFWS 2002).

Indiana bats may use upland forest for roosting and upland forest and pastures with scattered trees for foraging. Indiana bats prefer forests with old growth characteristics, large trees, scattered canopy gaps, and open understories (USFWS 2007). Instances have been documented of bats using forests altered by grazing, swine feedlots, row-crops, hay fields, residences, clear-cut harvests, and shelterwood cuts (Garner and Gardner 1992; and USFWS 1999).

Females produce one young per year, usually between mid-June and early July. Juveniles begin to fly between early July and early August. Maturity is likely dependent upon weather and the thermal character of the roost (Humphrey et al. 1977; and Kurta et al. 1996).

Male Indiana bats either disperse throughout the range or stay near hibernacula and roost individually or in small groups, occasionally in hibernacula (Whitaker and Brack 2002). Male Indiana bats have been observed roosting in trees as small as 2.5 inches dbh (Gumbert et al. 2002). Because males typically roost individually or in small groups, the average size of their roost trees tends to be smaller than the roost trees used by maternity colonies. Males have shown summer site fidelity and have been recaptured in foraging areas from prior years (USFWS 2007).

Indiana bats feed exclusively on flying aquatic and terrestrial insects. Diet varies seasonally and variations exist among different ages, sexes, and reproductive status (USFWS 2007). It is probable that Indiana bats use a combination of both selective and opportunistic feeding to their advantage (Brack and LaVal 1985). Moths

(*Lepidoptera*), beetles (*Coleoptera*) and midges and flies (*Diptera*), caddisflies (*Trichoptera*), and wasps and ants (*Hymenoptera*) constitute the bulk of the diet (Sparks and Whittaker 2004; and Tuttle et al. 2006).

Indiana bats forage in and around tree canopy and in openings of floodplain, riparian, and upland forests (USFWS 2007). They often utilize streams, trails, old roads, and fencerows as travel corridors (Brown and Brack 2003; and Murray and Kurta 2004). In Illinois, Gardner et al. (1991a) found that forested stream corridors and impounded bodies of water were preferred foraging habitats for pregnant and lactating Indiana bats, which typically flew up to 1.5 miles from upland roosts to forage. However, the same study reported the maximum distance that any female Indiana bat flew (regardless of reproductive status) from her daytime roost to her capture site was 2.5 miles. Females typically utilize larger foraging ranges than males (Garner and Gardner 1992). Foraging also occurs over clearings with successional vegetation, along cropland borders, forest edges, fencerows, and over farm ponds.

Swarming is a critical part of the life cycle when Indiana bats converge at hibernacula, mate, and forage until sufficient fat reserves have been deposited to sustain them through the winter (Hall 1962; Cope and Humphrey 1977; and Laval and Laval 1980). Some males may begin to arrive at hibernacula as early as July. Females typically arrive later, and by September the numbers of males and females are almost equal. Swarming activity in the Midwest peaks in early September (Cope and Humphrey 1977).

In autumn, Indiana bats continue to use multiple roosts, although they are located near hibernacula during this time (Gumbert 2001), which may provide energy advantages during swarming (Brack 2006). However, Indiana bats may leave the swarming area for several days to visit other hibernacula (Gumbert 2001; and Brack 2006). Autumn roosts may be located in canopy gaps created by disturbance (logging, blow down, and prescribed burning) and along edges (Gumbert et al. 2002). Roost trees used in autumn are primarily on ridge tops and upper slopes (Kiser and Elliott 1996).

The period after hibernation but prior to spring migration is known as staging. Female Indiana bats emerge first from hibernation in late March or early April, followed by the males. The timing of emergence may vary depending on latitude and weather conditions. Most populations leave their hibernacula by late April.

Migration is stressful for the Indiana bat, particularly in the spring when their fat reserves and food supplies are low. As a result, adult mortality may be the highest in late March and April. Females can migrate hundreds of miles from hibernacula (Kurta and Murray 2002; and Winhold and Kurta 2006). During spring staging, males have been found almost 10 miles from their hibernacula (Hobson and Holland 1995).

Indiana bats hibernate on cave and mine ceilings and walls in dense clusters of several hundred individuals per square foot. Hibernation lasts from mid-November to mid-April and facilitates survival during harsh winter months when prey is unavailable. Clusters may protect individuals from temperature change and speed arousal due to disturbance. Like other cave bats, the Indiana bat naturally arouses during hibernation (Brack 1979; Brack and Twente 1985; and Twente et al. 1985). Limited mating occurs throughout the winter and in early April as Indiana bats emerge (USFWS 2007).

Hibernacula must provide a stable and suitable temperature and humidity microclimate (Brack et al. 2009; and USFWS 2007), and only a small percentage of hibernacula meet these requirements. Hibernacula may contain large populations of several species of bats (Stihler and Brack 1992).

3.3.5 Baseline Conditions / Species Status in the Action Area

Based on technical assistance provided by the USFWS RIFO, Spire is aware that no summer or winter records of Indiana bats were previously known from the Action Area. Spire conducted a mist net survey from May 15 to June 1 and June 13 to June 19, 2017. Seven Indiana bats were captured, including five adult males and two adult females. Five of the Indiana bats, including three adult males and two adult females, were radio-tagged and tracked to eleven diurnal roosts. None of the roosts were within the Project Area. The details of the survey, including roost tree and emergence count data, are included in the Project mist net survey report (GAI 2017). The mist net report contains confidential information on the locations of Indiana bats, and therefore is not included as an Appendix to this BA.

Portal searches were conducted on all portions of the Project Area where landowner access was obtained. No caves, open karst features, abandoned mine portals, or any potential openings to subterranean voids were found. Portal searches were not completed along approximately 3.4 miles where the Project Area crosses two tracts in Jersey County, Illinois and two tracts in St. Louis County, Missouri where landowner access was not obtained, and the recently re-designed Missouri River HDD pullback site in St. Charles County, Missouri. It is assumed that no potentially suitable unknown bat hibernacula exist in the portions of the Project Area that cross agricultural lands in these areas (3.1 miles total). It is assumed to be unlikely that potentially suitable unknown bat hibernacula exist in the portion of the Project Area that crosses forest land in these areas (0.3-mile total). These areas will be searched for portals when access is obtained. GAI will notify the USFWS if any potentially suitable unknown bat hibernacula are found.

In summary, based on the results of the mist net survey and portal searches, Indiana bats and their summer habitat are considered present in the Action Area. It is assumed that no winter habitat is present in the Action Area.

3.3.5.1 Factors Affecting the Species in the Action Area

The Project crosses a variety of land cover types commonly found in rural, agricultural, and forested areas of western Illinois and eastern Missouri; the primary land use within the Project is agriculture. Other dominant landforms crossed include wooded areas and riverine systems. The Project route follows areas of predominately agricultural land use with forested cover typically associated with riparian areas and property lines; therefore, forested areas are currently fragmented throughout the vicinity of the Project. The largest areas of contiguous

forest along the Project are located along the north and south sides of the Mississippi River where the forest has been previously fragmented by roads and an existing right-of-way. The Project will be collocated with an existing pipeline corridor north of the Mississippi River, and will be bypassed by HDD and therefore not require tree clearing on the south side of the Mississippi River.

Forested land cover along the Project route includes bottomland forest (riparian forested areas bordering waterbodies). Towering trees and vine lattices characterize mature bottomland forests. In the lowlands bordering streams are forests of cottonwood, willow, ash, elm, sycamore, silver maple, and hackberry. Periodic flooding keeps the understory of these riverfront bottomland forests fairly open. In the Midwest, such as southern and central Illinois, maternity colonies are more commonly associated with bottomland, riparian, wetland, or other hydric forest types (Carter 2006).

White Nose Syndrome

Traditionally, loss and degradation of forested lands is often cited as a reason for the decline of Indiana bat populations (USFWS 2007). However, the introduction of WNS has devastated many hibernating bat populations and is now the most significant threat to this species. Prior to the onset of WNS, the range-wide population of Indiana bat appears to have been in a stationary state for at least two decades (Thogmartin et al. 2012). Between 2006 and 2009, during the first few years of onset of WNS, the median range-wide population decline for Indiana bats increased by 10.3 percent per year (Thogmartin et al. 2012). The presence of WNS was confirmed in Missouri in 2013 and in Illinois in 2014 and is now considered to be state-wide in both states.

Other Actions

Spire completed a cumulative impact analysis for the Project per relevant guidance by the Council on Environmental Quality ("CEQ;" 1997) and the USEPA (1999). Under these guidelines, Spire considered the impact on the environment resulting from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR 1508.7). Details and parameters of the analysis are summarized in the following paragraphs as they pertain to the environmental baseline for Indiana bats.

One electric transmission action, the Grain Belt Express Clean Line, located within Scott and Greene Counties, Illinois, is proposed to be constructed in the Action Area as early as 2018, and crosses the Project at approximate MP 2.6. Based on an evaluation of aerial imagery, some tree clearing would be expected within the same HUC-12 as the Project. The route is collocated with existing roads where possible. The proponent will work with landowners on vegetation maintenance procedures and has requested input on best practices from local conservation organizations. The proposed route of the Grain Belt Express Clean Line near the Action Area in Scott County, Illinois crosses a primarily agricultural landscape with some areas of forest. The easement will be approximately 150-200 feet wide. The proponent estimates that less than one percent of the easement will be occupied by structures; existing land use (e.g. farming, grazing, etc.) may continue provided activities do not interfere with operation of the line. It is not known at this time if disturbance will coincide with the Project workspaces.

One road infrastructure action was identified as the proposed and potential construction and upgrades of the US-67 corridor. Most of the US-67 corridor improvements are in the preliminary design or planning stage, and only one is included in IDOT's programmed projects for 2018-2022. Several sections of the anticipated US-67 corridor improvements cross a HUC-12 watershed affected by the Project in Greene and Jersey Counties, Illinois, including new bypasses and improvement corridors. New bypasses could be expected to have temporary and permanent impacts. Improvement corridors would entail expansion of the existing roadway, which would minimize impacts to the resources. Detailed analysis of these actions is not publicly available. It is presumed that the loss of some vegetation is likely to occur, though most impacts would be to agricultural lands. The Delhi Bypass is the only portion of the corridor improvements that has been programmed, and is expected to be constructed sometime between 2018 and 2022, which may overlap with the temporal scope of the Project. The remaining improvements are in varying stages of design, and the construction timeframes are unknown. It is improbable that improvements not yet programmed would be constructed at the same time as the Project.

The Grain Belt Express Clean Line in Scott County, Illinois and the improvements to the US-67 Corridor between Carrollton and White Hall, Greene County, Illinois will involve noise and temporary air quality impacts from heavy vehicles and machinery associated with clearing and construction. These actions would be subject to permit requirements not unlike that of the proposed Project which will further minimize effects to Indiana bats.

3.4 Decurrent False Aster

Decurrent false aster (*Boltonia decurrens*) is a perennial herb in the aster (*Asteraceae*) family that grows three to seven feet tall (Hilty 2017). The species forms either a solitary or a cluster of central stems that branch occasionally to abundantly (Hilty 2017). Central stems are light green with vertical veins that appear glabrous or sometimes glaucous with alternative leaves at regular intervals occurring along the entire length of the stems; leaves become gradually smaller in size as they ascend (Hilty 2017). While the stems are terete (circular in circumference), the bases of leaves extend one to three inches down the stem giving the appearance of winged stems (Hilty 2017). The entire, toothless, oblong and lanceolate shaped leaves of the central stem are up to seven inches in length and one and a half inches across and taper gradually to form narrow acute tips (Hilty 2017). Upper leaf surface is medium to dark green and glabrous, while the lower leaf surface is lighter green and glabrous or glaucous; venation is pinnate, and the central veins are particularly prominent toward their bases (Hilty 2017). Lateral stems have alternative, elliptic or linear-lanceolate shaped leaves up to three inches in length and half an inch across (Hilty 2017).

The blooming period for decurrent false aster occurs during late summer to autumn and lasts one to two months (Hilty 2017). Central stems terminate in large panicles of flowerheads up to two inches long and two inches across, and some robust plants may also have lateral stems terminate in smaller panicles of flowerheads (Hilty 2017). Each flowerhead is three-quarters of an inch to one inch across, daisy-like, consisting of 40 to 60 ray florets that surround a head of 180 or more disk florets. Rays of the flowerheads are linear-oblong in shape and white or rarely lavender or light purple; corollas of the disk florets are yellow and tubular in shape (Hilty 2017).

3.4.1 Status

Decurrent false aster was listed as federally threatened in 1988 (53 FR 45858, November 14, 1988), and at that time, only 12 populations were known in the states of Illinois and Missouri (USFWS 1988). When the original recovery plan was issued in 1990, the number of known decurrent false aster populations had grown to 20 populations (18 in Illinois and 2 in Missouri), and when the most recent 5-Year Review was issued in 2012, 10 of 19 historically occupied sites (surveyed in 2011) had reestablished decurrent false aster populations (USFWS 1990 and 2012). Populations appear to fluctuate given environmental conditions from year to year, and monitoring has not been sufficiently conducted as floodplain conditions and late-season water tables precluded monitoring on many of the long-term monitoring sites (USFWS 2012).

The natural habitat of decurrent false aster is on moist, sandy, alluvial floodplains, wet prairies, shallow marshes, and shores of open rivers, creeks, and lakes; and although the species is not tolerant to prolonged flooding, it does rely on periodic flooding to scour away other plants that compete for its habitat (USFWS 2000, 2015, and 2016).

Distribution of decurrent false aster historically ranged from La Salle County, Illinois to St. Louis County, Missouri. In Illinois, extant populations were recorded along the Illinois River in Jersey, Scott, Cass, Morgan, Schuyler, Fulton, Tazewell, and Marshall Counties and along the Mississippi River in St. Clair County (USFWS 1990). In Missouri, extant populations were recorded in St. Charles County (USFWS 1990).

3.4.2 Critical Habitat

No critical habitat has been designated for decurrent false aster.

3.4.3 Life History

Decurrent false aster exhibits morphological adaptations suited for life on the floodplain as it is extremely tolerant to root zone saturation and seed dispersal by river currents (USFWS 2000). The early successional species requires human or natural disturbance to create and maintain suitable habitat, such as periodic flooding or plowing to create open, sunny habitat while reducing other competitive species; germination will not occur in the dark or when achenes are covered with as much as two-tenths of an inch of sediment (Smith and Keevin 1998, USFWS 2000). Due to the structure of decurrent false aster achenes, they are able to float for long distances; and germination and seedling growth is more successful at sandy or silty soils rather than clay (USFWS 2000).

Vegetative production occurs during the fall when one or more basal rosettes form; rosettes bolt in the following spring and flower and set achenes from late August to early October (USFWS 2000). Decurrent false aster produces ca. 50,000 achenes per individual with an average production of ca. 40,000 seedlings in optimal conditions (USFWS 2000). Few seedlings are found at established populations due to small achene size, full sun and temperature requirements, and soil texture and microtopography requirements for germination and seedling growth; however, these populations can sustain by basal rosette production (Moss 1997, Smith 1991, USFWS 2000).

Although decurrent false aster is considered stable by some, as of 2000 the species was considered to be at 75 percent recovery; the Recovery Plan requires twelve stable populations in protection through purchase, easement, or other cooperative management agreement (USFWS 2000). Notable populations at that time were

the following: Riverlands Environmental Demonstration Area, Spatterdock Bottoms, and Columbia Bottoms in St. Charles County, Missouri; Rice Lake in Fulton County, Illinois; and Worley Lake in Tazewell County, Illinois (USFWS 2000; Dr. Marian Smith, Southern Illinois University - Edwardsville in litt. to Gerry Bade December 4, 1999; ibid. January 28, 2000).

3.4.4 Baseline Conditions / Status of the Species in the Action Area

No specific occurrence data was available for Project review other than the population extant and historical collection data provided in USFWS (1990) Recovery Plan. In October 2016, a field survey was conducted for decurrent false aster along the Otter Creek area (approximate MP 36.6 to 36.8) in Jersey County, Illinois. Neither the species, nor its suitable habitat, were located at the Project Area (Thomas 2017).

Based on technical assistance provided by the USFWS Columbia Field Office and RIFO, additional survey areas for decurrent false aster have been proposed in St. Charles County, Missouri, and will be surveyed in August/September 2017 (USFWS 2017a, 2017b, and 2017c). Surveys will be conducted in St. Charles County, Missouri (Figure 4).

While the habitat requirements for decurrent false aster growth are quite specific, much of St. Charles County, Missouri occurs within large floodplains of the Mississippi and Missouri rivers. Much of the Project Area is within heavy agricultural land use, thus, not suitable habitat for the species. However, those lower-lying areas skirting agricultural fields or roadsides with periodic disturbance or forested or open areas adjacent to rivers have potential for the decurrent false aster occurrence.

3.4.4.1 Factors Affecting the Species in the Action Area

Population decline of the decurrent false aster has been attributed to the following threats (USFWS 2000 and 2015d):

- Modification of the floodplain forest along the Illinois and Mississippi rivers;
- Wetland drainage;
- Agricultural expansion;
- Heavy siltation as a result of extensive row crop cultivation (smoothers seeds and seedlings);
- Elimination of wet prairies and marshes;
- Building of levees which changed flooding patterns; and
- Use of herbicides.

Other actions occurring in the Action Area that could affect the species are similar to those described for the Indiana bat in Section 3.3.5.1.

4.0 Effects of the Action

Direct effects are immediate effects of an action on listed species or their habitat. Indirect effects are caused by an action and are later in time, but still are reasonably certain to occur. Insignificant effects are related to the relative size of the effects and should never reach the scale where take occurs. Insignificant effects cannot be meaningfully measured, detected, or evaluated. Discountable effects are those effects that are extremely unlikely or not expected to occur (USFWS and NMFS 1998).

4.1 Indiana Bat

Direct and indirect effects to Indiana bats from construction, operation, and maintenance of the Project were assessed based on the presence of the species in the Action Area. The following areas were considered occupied habitat when determining the presence of the species in the Action Area:

- within five miles of a known, extant hibernaculum;
- within five miles of a summer maternity capture without a known roost;
- within 2.5 miles of a known maternity roost; and
- within 2.5 miles of a summer non-maternity record.

Based on the results of the mist net survey, Indiana bat summer maternity and summer non-maternity habitat exists within the Project Area (Figure 3). Table 9 provides acres of summer maternity and summer non-maternity habitat (i.e., forest) in the Project Area before and after construction.

Table 9. Forested Lands within Known Indiana Bat Habitat

Habitat Type	Total Area (acres)	Forested Area (acres)	Forested Area (percent)
All Lands within Known Maternity Habitat[1] (Pre-construction)	25,621.3	11,569.7	45.16
All lands within Known Maternity Habitat[1] (Post-construction)		11,559.1	45.12
Difference		**10.6**	**0.04**
All Lands within Known Non-maternity Habitat[1] (Pre-construction)	27,599.8	8,779.9	31.81
All lands within Known Non-maternity Habitat[1] (Post-construction)		8,761.6	31.75
Difference		**18.2**	**0.07**

Table 9. Forested Lands within Known Indiana Bat Habitat (Continued)

Habitat Type	Total Area (acres)	Forested Area (acres)	Forested Area (percent)
All Lands within Total Known Habitat[2] (Pre-construction)	53,221.0	20,349.6	38.24
All lands within Total Known Habitat[2] (Post-construction)		20,320.7	38.18
Difference		**28.8**	**0.05**

Notes:

1 Where Known Maternity and Known Non-maternity Habitat overlap (Figure 3), the habitat was considered Known Maternity Habitat.

2 Total Known Habitat includes Known Maternity Habitat and Known Non-maternity Habitat. Where these two habitat types overlap (Figure 3), habitat was considered Known Maternity Habitat.

The following factors were considered while evaluating direct and indirect effects:

Proximity

The Action Area lies near the center of the species overall range. It includes maternity and summer non-maternity habitat. Based on the results of surveys for winter habitat in the Project Area, it is assumed no winter habitat is in the Project Area. It is unlikely that the Project would affect unknown winter habitat, if present in the Action Area, due to the Project-related effects being primarily isolated to the Project Area, with the exception of noise (for which the Action Area was defined), which would be expected to have insignificant and discountable effects to winter habitat.

Distribution

The effects of the Action will be limited to the Action Area. Effects from construction activities will be primarily limited to specific areas of tree clearing, which lie well within the boundaries of the Action Area. The exception is construction noise, which will decrease as it extends to the edge of the Action Area, and is expected to have discountable effects to Indiana bats and would likely be limited to individual bats and maternity colonies within the Action Area.

Nature

Project tree clearing could (a) presumably result in a small amount of mortality, (b) remove occupied and potential roosting and foraging habitat (e.g., removal of non-maternity roost trees and foraging and traveling habitat used during summer); (c) alter habitat (e.g., fragmentation of foraging and traveling habitat used during summer); and (d) result in alteration and/or modification of normal Indiana bat behaviors (e.g., effects to reproduction, foraging, and roosting behaviors).

Timing

Spire proposes to clear all trees prior to April 1, 2018, assuming regulatory permits are received on schedule and allow for sufficient time to conduct clearing activities within the Project Area. However, tree clearing could occur during periods of Indiana bat occupation. Indiana bats are expected to occupy the Area between April 1 and October 15 (Table 9; USFWS 2015). Project tree clearing may occur between April 1 and April 30, followed by a tree clearing restriction from May 1 to July 31 (for tree-nesting migratory birds), and resume on August 1, if necessary.

Table 10. Indiana Bat Habitat Occupied by Season

Date	April 1[1] through August 15	August 16[1] through October 14	October 15[1,2] through November14	November 15[1,2] through March 31
Habitat Type	Summer	Migration and Swarming	Swarming	Winter

Notes:

1 Source: USFWS 2015b provided as an example.

2 Because not Swarming Habitat is in the Action Area, Indiana bats are not expected to be in the Action Area after October 15.

Effects to Indiana bats, if present, would occur primarily during the summer maternity season. These effects could occur during the early and late portions of the maternity season if tree clearing occurs during this time (April 1 to April 30, and after August 1). Because tree clearing will not be conducted between May 1 and August 1, (the middle of the maternity season, including then non-volant pup season) few effects would likely occur at this time.

Duration

Any mortality would be limited to the tree-clearing phase of construction, if occurring during the summer maternity season. The loss of roosts (both unknown and potential) and forested land used for foraging and traveling would be considered permanent; however, a portion of the Project Area will be allowed to naturally revegetate, lessening these effects. Effects to normal behavioral patterns as a result of those losses are expected to be temporary, and will persist until any bats find new roosts and foraging areas in the surrounding woodlands. Effects are not expected to persist for more than one summer season.

Disturbance Frequency

The tree clearing phases of the Project would likely cause the highest levels of disturbance to Indiana bats. Due to the Project construction schedule, the majority of these effects would occur during the first part of the summer maternity season (April 1 to April 30) and the last part of the summer maternity season (August 1 to October 15).

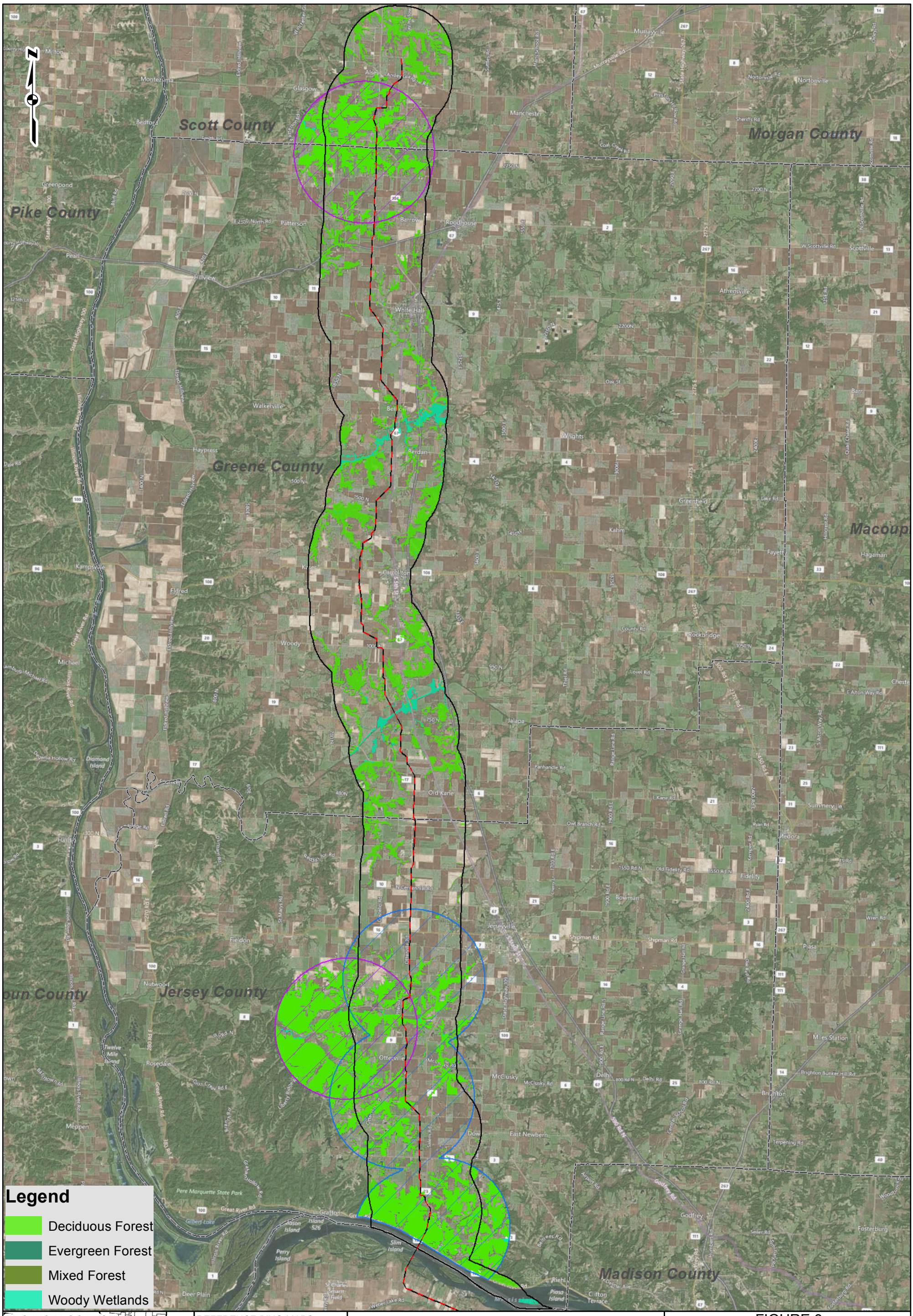
Disturbance Intensity

Effects are expected to range from minor disturbance (e.g., short-term nearby noise) to mortality. Effects from Project tree clearing are presumed to result in a small amount of mortality of individual Indiana bats, as well as harm and harassment of individual Indiana bats. These effects will mostly occur to males and non-maternity habitat due to their closer proximity to the Project Area. These effects are also expected to occur to the maternity

colonies and maternity habitat within the Action Area, but at a much reduced rate, and are not expected to result in severe reductions in the numbers of individuals associated with these maternity colonies or the amount of suitable maternity habitat. A suitable amount of maternity habitat is expected to remain on the landscape following Project construction. Both maternity colonies in the Action Area are expected to remain on the landscape following Project construction. Effects are not expected to reach beyond these maternity colonies.

Disturbance Severity

The timeframe in which Project effects may persist and how long it would it take the local or regional population of Indiana bats to recover is expected to be relatively short. Because effects are not expected to persist for more than one summer season, long-term effects to Indiana bat and their habitat are not expected to occur.


Scott County
Morgan County
Pike County
Greene County
Jersey County
Madison County
Milton
Montezuma
Glasgow
Bedford
Alsey
Manchester
Murrayville
Nortonville
Greenpond
Patterson
Barrow
Roodhouse
Pearl
Hillview
White Hall
Athensville
Scottville
Walkerville
Bell Owen
Haypress
Berdan
Wrights
Barr
Kampsville
Eldred
Carrollton
Kaser
Kahm
Hagaman
Woody
Michael
Rockbridge
Jalapa
Old Kane
Summerville
Medora
Fidelity
Bowman
Jerseyville
Fieldon
Nutwood
Otterville
McClusky
Delhi
Brighton
Meppen
Rosedale
East Newbern
Godfrey
Fosterburg
Alton
Grafton
Deer Plain
Riehl
Clifton Terrace
Miles Station
Piasa
Diamond Island
Pere Marquette State Park
Gilbert Lake
Great River Rd
Illinois River Rd
Eldred Hillview Rd
Legend
Deciduous Forest
Evergreen Forest
Mixed Forest
Woody Wetlands
PROJECT LOCATION
REFERENCE:BING MAPS ROAD, © 2014 MICROSOFT CORPORATION AND ITS DATA SUPPLIERS, ACCESSED : 07/2017
GREENE, JERSEY AND SCOTT COUNTIES, IL
ST.CHARLES AND ST.LOUIS COUNTIES, MO
LEGEND
24-inch Pipeline
North County Extension
Action Area
Indiana Bat Summer Maternity Habitat
Indiana Bat Summer Non-maternity Habitat
County Boundary
State Boundary
0 8,250 16,500 33,000
Feet
FIGURE 3
ACTION AREA AND KNOWN BAT OCCURENCE AREAS
gai consultants
SPIRE STL PIPELINE PROJECT
spire
DRAWN BY: PK
DATE: 7/7/2017
CHECKED: JAD
APPROVED: JAD
C:\Users\kudlup\Desktop\Priya\2016\Spire\MXD\BA\Figure 3 Action Area and Bat Buffers.mxd

4.1.1 Direct Effects

4.1.1.1 Tree Clearing in Summer

In most cases, the death of an individual Indiana bat from summer habitat removal would require the bat to be present in the specific tree being removed at the time it is felled. If not struck during the felling, volant Indiana bats would likely have the opportunity to escape the falling tree (Cope et al 1974, Belwood 2002, USFWS 2015b). Although volant Indiana bats can likely fly away from a tree prior to or during felling, females may be less likely to leave if they have non-volant young present (usually between June 1 and July 31). Non-volant young would not be capable of leaving their roost tree and, therefore, the young and the reluctant adult females may be wounded and/or killed.

Project tree clearing could coincide with small portions of the beginning and end of the summer maternity season (and summer non-maternity season for males), when Indiana bats are volant. Combined, these timeframes would be expected to correspond to a low chance of mortality of an individual Indiana bat, if present in a tree being felled. In addition, no known Indiana bat roost trees are within the Project Area or proposed for clearing. Despite this, a low amount of mortality is expected to occur from felling occupied unknown roosts, primarily occupied by males, based on the proximity of the known male roosts to the Project Area. The distances of roost trees from the portions of the Project area proposed for tree clearing are provided in the Project Mist Net Survey Report (GAI 2017) and ranged from 26.9 to 714.6 meters (88 – 2,344 feet) for roosts used by males, and 673.2 to 3,221.6 meters (2,209 – 10,5670 feet) for roosts used by female Indiana bats.

4.1.1.2 Loss of Roosts

Indiana bats, if displaced from roosts, would be required to find new roosts. Although Indiana bats use multiple roosts during a summer season, and they shift roosts within and between years due to the inherent ephemerality of dead trees, little is known with certainty about the effects of the loss of roost trees, whether occurring during summer or during a time when they are unoccupied (i.e., during off-season tree clearing). One study in Indiana documented the fragmentation of a maternity colony following the natural loss of a primary maternity roost (Sparks et al. 2003). Finding replacement roosts may expose bats to a reduction in time spent foraging, increases in energetic demands, exposure to competition, and exposure to predation. Effects may depend on season and type and number of roosts lost. New roosts may be more or less suitable than abandoned roosts (Kurta 2004).

No known roosts will be removed by the Project; however it is reasonable to assume that removal of these unknown roosts, prior to April 1 when they are unoccupied, would reduce these effects to an insignificant and discountable level where harm and/or harassment is not expected to occur. However, a low amount of harm and/or harassment would result from Indiana bats fleeing falling roosts and/or roosts in the immediate vicinity of tree clearing activities, and then subsequently having to find new roosts.

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4.1.2 Indirect Effects

4.1.2.1 Loss of Roosts

As described above, it is reasonable to assume that removal of unknown roosts prior to April 1, when they are unoccupied, would reduce indirect effects to an insignificant and discountable level.

4.1.2.2 Foraging and Traveling Habitat

The presence of Indiana bats is not correlated with a high amount of forest cover (Gardner and Cook, 2002; and Kurta 2004). Within home ranges of Indiana bats at a site in Indiana, the landscape was only 28 percent forested (Sparks et al., 2005). In southern Michigan, Indiana bats prospered in areas of 36 percent forest cover (Kurta et al., 2002). In an Illinois study, 90 percent of Indiana bat capture sites had 33 percent forest coverage within 0.6-mile (Gardner et al., 1991a). Finally, habitat models by BHE (1995) and Farmer et al. (2002) indicated that sites with 30 and 31 percent woodland cover within 0.6 mile area, respectively, could support maternity colonies. Indiana bats are more likely to occur in areas with higher densities of potential roost trees (Miller et al., 2002; and Farmer et al. 2002), and may occur in highly fragmented forests (Carter et al. 2002); however they use the highest quality habitat in those forests.

The Project Area will total 985.5 acres, of which, approximately 59.8 acres are forested (59 acres of upland forest and 0.8 acres of forested wetland as described in Section 2.0). The area considered known maternity habitat is 45.16 percent forested (Figure 3, Table 9). Tree clearing will remove approximately 10.6 acres of known summer maternity habitat, reducing the amount of forest to 45.12 percent, a change of 0.04 percent. Similarly, the area considered known non-maternity habitat (used by males), is 31.81 percent forested. Tree clearing will remove approximately 18.2 acres of forest in this area, reducing the amount of forest to 31.75 percent, a change of 0.07 percent. Combined, the area considered known summer Indiana bat habitat is 38.24 percent forested. Tree clearing will remove a total of 28.8 acres, reducing the amount of forest to 38.18 percent, a change of 0.05 percent (note: in areas where maternity and non-maternity habitat overlap were considered maternity habitat only). Tree clearing is not expected to reduce the amount of forest beyond levels commonly used by Indiana bats in the region, and is expected to be an insignificant and discountable change.

Indiana bats are known to follow forested and/or linear landscape features between roosts and foraging areas. Indiana bats travel longer distances between forest parcels in otherwise open landscapes by moving along tree lines (Kurta 2004, Murray and Kurta 2004, and Sparks et al. 2004). This behavior has sometimes been interpreted as reluctance to cross open areas; however, Indiana bats in heavily forested areas often travel a similarly long distance to find an open corridor to follow (Brack and Whitaker 2006). Project tree clearing includes a 90-foot temporary easement (75 feet through waterbodies and wetlands) and within a 25-foot easement for some temporary and permanent access roads. After construction, vegetation will be allowed to regenerate outside of the 50-foot permanent easement. In some instances, the removal of forest may result in new future travel corridors for Indiana bats through otherwise forested habitat. In other instances, the removal of forest may cross lines of tree cover, which Indiana bats would utilize to travel across otherwise open land. New forest openings along these tree lines could disrupt travel corridors. Construction activity may also result in a temporary disruption

to the utilization of these corridors. Given that the Project will primarily widen existing openings, and the limited width of the permanent openings, it is reasonable to assume that Indiana bats would continue to utilize these linear forested features when construction is complete. Effects to traveling bats from habitat fragmentation by the Project is considered insignificant because habitat connectivity on the landscape surrounding the Project would be maintained.

4.1.2.3 Winter, Spring, and Autumn Habitat

Based on the results of portal surveys in the Project Area, no winter habitat is within the Project Area, and is assumed that no unknown winter habitat or associated spring staging or autumn swarming habitat is present in the Action Area. Further, it is unlikely that the Project would affect unknown winter habitat, if present in the Action Area, due to the majority of Project-related effects being primarily limited to the Project Area.

Because the Project is in the core of the Indiana bat range, it is reasonable to assume the species could utilize forest cover within the Action Area for migration between summer and winter habitats. Migration pathways may be affected by habitat loss and degradation (USFWS 2007), increasing migratory stress. However, during these stages, Indiana bats may travel hundreds of miles, cross numerous open areas, and use a variety of roosts. Therefore, any effects from loss of forested lands associated with Project development would be extremely unlikely to occur and are expected to be discountable. Migrating Indiana bats may occupy the Action Area during this time; however, occupation would be brief. The Project is not expected to fragment the surrounding landscape to the extent of preventing migratory movement of the species.

4.1.2.4 Water Quality

The Project would not involve the construction of permanent diversions or dams and, therefore, would be expected to have only short-term temporary effects resulting from surface water quality. Temporary impacts on surface waters include disturbance of stream banks, removal of bank vegetation, sedimentation of the substrate, and, in some instances, modification of flow during dry-crossing construction. The level of temporary effects of the Project on surface waters would depend on precipitation events, sediment loads, stream area/velocity, channel integrity, and bed composition. Runoff from construction activities near waterbodies would be controlled by implementation of erosion and sediment control measures and by compliance with federal, state, and local requirements. BMPs will be utilized throughout the life of the Project to control erosion and sedimentation. E&SC devices would localize any temporary reduction in water quality. For certain large waterbody crossings, Spire would implement its HDD Contingency Plan and subsequently consult with the USFWS in the event of an inadvertent return. Therefore, the Project would be expected to have minimal temporary effects on water quality. Any effects to bats from changes in water quality are considered insignificant and discountable.

4.1.2.5 Noise

Although pipeline construction activities will generate unavoidable noise during construction, effects to Indiana bats, if present, would be limited to the relatively short period of active construction. Construction activity and associated noise levels for the pipeline and aboveground facility installation will vary depending on the phase of construction in progress at any given time. These construction phases include site grading, clearing/grubbing, and

pipeline and aboveground facility installation. The most prevalent sound source during construction will be the internal combustion engines used to power the construction equipment, particular at the HDD locations. For the M&R stations and mainline valves associated with the Project, the site construction noise associated with the installation of the new equipment construction will be limited to weekday daytime hours.

Effects to Indiana bats from noise would be limited to the Action Area, primarily during the construction phase. No data exist that indicate construction and operational noise affect roosting Indiana bats, and if they did, a graded response would be expected, based on distance from the source. It is assumed that Indiana bats utilizing roosts immediately adjacent to portions of the Project Area actively undergoing timber removal and earthwork would experience the greatest disturbance. Regardless, effects from construction noise on roosting bats are considered insignificant and discountable.

Some nighttime construction is expected to occur within the Project Area. If Indiana bats are present, a graded response would again be expected, based on distance from the source. Likewise, noise is unlikely to have any effect on Indiana bats traveling or foraging within but not inhabiting the Project Area, as exposure to excessive noise would be brief and generally avoidable.

4.1.2.6 Fugitive Dust and Lighting

Fugitive dust will result from clearing, grading, excavation, concrete work, and vehicle traffic on paved and unpaved roads. No data exist that indicate the effect of fugitive dust and lighting on Indiana bats. As previously described, temporary changes to air quality would be expected from heavy vehicles and machinery in use during construction. Heavy equipment would generate emissions of air contaminants and fugitive dust during the construction phase. If present, effects to Indiana bats from fugitive dust and lighting would be primarily limited to the Project Area. Because pipeline construction moves through an area quickly, air emissions associated with construction of the pipeline would be intermittent and short term, as well as spatially dispersed. In addition, Spire will implement the Fugitive Dust Control Plan for the Project to control/minimize potential effects.

Any increase in ambient lighting outside the Project Area is expected to be temporary and/or minimal. Lights may be utilized during early morning and early evening hours in periods of fewer daylight hours (autumn/winter) and may be visible from immediately outside the Project Area. Project construction activities will be conducted during daylight hours with the exception of short-term activities such as HDD crossings, critical maintenance, or other Project-mandated activities required to meet schedule or safety requirements. The three minor aboveground M&R facilities will employ ambient security lighting during the operational phase of the Project. The security lighting will be permanent, but is not expected to increase ambient lighting far from the intended purpose of lighting the M&R facilities within the Project Area.

Fugitive dust and lighting will be minimal and controlled, and Project effects as they relate to fugitive dust and lighting are expected to be insignificant and discountable.

4.1.2.7 Cumulative Effects

Cumulative effects include effects of future non-federal (state, local, or private) actions that are reasonably certain to occur within the Action Area (50 CFR 402.02). Future federal actions that are unrelated to the current proposed Action are not included because they are subject to separate consultation pursuant to Section 7 of ESA. As described in the Baseline Conditions, Spire completed a cumulative impact analysis for the Project per relevant guidance (CEQ, 1997; USEPA, 1999). Under these guidelines, Spire considered the impact on the environment that results from the incremental impact of the Action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR 1508.7).

All future actions identified in the Action Area are expected to be subject to separate consultation pursuant to Section 7 of ESA due to a federal nexus with USACE permits. Therefore, no cumulative effects to Indiana bats are expected to occur as a result of non-federal actions.

4.2 Decurrent False Aster

Direct and indirect effects to decurrent false aster from construction, operation, and maintenance of the Project were assessed based on the assumed presence of the species in the Project Area. As previously described, there are no known occurrences of the plant in the Project Area. The USFWS (2017a) does report that known locations of decurrent false aster have been found in Missouri; however, this BA is being submitted to the USFWS before the results of August/September's decurrent false aster survey in St. Charles and St. Louis Counties are available. If decurrent false aster is found, Spire will implement the avoidance and minimization measures described in Section 2.5. The following factors were considered while evaluating direct and indirect effects.

Proximity

Project-related direct effects would occur within the Project Area, although there are also potential indirect effects that could occur outside of the Project Area within the species range. It is assumed that a viable population of decurrent false aster exists within the six potential habitat survey areas (Figure 4). Due to the large scale agricultural land use in St. Charles and St. Louis Counties, Missouri, the potential for suitable habitat to exist within the Project Area is nominal and the Project is not expected to have significant effects to the species or its suitable habitat outside of the Project Area.

Distribution

The effects of the Project would occur within the Project Area in St. Charles and St. Louis Counties, where decurrent false aster has potential to occur, in addition to the species known range within those counties, given that its achenes are suited for floating to other locations. For the purposes of this analysis, effects from construction activities would be limited to the six proposed study areas for the species in St. Charles and St. Louis Counties, Missouri. These are low-lying areas adjacent to agricultural fields or waters identified by aerial signatures as areas that may be suitable habitat. These study areas total 16.3 acres (Figure 4), of which, 6.4 acres (39.4%) are within the Project Area.

DFA HABITAT 012

DFA HABITAT 013

DFA HABITAT 014

DFA HABITAT 016

DFA HABITAT 016A

DFA HABITAT 001

MISSOURI

ILLINOIS

REFERENCE: ORTHOPHOTOGRAPHY, FLOWN 2016. ESRI WORLD IMAGERY, ST. LOUIS ORTHOS, 2015, ACCESSED 07/2017.

LEGEND

- DFA STUDY AREA
- Facility
- ACCESS ROAD
- North County Extension
- 24-inch Pipeline
- STATE BOUNDARY
- COUNTY BOUNDARY

0 1 2 4 Miles

FIGURE 4
DECURRENT FALSE ASTER ASSUMED PRESENCE

gai consultants

SPIRE STL PIPELINE PROJECT

spire

DRAWN BY: AJT
CHECKED: JDP
DATE: 7/13/2017
APPROVED: LMF

Z:\Energy\2016\E160438.00 - Spire - STL Pipeline Proj\GIS\MXD\Biological_Assessment\Biological_Assessment_Map_Overview_2017_07_13.mxd

Table 11. Decurrent False Aster Survey Areas

Survey Area Name	Total Acres	Acres within Project Area	Percent Survey Area within Action Area
DFA HABITAT 001	1.9	1.7	85.1
DFA HABITAT 012	2.8	2.1	77.4
DFA HABITAT 013	6.3	1.2	18.4
DFA HABITAT 014	0.2	0.1	35.4
DFA HABITAT 016	2.3	0.5	21.4
DFA HABITAT 016A	2.8	0.9	32.1
Total	**16.3**	**6.4**	**39.4**

Nature

Project construction is expected to remove occupied habitat and would result in alteration and/or modification of habitat as soils are disturbed. As the trench and right-of-way are backfilled and graded after pipe installation, the original contours of the land will be restored; thus, the six potential habitat areas would continue to be potentially suitable for decurrent false aster. Effects would likely be limited given that most of the proposed study areas for the species are nominal in size and are in the 100-year flood zone of the two rivers rather than closer to the more active floodway. Achenes have a low probability of reaching the study areas from a flood event and any existing achenes have a low probability of reaching the Mississippi or Missouri River currents to have a significant distribution impact. If decurrent false aster is found, Spire will implement the avoidance and minimization measures described in Section 2.5, reducing the nature of the effects.

Timing

Project timing is not expected to play a role in the effects to decurrent false aster.

Duration

Effects to decurrent false aster at the six potential study area locations would likely be either long-term or permanent. Permanent effects would occur where permanent facilities are being located (i.e., the Chain of Rocks Station). Long-term effects would occur at all other areas where the construction right-of-way is restored to pre-existing contours, as achenes could once again germinate under the right conditions.

Disturbance Frequency

During construction, the decurrent false aster would be removed. As decurrent false aster may migrate back to the Project Area, the disturbance frequency changes as the Project shifts to operations and maintenance phases. With the exception of active agricultural fields, full right-of-way clearing and mowing may occur no more than once every three years (10-foot-wide maintenance can occur as necessary) at uplands in accordance with the FERC Procedures. This periodic disturbance of the right-of-way can create an opportunity for decurrent false aster

growth. The species may also benefit as new open areas are created and periodically disturbed (a requirement for the successful germination decurrent false aster achenes).

Disturbance Intensity

Disturbance intensity is the highest during Project construction as land is cleared and decurrent false aster is removed. After construction, if and when decurrent false aster repopulates the Project Area, disturbance intensity would change to low as right-of-way clearing and maintenance activities are periodic (as previously explained). As such, the operation and maintenance phases of the Project would be beneficial for the plant as it requires some periodic disturbance. If decurrent false aster is found, Spire will implement the avoidance and minimization measures described in Section 2.5, reducing the intensity of the effects.

Disturbance Severity

After the removal of decurrent false aster during Project construction, the species has potential to recover quickly if achenes remain near the surface. Assuming recovery would not occur until new achenes are distributed at the Project Area, the duration for recovery would be dependent on flooding bringing in new supply. If decurrent false aster is found, Spire will implement the avoidance and minimization measures described in Section 2.5, reducing the nature of the effects.

4.2.1 Direct Effects

A majority of the Project Area is within heavy agricultural land use not viable to affect decurrent false aster. Periodic disturbed areas (including floodplain forest, open areas with saturated soils, or alongside lake or ponded waters) may be suitable for decurrent false aster plants or seedlings, or its achenes. Direct effects to decurrent false aster are assumed and limited to the Project Area at the six proposed study area locations totaling 16.3 acres (Figure 4, Table 11), of which, 6.4 acres (39.4%) are within the Project Area.

After construction, the Project Area will be restored to pre-existing contours, thus, any potential habitat would remain potential habitat following completion of the Project with the exception of permanent facility locations. Permanent facilities would directly impact any existing decurrent false aster plants as they would be permanently removed.

As lands are cleared and soils are trenched and/or sorted during Project construction, any existing decurrent false aster plants, seedlings, or its achenes would be removed from the ground surface. As lands are backfilled at the final stages of Project construction and while contours are restored preconstruction levels, any existing achenes would likely not end up within their near surface requirement for germination (previously mentioned at less than two-tenths of an inch of soil). Alternatively, achenes that were previously silted over, may end up back atop the soil surface and become viable again for germination. Even so, it is assumed that Project activities along the construction right-of-way would result in the direct loss of decurrent false aster within the Project Area at the six potential habitat areas in St. Charles and/or St. Louis Counties, Missouri.

4.2.2 Indirect Effects

Because decurrent false aster plants and achenes are within the Project Area, the loss of those plants and their seed bank would preclude some achene production within the species range. Lost plants and associated achenes may have helped start a new population (or add to an existing population) outside the Project Area in that those achene would have had potential to be carried downstream with a river current in high water flood event. The overall effect of this loss of contribution to populations outside the Project Area is considered insignificant and discountable.

Alternatively, any areas of tree clearing along the Project Area may create new open areas viable for decurrent false aster seed germination. Another indirect effect could result from the periodic mowing or clearing of the right-of-way during Project operation and maintenance phases. Right-of-way vegetation within wetlands and adjacent perennial waterbodies will be limited and only occur where maintenance clearing of woody vegetation is needed. A 10-foot-wide maintenance can occur as necessary in uplands in accordance with the FERC Procedures. This could allow for the periodic disturbance suitable for decurrent false aster's growth.

4.2.3 Cumulative Effects

See Section 4.1.2.7 regarding the Project's cumulative impact analysis for the Indiana bat. All future actions identified in the Action Area are expected to be subject to separate consultation pursuant to Section 7 of ESA due to a federal nexus with USACE permits. Therefore, no cumulative effects to decurrent false aster are expected to occur as a result of non-federal actions.

5.0 Finding of Effects and Summary

A **No Effect** finding is the appropriate conclusion when an action will not affect listed species. A **May Affect** finding is the appropriate conclusion when a proposed action may pose any effects on listed species. An **Is Not Likely to Adversely Affect** determination is appropriate when effects on listed species are expected to be insignificant, discountable, or completely beneficial. An **Is Likely to Adversely Affect** finding is the appropriate conclusion if any adverse effect may occur to the listed species as a direct or indirect result of a proposed action or its interrelated or interdependent actions. In the event the overall effect of a proposed action is beneficial to the listed species, but also is likely to cause some adverse effects, then the proposed action is likely to adversely affect the listed species. If incidental take is anticipated to occur as a result of a proposed action, the action is likely to adversely affect listed species. An action that is likely to adversely affect listed species requires the initiation of formal Section 7 consultation (USFWS and NMFS, 1998). A **Jeopardy** finding is the appropriate conclusion when an agency will engage in an action that reasonably would be expected, directly or indirectly, to appreciably reduce the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species (50 CFR 402.02). All of the above definitions include prohibitions on effects to designated critical habitat.

5.1 Northern Long-Eared Bat

5.1.1 Direct Effects

The Action may directly affect, and is likely to adversely affect northern long-eared bats. Incidental take of northern long-eared bats as a result of Project tree clearing is not prohibited under Section 9 of ESA because the Project design meets the conservation requirements of the final rule, under Section 4(d) of ESA, for the species (81 FR 1900).

5.1.2 Indirect Effects

The Action may indirectly affect, but is not likely to adversely affect northern long-eared bats.

5.1.3 Cumulative Effects

The action may cumulatively affect, but is not likely to adversely affect northern long-eared bats.

5.2 Indiana Bat

5.2.1 Direct Effects

The Action may directly affect, and is likely to adversely affect Indiana bats.

5.2.2 Indirect Effects

The Action may indirectly affect, but is not likely to adversely affect Indiana bats.

5.2.3 Cumulative Effects

The action may cumulatively affect, but is not likely to adversely affect Indiana bats.

5.3 Decurrent False Aster

5.3.1 Direct Effects

The Action may directly affect, and is likely to adversely affect decurrent false aster. Under section 9(a)(2)(B) of the ESA, there are no federal prohibitions for the take of listed plants on nonfederal lands unless taking of those plants is in violation of state law or federal law. The ESA prohibits the removal and reduction to possession of federally listed endangered plants or the malicious damage of such plants on areas under federal jurisdiction. Additionally, the ESA prohibits the destruction of endangered plants on non-federal areas in violation of state law or regulation or in the course of any violation of a state criminal trespass law (USFWS 1998). Because there are no take prohibitions, the USFWS may make a jeopardy determination for decurrent false aster.

5.3.2 Indirect Effects

The Action may indirectly affect, but is not likely to adversely affect decurrent false aster.

5.3.3 Cumulative Effects

The action may cumulatively affect, but is not likely to adversely affect decurrent false aster.

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APPENDIX A

Agency Correspondence

GAI Consultants, Inc.- Chicago Office **T** 331.301.2001
1444 Farnsworth Avenue, Suite 303
Aurora, Illinois 60505

August 12, 2016

Mr. Kraig McPeek
Director
United States Fish and Wildlife Service
Rock Island Field Office
1511 47th Avenue
Moline, Illinois 61265

Re: Rare, Threatened and Endangered Species Consultation
Spire STL Pipeline LLC
Spire STL Pipeline
Scott, Greene, and Jersey Counties, IL

Dear Mr. McPeek:

GAI Consultants, Inc. ("GAI") is submitting this information request on behalf of Spire STL Pipeline LLC ("Spire"), for the Spire STL Pipeline ("Project") in Scott, Jersey, and Greene Counties, Illinois, and St. Charles and St. Louis Counties, Missouri. Representatives from Spire and GAI met with your office on July 8, 2016 to introduce the Project. As requested, GAI is submitting further information to coordinate anticipated reviews and surveys for the proposed Project.

Project Description

Spire is in the planning stages of the Project. As proposed, the Project will serve the energy needs of residential, commercial, and industrial customers in the eastern portion of Missouri, including the St. Louis metropolitan area and surrounding counties. The Project as proposed will consist of approximately 60 miles of new build 24-inch diameter steel pipeline (referred to as the "new build" portion of the Project) originating at an interconnection with Rockies Express Pipeline LLC ("REX") pipeline in Scott County, Illinois, extending down through Greene and Jersey Counties in Illinois before crossing the Mississippi River and extending east in St. Charles County, Missouri, until crossing the Missouri River and tying into an existing 20-inch diameter steel transmission pipeline in St. Louis County, Missouri, that is currently owned and operated by Laclede Gas Company ("LGC") (referred to as "Line 880"). Spire plans to purchase Line 880 from LGC and modify approximately nine miles of existing 20-inch diameter steel natural gas pipeline located in St. Louis County, Missouri, that will connect the new build part of the Project to the Enable Mississippi River Transmission, LLC ("MRT") pipeline along the western bank of the Mississippi River, in St. Louis County, Missouri. The total length of the entire Project will be approximately 70 miles and will include the construction of minor aboveground facilities. A pig launcher/receiver will also be installed at each portion of the Project. The overall design capacity of the new build portion of the pipeline is expected to be 400,000 Dth/d. No compression will be required.

Spire anticipates a typical 90-foot temporary construction right-of-way ("ROW") width, and a 50-foot permanent ROW. The construction ROW is anticipated to be reduced to 50-foot at streams and wetlands. An additional 25 feet of temporary work space will be required through agricultural areas, and additional temporary work space will be required to facilitate construction in certain areas, such as crossings of roads, railroads, streams, and wetlands.

Illinois

Approximately 45 miles of the new build 24-inch diameter steel pipeline will be located in Illinois and traverse Scott, Greene, and Jersey Counties. One metering and regulating station and one pig launcher are proposed in Scott County, Illinois, at the interconnection location with the REX pipeline.

The pipeline facilities are shown on the attached United States Geological Survey ("USGS") 7.5-minute series topographic maps (Figure 1). In addition, Spire has assumed the use/development of new and/or existing access roads throughout the Project area. Temporary extra work spaces and contractor yards will also be utilized to accommodate equipment staging and stockpiling of materials along the proposed corridor during construction. The locations of these facilities are still pending.

Missouri

Approximately 13 miles of new build 24-inch diameter steel pipeline will be located in Missouri and traverse St. Charles and St. Louis Counties. Approximately nine miles of existing 20-inch diameter steel natural gas pipeline located in St. Louis County, Missouri, will be modified. One regulation station, one metering and regulating station, and one pigging facility are proposed in St. Louis County, Missouri.

The pipeline facilities are shown on the attached USGS topographic map (Figure 1). In addition, Spire has assumed the use/development of new and/or existing access roads throughout the Project area. Temporary extra work spaces will be utilized to accommodate equipment staging and stockpiling of materials along the proposed corridor during construction. The locations of these facilities are still pending.

Site Description

The Project is located in Scott, Greene, and Jersey Counties, Illinois, and in St. Charles and St. Louis Counties, Missouri, and is depicted on the attached portions of the Alsey (1983), Roodhouse West (1983), Carrolton (1985), Boyer Creek (1983), Otterville (1983), Elsah (1979), and Grafton (1995), Illinois and the Grafton (1979), Elsah (1979), Alton (1979), Florissant (1979), and Columbia Bottom (1979), Missouri USGS maps (Figure 1). Based on discussions at the meeting, Spire is evaluating potential impacts to the following species or communities:

- bat species including Indiana bat (*Myotis sodalis*), Northern long-eared bat (*Myotis septentrionalis*), and gray bat (*Myotis grisescens*);
- known winter hibernaculum located in Hannibal, Missouri;
- tree nesting migratory birds;
- mussel and fish species including Higgins eye pearlymussel (*Lampsilis higginsii*), Spectaclecase (*Cumberlandia monodonta*), and Pallid sturgeon (*Scaphirhynchus albus*);
- Cave amphipod (*Gammarus acherondytes*);
- plant species including Decurrent false aster (*Boltonia decurrens*) and Running buffalo clover (*Trifolium stoloniferum*); and
- nesting bald eagles (*Haliaeetus leucocephalus*).

The majority of the pipeline is greenfield and crosses a primarily agricultural landscape. The existing pipeline to be modified is located primarily within existing ROW, which traverses residential, agricultural, and some wooded areas. The Project is located within the North Little Sandy Creek [USGS Hydrologic Unit Code ("HUC") #071300110503], Little Sandy Creek (HUC #071300110504), Hurricane Creek (HUC #071300110806), Whitaker Creek-Apple Creek (HUC #071300110702), Coates Creek-Apple Creek (HUC #071300110703), Link Branch-Lower Macoupin Creek (HUC #071300120602), Wines Branch-Lower Macoupin Creek (HUC #071300120603), De Arcy Branch-Phils Creek (HUC #071300120502), Sandy Creek-Otter Creek (HUC #071300110901), Shilow

Hollow-South Fork Otter Creek (HUC #071300110902), Lower Piasa Creek (HUC #071100090204), Marais Temps Clair-Mississippi River (HUC #071100090401), Marais Temps Clair-Mississippi River (HUC #071100090401], Outlet Missouri River (HUC #103002000804), Coldwater Creek (HUC #103002000803), and Maline Creek-Mississippi River (HUC #071401010401) watersheds.

Based on an initial review of the Project, Spire does not anticipate impacts to the Illinois cave amphipod. Range information available online through the United States Fish and Wildlife Service ("USFWS") states that the species is endemic to Monroe and St. Clair Counties, which are not proposed to be crossed by the Project. Should the Project design change and facilities be proposed for these counties, Spire will coordinate with USFWS to avoid or minimize potential impacts to this species.

Spire is continuing to refine the Project area, and will contact the USFWS for additional technical assistance to determine the appropriate species and/or habitat surveys. Spire is aware that some properties crossed by the Project may have USFWS easements, and will evaluate available information obtained during title searches. Spire understands that the Rock Island District will handle coordination with the Columbia Field Office as well as the Two Rivers Refuge.

GAI understands that species and/or habitat surveys are recommended, and would appreciate further technical assistance. In addition, GAI would appreciate the identification of any additional federally-listed species or significant biological features within one-half-mile of the proposed Project centerline, as shown on Figure 1.

Please note the intent of this letter is solely for the purpose of formally initiating consultation and/or applicable permit applications. An invitation for you to participate in the Federal Energy Regulatory Commission's National Environmental Policy Act Pre-Filing Process will be addressed to you under separate cover.

If you have any questions regarding this submission, please feel free to contact me at 234.203.0763 or by e-mail at J.Fuller@gaiconsultants.com.

Sincerely,

GAI Consultants, Inc.

Jayme L. Fuller
Environmental Manager

JLF/jbm

Attachment: USGS Topographic Map (Figure 1)

GAI Consultants, Inc. - Chicago Office **T** 331.301.2002
1444 Farnsworth Avenue, Suite 303
Aurora, Illinois 60505

September 29, 2016

Mr. Chase Allred
Project Manager
United States Fish and Wildlife Service
Rock Island Field Office
1511 47th Avenue
Moline, Illinois 61265

Re: Rare, Threatened and Endangered Species Consultation
Spire STL Pipeline LLC
Spire STL Pipeline
Scott, Greene, and Jersey Counties, IL
St. Charles and St. Louis Counties, MO

Dear Mr. Allred:

GAI Consultants, Inc. ("GAI") is performing environmental services on behalf of Spire STL Pipeline LLC ("Spire"), for the Spire STL Pipeline ("Project") in Scott, Jersey, and Greene Counties, Illinois, and St. Charles and St. Louis Counties, Missouri. A letter was submitted to the United States Fish and Wildlife Service ("USFWS") on August 12, 2016 requesting additional information regarding the presence of rare, threatened, and endangered species within the Project area. As requested, GAI is submitting further information to coordinate surveys for the proposed Project.

Project Description

Spire is in the planning stages of the Project. As proposed, the Project will serve the energy needs of residential, commercial, and industrial customers in the eastern portion of Missouri, including the St. Louis metropolitan area and surrounding counties. The Project will consist of approximately 57.4 miles of new build 24-inch diameter steel pipeline (referred to as the "new build" portion of the Project) originating at an interconnection with Rockies Express Pipeline LLC ("REX") pipeline in Scott County, Illinois, extending down through Greene and Jersey Counties in Illinois before crossing the Mississippi River and extending east in St. Charles County, Missouri. The new build pipeline then crosses the Missouri River and ties into an existing pipeline in St. Louis County, Missouri, that is currently owned and operated by Laclede Gas Company ("LGC") (referred to as "Line 880"). Spire plans to purchase Line 880, including its appurtenant and ancillary facilities, from LGC and modify the pipeline before placing it into interstate service. Line 880 consists of approximately 7.6 miles of existing 20-inch-diameter steel natural gas pipeline located in St. Louis County, Missouri, that will connect the new build portion of the Project to the Enable Mississippi River Transmission, LLC ("Enable MRT") pipeline along the western bank of the Mississippi River, in St. Louis County, Missouri. The total length of the Project pipelines will be approximately 65.0 miles. No compression will be required. The Project will include pipeline interconnects with REX in Illinois and LGC and Enable MRT in Missouri. The Project will also include the construction of minor aboveground facilities.

Spire anticipates a 90-foot temporary construction right-of-way width, which will include a 50-foot permanent easement. An additional 25 feet of temporary workspace will be required through agricultural areas, and additional temporary workspace may be required to facilitate construction in

certain areas, such as crossings of roads, railroads, streams, and wetlands. The construction right-of way width will be reduced to 75-feet at streams and wetlands.

Federal-listed Species

Spire utilized the USFWS Information, Planning, and Conservation ("IPaC") System to develop a list of federally-listed species that are potentially located within the vicinity of the Project (Table 1). Based on a review of the habitats associated with each species, and an assessment of the potential impacts from the construction of the Project, the following preliminary determinations have been made.

Bird Species

Federally Listed Species

Least Tern and Piping Plover were included in the USFWS IPaC likely due to the crossing of the Mississippi and Missouri Rivers and Line 880's proximity to these rivers. Spire is planning to cross the Mississippi and Missouri rivers via a horizontal directional drill ("HDD") therefore no in-stream construction or disturbance to the stream bed is anticipated at these locations. It is anticipated that a HDD of these waterbodies would mitigate the potential effects of the Project on the Least Tern and Piping Plover. Furthermore, Line 880 does not cross large waterbodies containing habitat for these species. According to the reasons listed above, Spire has determined that the Project is not likely to adversely affect these species.

The Red Knot species is typically associated with large waterbodies with gravel and/or sandy edges. Based on a literature review and available observation data online, Red Knot is not likely to breed within the Project area, and may only be present as a transient species seeking out foraging opportunities along the Mississippi and Missouri Rivers. Additionally, the Line 880 portion of the Project does not cross large waterbodies of this type that would provide habitat for this species. According to the reasons listed above, Spire has determined that the Project is not likely to adversely affect these species.

Bald and Gold Eagle Protection Act

Spire is in process of conducting biological field surveys within a 300 foot corridor along the new build portion of the Project and within an approximate 200 foot corridor along Line 880. As part of these surveys, Spire will survey potential habitat along the Mississippi and Missouri Rivers for the presence of bald eagle nests. In addition, Spire will coordinate with the USFWS Rock Island Field Office to determine the locations of known bald eagle nests within the vicinity of the Project. If data or surveys identify bald eagle nests within the vicinity of the Project, Spire will consult with the USFWS Rock Island Field Office to implement the appropriate mitigation measures during construction of the Project.

Migratory Bird Treaty Act

During the meeting on July 18, 2016, the USFWS indicated that MBTA habitat would likely be associated with the habitat for federal listed bat species as the majority of the pipeline route traverses agricultural lands that will be disturbed by spring prepping. Spire has routed its pipeline such that it avoids trees to the extent practicable. Generally, locations of trees within the Project area are associated with property lines or riparian areas. In locations of streams or wetlands, Spire will reduce its construction right-of-way width to 75 feet in order to minimize the acreage of clearing that will be required for the Project. Spire anticipates commencing construction in Q1 2018, with an anticipated in-service date of November 1, 2018.

Bat Species

The Project is within the ranges of three federally-listed bats, including the endangered Indiana bat, endangered gray bat, and threatened northern long-eared bat. A known winter bat hibernaculum is located in Hannibal, Missouri which is located 51 miles from the closest point of the Project area.

During the July 8, 2016 meeting, the USFWS recommended performing mist net surveys, therefore, Spire intends on conducting mist net surveys to determine the presence/absence of listed bats. Surveys will be conducted between May 15 and August 15, 2017, in accordance with the latest Range-wide Indiana Bat Survey Protocols; currently the 2016 Range-wide Indiana Bat Summer Survey Guidelines, April 2016 (Guidelines). Due to the linear nature of the Project, mist net surveys will follow protocols required for a linear project in the Ozark-Central Recovery Unit for Indiana bat. If listed bats are not captured, then Spire assumes that tree clearing can proceed at any time during the year without restriction.

If Indiana bats are captured during mist netting, radio-telemetry will be required in order to document detailed habitat use. Due to the final 4(d) rule for the northern long-eared bat, which does not prohibit incidental take associated with tree clearing under most circumstances, Spire assumes that USFWS would not require northern long-eared bats to be tracked in order to find known roost trees. Gray bats would not be tracked to diurnal roosts, due to difficulty in detecting bats located in subterranean voids (e.g. caves/mines), and the overall low effect of Project development on gray bat habitat.

In addition, Spire conducted a cursory GIS desktop analysis to determine if there is potential for caves or other underground features in the vicinity of the Project. Karst topography and mining resources were overlaid and revealed that much of the Project is within known karst resource areas, and numerous sinkholes could be detected via aerial photograph analyses. A permitted bat biologist will assess any open portals in distinct locations along the Project route and within Spire's 300-foot survey corridor, to determine their ability to support bats. Portal assessments will be conducted in the winter of 2016/2017 in an effort to determine if bats may be present in suitable portals. This assumes that suitable portals that could not be ruled out during the winter survey would be harp-trapped in the spring, between April 1 and May 1, pending USFWS approval.

A study plan will be prepared and submitted to the USFWS Rock Island Field Office for their approval prior to the commencement of any presence/absence survey work. Once surveys are complete, Spire will provide a report to the USFWS Rock Island Field Office for review and concurrence.

Aquatic Species

The Project is within the ranges of Higgins eye clam and pallid sturgeon. During the July 8, 2016, meeting, the USFWS also requested an assessment of the Illinois cave amphipod. Spire assumes that the presence of the Higgins Eye clam is restricted to the Mississippi and Missouri Rivers. Spire is proposing to cross the Mississippi and Missouri Rivers via HDD, therefore no in-stream construction or disturbance to the stream bed is anticipated at these locations. It is anticipated that HDD of these waterbodies would mitigate potential effects of the Project on these species, therefore Spire has determined that the Project is not likely to adversely affect these species.

Based on an initial review of the Project, Spire does not anticipate impacts to the Illinois cave amphipod. Range information available online through the USFWS states that the species is endemic to Monroe and St. Clair Counties, which are not proposed to be crossed by the Project, therefore, Spire has determined that the Project will have no effect to this species.

Plant Species

A review of the USFWS IPaC System indicated that Decurrent False Aster, Eastern Prairie Fringed Orchid, Mead's Milkweed, and Running Buffalo Clover are potentially located within the vicinity of the Project.

Based on further consultation with the USFWS on August 2nd and 8th, 2016, Decurrent False Aster surveys will be limited to Jersey County, Illinois in locations of forested floodplains that are frequently flooded and disturbed. Spire has identified one location, Otter Creek, for Decurrent False Aster surveys. Surveys for Decurrent False Aster will occur during October 2016. Although Decurrent False Aster is listed in the counties crossed by the Project in Missouri, the Project will not cross locations of forested floodplains in Missouri, with the exception of the area south of the Mississippi River. Spire will be crossing this area via HDD as part of its crossing of the Mississippi River, therefore, no further surveys are necessary for Decurrent False Aster.

Spire is currently conducting 2016 biological field surveys for wetlands and waterbodies within a 300-foot survey corridor over the entire Project where landowner permissions have been granted. During these surveys, Spire will identify areas of potential high-quality habitat for Running Buffalo Clover, Mead's Milkweed, and Eastern Prairie Fringed Orchid. Based on the results of Spire's initial surveys, and in coordination with the USFWS, Spire will determine if there is a need to conduct plant species-specific surveys for these three plant surveys in 2017. If necessary, surveys will be conducted in 2017 between late April and early July in accordance with the flowering period of these species.

Once species-surveys have been completed, Spire will provide the USFWS with a report for review and concurrence.

Conclusion

Should the Project design change, Spire will coordinate with USFWS to discuss changes to species determinations as appropriate. Spire understands that the Rock Island Field Office will handle coordination with the Columbia Field Office.

At this time, Spire is requesting concurrence on the species determinations and survey protocols provided on the rare, threatened, and endangered species that may exist within the Project area. GAI and Spire thank you in advance for your assistance.

If you have any questions regarding this submission, please feel free to contact me at 331.301.2002 or by e-mail at l.ferry@gaiconsultants.com.

Sincerely,
GAI Consultants, Inc.

Lori Ferry
Environmental Manager

cc. Mr. Kraig McPeek, USFWS Director
Ms. Trisha Crabill, USFWS Columbia Field Office

Table 1

Species Identified by the IPaC System

Species	Status	County, State	Habitat	Project Facility Reviews	Preliminary Assumptions	ESA Determination
Birds						
Least Tern (*Sterna antillarum*)	Endangered	St. Charles and St. Louis, Missouri	Nest on barren to sparsely vegetated sandbars along rivers, sand and gravel pits, lake and reservoir shorelines, and occasionally gravel rooftops.	New build 24-inch pipeline (MO only), Line 880	Habitat associated with the Mississippi River. Project crossing location does not consist of sandbars. Project will cross the Mississippi River via horizontal directional drill without impacting shorelines and river islands. No habitat present along Line 880.	Project is not likely to adversely affect this species.
Piping Plover (*Charadrius melodus*)	Threatened	St. Charles, St. Louis, Missouri	Piping plovers use wide, flat, open, sandy beaches with very little grass or other vegetation. Nesting territories often include small creeks or wetlands.	New build 24-inch pipeline (MO only), Line 880	Habitat associated with the Mississippi and Missouri River. Project crossing location does not consist of sandbars. Project will cross the Mississippi River via horizontal directional drill without impacting shorelines and river islands. No habitat present along Line 880.	Project is not likely to adversely affect this species.

Species	Status	County, State	Habitat	Project Facility Reviews	Preliminary Assumptions	ESA Determination
Red Knot (*Calidris canutus rufa*)	Threatened	St. Charles and St. Louis, Missouri	Large waterbodies with gravel and/or sandy edges	New build 24-inch pipeline (MO only), Line 880	Species is a transient individual but does not breed within the Project areas.	Project is not likely to adversely affect this species.
Bald Eagle (*Haliaeetus leucocephalus*)	Bald and Golden Eagle Protection Act ("BGEPA")	Various	Large, tall trees near rivers or reservoirs. Prefer trees which have 1 or 2 open edges in which they roost or nest in the upper open branches, allowing for easy surveillance for food and accessibility.	New build 24-inch pipeline, Line 880	Surveys for bald eagle nests will be conducted within the Project's 300-foot survey corridor along areas of potential habitat along the Mississippi and Missouri Rivers (24-inch new build pipeline). No habitat present along Line 880	Surveys in progress
Bats						
Indiana bat (*Myotis sodalis*)	Endangered	Scott, Greene, Jersey, Illinois St. Charles, St. Louis, Missouri	Hibernate during winter in caves or abandoned mines. For hibernation, they require cool, humid caves with stable temperatures, under 50° F but above freezing. Summer habitat is in wooded areas where they usually roost under loose tree bark on dead	New build 24-inch pipeline, Line 880	Spire will conduct mist net surveys in 2017 in necessary locations and portal searches in 2016/2017.	Surveys to be conducted in 2017. Spire will provide the USFWS information regarding the results of these surveys upon completion.

Species	Status	County, State	Habitat	Project Facility Reviews	Preliminary Assumptions	ESA Determination
			or dying trees and forage in or along the edges of forested areas.			
Northern long-eared bat (*Myotis septentrionalis*)	Endangered	Scott, Greene, Jersey, Illinois St. Charles, St. Louis, Missouri	Hibernates in caves and mines. They use areas in various sized caves or mines with constant temperatures, high humidity, and no air currents. Roost underneath bark in the summer, in cavities or in crevices of both live trees and snags, choosing roost trees based on suitability to retain bark or provide cavities or crevices.	New build 24-inch pipeline, Line 880	Spire will conduct mist net surveys in 2017 in necessary locations and portal searches in 2016/2017.	Surveys to be conducted in 2017. Spire will provide the USFWS information regarding the results of these surveys upon completion.
Gray bat (*Myotis grisescens*)	Threatened	St. Charles, St. Louis, Missouri	Lives in caves year-round. During the winter they hibernate in deep, vertical caves. In the summer, they roost in caves which are scattered along	New build 24-inch pipeline (MO only), Line 880	Spire will conduct mist net surveys in 2017 in necessary locations and portal searches in 2016/2017.	Surveys to be conducted in 2017. Spire will provide the USFWS information regarding the results of these surveys upon completion.

Species	Status	County, State	Habitat	Project Facility Reviews	Preliminary Assumptions	ESA Determination
			rivers. These caves are in limestone karst areas.			
Aquatics						
Higgins eye (pearlymussel) (*Lampsilis higginsii*)	Endangered	Not known or believed to occur in counties crossed by the Project	Larger rivers where it is usually found in deep water with moderate currents. Not identified in the counties crossed by the Project in Missouri.	New build 24-inch pipeline (MO only)	Project will cross the Mississippi River via horizontal directional drill.	Project is not likely to adversely affect.
Pallid sturgeon (*Scaphirhynchus albus*)	Endangered	St. Charles and St. Louis, Missouri	Large, silty rivers with natural a hydrograph with a diversity of depths and velocities formed by braided channels, sand bars, sand flats and gravel bars.	New build 24-inch pipeline (MO only)	Project will cross the Mississippi River via horizontal directional drill.	Project is not likely to adversely affect.
Cave amphipod (*Gammarus acherondytes*)	Endangered	Not known or believed to occur in counties crossed by the Project	Lives in the "dark zone" of cave streams, needs cold water and does not tolerate a wide range in water temperatures.	Not identified on IPaC	Not known or believed to occur in counties crossed by the Project.	Project is anticipated to have no effect to the species.

Species	Status	County, State	Habitat	Project Facility Reviews	Preliminary Assumptions	ESA Determination
			Currently, the Illinois cave amphipod is found in only three of the original six cave sites. These caves are all in Monroe County.			
Plants						
Decurrent false aster (*Boltonia decurrens*)	Threatened	Scott, Greene, Jersey; Illinois St Charles, St. Louis, Missouri	Moist, sandy floodplains and prairie wetlands	New build 24-inch pipeline (IL and MO), Line 880	Surveys will be performed in 2016 in Jersey County (Otter Creek), Illinois. Other potential habitat in Missouri associated with the Mississippi River will be crossed via horizontal directional drill.	Surveys to be conducted in 2016. Spire will provide the USFWS information regarding the results of these surveys upon completion.
Eastern prairie fringed orchid (*Platanthera leucophaea*)	Threatened	Scott, Greene, Jersey, Illinois MO- Not known or believed to occur in Counties crossed by the Project	Mesic prairie to wetlands, requires full sun for optimum growth and flowering and a grassy habitat with little or no woody encroachment.	New build 24-inch new build pipeline (IL and MO)	Surveys will be performed if necessary in 2017.	Surveys to be conducted in 2017. Spire will provide the USFWS information regarding the results of these surveys upon completion.
Mead's milkweed (*Asclepias meadii*)	Threatened	St. Louis County, Missouri	Mesic to dry mesic, upland tallgrass prairie or glade/barren. Habitat	New build 24-inch build pipeline (MO only), Line 880	Surveys will be performed if necessary in 2017.	Surveys to be conducted in 2017. Spire will provide the USFWS information regarding the results of

Species	Status	County, State	Habitat	Project Facility Reviews	Preliminary Assumptions	ESA Determination
			characterized by vegetation adapted for drought and fire. Persists in stable late-successional prairie.			these surveys upon completion.
Running buffalo clover (*Trifolium stoloniferum*)	Endangered	St. Charles, St. Louis, Missouri	Mesic habitats of partial to filtered sunlight, where there is a prolonged pattern of moderate periodic disturbance, such as mowing, trampling, or grazing. It is most often found in regions underlain with limestone or other calcareous bedrock.	New build 24-inch pipeline (MO only), Line 880	Surveys will be performed if necessary in 2017.	Surveys to be conducted in 2017. Spire will provide the USFWS information regarding the results of these surveys upon completion.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Rock Island Field Office
1511 47th Avenue
Moline, Illinois 61265
Phone: (309) 757-5800 Fax: (309) 757-5807

IN REPLY REFER TO:
FWS/RIFO

December 8, 2016

Ms. Loir Ferry
GAI Consultants Inc.
1444 Farnsworth Avenue, Suite 303
Aurora, Illinois 60505

Dear Ms Ferry:

Thank you for your letter of September 29, 2016, requesting review of initial effects determinations and proposed survey protocol for federally threatened and endangered species that may be impacted by the proposed Spire STL Pipeline. The proposed project will consist of approximately 57.4 miles of new 24-inch diameter steel natural gas pipeline extending from Scott County, Illinois through Greene and Jersey counties, crossing under the Mississippi River and east into St. Claire County Missouri, then crossing the Missouri River and tying into an existing 20-inch pipe in St. Louis County, Missouri. Spire is anticipating a 90-foot temporary construction right-of-way with a 50-foot permanent easement. An additional 25 feet of temporary workspace will be required in agricultural areas and additional workspaces may be added in certain areas as the alignment is finalized. The construction right-of-way will be reduced to 75 feet within streams and wetlands.

Threatened and Endangered Species

Your letter includes assessments and proposed survey methodology for species that may be impacted by the proposed project. Several species are included that are located within the Mississippi and Missouri Rivers where the line will be installed through horizontal directional drilling (HDD) under the river bottom. You have made preliminary determinations that the following species are not likely to be adversely affected based on avoiding direct impacts by HDD; least tern, piping plover, red knot, Higgins eye pearlymussel, and pallid sturgeon. We recommend that additional information be included detailing how the geological features or drilling methods will prevent the possibility of frackouts during drilling and any hydrological testing to support these determinations.

The following plant species are listed within the counties along the alignment; the decurrent false aster *(Boltonia decurrens)*, eastern prairie fringed orchid *(Platanthera leucophaea)*, Mead's milkweed *(Asclepias meadii)*, and running buffalo clover *(Trifolium stoloniferum)*. We agree surveys should be conducted to identify whether any of the species occur within the alignment where suitable habitat exists for these species.

The project is also within the range of three federally listed bat species: the Indiana bat *(Myotis sodalis)*, the northern long-eared bat *(Myotis septentrionalis)*, and the gray bat *(Myotis grisescens)*. Suitable roosting and foraging habitat for these species is likely present within the proposed alignment, and Indiana and northern long-eared bats are known to occur within the counties where the project will occur. Spire has proposed that mist netting surveys be conducted in the summer of 2017 to determine the presence or probable absence of listed bats within the proposed alignment following the latest U.S. Fish and Wildlife Service (Service) Range-wide Indiana Bat Survey Guidance. Spire has indicated radio-telemetry will be utilized in order to locate important maternity roosts and document habitat use of Indiana bats within the proposed alignment. You indicate that northern long-eared bats will not be tracked due to incidental take of this species being exempted by the final 4(d) rule which was published for this species. While we do not require this species to be tracked, we encourage you to consider a telemetry survey of northern long-eared bats in addition to Indiana bats to identify occupied maternity roosts and avoid incidental take of this species when possible. We appreciate your efforts to survey portals for evidence of bats within the proposed construction corridor. We recommend that you coordinate these efforts with our office to be sure your methods are the least disruptive to hibernating bats.

Bald Eagles

We have reviewed our data for any known bald eagle nests within the proximity of the proposed right-of-way and the closest known nest is 4 miles from the alignment. We agree that field surveys should be conducted to determine if there are other active bald eagle nests that could be impacted by the construction of the pipeline. Although eagle nests are concentrated along river corridors, they are found in other wooded locations and we recommend surveys for active nests are conducted throughout the proposed corridor.

Migratory Birds

Bird species protected under the Migratory Bird Treaty Act may be negatively impacted by loss of habitat associated with right of way clearing. Clearing of habitat when it is occupied by migratory birds can lead to direct take. Loss of habitat and habitat fragmentation is also detrimental to migratory birds in landscapes heavily dominated by agriculture, urban sprawl, or other land use practices that restrict and fragment habitat. We recommend that timing restrictions be included in the construction plan to avoid direct impacts to migratory birds. The Service also recommends that Spire (as they have been designated by FERC as the non-federal representative to consult with the Service) develop a migratory bird habitat impact analysis to evaluate the overall impacts of habitat loss associated with this project and possibly provide mitigation to comply with Executive Order 13186.

The Service appreciates your willingness to coordinate on this project and looks forward to future discussions to avoid any impacts to trust resources.

These comments are provided as technical assistance in accordance with the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq).

If you have any questions regarding our comments, please contact Kristen Lundh of my staff at (309) 757-5800, extension. 215.

Sincerely,

Kraig McPeek
Field Supervisor

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GAI Consultants, Inc. - Chicago Office **T** 331.301.2002
1444 Farnsworth Avenue, Suite 303
Aurora, Illinois 60505

January 25, 2017

Project E160438.00, Task 002.001

Mr. Kraig McPeek
Field Supervisor
United States Fish and Wildlife Service
Rock Island Field Office
1511 47th Avenue
Moline, Illinois 61265

Re: Rare, Threatened, and Endangered Species Consultation
Spire STL Pipeline LLC
Spire STL Pipeline
Scott, Greene, and Jersey Counties, Illinois
and St. Charles and St. Louis Counties, Missouri

Dear Mr. McPeek:

GAI Consultants, Inc. ("GAI") is performing environmental services on behalf of Spire STL Pipeline LLC ("Spire"), for the Spire STL Pipeline ("Project") in Scott, Jersey, and Greene Counties, Illinois, and St. Charles and St. Louis Counties, Missouri. A letter was submitted to the United States Fish and Wildlife Service ("USFWS") Rock Island Field Office ("RIFO") on September 29, 2016, requesting review of initial effects determinations and proposed survey protocol for federally threatened and endangered species that may be impacted by the proposed Project. The USFWS RIFO responded in a letter dated December 8, 2016; GAI's responses to those comments are provided herein.

Threatened and Endangered Species

Least Tern, Piping Plover, Red Knot, Higgins eye pearlymussel, and pallid sturgeon

In GAI's September 29, 2016, letter to the USFWS RIFO, preliminary determinations were made that the following species are not likely to be adversely affected based on avoiding direct impacts by horizontal directional drilling ("HDD"): Least Tern, Piping Plover, Red Knot, Higgins eye pearlymussel, and pallid sturgeon. The USFWS RIFO recommended that additional information be included detailing how the geological features or drilling methods will prevent the possibility of frackouts ("inadvertent returns") during drilling and any hydrological testing to support these determinations.

Geotechnical borings were completed at both the Mississippi River and Missouri River crossings. Two main aspects of the HDD design indicate that the approach for completing the river crossings via HDD is deemed highly feasible based on the following factors:

Geological Features and Construction Methods

Mississippi River

Spire conducted four geotechnical borings at the Mississippi River; land-based bores and bores conducted within the river. Soil conditions on the north side drill site (the HDD will be advanced from the north side of the crossing towards the south side) was composed of a 23.5-foot-thick layer of soils consisting of soft to medium stiff clayey silt with fine gravel, loose rock fragments and silts. When borings drilled straight down, bedrock was encountered at approximate elevation of 423.5 feet. Bedrock consisted of predominately limestone and shale with layers of mudstone, siltstone and sandstone.

When soils are present in a soft or loose state, it presents difficulty in providing sufficient strength to resist the required fluid pressures necessary to complete an HDD installation. These conditions are present at the beginning and end of the HDD. When these materials are present, the required drilling fluid pressures can

exceed the strength of the soil resulting in the formation of hydraulic fracturing. To mitigate this potential issue, Spire has incorporated temporary conductor casings on the entry and exit locations due to the presence of loose soils near the ground surface. Casings will be installed a minimum length of 85 feet on the north side of the river and 275 feet on the south side of the river. The temporary conductor casings will terminate in favorable soils at depth and will provide an open pathway for drilling fluid flow back to the HDD entry/exit locations. Once the HDD installation is completed, the temporary conductor casings will be removed from the bore. These casings will be removed and grouted upon the completion of pullback operations.

Bedrock materials are also important for a successful drill. Rock quality designations (RQD) is a technique for determining the quality of rock that is recovered when taking core samples. Heavily weathered, jointed, fractured bedrock with RQDs less than 60 percent present challenges in terms of constructability of an HDD installation. The bedrock recovered from the bores along the HDD alignment presented at RQDs of over 60 percent which indicates that the bedrock along the alignment of the pipeline is well suited for HDD installation providing decreased installation risks associated with bore instability, raveling, and loss of drilling fluids to the overlaying geotechnical materials.

Missouri River

Spire conducted five geotechnical borings at the Missouri River; land-based bores and bores conducted within the river. Soil conditions on the north side drill site (the HDD will be advanced from the north side of the crossing towards the south side) was composed of a 45-foot-thick layer of soils consisting of very loose to medium dense sand or silt and very soft to medium stiff silts before transitioning to medium dense to very dense sand. When borings drilled straight down, bedrock was encountered at approximate elevation of 293 feet. Bedrock consisted of mudstone and limestone.

When soils are present in a soft or loose state, it presents difficulty in providing sufficient strength to resist the required fluid pressures necessary to complete an HDD installation. These conditions are present at the beginning and end of the HDD. When these materials are present, the required drilling fluid pressures can exceed the strength of the soil resulting in the formation of hydraulic fracturing. To mitigate this potential issue, Spire has incorporated temporary conductor casings on the entry and exit locations due to the presence of loose soils near the ground surface. Casings will be installed a minimum length of 200 feet on the north side of the river and while not anticipated, a small length of temporary casing on the south side of the river may be required. The temporary conductor casings will terminate in favorable soils at depth and will provide an open pathway for drilling fluid flow back to the HDD entry/exit locations. Once the HDD installation is completed, the temporary conductor casings will be removed from the bore. These casings will be removed and grouted upon the completion of pullback operations.

Bedrock materials are also important for a successful drill. RQDs are a technique for determining the quality of rock that is recovered when taking core samples. Heavily weathered, jointed, fractured bedrock with RQDs less than 60 percent present challenges in terms of constructability of an HDD installation. The bedrock recovered from the bores along the HDD alignment presented at RQDs of over 60 percent for the majority of the crossing, which indicates that the bedrock along the alignment of the pipeline is well suited for HDD installation providing decreased installation risks associated with bore instability, raveling, and loss of drilling fluids to the overlaying geotechnical materials.

Drilling Fluid Pressure

Spire evaluated the potential for hydraulic fracturing along the proposed HDD crossings of the Mississippi and Missouri Rivers by completing drilling fluid pressure calculations. Spire applied a factor of safety of 2.0 to the cavity expansion calculation, per the recommendations of the United States Army Corps of Engineers. Based on those calculations Spire has determined that the required drilling fluid pressure for the installation is below the recommended allowable pressure for installation. For both the Mississippi and Missouri River crossings, the allowable drilling fluid pressure was found to be significantly higher than the required drilling fluid pressure for the installation. This indicates that the risk for hydraulic fracturing is greatly reduced because the rock type that the drill will be conducted in is able to support the HDD and associated mud pressures. As part of standard construction practice, Spire has developed an HDD Contingency Plan in the event of an inadvertent release of drilling mud. As part of the plan, drilling pressures would be monitored at all times. In the event of

an inadvertent release, Spire would implement the procedures in its plan and coordinate with the USFWS as appropriate.

HDD Summary

No fatal deterrents have been identified with the alignment or the proposed HDD at the Mississippi and Missouri Rivers. Based on the required installation length and diameter, there are nine successfully completed HDD installations of similar lengths within North America for the Mississippi River crossing and 29 for the Missouri River crossing. The proposed HDD installation has been designed based on the use of the drill and intersect method of construction, where drill rig spreads are established on both sides of the crossing to drill individual pilot bores that meet within a target intersect zone beneath the Mississippi and Missouri Rivers.

While not anticipated, if an attempted HDD installation is unsuccessful, the proposed HDD alignment could be modified beneath the Mississippi and/or Missouri Rivers using the same general location to accommodate an additional HDD attempt, depending on the condition/cause contributing to the original HDD failure. Prior to attempting a second HDD crossing, a risk mitigation workshop should be held with all parties to determine the cause of the initial failure and any mitigation measures that could be adopted to reduce the risk(s) during the second HDD attempt.

Plants

In their letter dated December 8, 2016, the USFWS RIFO agreed that plant species are listed within the counties along the alignment and that surveys should be conducted to identify whether any of the species occur within the alignment where suitable habitat exists for decurrent false aster (*Boltonia decurrens*), eastern prairie fringed orchid (*Platanthera leucophaea*), Mead's milkweed (*Asclepias meadii*), and running buffalo clover (*Trifolium stoloniferum*).

Decurrent false aster

Based on prior consultation with the USFWS, decurrent false aster surveys were limited to Jersey County, Illinois in locations of forested floodplains that are frequently flooded and disturbed. Only one location was identified that matches that criteria, Otter Creek. Surveys for decurrent false aster were completed in October 2016 and no individuals were located. A copy of the survey report is provided as Attachment 1. Although, decurrent false aster is listed in the counties crossed by the Project in Missouri, no suitable habitat was identified in Missouri, with the exception of the area south of the Mississippi River, which will be crossed via HDD, therefore, surveys for the decurrent false aster in this location are not warranted.

Eastern prairie fringed orchid, Mead's milkweed, and running buffalo clover

Biological field surveys for wetlands and waterbodies within a 300-foot survey corridor over the proposed Project alignment was completed in 2016. During these surveys, GAI biologists identified areas of potential high-quality habitat for Eastern prairie fringed orchid, Mead's milkweed, and running buffalo clover. Based on those results, potential habitat for Eastern prairie fringed orchid and Mead's milkweed were identified in select locations in Illinois. Surveys for these two species will be completed in June 2017, in accordance with the flowering period of these species. Results of these surveys will be provided to the USFWS for review and concurrence in July 2017. Spire has not been granted landowner permission in the location where surveys for Mead's milkweed are proposed. Once survey permission has been granted, Spire will complete a habitat assessment to determine if suitable habitat for Mead's milkweed is present in the Project area and update the USFWS. One potential area was identified as suitable habitat for the running buffalo clover in Missouri. Surveys will be conducted in May 2017. Results of these surveys will be provided to the USFWS in July 2017. If individuals are located during the surveys, Spire will coordinate with the USFWS to determine the appropriate avoidance and/or minimization measures.

Bats

In their letter dated December 8, 2016, the USFWS RIFO indicated that the Project is within the range of three federally listed bat species: Indiana bat (*Myotis sodalis*), northern long-eared bat (*Myotis septenrionalis*), and gray bat (*Myotis grisescens*). According to the USFWS RIFO, the Indiana bat and northern long-eared bat are known to occur within the counties where the proposed Project will occur. Mist net surveys will be completed in May 2017 to determine the presence or absence of listed bats within the proposed alignment following the

latest USFWS Range-wide Indiana bat Survey Guidance (April 2016). A mist-net study plan will be prepared and submitted to the USFWS RIFO for approval prior to commencement of any mist net surveys. Prior to the mist net surveys being completed Spire will proactively work with the USFWS to develop a Biological Assessment in the event that Indiana bats are captured during mist net surveys and tree clearing needs to be conducted after April 1, 2018. Based on the results of the mist net survey Spire will work with USFWS to determine if submission of the Biological Assessment is necessary. Results of the mist net surveys will be submitted in July 2017. If listed bat species are not captured during mist net surveys, Spire has assumed the USFWS would not require tree clearing restrictions for bat species. If listed-bat species are captured, further coordination with the USFWS RIFO will be required. If northern long-eared bats are captured during the surveys, Spire will request concurrence from USFWS that the Project may affect the northern long-eared bat, but that any resulting incidental take of the northern long-eared bat is not prohibited by the final 4(d) rule. If caught during mist nest surveys, northern long-eared bats are not proposed to be tracked via a telemetry survey to identify occupied maternity roosts.

As indicated in our letter dated September 29, 2016, the Project is within known karst resource areas and numerous sinkholes could be detected via aerial photograph analyses. Portal assessments were completed in the winter 2016/2017 and no portals were located. Because no caves or abandoned mine portals were found during the biological field surveys, it is unlikely that the Project will affect any roosting or hibernating habitat for the gray bat. In addition, because the Project will not affect the other types of habitat utilized by the gray bat, such as for foraging and traveling (i.e., rivers, streams, lakes, and reservoirs), the overall Project effects to gray bats are expected to be insignificant and/or discountable, and therefore, would not rise to the level of take. Regardless, gray bats could still utilize the Project area and be captured during mist net surveys. Generally, when gray bats are captured during mist net surveys, they are not radio-tracked to diurnal roosts because, unlike forest-roosting species, it is improbable that a radio-tagged gray bat would be located in an underground roost (where the radio signal cannot be detected from the surface).

Bald Eagles

In their letter dated December 8, 2016, the USFWS RIFO recommended that surveys for active Bald Eagle nests be conducted throughout the proposed Project corridor. A desktop review of the Project area using aerial imagery was completed to identify appropriate proposed locations for Bald Eagle nest searches. Areas selected for searches were where the Project crosses large bodies of water or is in close proximity to a large body of water and where trees are located. Due to the limited amount of work proposed to occur along Line 880 in the vicinity of Spanish Lake in St. Louis County, Missouri, no Bald Eagle nest searches are proposed to occur in the vicinity of the workspace areas around Spanish Lake. To correspond with when Bald Eagles are active in constructing or repairing nests for the upcoming breeding season, nest surveys are anticipated to be completed in early February 2017. Nest searches during this time of year are also favorable as the searcher's view is not obstructed by leaves. The selected areas for Bald Eagle nest searches will be traversed on foot by a qualified biologist using binoculars and a spotting scope as needed by scanning tree canopies for nests. Where needed (i.e., river islands) a spotting scope will be set-up and used to review areas outside the search area or where access is limited. Due to property access restrictions, surveyor's foot traffic will be limited to the 300-foot environmental study corridor centered on the pipeline and the limits of the access roads. Eighteen areas along the Project have been identified for Bald Eagle nest searches to be completed. A copy of the Bald Eagle nest search report will be provided to the USFWS RIFO upon completion of the fieldwork.

Migratory Birds

In their letter dated December 8, 2016, the USFWS RIFO recommended that timing restrictions be included in the construction plan to avoid direct impacts to migratory birds. In addition to avoiding forested areas to the maximum extent practicable, Spire anticipates that tree clearing would be completed prior to May 1, 2018 and, if necessary, after August 1, 2018, to avoid the nesting season for the majority of the Birds of Conservation Concern that may occupy trees in the Project area.

Although Line 880 modifications are proposed to commence in June 2018, Project activities are primarily located within existing easement or maintained residential areas. Construction activities are not anticipated to impact migratory bird species to the degree to which the regional breeding success of these species would be compromised if nests were to be disturbed.

Tree-nesting Species

The USFWS RIFO also recommended that a migratory bird habitat impact analysis be developed to evaluate the overall impacts of habitat loss associated with this Project and possibly provide mitigation to comply with Executive Order 13186. Displacement of individuals and the loss or conversion of habitat from operation activities poses the greatest risk of impact to migratory birds. In December 2016, the USFWS indicated that loss of habitat associated with right-of-way clearing and habitat fragmentation are detrimental to migratory birds in landscapes heavily dominated by agriculture, urban sprawl, or other land use practices that restrict and fragment habitat. In order to minimize these risks, Spire implemented the following avoidance and minimization measures:

- Spire has routed its pipeline such that it avoids trees to the extent practicable by routing the majority of the 24-inch pipeline through agricultural fields.
- Spire has limited its construction right-of-way to the minimal width needed within wooded areas to safely construct and operate the proposed facilities.
- Other than tree clearing for the right-of-way on the north side of the Mississippi River, no interior forests are crossed by the Project. However, the proposed location of the 24-inch pipeline across the Mississippi River will parallel an existing pipeline right-of-way, therefore, minimizing new fragmentation to an otherwise undisturbed tract of interior forest habitat.
- Spire has maximized the use of existing rights-of-way by collocating the route (approximately one-third of the 24-inch pipeline is collocated) with an existing linear easement as to further reduce impacts to the forest or other land uses in the Mississippi River Valley.
- Line 880 modifications are primarily located within existing easement or maintained residential areas and construction activities are not anticipated to impact migratory bird species.
- The majority of the 24-inch pipeline route traverses agricultural lands that will be disturbed by spring agricultural prepping activities.

The majority of the migratory birds identified in the USFWS's Information, Planning and Consultation System ("IPaC") Reports are known to breed in the Project area; the Fox Sparrow, Rusty Blackbird, and Short-eared Owl are non-breeding species of concern for the region. Excluding the non-breeding species, eight species are known to be ground nesting species and 13 species are tree and/or shrub nesting species in the Project area. Additionally, three of the species that were identified in the IPaC Report are associated with large expansive aquatic habitat systems. The nesting seasons associated with the migratory bird species potentially present within the Project areas is generally May 1 through July 31. Based on the review of the species potentially present in the Project areas, nesting seasons associated with the species likely present in the Project areas, nesting typically occurs between May 1 and August 1.

Based on a review of the tree and/or shrub nesting species, the majority of these species have a nesting time period (i.e., eggs or young in the nest) from May through July. In order to protect nesting migratory birds, Spire would not clear trees for construction between May 1 and August 1, 2018. Spire anticipates commencing construction in January 2018 provided that federal authorizations and state permits have been received. Tree clearing activities are currently proposed to be conducted between February 1 and May 1, 2018 (assuming these clearing dates also meet the allowable timeframes for listed bat species pending ongoing agency consultations). Some bird species, such as the Loggerhead Shrike, begin their nesting season earlier in the year, whereas some species may have active nests into August or September, such as Black-billed Cuckoo, Red-headed Woodpecker, Willow Flycatcher, and Wood Thrush. Should impacts to Loggerhead Shrike occur through the removal of shrubs and/or trees prior to May 1, those individuals are likely to re-nest in suitable undisturbed adjacent habitat with sufficient time remaining in the breeding season to not only raise one brood, but multiple broods. For those species that may have active nests into August and September, impacts to those nesting species are not anticipated as tree clearing activities for the Project are anticipated to be completed prior to the start of their nesting season in May.

Bird-related habitat loss for the Project overall will primarily be confined to where wooded areas will be cleared for construction and operation. Approximately five percent of the total area required for construction is considered forested. Impacts to forest are scattered throughout the proposed 59 miles of the 24-inch pipeline,

which equates to less than one-acre per mile of tree clearing for the Project. Furthermore, 50 percent of the proposed 40 acres of proposed forested impacts will be allowed to revert back to forest after construction. Permanent forested impacts have been limited to approximately five percent of the total acreage required for operation of the Project overall.

Ground-nesting Species

The Kentucky Warbler and Worm-eating Warbler are ground nesting species in wooded habitat, and therefore, are not anticipated to be impacted by the Project as the principle habitat they occupy (trees and shrubs) is proposed to be disturbed through the removal of vegetation prior to May 1, which is the beginning of their active nesting time period. Other ground nesting species, such as the Blue-winged Warbler, Dickcissel, Field Sparrow, and Henslow's Sparrow nest in areas dominated by grasses, with the exception of Blue-winged Warbler which nests in herbaceous vegetation within edge and scrub-shrub habitat. Habitat for the Blue-winged Warbler can be assumed to be present over a majority of the Project where edges between wooded and open areas exist; therefore, it can be anticipated that most areas where Blue-winged Warbler would nest would be disturbed during tree clearing activities proposed to be completed prior to May 1, which would coincide with the beginning of their nesting season in May. As for the other ground nesting species that occupy open herbaceous land (i.e., Dickcissel, Field Sparrow, and Henslow's Sparrow), this nesting habitat is anticipated to be disturbed prior to their breeding season commencing in May through a) spring agricultural field preparation by private landowners, and b) the use of the construction right-of-way by contractor vehicles and construction equipment. As a result of tree clearing activities occurring prior to nests being occupied with eggs and/or young, these species may already be displaced from the Project during or prior to territory establishment and pair bonding, and therefore, would find suitable nesting sites in adjacent undisturbed habitat. Nonetheless, should impacts to these ground nesting species occur during Project construction activities the amount of open, non-cultivated land crossed by the Project is minimal and scattered throughout the Project. Therefore, should nesting Dickcissel, Field Sparrow, and Henslow's Sparrow be impacted during construction, the number of nesting individuals impacted is likely to be minimal and not concentrated to a single location to have a significant negative impact to the regional reproductive output for that species during the year of Project construction.

Aquatic Habitat Species

Lastly, species that primarily occupy aquatic habitat, such as Black-crowned Night-heron, Least Bittern, and Pied-billed Grebe are not anticipated to be impacted by the Project as large expansive wetland and/or aquatic habitats are not anticipated to be impacted by the Project. Although the Project crosses the Upper Mississippi Conservation Area on the south side of the Mississippi River, no tree clearing or surface disturbance within that area is proposed.

From a habitat perspective, the proposed Project is not anticipated to significantly increase habitat fragmentation. The largest tract of forest crossed by the Project is located on the northern side of the Mississippi River. This area is fragmented by the presence of an existing pipeline right-of-way which the 24-inch pipeline lies adjacent. Collocating the proposed 24-inch pipeline with an existing pipeline right-of-way minimizes impacts to this natural resource while still meeting the purpose and need of the Project.

Non-local Breeding Species

Impacts to habitats used by the three non-breeding species of concern for the region (Fox Sparrow, Rusty Blackbird, and Short-eared Owl) are not anticipated following completion of the Project as large or concentrated areas of grassland habitat are not proposed to be converted to other land uses and large expanses of aquatic habitat will not be impacted. Habitat loss for the other grassland species of conservation concern that may breed in the Project area is also not anticipated as almost all of the impacted grassland and/or agricultural-related habitat will be allowed to revert back to prior land use following construction.

Spire will minimize operational impacts to nesting birds of conservation concern (for all habitat types) by completing routine vegetation mowing or clearing over the full width of the operational right-of-way in uplands outside of the migratory bird nesting season of April 15 through August 1 as prescribed in the Federal Energy Regulatory Commission's Plan.

In summary, the implementation of the avoidance and minimization measures described herein as well as the abundance of suitable and similar habitat adjacent to the Project are anticipated to alleviate the potential for direct impacts to nesting adults and their young, regional population-level impacts, and the habitat of birds of conservation concern. Significantly measureable negative impacts on migratory birds and their habitats are not anticipated as a result of construction and operation of the Project; therefore, mitigation for the potential impacts to migratory birds is not proposed.

Conclusion

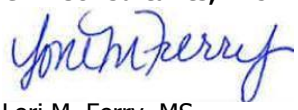
Should the Project design change, Spire will coordinate with the USFWS to discuss changes to species determinations and/or proposed surveys as appropriate. Spire understands that the RIFO will continue to handle coordination with the Columbia Field Office.

At this time, Spire is requesting concurrence on the information provided herein, or as appropriate, additional guidance on the species determinations and survey protocols provided on the rare, threatened, and endangered species that may exist within the Project area. GAI and Spire thank you in advance for your assistance.

If you have any questions regarding this submission, please feel free to contact me at 331.301.2002 or by e-mail at l.ferry@gaiconsultants.com.

Sincerely,

GAI Consultants, Inc.



Lori M. Ferry, MS
Environmental Manager

LMF/djz

Attachment: Attachment 1 (Decurrent False Aster Survey Report)

cc: Ms. Kristen Lundh, USFWS, Rock Island Field Office
Ms. Trisha Crabill, USFWS, Columbia Field Office

ATTACHMENT 1

DECURRENT FALSE ASTER SURVEY REPORT