MARCH 24, 2026

BIOLOGICAL ASSESSMENT FOR THE MVP BOOST PROJECT

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List of Abbreviations

Abbreviation	Term/Phrase/Name
°	degree
AMM	avoidance and minimization measures
ANSI	American National Standards Institute
API	American Petroleum Institute
BA	Biological Assessment
BMP	best management practice
Boost Project	Mountain Valley Pipeline Boost Project
C	Celsius
Caltrans	California Department of Transportation
CFR	Code of Federal Regulations
dB	decibel
dBA	A-weighted decibels
DBH	diameter at breast height
draft Revised Recovery Plan	*Indiana Bat (Myotis sodalis) Draft Recovery Plan: First Revision*
E&SC	erosion and sediment control
EI	Environmental Inspector
EPRI	Electric Power Research Institute
ESA	Endangered Species Act
F	Fahrenheit
FERC	Federal Energy Regulatory Commission
FHWA	Federal Highway Administration
FR	Federal Register
hp	horsepower
IAQM	Institute of Air Quality Management
IPaC	Information for Planning and Consultation
ISEE	International Society of Explosives Engineers
ISO	International Organization for Standardization
L_{dn}	day-night average sound level
LEI	Lead Environmental Inspector
LOD	limits of disturbance
MAOP	maximum allowable operating pressure

Abbreviation	Term/Phrase/Name
MJV	Monarch Joint Venture
MLV	mainline block valve
monarch habitat	suitable reproductive, roosting, and foraging habitat for monarch butterflies
Mountain Valley	Mountain Valley Pipeline, LLC
MP	milepost
MVP Mainline	Mountain Valley Pipeline mainline
NA	Noise Area
NA	Noise Area
NDE	non-destructive examination
NLCD	National Land Cover Database
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
psig	pounds per square inch gauge
RU	Recovery Unit
SLR	SLR International Corporation
SPCC	Spill Prevention, Control, and Countermeasure
SSA	Species Status Assessment
TNM	Traffic Noise Model
TNM Guidelines	Traffic Noise Model Guidelines
U.S.	United States
USC	U.S. Code
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VDCR	Virginia Department of Conservation and Recreation
VDOT	Virginia Department of Transportation
VDWR	Virginia Department of Wildlife Resources
VFO	USFWS Virginia Field Office
WEST	Western Ecosystems Technology, Inc.
WNS	White-nose Syndrome
WVDNR	West Virginia Division of Natural Resources
WVDOT	West Virginia Department of Transportation
WVFO	USFWS West Virginia Field Office

Abbreviation	Term/Phrase/Name
WVNHP	West Virginia Natural Heritage Program

Executive Summary

The purpose of this Biological Assessment (BA) is to evaluate potential effects of Mountain Valley Pipeline, LLC's (Mountain Valley), proposed Boost Project (Boost Project or Project) on species listed or proposed to be listed as threatened or endangered under the Endangered Species Act (ESA) and designated or proposed critical habitat.

The Boost Project includes expanding three existing compressor stations in Braxton, Fayette, and Wetzel Counties, West Virginia and constructing one new compressor station in Montgomery County, Virginia to provide timely and cost-effective access to the growing demand for natural gas for use by local distribution companies, industrial users, and power generation in the Mid-Atlantic and Southeastern markets, as well as potential markets in the Appalachian region. The locations of the Boost Project occur within areas under the jurisdiction of the Gloucester, Virginia, and Davis, West Virginia, U.S. Fish and Wildlife Services (USFWS) Ecological Services Field Offices.

This BA has been prepared on behalf of the Boost Project proponent, Mountain Valley, and will be submitted to the Federal Energy Regulatory Commission (FERC) and the USFWS in compliance with requirements of ESA Section 7. It evaluates potential effects of the Boost Project on 8 species listed as endangered or threatened and 3 species proposed for federal listing, as well as designated and proposed critical habitat for those species as applicable. Based on guidance from USFWS and state agencies, as well as the best available information about listed and proposed listed species and/or designated and proposed critical habitat, it was determined the Boost Project will have no effect on the following species: salamander mussel (*Simpsonaias ambigua*), snuffbox (*Epioblasma triquetra*), longsolid (*Fusconaia subrotunda*), round hickorynut (*Obovaria subrotunda*), small whorled pogonia (*Isotria medeoloides*), smooth coneflower (*Echinacea laevigata*), and Virginia spiraea (*Spiraea virginiana*). Nor will the Boost Project affect designated or proposed critical habitat for any of those species. The BA further evaluates potential effects to Indiana bat (*Myotis sodalis*), northern long-eared bat (*Myotis septentrionalis*), tricolored bat (*Perimyotis subflavus*), and monarch butterfly (*Danaus plexippus*).

Potential Effects to Indiana Bats. The Boost Project intersects the Current Range of the federally endangered Indiana bat in Virginia and West Virginia. No designated Indiana bat critical habitat occurs in within the Boost Project Action Area. Based on the best scientific and commercial information available, including data from USFWS and state agencies, previous surveys and monitoring conducted for Mountain Valley Pipeline Mainline Project (MVP Mainline), and guidance from the agencies, Mountain Valley is assuming presence of the Indiana bat within the portion of the Action Area associated with the Harris Compressor Station site. Mountain Valley will implement a variety of conservation measures, including seasonal tree clearing, to ensure that Boost Project construction, operation, and maintenance will not adversely affect Indiana bats. The Boost Project May Affect – Is Not Likely to Adversely Affect the Indiana bat.

Potential Effects to Northern Long-eared Bats. The Boost Project intersects the Current Range of the federally endangered northern long-eared bat in Virginia and West Virginia. No northern long-eared bat critical habitat has been designated or proposed. Based on the best scientific and commercial information available, including data from USFWS and state agencies, previous surveys and monitoring conducted for MVP Mainline, and guidance from the agencies, Mountain Valley is assuming presence of the northern long-eared bat within the portion of the Action Area associated with the Harris and Stallworth Compressor Station sites. Mountain Valley will implement a variety of conservation measures, including seasonal tree clearing, to ensure that Boost Project construction, operation, and maintenance will not adversely affect northern long-eared bats. The Boost Project May Affect – Is Not Likely to Adversely Affect the northern long-eared bat.

Potential Effects to Tricolored Bats. The Boost Project in Virginia and West Virginia intersects the Current Range of tricolored bat, which has been proposed to be listed as endangered under the ESA. Critical habitat for the tricolored bat has not been proposed. Based on the best scientific and commercial information available, including data from USFWS and state agencies, previous surveys and monitoring conducted for MVP Mainline, and guidance from the agencies, Mountain Valley is assuming presence of the tricolored bat within the portion of the Action Area associated with the Bradshaw, Harris, and Swann Compressor Station sites. Mountain Valley will implement a variety of conservation measures, including seasonal tree clearing, to ensure that Boost Project construction, operation, and maintenance will not adversely affect tricolored bats. The Boost Project May Affect – Is Not Likely to Adversely Affect the tricolored bat and is Not Likely to Jeopardize the Continued Existence of the tricolored bat.

Potential Effects to Monarch Butterfly. The Boost Project in Virginia and West Virginia intersects the Current Range of monarch butterfly (monarch), which has been proposed for listing as threatened with a 4(d) rule under the ESA. Critical habitat for the monarch has not been proposed outside of coastal California. Based on the best scientific and commercial information available, including data from USFWS, state agencies, and public sources and guidance from the agencies, Mountain Valley is assuming presence of the monarch within the Boost Project Action Area from March through October. Mountain Valley will implement conservation measures to avoid and minimize potential impacts to monarchs. Thus, while the Boost Project May Affect – Is Likely to Adversely Affect monarchs, it is Not Likely to Jeopardize the Continued Existence of the monarch.

1. Introduction

Mountain Valley Pipeline, LLC (Mountain Valley) is seeking a Certificate of Public Convenience and Necessity from the Federal Energy Regulatory Commission (FERC) pursuant to Section 7(c) of the Natural Gas Act authorizing Mountain Valley to construct and operate the proposed Boost Project (Boost Project or Project) located in Wetzel, Braxton, and Fayette Counties in West Virginia and Montgomery County in Virginia. Mountain Valley plans to expand the compressor stations at three existing sites[1] and construct one new compressor station to provide timely and cost-effective access to natural gas to meet the growing demand by local distribution companies, industrial users, and power generation in the Mid-Atlantic and Southeastern markets, as well as potential markets in the Appalachian region. The purpose of this Biological Assessment (BA) is to evaluate potential effects of the proposed Boost Project on species listed or proposed for listing as threatened or endangered under the Endangered Species Act (ESA) and any critical habitat designated or proposed for those species to assist FERC and the U.S. Fish and Wildlife Service (USFWS) comply with their obligations under Section 7 of the statute.[2]

The Boost Project will add a total of approximately 265,750 isometric (ISO) horsepower (hp) of compression from the proposed modifications at the existing Bradshaw (Wetzel County, West Virginia), Harris (Braxton County, West Virginia) and Stallworth (Fayette County, West Virginia) Compressor Stations. The construction and operation of the new Swann Compressor Station (Montgomery County, Virginia) will also include ancillary facilities required for safe and reliable operations. The Boost Project will create approximately 600,000 dekatherms per day of incremental natural gas capacity on the existing Mountain Valley Pipeline Mainline Project (MVP Mainline).

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[1] For purposes of this Biological Assessment, the “compressor station site” encompasses the limits of disturbance (LOD) for all construction, operation, and maintenance activities associated with the Boost Project, including the LOD associated with any laydown yards and access roads for the respective compressor stations. The LOD for each compressor station site is defined in Section 2.

[2] Mountain Valley reserves all rights to amend, withdraw, or supplement the BA or any of its Attachments, and/or to object to, contest, or hold out as optional/unnecessary any permit, request, approval, opinion, certification, or assessment applied for, denied, or received pursuant to the BA or its Attachments, pursuant to any Presidential Executive Order or any governmental action taken as a result of or related to any Presidential Executive Order.

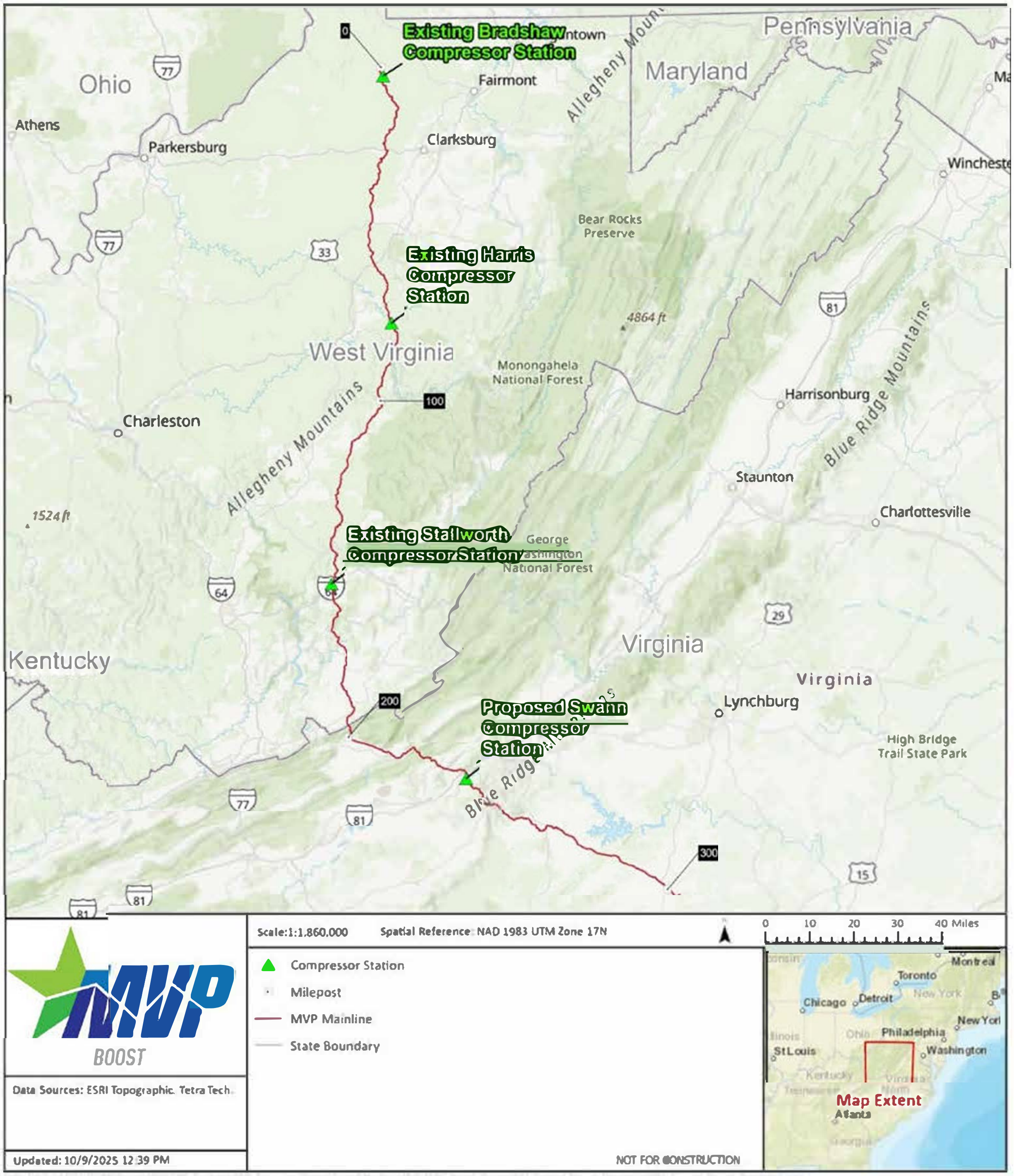

Figure 1-1: Boost Project location in Braxton, Fayette, and Wetzel counties, West Virginia, and Montgomery County, Virginia.

1.1. Regulatory Compliance

Mountain Valley is working with multiple entities to ensure compliance with state and federal environmental regulations. Efforts to address the following statutes have influenced the Boost Project design as it relates to protected species.[3]

- Section 7(c) of the Natural Gas Act (15 U.S. Code [USC] 717f(c))
- The National Environmental Policy Act (42 USC 4321-4347)
- The ESA (16 USC 1531-1544)
- Virginia Annotated Code Title 29.1 Chapter 5, Article 6: Endangered Animal Species

Mountain Valley is also complying with state and local laws and regulations required for the construction, operation, and maintenance of the Boost Project.

1.2. Consultation History

On August 1, 2025, Mountain Valley submitted letters describing the Boost Project to the Virginia Department of Conservation and Recreation (VDCR), the Virginia Department of Wildlife Resources (VDWR), and the West Virginia Division of Natural Resources (WVDNR). On August 2, 2025, VDCR requested additional information. Mountain Valley provided the requested information on August 6, 2025. On September 5, 2025, VDCR provided a letter that outlined the occurrences of natural heritage resources in proximity to the Boost Project. The VDCR letter indicated there was a potential for suitable habitat for the smooth coneflower, but the agency did not recommend completing surveys for the species based on the best available information and staff review. On August 25, 2025, VDWR informed Mountain Valley that it would not be providing comments at that time. On February 5, 2026, Mountain Valley held a follow-up conference call with VDWR to discuss the Boost Project. Mountain Valley will provide any relevant information that it may receive from VDWR in the future.

On August 4, 2025, Mountain Valley sent letters requesting species information to USFWS's Virginia Field Office (VFO) and USFWS's West Virginia Field Office (WVFO). On August 4, 2025, Mountain Valley received Official Species lists from the VFO and WVFO. On August 6, 2025, the VFO requested additional information. Mountain Valley provided the requested information on September 12, 2025. Further additional information was requested by the VFO on September 15, 2025, and provided by Mountain Valley on September 17, 2025. Mountain Valley requested and received updated Official Species lists from the VFO and WVFO on December 12, 2025 (USFWS 2025b, 2025c, 2025d, 2025e; Appendix A). The WVFO requested additional information on December 19, 2025. Mountain Valley responded to that request as part of FERC's Environmental Information Review on February 12, 2026. Copies of species-related agency correspondence regarding the Boost Project are included in Appendix A and summarized below to the extent relevant to Section 7 consultation and this BA.

On November 19, 2025, Mountain Valley held a conference call with the VFO to discuss the Boost Project and the results of the Information for Planning and Consultation (IPaC) search and the Species Determination table with the field office. An additional teleconference with the VFO, was conducted on December 3, 2025. The purpose of the call was to discuss the proposed components of this BA, potential impact triggers, and supporting studies.

[3] West Virginia does not have state threatened or endangered species legislation. However, under the administration of the West Virginia Department of Natural Resources, the West Virginia Natural Heritage Program (WVNHP) maintains a comprehensive database of federally listed threatened and endangered species, or otherwise sensitive species (e.g., species considered rare within the state by the WVNHP and have global rank designations by NatureServe) and ecologically important or unique habitats, such as wetlands (WVDNR 2025).

On August 13 and 28, 2025, Mountain Valley requested information from Montgomery County and Roanoke County, Virginia, respectively, on projects in the area to analyze potential cumulative impacts. A Roanoke County Administrator forwarded the request to the appropriate staff, but Mountain Valley has not received a follow-up response and has not received a response from Montgomery County.

1.3. Species Analyzed

Based on guidance from USFWS and the state agencies, a USFWS Information for Planning and Consultation (IPaC) query, and other data representing the best scientific and commercial information available, this BA evaluates potential effects to 8 federally listed and 3 proposed listed species with potential to occur in the Boost Project Action Area (discussed in Section 3; Table 1.1). No designated or proposed critical habitat for federally listed species occurs within the Boost Project Action Area.

Table 1-1: Federally Listed and Proposed Species with the Potential to Occur in the Boost Project Action Area.[4]

Common Name	Scientific Name	Protection Status	Compressor Station			
			Bradshaw	Harris	Stallworth	Swann
Indiana bat	*Myotis sodalis*	FE	x	x	x	x
Northern long-eared bat	*M. septentrionalis*	FE	x	x	x	x
Tricolored bat	*Perimyotis subflavus*	PE	x	x[1]		x
Monarch butterfly	*Danaus plexippus*	PT	x	x	x	x
Longsolid	*Fusconaia subrotunda*	FT		x		
Round hickorynut	*Obovaria subrotunda*	FT		x		
Salamander mussel	*Simpsonaias ambigua*	PE	x	x		
Snuffbox	*Epioblasma triquetra*	FE	x	x		
Small whorled pogonia	*Isotria medeoloides*	FT			x	
Smooth coneflower	*Echinacea laevigata*	FT				x
Virginia spiraea	*Spiraea virginiana*	FT			x	

FE = Federally Endangered; PE = Proposed Endangered; FT = Federally Threatened; PT = Proposed Threatened.

1. [redacted]

Source: IPaC (USFWS 2025b, 2025c, 2025d, 2025e, 2026), WEST 2025; WEST unpublished data.

1.3.1. Species That Will Not Be Affected by the Boost Project

1.3.1.1. Salamander Mussel

The salamander mussel is a small freshwater mussel in the Unionidae family (pearly mussels) with an elliptical thin shell that reaches approximately 1.5 to 2 inches (USFWS 2025l). The species was historically found in Arkansas, Illinois, Indiana, Iowa, Kentucky, Michigan, Missouri, New York, Ohio, Pennsylvania, Tennessee, West Virginia, and Wisconsin. Salamander mussels inhabit swift-flowing rivers and streams, favoring areas with abundant flat rocks and stones that provide shelter beneath slab rocks or within crevices (Clayton 2023). The salamander mussel's distribution in West Virginia is primarily associated with the Ohio River and its tributaries, where these habitat features are prevalent. Its lifecycle is uniquely tied to the mudpuppy (*Necturus maculosus*), an aquatic salamander that serves as its host. The presence of suitable host populations and clean, well-oxygenated, fast-flowing water with stable rocky substrates is critical for

[4] No designated or proposed critical habitat for federally listed species occurs within the Boost Project Action Area.

the survival of this species. Due to its specialized habitat requirements and limited distribution, the salamander mussel is considered vulnerable to habitat disturbances such as sedimentation, pollution, and alterations to stream flow (USFWS 2023d).

A review of the USFWS IPaC online tool indicated that salamander mussels potentially could occur in within the portions of the Action Area associated with the Bradshaw and Harris Compressor Station sites (Section 3.5) in Wetzel and Braxton Counties, West Virginia, respectively (USFWS 2025b, 2025c). Critical habitat for this species has been designated in numerous waterbodies across 10 states, including West Virginia. No salamander mussel critical habitat occurs within the Boost Project Action Area. The closest designated critical habitat occurs [redacted] (USFWS 2023d).

No ground disturbance is proposed at which is located approximately of the compre t ion. T erefore, no effects to salamander mussels are expected from Boost Project activities at . However, there will be ground disturbance within the limits of the previously disturbed area at the Bradshaw Compressor Station. Two intermittent streams (Fallen Timber Run and Buck Run) occur within the aquatic portion of the Action Area associated with the Bradshaw Compressor Station site (Section 3.5). These intermittent streams are upstream of North Fork Fishing Creek, which is considered a high-quality mussel stream with potential mussel habitat, but salamander mussels are not expected to occur there (WVDNR 2024). Potential effects from the Boost Project will be confined to the aquatic portion of the Action Area associated with the Bradshaw Compressor Station site, and therefore, will not reach any location where salamander mussels could occur or where their critical habitat occurs.

There will also be ground disturbance associated with the planned expansion of the Harris Compressor Station within the limits of the previously disturbed site. Two intermittent streams (Stonecoal Run and an unnamed tributary) occur within the aquatic portion of the Action Area associated with the Harris Compressor Station site (Section 3.5). These intermittent streams are upstream of the Little Kanawha River, which is considered a high-quality mussel stream with potential mussel habitat, but salamander mussels are not expected to occur there (WVDNR 2024). Potential effects from the Boost Project will be confined to the aquatic portion of the Action Area associated with the Harris Compressor Station site, and therefore, will not reach any location where salamander mussels could occur or where its critical habitat occurs.

Although potential effects from Boost Project activities are not expected to reach any location where salamander mussels or their critical habitat occur, Mountain Valley will implement erosion and sediment control (E&SC) measures and other conservation measures (Section 2.5) to avoid and minimize the potential for adverse effects to any species of freshwater mussels. Therefore, the Boost Project will have no effect on salamander mussels or critical habitat for salamander mussels.

1.3.1.2. Snuffbox

The snuffbox is a small to medium-sized (1.8 to 2.8 inches) freshwater mussel typically characterized by a yellow, green, or brown shell interrupted by green rays or blotches (USFWS 2022e). The shell darkens with age. Females typically have a triangular-shaped shell whereas males are more oblong or oval. Adults burrow deep within sand, gravel, or cobble substrates, preferably in small to medium-sized streams with swift currents (USFWS 2022e). Individuals are occasionally found in larger rivers. This species is widely distributed and found in many states including Alabama, Arkansas, Illinois, Indiana, Kentucky, Michigan, Minnesota, Mississippi, Missouri, Ohio, Pennsylvania, Virginia, West Virginia, and Wisconsin (USFWS 2022e).

A review of the USFWS IPaC online tool indicated that snuffbox potentially could occur within the portions of the Action Area associated with the Bradshaw and Harris Compressor Station sites (Section 3.5) in Wetzel and Braxton Counties, West Virginia, respectively (USFWS 2025b, 2025c). Critical habitat for this species has been designated in numerous waterbodies in West Virginia, but no snuffbox critical habitat occurs within the Boost Project Action Area. [redacted]

No ground disturbance is planned at [redacted], which is located approximately [redacted] of the compressor station. Therefore, no effects to snuffbox are expected from Boost Project activities at [redacted]. However, there will be ground disturbance within the limits of the previously disturbed area at the Bradshaw Compressor Station. Two intermittent streams (Fallen Timber Run and Buck Run) occur within the aquatic portion of the Action Area associated with the Bradshaw Compressor Station site (Section 3.5). These intermittent streams are upstream of North Fork Fishing Creek, which is considered a high-quality mussel stream with potential mussel habitat, but snuffbox are not expected to occur there (WVDNR 2024). Potential effects from the Boost Project will be confined to the aquatic portion of Action Area associated with the Bradshaw Compressor Station site, and therefore, will not reach any location where snuffbox could occur or where their critical habitat occurs.

There will also be ground disturbance associated with the planned expansion of [redacted] within the limits of the previously disturbed site. Two intermittent streams (Stonecoal Run and an unnamed tributary) occur within the aquatic portion of the Action Area associated with the [redacted] (Section 3.5). These intermittent streams are upstream of the Little Kanawha River, which is considered a high-quality mussel stream with potential mussel habitat, but snuffbox are not expected to occur there (WVDNR 2024). Potential effects from the Boost Project will be confined to the portion of the aquatic Action Area associated with [redacted], and therefore, will not reach any location where snuffbox could occur or where its critical habitat occurs.

Although potential effects from Boost Project activities are not expected to reach any location where snuffbox or their critical habitat occur, Mountain Valley will implement E&SC measures and other conservation measures (Section 2.5) to avoid and minimize the potential for adverse effects to any species of freshwater mussels. Therefore, the Boost Project will have no effect on snuffbox or critical habitat for snuffbox.

1.3.1.3. Longsolid

Longsolid is a medium-sized freshwater mussel in the Unionidae family (pearly mussels) with a thick shell up to 5 inches in length (USFWS 2022f). Life history information is limited, but studies indicate the species can live up to at least 32 years (USFWS 2022f). The species appears to prefer sandy to gravelly habitat in streams and small rivers but has been observed in coarser sediments as well.

A review of the USFWS IPaC online tool indicated that longsolid potentially could occur within the portion of the Action Area associated with the Harris Compressor Station site (Figure 3.5) in Braxton County, West Virginia (USFWS 2025c). Critical habitat for this species has been designated in numerous waterbodies in West Virginia, but no longsolid critical habitat occurs within the Boost Project Action Area. [redacted]

There will be ground disturbance associated with the planned expansion of the [redacted] within the limits of the previously disturbed site (Section 2.1.2). Two intermittent streams (Stonecoal Run and an unnamed tributary) occur within the aquatic portion of the Action Area associated with the [redacted] site (Section 3.5). These intermittent streams are upstream of the Little Kanawha River, which is considered a high-quality mussel stream with potential mussel habitat, but longsolid are not expected to occur there (WVDNR 2024). Potential effects from the Boost Project will be confined to the aquatic portion of the Action Area associated with the [redacted] site, and therefore, will not reach any location where longsolid could occur or where their critical habitat occurs.

Although potential effects from Boost Project activities are not expected to reach any location where longsolid or its critical habitat occur, Mountain Valley will implement E&SC measures and other conservation measures (Section 2.5) to avoid and minimize the potential of adverse effects to any species of freshwater mussels. Therefore, the Boost Project will have no effect on longsolid or critical habitat for longsolid.

1.3.1.4. Round Hickorynut

Round hickorynut is a small to medium thick-shelled freshwater mussel that averages less than 2.4 inches in length but can grow up to 3 inches long (USFWS 2022g). The shells are generally round in shape and adults often have a greenish hue. The species is generally found in sand and gravel in riffle, run, and pool habitats in streams and rivers but has also been observed in shallow, low-flow habitats and those with sandy mud substrate (USFWS 2022g).

A review of the USFWS IPaC online tool indicated that round hickorynut potentially could occur in the portion of the Action Area associated with the Harris Compressor Station site (Section 3.5) in Braxton County, West Virginia (USFWS 2025c). Critical habitat for this species has been designated in waterbodies across eight states, including West Virginia, but no round hickorynut critical habitat occurs within the Boost Project Action Area. [redacted]

There will be ground disturbance associated with the planned expansion of the [redacted] within the limits of the previously disturbed site. Two intermittent streams (Stonecoal Run and an unnamed tributary) occur within the aquatic portion of the Action Area associated with the [redacted] site (Section 3.5). These intermittent streams are upstream of the Little Kanawha River, which is considered a high-quality mussel stream with potential mussel habitat, but round hickorynut are not expected to occur there (WVDNR 2024). Potential effects from the Boost Project will be confined to the aquatic portion of Action Area associated with the [redacted] site, and therefore, will not reach any location where round hickorynut could occur or where their critical habitat occurs.

Although potential effects from Boost Project activities are not expected to reach any location where round hickorynut or its critical habitat occur, Mountain Valley will implement E&SC measures and other conservation measures (Section 2.5) to avoid and minimize the potential of adverse effects to any species of freshwater mussels. Therefore, the Boost Project will have no effect on round hickorynut or critical habitat for round hickorynut.

1.3.1.5. Small whorled pogonia

Small whorled pogonia, a member of the orchid family, has a single gray-green stem (2 to 10 inches tall) and a whorl of five to six leaves at the top of the stem (Gawler and Tyler 1995, USFWS 2022h). The leaves are gray-green, oblong, and can reach 1 to 3.5 inches (Gawler and Tyler 1995). A single or pair of green-yellow flowers appears in May or June (Gawler and Tyler 1995, USFWS 2022h). Small whorled pogonia is found in mature, hardwood stands of beech (*Fagus* spp.), birch (*Betula* spp.), maple, oak (*Quercus* spp.), and hickory (*Carya* spp.) with an open understory (USFWS 1992a, 2022h). Small whorled pogonia prefers acidic soils under a thick layer of dead leaves, often on slopes adjacent to small streams (USFWS 1992a, USFWS 2008). Although widely distributed across 18 eastern states (USFWS 2025m), small whorled pogonia is rare, with populations typically containing less than 30 stems (USFWS 2022h).

A review of the USFWS IPaC online tool indicated that small whorled pogonia potentially could occur within the portion of the Action Area associated with the Stallworth Compressor Station site (Section 3.5) in Fayette County, West Virginia (USFWS 2025d). Nevertheless, small whorled pogonia was not detected in surveys conducted in the vicinity of the Stallworth Compressor Station site prior to construction of the MVP Mainline Project (MVP 2017). Additionally, the Boost Project would not result in any new ground disturbance that could potentially impact small whorled pogonia individuals or habitat. Activities associated with the Boost Project in Fayette County, which include the expansion of the Stallworth Compressor Station, are entirely located within the previously approved limits of disturbance (LOD) for the MVP Mainline Project, which was the subject of previous surveys and consultation with state and federal agencies (MVP 2017, 2022). Mature forest, which could support the presence of small whorled pogonia, is not present within the Stallworth Compressor Station site. Based on previous surveys and lack of suitable habitat, small whorled pogonia is not reasonably expected to occur in relevant proximity to the Stallworth Compressor Station site. As a result, the Boost Project will have no effect on small whorled pogonia.

1.3.1.6. Smooth coneflower

Smooth coneflower, an herbaceous perennial in the aster family (*Asteraceae*), grows up to 3 to 4 feet tall from a vertical root stock (USFWS 1995). Basal leaves may reach 8 inches in length and 3 inches wide and are smooth to slightly rough in texture (USFWS 1995). Stems are smooth and contain fewer leaves than the base. Flower heads are usually solitary and contain 13 to 21 rays that are light pink to purplish, usually drooping, and 2 to 3.2 inches long (USFWS 1995). Flowering occurs from late May through mid-July, with fruits developing from late June to September. Fruiting structures often persist through autumn. Smooth coneflower prefers open, sunny areas where competition from other plants is minimal, and it requires neutral to alkaline soils rich in calcium and magnesium in well drained areas (USFWS 1995). Scattered populations are found in Georgia, North Carolina, South Carolina, and Virginia (USFWS 1995).

A review of the USFWS IPaC online tool indicated that smooth coneflower potentially could occur within the portion of the Action Area associated with the Swann Compressor Station site (Section 3.5) in Montgomery County, Virginia (USFWS 2025e). Mountain Valley consulted with the VDCR Natural Heritage Program for the Boost Project, which indicated that, although a predictive model identified the potential for suitable smooth coneflower habitat in the vicinity of the Swann Compressor Station site, VDCR did not recommend field surveys and determined that the Boost Project will not affect any state-listed plant species, including smooth coneflower (VDCR 2025). Additionally, smooth coneflower was not detected in surveys conducted in adjacent areas prior to construction of the MVP Mainline Project (MVP 2017, 2022). Based on the expected absence of smooth coneflower in relevant proximity to the Swann Compressor Station site, the results of prior surveys, and feedback from VDCR, the Boost Project will have no effect on smooth coneflower.

1.3.1.7. Virginia spiraea

Virginia spiraea is a perennial shrub 3 to 13 feet tall that forms dense thickets of erect or arching stems (USFWS 1992b). Leaves (1 to 6 inches) are alternate, lance-shaped, oval, or oblong, and taper to a short leaf stalk. Leaf edges are smooth or toothed only above the middle, and lower surfaces are a powdery white (USFWS 1992b). Small (<0.25 inch), white flowers (5 petals) form showy clusters approximately 2 to 3 inches wide (USFWS 1992b). Fruit pods occur in clusters from August to October. Virginia spiraea is found along scoured banks of high gradient streams or on meander scrolls, point bars, natural levees, and braided features of lower stream reaches (USFWS 1992b). This species requires occasional scouring floods to reduce competition from other shrubs. Most existing populations of Virginia spiraea consist of only a few plants in scattered locations in Georgia, Kentucky, North Carolina, Ohio, Tennessee, Virginia, and West Virginia (USFWS 1992b, USFWS 2025n).

A review of the USFWS IPaC online tool indicated that Virginia spiraea potentially could occur within the portion of the Action Area associated with the Stallworth Compressor Station site (Section 3.5) in Fayette County, West Virginia (USFWS 2025d). However, Virginia spiraea was not detected in surveys conducted in the vicinity of the Stallworth Compressor Station site prior to construction of the MVP Mainline Project (MVP 2017). Activities associated with the Boost Project in Fayette County, which include the planned expansion of the Stallworth Compressor Station, will occur entirely within the previously approved limit of disturbance for the MVP Mainline Project that was the subject of previous surveys (all of which were negative for the species) and consultation with state and federal agencies (MVP 2017, 2022). Additionally, there are no areas within or in relevant proximity to the Stallworth Compressor Station site that would be considered suitable habitat for Virginia spiraea because the location includes no wetland or riparian areas. Based on previous surveys, lack of suitable habitat, and the expected absence of Virginia spiraea in relevant proximity to the Stallworth Compressor Station site, the Boost Project will have no effect on Virginia spiraea.

1.4. Bat Studies, Assessments, and Surveys Completed in Support of or Relevant to the Boost Project

Qualified biologists completed species-specific studies, assessments, and surveys for federally listed bat species for the MVP Mainline Project based on coordination with the USFWS between 2015 and 2022 (MVP 2017, 2022). While a majority of the surveys were completed more than 5 years ago (USFWS 2024f)[5], the surveys indicate potential presence of suitable summer habitat and federally listed bat species occurrence in the vicinity of the Boost Project. The results of those efforts are summarized below with a focus on those that are relevant to the Boost Project and its Action Area.

1.4.1. Mist-net Surveys

In 2015 and 2016, Mountain Valley conducted mist-net surveys along the MVP Mainline Project route (MVP 2017). Methods were consistent with the USFWS 2015 Range-wide Indiana Bat Summer Survey Guidelines (USFWS 2015a), which were also applicable to northern long-eared bats for summer surveys at the time. No Indiana bats were captured during surveys. [redacted] No northern long-eared bats were captured within 3.0 miles of the Bradshaw or Swann Compressor Station sites. [redacted] There were no tricolored bat captures within 3.0 miles of the Bradshaw, Harris, or Stallworth Compressor Station sites.

1.4.2. Portal Search and Harp Trapping Surveys

From November 2014 to January 2017, searches for potential winter habitat suitable for use by bats, such as voids and underground features/portals, were conducted along the MVP Mainline Project route (MVP 2017). Potentially suitable portals in Virginia and West Virginia were surveyed using harp traps in 2015 and

[5] USFWS's survey guidance indicates that survey results typically are considered valid for a period of five years (USFWS 2024f). Although the mist-net surveys for the 2017 MVP Mainline Biological Assessment were completed in 2015, the results of these surveys are summarized in this document as relevant, though not conclusive, data.

2016. [redacted] No bats were captured at the other portals surveyed.

Additional portal assessments were conducted along the MVP Mainline Project route in 2020 (MVP 2022). Three additional known occupied northern long-eared hibernacula were identified within Virginia and West Virginia, all of which are located more than 5.0 miles from the Boost Project Action Area. Of the 3 known occupied northern long-eared bat hibernacula, two were also known occupied Indiana bat hibernacula, however, both are located more than 5.0 miles from the Boost Project Action Area.

1.4.3. Tricolored Bat Hibernacula Assessment

Tricolored bat hibernacula occurrence information was obtained for the MVP Mainline Project in 2022 (MVP 2022). Eleven known occupied tricolored bat hibernacula were identified in Virginia and West Virginia, all of which are located more than 3 miles from the Boost Project Action Area.

1.4.4. Acoustic Monitoring

Bat acoustic monitoring was conducted at specified cave openings in [redacted] Acoustic monitoring began June 30, 2023, and is planned to continue through March 2026. [redacted] Indiana bats and northern long-eared bats were qualitatively confirmed in 2023 (summer [May 16 – August 15], fall [August 16 – November 14], and winter [November 15 – March 31]), and during all seasons in 2024 (WEST 2024, 2025, WEST unpublished data), and tricolored bats were qualitatively confirmed in all seasons in 2024 (WEST 2025; WEST unpublished data).

1.5. Listing, Recovery, and Critical Habitat

This BA provides information on the threats warranting the protection of species under the ESA (listing factors), the status of recovery efforts at reducing those threats, and relevant information associated with designated critical habitat. This information is provided for the following species:

- Indiana bat (Section 4.1)
- Northern long-eared bat (Section 4.2)
- Tricolored bat (Section 4.3)
- Monarch butterfly (Section 4.4)

1.5.1. Listing Factors

Information is provided for each species regarding the threats that the USFWS identified for the species in its listing decision or proposal. At the time of listing, the USFWS assessed the best scientific and commercial information available regarding past, present, and future threats to the species to complete the ESA's 5--factor analysis: present or threatened destruction, modification, or curtailment of its habitat or range; overutilization of the species for commercial, recreational, scientific, or educational purposes; disease or predation; inadequacy of existing regulatory mechanisms; and other natural or manmade factors affecting its continued existence. This BA includes available information on the listing factors relative to current conditions.

1.5.2. Recovery Status

This BA includes relevant and current information on the progress of recovery efforts for each species. It summarizes recovery plan content (where available); describes recovery goals, objectives, and criteria; and identifies specific recovery actions that have been taken. This information helps provide a measure of success toward recovery. As appropriate, information from 5-Year Reviews and Species Status Assessments (SSA) has been included along with species recovery potential.

1.5.3. Critical Habitat

As relevant and appropriate, this BA includes information on critical habitat for listed species where it has been designated. As defined, critical habitat consists of:

- Specific areas within the geographical area occupied by the species at the time of listing that contain physical or biological features essential to the conservation of the species and that may require special management considerations or protection; and
- Specific areas outside the geographical area occupied by the species at the time of listing if the agency determines that such areas are essential to the conservation of the species.

This BA also addresses where the Boost Project Action Area is located relative to designated critical habitat and appropriate physical and biological features when relevant.

1.6. Purpose of the Biological Assessment

This BA evaluates potential impacts to federally listed species and critical habitat, as well as species that are proposed for federal listing and may occur within the Boost Project Action Area associated with the development of the Boost Project in Braxton, Fayette, and Wetzel Counties, West Virginia, and Montgomery County, Virginia.

2. Proposed Action

2.1. Project Purpose and Location

The purpose of the Boost Project is to expand the existing MVP Mainline infrastructure to increase system capacity and delivery capabilities, and transport additional volumes of natural gas from interconnection points in response to increased demand. Specifically, the Boost Project is designed to transport natural gas from interconnection points with Equitrans, L.P. at Mobley Run and EQM Gathering Opco, LLC at Great Hammerhead to delivery points on the MVP Mainline system as well as MVP Southgate Project in order to meet the specific requests for natural gas transportation service from Boost Project shippers. The Boost Project will provide firm natural gas transportation services for the shippers to meet growing supply and resiliency needs via existing interconnections on the MVP Mainline.

Mountain Valley plans to expand three existing compressor stations and construct one new compressor station to provide timely and cost-effective access to the growing demand for natural gas for use by local distribution companies, industrial users, and power generation in the Mid-Atlantic and Southeastern markets, as well as potential markets in the Appalachian region. The Boost Project will include a total addition of approximately 265,750 horsepower (hp) of compression at ISO conditions from the proposed modifications and operation at the existing Bradshaw, Harris, and Stallworth Compressor Stations, and the construction of the new Swann Compressor Station, including ancillary facilities required for safe and reliable operations (Figure 1-1). The Boost Project will create approximately 600,000 dekatherms per day of incremental natural gas capacity on the existing MVP Mainline. The Boost Project will leverage the existing 303-mile MVP Mainline system, by adding compression at each of the three existing compressor stations in Wetzel, Braxton, and Fayette Counties, West Virginia, and adding a new compressor station in Montgomery County, Virginia, thereby minimizing the need for new construction and associated environmental impacts, while supporting the region's growing natural gas demand. The Boost Project is expected to be in service by mid-2028.

2.1.1. Bradshaw Compressor Station Expansion

The existing Bradshaw Compressor Station began operating as part of MVP Mainline (FERC Docket No. CP16-10-000) in June 2024. It is located at milepost (MP) 2.8 along the existing MVP Mainline in Wetzel County, West Virginia. The Bradshaw Compressor Station boosts gas from the starting point of the MVP Mainline for relay delivery to the Harris Compressor Station.

The existing Bradshaw Compressor Station currently contains four Solar Titan 130E gas-driven turbines, which combined provide approximately 93,880 hp of compression at ISO conditions. The proposed Bradshaw Compressor Station expansion will consist of one additional Titan 130E gas-driven turbine, which will add approximately 23,470 hp of compression for a total station combined compression of 117,350 hp at ISO conditions. Upon completion of the Boost Project, the Bradshaw Compressor Station will raise the pressure from about 600 pounds per square inch (gauge; [psig]) up to 1,450 psig.

The existing station includes a compressor building, two electrical control buildings, an office building, and an air compressor building, with a chain-link security fence installed around the perimeter of the site. Existing equipment at the station includes gas filters and separators, fuel gas heaters, gas coolers, condensate and used oil tanks, inlet air filters, exhaust silencers, blowdown silencers, and auxiliary microturbines. The existing compressor building at the site will be expanded within the fence line to enclose the new Titan 130E turbine. As part of the proposed expansion of the Bradshaw Compressor

Station, a microturbine generator will also be installed to provide additional primary electric power to the compressor station.

The Bradshaw Compressor Station expansion will be contained within the existing permanent footprint of the existing station and no new temporary workspace is required. One temporary laydown yard is proposed to support construction at the Bradshaw Compressor Station as described in Section 2.4.4. This temporary laydown yard already exists, having been previously utilized for the original construction of the Bradshaw Compressor Station and the MVP Mainline. The laydown yard is currently being utilized by a third party. Land requirements for the Bradshaw Compressor Station are summarized in Table 2-1 and 2-2.

Construction and operation of the Bradshaw Compressor Station expansion will require the use of an existing permanent access road, as further described in Section 2.4.3. The access road was previously developed for the original construction of the Bradshaw Compressor Station.

2.1.2. Harris Compressor Station Expansion

The existing Harris Compressor Station began operating as part of MVP Mainline in June 2024. It is located at MP 77.5 along the existing MVP Mainline in Braxton County, West Virginia. The Harris Compressor Station boosts gas in the MVP Mainline that comes from the Bradshaw Compressor Station for relay delivery to the Stallworth Compressor Station.

The existing Harris Compressor Station currently contains two Titan 130 gas-driven turbines, which combined provide a total of approximately 41,000 hp at ISO conditions. The proposed Harris Compressor Station expansion will consist of one additional Titan 350 gas-driven turbine, which will add approximately 52,500 hp of compression for a total station combined compression of 93,500 hp at ISO conditions. Upon completion of the Boost Project, the Harris Compressor Station will increase natural gas pressure from about 600 psig to up to 1,450 psig.

The existing station includes a compressor building, an electrical control building, an office building, and an air compressor building, with a chain-link security fence installed around the perimeter of the site. The proposed new Titan 350 turbine at the Harris Compressor Station will be enclosed and will not require an additional compressor building or expansion of the existing building. Existing equipment at the station includes gas filters, fuel gas heaters, gas coolers, condensate and used oil tanks, inlet air filters, exhaust silencers, blowdown silencers, and auxiliary microturbines. As part of the proposed expansion of the Harris Compressor Station, Mountain Valley will relocate existing blowdown silencers and install a microturbine generator to provide additional primary electric power. The existing Harris Compressor Station footprint will be expanded by approximately 0.1 acre to accommodate the relocated blowdown silencers at the site; however, the expansion and temporary workspace associated with the Boost Project will be contained within the existing workspace previously developed for the MVP Mainline. The fence line at the Harris Compressor Station will be expanded to include the updated footprint, also within the existing workspace.

Two temporary laydown yards are proposed to support Boost Project construction at the Harris Compressor Station as described in Section 2.4.4. These temporary laydown yards were previously developed for the original construction of the Harris Compressor Station for the MVP Mainline. Land requirements for the Harris Compressor Station are summarized in Table 2-1 and 2-2.

Construction and operation of the Harris Compressor Station expansion will also require the use of an existing permanent access road as further described in Section 2.4.3. The access road was previously developed for original construction of the Harris Compressor Station.

2.1.3. Stallworth Compressor Station Expansion

The existing Stallworth Compressor Station began operating as part of MVP Mainline in June 2024. It is located at MP 154.2 along the existing MVP Mainline in Fayette County, West Virginia. The Stallworth Compressor Station boosts gas in the MVP Mainline that comes from the Harris Compressor Station and will relay delivery to the proposed Swann Compressor Station.

The existing Stallworth Compressor Station currently contains two Titan 130 gas-driven turbines, which combined provide a total of approximately 41,000 hp at ISO conditions. The proposed Stallworth Compressor Station expansion will consist of upgrades to the two existing compressors, which will increase the combined hp by 5,940 to a combined total compression of 46,940 hp at ISO conditions, and installation of two additional Titan 130E gas-driven turbines, which will add approximately 46,940 hp of additional compression at ISO conditions. Therefore, an additional 52,880 total hp are proposed at the Stallworth Compressor Station for a total station combined compression of 93,880 hp at ISO conditions. Upon completion of the Boost Project, the Stallworth Compressor Station will increase the natural gas pressure from about 600 psig to up to 1,450 psig.

The existing station includes a natural gas compressor building, an electrical control building, an office building, and an air compressor building, with a chain-link security fence installed around the perimeter of the site. As part of the proposed expansion of the Stallworth Compressor Station, the existing compressor building will be expanded to enclose the new turbines. Existing equipment at the station includes gas filters, fuel gas heaters, gas coolers, condensate and used oil tanks, inlet air filters, exhaust silencers, blowdown silencers, and auxiliary microturbines. As part of the proposed expansion of the Stallworth Compressor Station, Mountain Valley will also relocate existing blowdown silencers and install a microturbine generator to provide additional primary electric power to the compressor station. The Stallworth Compressor Station footprint will be expanded by 0.5 acre to accommodate the building expansion and relocated blowdown silencers at the site; however, the expansion and temporary workspace associated with the Boost Project will be contained within the existing workspace previously developed for the MVP Mainline. The fence line at the Stallworth Compressor Station will be expanded to include the facilities, again within the existing workspace. Land requirements for the Stallworth Compressor Station are summarized in Table 2-1 and 2-2.

Construction and operation of the Stallworth Compressor Station expansion will require the use of an existing permanent access road, as further described in Section 2.4.3. The access road was previously developed for the original construction of the Stallworth Compressor Station.

2.1.4. Proposed Swann Compressor Station

The Swann Compressor Station is proposed to be constructed at MP 236 along the existing MVP Mainline in Montgomery County, Virginia. The Swann Compressor Station will boost gas in the MVP Mainline that comes from the Stallworth Compressor Station for relay to delivery points on the MVP Mainline system as well as the MVP Southgate Project.

The proposed compressor station will contain two Titan 350 gas-driven turbines and one Titan 250 gas-driven turbine, which combined will provide a total of approximately 136,900 hp of compression at ISO conditions. The Swann Compressor Station is designed to raise natural gas pressure from about 600 psig to up to 1,450 psig.

The Swann Compressor Station is designed to include approximately four structures (two electrical control buildings, an office building, and an air compressor building), with a chain-link security fence installed around the perimeter of the site. Planned equipment at the station will include a gas filter, gas coolers, inlet air filters, exhaust catalyst/silencers, condensate and used oil tanks, blowdown silencers, heaters, a transformer, and auxiliary microturbines. Mountain Valley also will install cathodic protection consisting of a deep anode ground bed system along the station perimeter at the Swann Compressor Station.

Construction of approximately 0.2 miles of new 42-inch-diameter dual lay natural gas suction and discharge facilities will be required at the Swann Compressor Station to connect the proposed compressor station to the existing MVP Mainline. At the proposed connection point, two taps and two temporary valves will be installed within the MVP Mainline permanent right-of-way. The temporary valves will be installed above ground to divert flow through a bypass so MVP Mainline operations can continue as normal during the connection to the Swann Compressor Station. However, once the tie-in at the station is made and flow is initiated, the temporary valves will be removed, the tap will be sealed, and the MVP Mainline will be reburied. A mainline block valve (MLV) consisting of a bypass valve will be installed within the compressor station fence line, as further discussed in Section 2.1.4.1.

The suction and discharge facilities at the Swann Compressor Station will operate at a maximum allowable operating pressure (MAOP) of 1,480 psig and will be constructed in compliance with 49 CFR Part 192 and other applicable standards.

The proposed compressor station will also house a new pig launcher and receiver within the fence line. Pig launching and receiving facilities are designed to accommodate in-line inspection tools (smart pigs) for periodic internal inspections and suction and discharge facilities during operations. A pig launcher will be installed at the discharge side of the Swann Compressor Station, and a pig receiver will be installed on the suction side.

Primary and backup telecommunications services will be provided for the Swann Compressor Station. Primary telecommunications service will be by cellular service provider, with secondary communications by Starlink satellite service. No communication tower is proposed for the Swann Compressor Station site.

Primary and backup electric services will be provided for the Swann Compressor Station. A group of microturbine generators will be installed to supply primary electric power to the compressor station. Backup power to the Swann Compressor Station will be commercially purchased from the local distribution company and an electric utility power feed will be installed.

A temporary laydown yard is proposed to support construction at the Swann Compressor Station as described in Section 2.4.4. The area that will be used for this temporary Swann Laydown Yard was previously developed for construction of the MVP Mainline. Construction and operation of the Swann Compressor Station will use existing access roads, as described further in Section 2.4.3. Land requirements for the Swann Compressor Station are summarized in Table 2-1 and 2-2.

2.1.4.1. Mainline Block Valve

Only one new MLV will be installed for the Boost Project, and it will be installed within the fence line of the proposed Swann Compressor Station. The MLV at this location will be a bypass valve that will be used to allow gas to continue to flow along the MVP Mainline if the compressor station is shut down for maintenance. The MLV will be buried with above-ground appurtenances and equipped with valve actuators to allow for local or remote operation. The MLV will be capable of closing via a remote signal and will be contained within a fenced, gated, and locked area. Land requirements for the MLV include land within the existing operation of the Bradshaw, Harris, and Stallworth Compressor Stations and land within the existing operation of the MVP Mainline permanent right-of-way (Table 2-1 and 2-2).

The MLV will have a system of automatic alarms that connect to a control center operated 24 hours per day, 7 days a week, so a gas controller can shut the valve while managing the rest of the system and compressor station to manage any over-pressure.

Table 2-1: Land Requirements for the Boost Project.

Facility	Land Required for Construction (acres)[1]	Land Required for Operation (acres)[1]
Compressor Stations	0.3	42.1[2]
MLV site[3]	0	0
Pig Launcher/Receiver Site[3]	0	0
Laydown Yards[4]	21.6	0
Access Roads[4]	0	0
Total Land Requirements	**21.9**	**42.1**

1. Land required for operation will also be used during construction of the Boost Project. Acreage totals for land required for construction reflect only land that will not be used during operation.
2. Of this total, 17.8 acres are within the existing operation of the Bradshaw, Harris, and Stallworth Compressor Stations, and an additional 0.3 acre of this total is within the existing operation of the MVP Mainline permanent right-of-way.
3. The one new MLV and pig launcher and receiver that will be installed for the Boost Project will be installed within the construction and operational area at the Swann Compressor Station site; therefore, no additional land is required for these facilities.
4. The Bradshaw laydown yard was previously used for the original construction of the Bradshaw Compressor Station and is currently being utilized by a third party. The Harris and Swann laydown yards were previously developed and used for the original construction of the Harris Compressor Station and MVP Mainline. The Harris laydown yards were restored with a West Virginia native seed mix, and the Swann laydown yard was restored to an open herbaceous field.
5. All access roads are existing. Acreage for disturbance due to access road modifications for the Swann Compressor Station are included in the land required for operation of the Swann Compressor Station.

Table 2-2: Land Requirements for the Boost Project Aboveground Facilities.

Facility Name	Approximate MP	Construction[1]		Operation[1]	
		Within Existing Operation[2]	Additional Land Required (acres)[3]	Within Existing Operation[2]	Additional Land (acres)[4]
Existing Bradshaw Compressor Station Expansion	2.8	0	0	6.3	0
Existing Harris Compressor Station Expansion	77.5	0	0	5.6	<0.1
Existing Stallworth Compressor Station Expansion	154.2	0	0	5.9	0.5
Proposed Swann Compressor Station	236	0	0.3	0.4	23.4
MLV[5]	236	0	0	0	0
Pig Launcher and Receiver[5]	236	0	0	0	0
Total Land Requirements for Aboveground Facilities		**0**	**0.3**	**18.2**	**23.9**

Facility Name	Approximate MP	Construction[1]		Operation[1]	
		Within Existing Operation[2]	Additional Land Required (acres)[3]	Within Existing Operation[2]	Additional Land (acres)[4]

1. Land required for operation will also be used during construction of the Boost Project. Acreage totals for land required for construction reflect only land that will not be used during operation.
2. Includes land within the existing operation of the Bradshaw, Harris, and Stallworth Compressor Stations and land within the existing operation of the MVP Mainline permanent right-of-way.
3. All land required for construction presented is also within land previously approved for the construction of the MVP Mainline.
4. Includes only additional land required for operation that is not currently used for compressor station operation or the MVP Mainline permanent right-of-way.
5. The one new MLV and pig launcher and receiver that will be installed for the Boost Project, will be installed within the construction and operational area for the Swann Compressor Station site; therefore, no additional land is required for these facilities.

2.2. Construction Timeline

The Boost Project schedule is dependent upon obtaining all necessary authorizations, which will then dictate when Boost Project activities can begin. Mountain Valley will begin tree-clearing activities as soon as allowed, subject to its tree clearing avoidance and minimization measures (AMMs) discussed in Section 2.5.

In general, construction activities will occur six days per week from 7:00 a.m. to 7:00 p.m. or daylight hours except activities that would require around-the-clock operations, which include hydrostatic testing and subsequent pig runs to clean and dry the pipe, as well as tie-in welds. In spring, summer, and fall, when sunset occurs later in the evening, construction activities may continue after 7:00 p.m. but will be limited to daylight hours.

Restoration will begin immediately following compressor station construction at each site and continue until vegetation is successfully established.

2.3. Life of the Project

The Boost Project currently has no plans for either future expansion or abandonment of the facilities. Market forces will determine the timing and need of any expansions that may be warranted in the future.

2.4. Facilities and Infrastructure

This section provides an overview of the typical and specialized construction methods that will be implemented on the Boost Project. Mountain Valley anticipates it will employ the following procedures to construct the Boost Project; however, deviations are possible based on actual field conditions or to comply with regulatory requirements.

2.4.1. Typical Construction Procedures

Mountain Valley will conduct all construction activities in accordance with applicable federal and state regulations and guidelines, as well as the specific requirements of applicable permits. In addition to adopting the FERC *Upland Erosion Control, Revegetation, and Maintenance Plan* (2013a) and *Wetland and Waterbody Construction and Mitigation Procedures* (2013b; FERC Plan and Procedures), Mountain Valley will develop its own site-specific E&SC Plan based on the topography at each site and in accordance with all applicable laws. The E&SC Plan will be employed in conjunction with the FERC Plan and Procedures.

Prior to initiating construction-related activities, Mountain Valley will secure one permanent easement for the new suction and discharge facilities. The majority of the Boost Project is within Mountain Valley ownership or existing permanent rights-of-way; however, some land rights may be required for laydown yards and temporary workspace. Outside of the permanent facilities, property will be returned to approximate original contours as part of the restoration process. Ground temporarily disturbed during construction will be stabilized as described in the FERC Plan and Procedures and Mountain Valley's E&SC Plan; however, plant seed mix components may vary based on site conditions, landowner requests, and coordination with agencies.

Most areas around the buildings and associated piping and equipment will be covered with crushed rock (or equivalent) to minimize the amount of maintenance required. Permanent roads and parking areas may be crushed rock. Construction procedures for above-ground facilities are described in more detail in Section 2.4.3. Other ground surfaces will be vegetated.

2.4.1.1. Welding

Specific to the suction and discharge facilities at the Swann Compressor Station, after trenching, the steel pipe will be transported to the site placed along the excavated trench in a single, continuous line, easily accessible to the construction personnel on the working side of the trench, typically opposite the spoil side. This will allow the subsequent lineup and welding operations to proceed efficiently. Prior to welding, selected joints will be bent in the field by track-mounted hydraulic bending machines to allow the facilities to follow natural grade and direction changes along the alignment. 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. Only qualified welders will be allowed to perform the welding, or automated welding techniques may be used. Welders and welding procedures will be qualified according to applicable American Society for Mechanical Engineers, American Petroleum Institute (API), and 49 CFR Part 192 Standards.

To ensure that the assembled pipe for the suction and discharge facilities will meet or exceed design strength requirements, the completed welds will be visually inspected and tested for integrity using non-destructive examination (NDE) methods such as radiography (X-ray) or ultrasound in accordance with API standards. Following welding, the previously uncoated ends of the pipe at the joints will be epoxy coated. The coating on the completed pipe section will be inspected and damaged areas will be repaired. Coating will be inspected prior to lowering in accordance with applicable industry standards.

2.4.1.2. Surveying and Staking

A civil survey crew will stake the outside LOD for the construction work area, the location of the facility piping, elevations, access roads, temporary extra workspace, such as laydown areas, and environmental resources such as streams or wetlands in the Boost Project area. The "One Call" system of each state will be contacted and underground public utilities (e.g., cables, conduits, and pipelines) will be located and flagged. Affected landowners will be notified prior to surveying and staking.

2.4.1.3. Clearing and Grading

The work area will be cleared of obstructions and vegetation to the extent applicable (i.e., trees and stumps, brush, logs, and large rocks) according to the FERC Plan and as outlined in Mountain Valley's Project-specific E&SC Plan that will be developed. Timber will be chipped and taken offsite for disposal, unless otherwise agreed to with the landowner. At no time will Mountain Valley or its contractor clear or alter any areas outside of the boundaries of the Boost Project area. Best Management Practices (BMPs) will be properly maintained throughout construction and will remain in place until permanent erosion controls are installed, or restoration is completed. The compressor station sites will be graded as necessary to facilitate compressor station construction and future operation.

2.4.1.4. Excavation and Backfilling

Excavation for foundations and underground facilities will typically be completed with a track-mounted backhoe, or similar equipment. Explosives will only be used if necessary in areas where rock substrates are found at depths that interfere with conventional excavation methods (Section 2.4.1.7). Along the suction and discharge facilities, a trench will be excavated at least 12 inches wider than the diameter of the pipe. The sides of the trench will be sloped with the top of the trench up to 12 feet across, or more, depending upon the stability of the native soils. The trench will be excavated to a sufficient depth to allow a minimum of three feet of soil cover between the top of the facility and the final land surface after backfilling.

Excavated soils will typically be stockpiled for reuse on-site as backfill to the extent practicable. Excess soil that cannot be reused or stockpiled on site would be taken offsite for disposal at a licensed facility or permitted reuse in accordance with all applicable state and federal regulations. For the suction and discharge facilities, excavated soils will typically be stockpiled along the side of the trench. Previously excavated materials will be pushed back into the trench using equipment. 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.

2.4.1.5. Hydrostatic Testing

Following backfilling of the suction and discharge facilities at the Swann Compressor Station site, the facilities will be hydrostatically tested to ensure they are capable of safely operating at the design pressure. Approximately 120,000 gallons of water will be required to test the suction and discharge facilities and is anticipated to be obtained from municipal sources. The suction and discharge facilities will be capped with test manifolds, filled with water, and pressurized to a minimum of 1.5 times the designed MAOP for a minimum of eight hours in accordance with the U.S. Department of Transportation (USDOT) requirements identified in 49 CFR Part 192 prior to being placed in service. Loss of pressure that cannot be attributed to other factors, such as temperature changes, will be investigated. Leaks will be repaired and the segment will be retested.

It is anticipated that test water will be released through an energy-dissipating device in compliance with local E&SC requirements and, as necessary, National Pollutant Discharge Elimination System (NPDES) permit conditions. Test water will be released at an approved, well-vegetated upland location at a regulated low-flow rate to prevent erosion and sediment transport. Test water will contact only new pipe, and no chemicals will be added, except that a de-chlorinating agent may be added, if required, prior to release.

Once testing has been completed successfully and the pipe is dried, the test manifolds will be removed, and the suction and discharge facilities will be connected to the MVP Mainline and compressor station. Desiccant will not be used to dry the pipe. Mountain Valley will implement Section VII of the FERC Procedures regarding hydrostatic testing, as well as any specifications in individual state permit guidelines.

2.4.1.6. Cleanup and Restoration

Post-construction restoration activities will be undertaken in accordance with the measures specified in the FERC Plan and Procedures as applicable. After backfilling, construction workspaces, the right-of-way, and other disturbed areas will be finish-graded, and construction debris will be disposed of properly. Temporary and permanent E&SC measures, including silt fencing, diversion terraces, and vegetation, will be installed at that time. Private and public property, such as fences, gates, driveways, and roads that have been disturbed by the construction will be restored to original or better condition.

Restoration of temporarily disturbed areas will be considered successful if the disturbed surface condition is similar to adjacent undisturbed lands, construction debris is removed (unless requested otherwise by the landowner), revegetation is successful, proper drainage has been restored, and the appropriate federal and state agencies approve as appropriate.

2.4.1.7. Blasting

Mountain Valley will minimize the amount of blasting required to the extent practicable. Blasting may be necessary where unrippable subsurface rock is encountered. Mountain Valley has identified shallow rock that may require blasting in areas of the Harris and Swann Compressor Station sites. All blasting for the proposed Boost Project, if necessary, is anticipated to be limited to locations within Mountain Valley-owned property. Mountain Valley is committed to implementing measures to prevent any risk of damage to underground structures (e.g., cables, conduits, and pipelines) or to springs, water wells, and other water sources, and to other natural resources, including federally listed species and their habitats. Blasting mats or padding will be used as necessary to prevent the scattering of loose rock. Per Section III of the FERC Plan, Mountain Valley has developed a Blasting Plan and will finalize the Blasting Plan in consultation with the appropriate agencies. Pre-blast plans will be developed and submitted to all necessary state and federal agencies. All blasting will be conducted during daylight hours and will not begin until occupants of nearby buildings, stores, residences, places of business, and farms have been notified. All blasting will be conducted in accordance with Mountain Valley's Blasting Plan.

2.4.1.8. Excavation Dewatering

In most cases, dewatering will be limited to the removal of storm water, if necessary, from the excavations for foundations and underground facilities in upland areas. Dewatering will be conducted in a manner that does not cause erosion and does not result in heavily silt-laden water flowing into any waterbody or wetland. The storm water will be discharged to an energy dissipation/filtration dewatering device, such as a hay bale structure. Heavily-silt laden water may first be passed through a filter bag. The dewatering structure will be removed as soon as possible after completion of the dewatering activities.

2.4.1.9. Winter Construction

Mountain Valley does not expect that construction activities will occur in frozen ground conditions, but construction could occur during times of snowfall in West Virginia and Virginia, particularly at higher elevations. Therefore, construction methods will incorporate measures to handle construction activities for the Boost Project during the inclement winter season and protect from erosion or other damage during the winter months. Mountain Valley is proposing to begin cutting and clearing trees in winter 2026-2027. As necessary during snow accumulation, snow will be removed from construction work areas to expose soils for grading and excavation. Snow removal will be limited to active construction areas and areas needed to maintain access. Snow will be bladed or pushed to the edges of the construction area with a motor-grader, snowplow, or bulldozer fitted with a "shoe" to minimize impacts on underlying soils and vegetation and stockpiled within workspace. Snow removal equipment will access the Boost Project areas from approved, existing access roads and will operate from within approved construction workspace areas. E&SC devices and diversion berms will be installed where needed to control snow and melting run off.

2.4.2. Aboveground Facilities

Typical construction activities associated with the installation of the above-ground facilities are summarized below. Construction activities and storage of construction materials and equipment will be confined within the compressor station site boundaries. The facilities will be constructed in accordance with Mountain Valley construction standards and specifications as described in the sections that follow.

2.4.2.1. Foundations

Reinforced concrete foundations will be built to support new facilities at each of the stations. Excavation will be performed to accommodate the new reinforced concrete foundations for the compressors, microturbine generators, transformer, launching and receiving facilities, filtration equipment, coolers, and buildings. Subsurface piles may be required to support the foundations depending upon the bearing capacity of the existing soils and the equipment loads. Forms will be set, rebar installed, and the concrete placed and cured in accordance with applicable industry standards. Concrete batches for equipment and building foundations will be tested to verify compliance with minimum strength requirements. Backfill will be compacted and excess soil will be used elsewhere, stockpiled, or distributed around the site to improve grade.

2.4.2.2. Equipment

The compression, facility piping, and other equipment will be shipped to the sites by truck. The equipment will be offloaded using cranes or other appropriate material handling equipment. The equipment will then be positioned on the foundations, leveled, grouted where necessary, and secured with anchor bolts. Non-screwed piping associated with the above-ground facilities will be welded, except where connected to flanged components. Welders and welding procedures will be qualified in accordance with API standards. Welds in gas piping systems will be examined using radiography, ultrasound, or other approved NDE methods to ensure compliance with code requirements. Aboveground piping surfaces will be cleaned and coated in accordance with Mountain Valley construction specifications. Coating inspection and cleanup will be conducted in accordance with regulatory requirements and best engineering practices.

2.4.3. Access Roads

Mountain Valley plans to use existing permanent roads for access to the three existing compressor stations. At the Swann Compressor Station, Mountain Valley plans to use an existing permanent access road (MVP-MLV-AR-28) with modifications that include widening, grading, and stabilization. Mountain Valley also will modify a previously temporary access road (MVP-MLV-AR-28.01) that was used for the MVP Mainline construction to be a permanent access road, including widening, grading, stabilization, and a modification to adjust the alignment to the entrance of the new proposed compressor station site. No new easements will be required for access roads.

Where existing roads are upgraded or modified, temporary erosion control measures may be used during construction, but will be removed upon final stabilization, approval from applicable federal and state agencies, and installation of any permanent erosion control measures. Laydown yards proposed for use during construction are accessible directly from public roadways and do not require additional access roads.

Where impacts from the modification, use, and maintenance of access roads cannot be avoided, Mountain Valley will adopt the FERC Plan and Procedures and will develop its own site-specific E&SC Plan in compliance with applicable law that will stipulate BMPs to minimize impacts. Mountain Valley will implement reduced speed limits on all access roads.

2.4.4. Laydown Yards

Mountain Valley has selected four laydown yards for use during construction of the Boost Project. All proposed laydown yards were previously developed as laydown yards, construction workspace, or additional temporary workspace during the construction of the MVP Mainline. These laydown yards include: MVP-LY-001 in Wetzel County, WV, for the Bradshaw Compressor Station; MVP-CY-002 and MVP-CY-002A in Braxton County, WV for the Harris Compressor Station; and the Swann Laydown Yard in Montgomery County, Virginia, which includes areas of temporary workspace in addition to that used for the MVP Mainline (MVP-ATWS-1566, MVP-ATWS-645) and an adjacent portion of the MVP Mainline construction.

Mountain Valley has maximized use of existing developed sites close to the Boost Project for laydown yards. As such, laydown yards were designed to avoid streams, wetlands, and other sensitive habitats. No tree clearing is proposed for any of the Boost Project laydown yards. Mountain Valley will use laydown yards during construction to fabricate facilities, stage construction equipment, store materials, park equipment, and set up temporary construction offices.

Laydown yard MVP-LY-001 is an approximately 2.7-acre existing gravel yard located at the intersection of the Shortline Highway and County Road 20/10 (Bates Run) in Jacksonburg, West Virginia (Wetzel County). A drainage ditch and delineated wetland areas are present at the site; however, these will be avoided. Based on the existing gravel surface of the site, it is anticipated that the laydown yard can be used without grading or improvements.

Laydown yards MVP-CY-002 and MVP-CY-002A are contiguous areas totaling a combined 1.5 acres of land west of County Route 25/4 (Milroy Road) in Flatwoods, West Virginia (Braxton County). The laydown yards are located opposite the Milroy Road entrance to the Harris Compressor Station. A wetland swale is present in the northwest corner of MVP-CY-002, but it will be avoided. Although previously used as laydown yards for the MVP Mainline construction, both yards were previously vegetated and restored in April 2020 with an approved West Virginia native seed mix. Therefore, vegetation clearing and placement of stone will be required for use of laydown yards MVP-CY-002 and MVP-CY-002A during construction of the Boost Project.

The Swann laydown yard is located approximately 0.2 mile northeast of the Swann Compressor Station site and consists of approximately 17.4 acres south of Cove Hollow Road, to both the east and west of Howard Drive, in Elliston, Virginia (Montgomery County). The laydown yard is comprised of two additional temporary workspace areas and a portion of the construction corridor from the MVP Mainline construction that have been restored to open herbaceous fields. Therefore, vegetation clearing and placement of stone will be required for use of the Swann laydown yard during construction of the Boost Project.

Land requirements, land ownership, and current land use for laydown yards are provided in Table 2-3. Land use data is based on the National Land Cover Database (NLCD; 2024[6]); however, MVP modified

[6] The annual update of the National Land Cover Database for 2024 was released in September 2024; however, the data product is not currently downloadable.

the land use information to reflect recent land use changes since the mapping was published, based on aerial photography and field investigation.

Upon completion of construction, all temporary facilities (e.g., trailers, sheds, latrines, pipe racks, fencing, and gates) will be removed from the laydown yards. The sites will be re-vegetated (if previously vegetated), and temporary E&SC measures will be removed.

Table 2-3: Proposed Laydown Yards for Construction[1]

Laydown Yard Name	County	State	Location	Land Ownership	Land Use[1]	Acres[2]
MVP-LY-001 (Bradshaw)	Wetzel	WV	Jacksonburg	Private	Developed	2.7
					Subtotal	**2.7**
MVP-CY-002 (Harris)	Braxton	WV	Flatwoods	Private	Open	1.2
					Subtotal	**1.2**
MVP-CY-002A (Harris)	Braxton	WV	Flatwoods	Private	Open	0.3
					Developed	<0.1
					Subtotal	**0.3**
Swann Laydown Yard	Montgomery	VA	Lafayette	Private	Agricultural	13.2
					Developed	4.2
					Subtotal	**17.4**
					Total	**21.6**

1. Based on the National Land Cover Database (2024) with modification to reflect land use changes since the mapping was published based on aerial photography and field investigations.
2. Minor discrepancies in subtotals are due to rounding.

2.4.5. Operation and Maintenance

Mountain Valley will operate and maintain the proposed facilities in compliance with Pipeline and Hazardous Materials Safety Administration regulations provided at 49 CFR Part 192, FERC regulations at 18 CFR § 380.15, and maintenance provisions of the FERC Plan and Procedures.

Compressor station crews will perform operation and maintenance of all equipment. Crews will perform routine checks of the facilities including calibration of equipment and instrumentation, inspection of critical components, and scheduled and routine maintenance of equipment. Safety equipment such as pressure relief devices and fire and gas detection systems will be tested for proper operation. Corrective actions will be taken if problems are identified.

The existing compressor stations are equipped with combustible gas and fire detection alarm systems, as well as emergency shutdown systems. The proposed Swann Station will also be equipped with these systems. The gas detection system will alarm upon detection of 25 percent of the lower explosive limit of natural gas in the air. Automatic emergency shutdown of the compressors, evacuation or venting of gas from the station piping, and isolation of the station from the MVP Mainline will occur following a fire detection alarm or the detection of a 50 percent lower explosive limit inside the station. The compressor stations will also be equipped with relief valves or pressure protection devices to protect the station piping from overpressure if station or unit control systems fail. The stations will be unmanned with start/stop control capabilities controlled by the Mountain Valley's gas control headquarters, located in Canonsburg, Pennsylvania. A telemetry system will notify personnel at the gas control headquarters of the activation of safety systems and alarms as appropriate. The control center for the Mountain Valley system is located at Mountain Valley's offices in Canonsburg, Pennsylvania and is staffed continuously by qualified controllers. The controllers monitor all aspects of the system including system pressures, temperatures, flows, and valve positions (open or closed). Upon activation of safety systems and alarms, maintenance personnel will be dispatched to investigate and take proper corrective actions, if necessary. In case of an emergency at the control center, a secondary control center is available at an alternate back-up site located in Finleyville, Pennsylvania.

The suction and discharge facilities are located in a Class I area as per National Fire Protection Association standard NFPA-70 500 and will be maintained in accordance with the requirement for operation of the adjacent existing MVP Mainline, including inspection, repair, and cleaning. The suction and discharge facilities will be designed for internal inspection technology. The pig launcher and receiver facilities on these lines are proposed to be located within the Swann Compressor Station fence line. Responses to conditions observed during internal inspections will be taken as appropriate.

Cathodic protection systems will also be monitored and inspected in accordance with 49 CFR Part 192 to ensure proper and adequate corrosion protection. Mountain Valley will install cathodic protection consisting of a deep anode ground bed system along the station perimeter at the Swann Compressor Station, similar to the systems in place at the existing compressor stations.

Vegetation on the permanent right-of-way for the suction and discharge facilities will be maintained by mowing, cutting, and trimming. The permanent right-of-way will be allowed to revegetate; however, large brush and trees will be periodically removed in accordance with the FERC Plan and Procedures. In uplands, trees or deep-rooted shrubs could damage the protective coating, obscure periodic surveillance, or interfere with potential repairs and would not be allowed to grow within the permanent right-of-way. Vegetation maintenance will be conducted in accordance with the FERC Plan and Procedures. Since the suction and discharge facilities outside of the Swann Compressor Station property immediately enter the existing permanent maintained right-of-way for the MVP Mainline, right-of-way maintenance for the suction and discharge facilities is anticipated to be limited to the compressor station property.

As needed, underground facilities will be marked in accordance with Pipeline and Hazardous Materials Safety Administration regulations. Mountain Valley participates in "One Call" systems in West Virginia and Virginia.

2.4.6. Quality Assurances Measures

The selected construction contractors will install facilities according to company specifications, the Construction Drawing Package, the terms of the negotiated contract, federal and state permits, and the FERC Plan and Procedures. Mountain Valley will conduct training for all personnel involved on the Boost Project prior to the start of construction or authorization to enter any Boost Project work area. The Boost Project inspectors will be selected from the industry's inspector pool utilizing only qualified third-party contractors. Prior to and during construction, training for field construction personnel and contractor personnel will be conducted. This training will focus on the FERC Plan and Procedures as well as other regulatory requirements for categories such as endangered species, cultural resources, and wetlands. The training will also cover Boost Project-specific construction and mitigation plans, operator qualification, and site-specific safety requirements.

For purposes of quality assurance and compliance with mitigation measures, other applicable regulatory requirements, and company specifications, at least one Chief Inspector will represent Mountain Valley. The Chief Inspector will be assisted by a Lead Inspector, one or more craft inspectors, and NDE technicians. In addition, there will be at least one Environmental Inspector (EI) for each state to monitor the active construction sites. One EI will be designated as the Lead Environmental Inspector (LEI), who in turn reports to the Construction Project Manager at a level equivalent to the Chief Inspector. The EI's duties are consistent with those contained in Section II.B (Responsibilities of the Environmental Inspector) of the FERC Plan and shall be to:

- Monitor and document compliance with all mitigation measures required by FERC's Order and any other grants, permits, certificates, or other authorizing documents;
- Evaluate the construction contractor's implementation of the environmental mitigation measures required in the contract or any other authorizing document;
- Order correction of acts that violate the environmental conditions of FERC's Order, or any other authorizing document (e.g., U.S. Army Corps of Engineers Section 404 permit), including using stop work authority;
- Maintain a full-time position separate from all other activity inspectors; and
- Maintain status reports and training records.

An ample number of copies of the Construction Drawing Package will be distributed to inspectors and to contractors' supervisory personnel. If a contractor's performance is unsatisfactory, the terms of the contract will allow for work stoppage and will require the contractor to begin remedial work.

The Mountain Valley engineering and construction departments are responsible for designing and constructing certificated facilities in compliance with regulatory and contractual requirements and agreements. If technical or management assistance is required, the responsible Mountain Valley Construction Manager and/or Chief Inspector will request assistance from the appropriate company department. The operations department will be responsible for long-term Boost Project maintenance and regulatory compliance once the Boost Project has been placed into service.

2.4.6.1. Environmental Training and Inspection

Consistent with FERC guidelines, environmental training will be given to the Mountain Valley personnel and to contractor personnel whose activities may impact the environment during Boost Project construction.

The level of training will be commensurate with the type of duties of the personnel. All construction personnel from the Chief Inspector, LEI, craft inspectors, and contractor job superintendent to loggers, welders, equipment operators, and laborers will be given the appropriate level of environmental training. The training will be given prior to the start of construction and throughout the construction process, as needed. The training program will cover, as relevant: job-specific permit conditions, contaminated sediment and groundwater management, health and safety, company policies, cultural resource procedures, threatened and endangered species protection and restrictions, Spill Prevention, Control, and Countermeasure (SPCC) Plans, NPDES, Stormwater Pollution Prevention Plan, and any other pertinent information related to the job. In addition to the EIs, all other construction personnel will play an important role in maintaining strict compliance with all permit conditions and legal requirements to protect the environment during construction.

At least one EI will be assigned for each state during active construction and restoration. In addition, Mountain Valley will participate in FERC's third-party construction compliance monitoring program. The LEI will have peer status with all other activity inspectors and will report directly to the Resident Engineer/Chief Inspector who has overall authority on the construction site. The LEI will have the authority to stop activities that violate the environmental conditions of the FERC Certificate (if applicable), other federal and state permits, or landowner requirements, and to order corrective action.

2.5. Project Design Features to Avoid and Minimize Impacts

The Boost Project will avoid and minimize impacts to the natural environment, especially those pertinent to federally listed species and their habitats. Mountain Valley is implementing BMPs for the construction, operation, and maintenance of the Boost Project to minimize impacts to upland areas and to wetlands, waterbodies, and associated riparian habitats. These practices serve to avoid and minimize potential adverse effects on species associated with these features. BMPs and project-wide conservation measures for the Boost Project are listed in the following sections.

2.5.1. Wetlands and Waterbody-Related Conservation Measures

Mountain Valley will use a variety of conservation measures to minimize potential adverse impacts to waterbodies, wetlands, and riparian areas from the Boost Project. Wetlands and open waters are important for bats (Carter 2006). They offer an abundance of nocturnal insects, providing food and water during the spring, summer, and fall months, and flood-killed trees are an important roosting resource (Watrous et al. 2006). Since impacts to wetlands and waterbodies could affect the overall foraging and roosting activity of bats, BMPs implemented for the Boost Project to protect and minimize potential impacts to these resources also serve to minimize adverse effects on bat species.

Measures Mountain Valley will implement to avoid or minimize potential impacts to wetlands and waterbodies include:

- Clearly marking wetland boundaries and buffers to be avoided in the field with signs and/or highly visible flagging until construction-related ground-disturbing activities are complete.
- Minimizing the amount of construction equipment traffic to that which is necessary for construction, operation, and maintenance activities.
- Prohibiting construction equipment, vehicles, hazardous materials, chemicals, fuels, lubricating oils, and petroleum products from being parked, stored, or serviced within a 100-foot radius of any wetland or waterbody. All equipment will be inspected for leaks by an inspector at the beginning of the day. In the event of a spill, the operation will not commence or will cease until the spill is contained, cleaned up, and collected before operations continue. Leaking equipment will be removed or repaired on the same day.

- Avoiding the use of herbicides and pesticides to maintain any portion of the Boost Project or aboveground facilities except as specified below.
- Avoiding the use of freshwater withdrawals for hydrostatic testing at the Swann Compressor Station site (the only location where hydrostatic testing is proposed). Municipal source water will be used.
- Discharging hydrostatic test water to the ground in an upland, well-vegetated area, using energy-dissipating devices, and not directly to surface waters.
- Implement the following additional AMMs within watersheds supporting federally listed aquatic species and/or designated critical habitat:
    - Mountain Valley will adhere to standards established in Virginia Department of Environmental Quality (DEQ) Virginia Stormwater Management Handbook (2025) and West Virginia DEQ Stormwater Management and Design Guidance Manual (2012).
    - Mountain Valley will stabilize topsoil piles and minimize loss due to wind and water erosion with use of sediment barriers, mulch, temporary seeding, tackifiers, or functional equivalents where necessary.
    - Disturbed areas will be temporarily mulched/seeded if the areas are to remain undisturbed for an extended period.
    - Temporary sediment control measures will remain in place until sufficient vegetation has been re-established to inhibit erosion.

2.5.2. Federally Listed Bat Conservation Measures

Mountain Valley will implement the following additional conservation measures to avoid and minimize potential adverse effects to federally listed bat species. The following measures may be modified if negative survey results conducted in accordance with current USFWS survey guidance indicate the likely absence of listed species prior to Boost Project construction, indicating that Project activities would be unlikely to affect listed species and conservation measures are not warranted.

- Clearly mark the Boost Project construction area to help ensure that contractors do not accidentally remove more trees than anticipated to maintain the maximum practicable amount of suitable roosting habitat.
- Avoid construction tree clearing during the bat active season between April 1 – November 15, which includes the pup season (May 15 – July 31), barring an unforeseen emergency arising. Mountain Valley will coordinate with the USFWS and FERC in the event that emergency circumstances arise requiring any tree cutting between April 1 – November 15 to identify additional measures to implement to avoid adversely affecting listed bat species.
- Minimize the potential for lighting impacts on bats by instituting a 7:00 a.m. to 7:00 p.m. workday, 6 days per week, except activities that require around-the-clock operations, which include hydrostatic testing, subsequent pig runs to clean and dry the pipe, as well as tie-in welds. In spring, summer, and fall, when sunset occurs later in the evening, construction activities may continue after 7:00 p.m. but will be limited to daylight hours. The directional luminous intensity of lighting structures used during construction will be proportional to work area required to complete the task. Fully shielded, “full cut-off” type lighting fixtures will be used to minimize light impacts from upland facilities. “Full cut-off” means no direct upward lighting is emitted above the horizontal plane and, therefore, provides the maximum possible shielding to prevent unintentional lighting of surrounding areas.
- Adhere to measures specified in the project-specific SPCC Plan and the E&SC Plan to manage the risk of a potential spill or release of oil or hazardous material during construction.
- Site equipment servicing and maintenance areas at least 100 feet away from streams.

- Implement sediment and erosion control measures, ensure restoration of pre-existing topographic contours after any ground disturbance, and restore native vegetation (where possible).
- Control erosion and sediment by using appropriate BMPs. EIs will be present onsite during construction, and until stabilization after construction. Any erosion and sedimentation issues would be addressed immediately.
- Use water trucks to dampen the area and control fugitive dust to minimize potential for construction-related dust to affect wooded lands when roosting bats may be present (most frequently in summer, but also in spring and fall).
- Maintain areas that must be kept open for operation and safety by conducting routine maintenance mowing at the maximum time interval required to prevent woody encroachment (e.g., every three years) and from August 1 – April 15. (measure is also beneficial to monarchs)
- Mountain Valley has developed a General Blasting Plan for the Boost Project that prescribes site-specific blasting plans be developed based on the conditions of each location prior to the blasting event. The potential for blasting to occur is only at the Harris and Swann Compressor Stations.
    - Each site-specific plan will be provided to the appropriate federal, state, and local authorities for review and approval 5 working days prior to conducting the blasting.
- If blasting occurs at the Boost Project, the following precautions will be taken according to the General Blasting Plan:
    - A maximum charge of 2 inches per second ground acceleration and charge delays will be used, which stagger each charge in a series of explosions, to minimize noise and vibration.
    - Matting or other suitable cover will be used, as necessary, to prevent fly-rock from damaging adjacent natural resources and structures and minimize noise and vibration.
- Avoid the use of herbicides and pesticides (including systemic neonicotinoid insecticides) unless needed to spot treat exotic/invasive species posing a safety risk or to treat pest species that threaten the integrity of stabilizing revegetation when fall mowing is unsuitable to treat the pest species.
- When mowing treatment is unsuitable to address a localized pest outbreak, use an appropriate pesticide product, on a limited basis, in the specific and discrete areas of outbreak occurrence, in strict compliance with the product label requirements identified by federal and state regulators and the manufacturer, and in direct response to an identified outbreak that jeopardizes the integrity of a revegetated area.
- Upon discovery of a pest infestation or outbreak that may require management, and with direction from Mountain Valley, a Licensed Pesticide Applicator will review potential treatment options, give recommendations, and select a commercially available, U.S. Environmental Protection Agency (USEPA)-approved pesticide or other treatment product that is appropriate for the specific location and circumstances and that:
    - Has shown effectiveness in treating the pest,
    - Is approved for treating the pest in the state where it will be applied, and
    - Is approved for treating infestations occurring in turf/grasses (if relevant).
- Apply insecticide or herbicide spot treatments by hand or using equipment approved for precise, localized product application; aerial application will not be used.
- Avoid herbicide or insecticide application during or within 12 hours of measurable rainfall, and, unless a greater setback distance is identified on the product label (USEPA-approved conditions), adhere to a minimum of 150-foot horizontal buffer around the following features:
    - Pastures and other livestock grazing areas;
    - Buildings and yards;

  - Streams, wetlands, and ponds;
  - "No Spray" property lines; and
  - Drains, culverts, and storm sewer inlets.
- Allow natural woodland regeneration of temporary and additional workspaces, where feasible.
- Native species will be included in seed mixes intended for permanent restoration. Portions of the LOD not considered steep slope will incorporate herbaceous species preferable to native pollinators that contain herbaceous species considered superfoods or immune builders for native pollinators. (This measure is also beneficial to monarchs.)
- Use grains such as oats, wheat or rye for temporary cover when feasible.
- Prepare and distribute information for the training of construction personnel that provides information about bat biology and activities that may affect bat behavior, ways to avoid and minimize these effects, and appropriate procedures to follow as they relate to project-specific conservation measures.

Mountain Valley also will implement the following additional conservation measures to avoid and minimize potential adverse effects if a final federal listing decision for tricolored bats takes effect before the below activities are completed.

- Survey at the Bradshaw and Swann Compressor Station, in accordance with current USFWS survey guidelines, any culverts potentially suitable for use by bats (greater than 3 feet in diameter and 23 feet long) or bridges within the culvert/bridge impact assessment area. If signs of unidentified bats are found during surveys, Mountain Valley will coordinate with the USFWS on how to determine species type. If tricolored bats are determined to be present, Mountain Valley will confer with the USFWS to identify additional measures to implement that would ensure construction activities would not adversely affect this species within 0.25 miles of the occupied culvert or bridge during the bat active season in Virginia (April 1 – November 15).

2.5.3. Monarch Conservation Measures

Mountain Valley will implement the following additional conservation measures to avoid and minimize potential adverse effects if a final federal listing decision for monarchs occurs in the future.

- Incorporate native milkweed into seed mixes when restoring disturbed areas when feasible.
- In addition to the vegetation maintenance conservation measures described in Bat Conservation Measures above, conduct routine maintenance-related mowing and other routine vegetation management activities in areas where milkweed and/or nectar plants are present at times of year when monarchs are not likely to be present (October 1 – March 31).
- Use individual plant treatment to control invasion of woody plants, as needed, between mowing intervals.
- Attempt to only apply herbicides when flowers are not open.
- Implement a reduced vehicle speed limit on all temporary and permanent access roads (implementation of this conservation measure is not dependent on a final listing decision).
- Minimize the spread of invasive species through implementation of FERC Plan and Procedures, including trained Environmental Inspectors to verify equipment is free of soil and debris prior to relocation and the use of designated equipment cleaning stations to prevent transport of non-native vegetation.

3. Action Area

The action area includes all areas to be affected directly or indirectly by the proposed action, not merely the immediate area involved. It is determined by considering the spatial extent of stressors to the environment (50 CFR 402.02). The action area includes the geographic extent of environmental changes (i.e., physical, chemical, and biotic effects) that are expected to result from the action. The action area is defined by measurable or detectable changes in land, air, and water quality. Accordingly, in addition to the immediate area of planned disturbance, the Boost Project Action Area includes any location where impacts of the proposed activities can occur. The Boost Project Action Area, therefore, encompasses both effects within the compressor station sites and those locations beyond the compressor station sites expected to experience exposure to Boost Project-generated stressors. Of those stressors, dust, light, noise (air or substrate-born sound or vibration), and sedimentation/water quality effects are most likely to extend beyond the immediate area of planned disturbance. Accordingly, in the sections below, the respective areas of potential environmental reach of Project-related dust, light, noise, and sediment are identified and used to define the Boost Project Action Area.

3.1. Dust

Dust created during Boost Project activities can travel from the point of origin to more remote locations where it can settle on natural and anthropogenic surfaces. As a result, dust produced during the construction and operation of the Boost Project and the estimated distance dust can travel from the point of origin are accounted for in defining the Boost Project Action Area.

In the context of Boost Project development and operation, dust creation and dissemination are greatest during site preparation (e.g., demolition, land clearing, grubbing, earth moving, and grading) and construction. Empirical data describing the distance over which dust impacts may occur are limited. Nevertheless, the latest Institute of Air Quality Management (IAQM) guidance identifies 50 meters as the farthest distance for analyzing dust emissions from the point of origin for assessing potential effects to ecological receptors (IAQM 2024). That 50-meter distance does not account for site-specific conditions or implementation of suppression measures during construction activities that can reduce dispersal distances. Dust emission from construction is positively correlated with the silt content of the soil and the speed and weight of vehicles, while it is negatively correlated with soil moisture. Thus, the scope of dust generation and distribution typically depends on whether dust suppression measures are implemented. Mountain Valley will implement measures to significantly reduce dust generation and control dust emission through the use of wet suppression (water application) in disturbed areas and suppression of dust emission on paved surfaces using a combination of water trucks, power washers, sweeping, and/or vacuuming.

With these dust suppression measures in place, the potential distance that dust from construction, maintenance, and operation activities could travel will be less than 50 meters. Thus, a maximum of 50 meters is the farthest distance that Boost Project dust impacts might occur from the source and is used in determining the Boost Project Action Area.

3.2. Light

Though limited and localized, as discussed in Section 2, artificial lighting may be used during construction when the completion of particular Boost Project activities warrant continued work outside normal daylight operating hours due to agency requirements that limit the time allowed for such tasks, or to temporarily extend workable hours during the construction phase. The distance that artificial light travels will vary by the wavelength, duration, and intensity of emitted light, the environment in which it occurs, and any minimization measures implemented.

To characterize light in the Boost Project Action Area, it is assumed, based on the specifications of typical lighting equipment used for compressor station construction, that light sources will be less than the height of typical woodland trees. Therefore, given line-of-sight transmission, lighting associated with the Boost Project is expected to be at least partially obscured by surrounding woody vegetation, with the level of light attenuation influenced by the density of vegetation in both the canopy and subcanopy of the surrounding forest. The overall mean distance for car light penetration in forested environments was 360 meters when the light is directed horizontally from its source (Pocock and Lawrence 2005). Therefore, any light directed horizontally from the Boost Project would not be expected to travel more than 360 meters in areas with obscuring vegetation if Mountain Valley (1) directed light horizontally, and (2) did not implement any light attenuation-focused conservation measures. However, Mountain Valley will not direct light horizontally from the Boost Project, and, as discussed in Section 2, Mountain Valley will implement specific conservation measures to limit light generation from the Boost Project and the distance that the minimal light generated may travel from the isolated locations lighting is used. Those measures include workday schedule restrictions, light directional shielding, and reliance on full cut-off type lighting fixtures.

Numerous variables, both static and dynamic, affect the scope of light transmission, including atmospheric conditions (moisture, cloud, rain, dust); site characteristics (hills, vegetation, buildings); natural sources of light (moon and stars); other artificial sources of light; the spectral output of luminaires; and the distance, elevation and viewing angle of receptors (Department of Climate Change, Energy, the Environment and Water 2023). This variability makes it impossible to identify a specific distance that potential light effects could extend from the Boost Project. As a result, while it is reasonable to expect that the maximum distance that the limited light used at the Boost Project would travel will be less than 150 meters, for purposes of this BA, it is conservatively assumed that Boost Project light could extend up to the distance from the Boost Project that noise could extend.

3.3. Noise

Ambient or background sound levels are those emanating from natural or artificial sources that currently exist on a given landscape and are often referred to as baseline noise levels. The magnitude and frequency of ambient noise will vary over a 24-hour period and throughout the year due to weather conditions, vegetative cover, and human activity. Noise impacts are determined by quantifying increases over ambient levels caused by a given activity. Humans cannot discern less than a 3 A-weighted decibel (dBA) increase, an increase of 5 dBA is considered clearly noticeable, and increases of 10 dBA are perceived as a doubling of noise or becoming twice as loud.

To characterize predicted noise generation from Boost Project activities, Mountain Valley engaged SLR International Corporation (SLR) to perform Boost Project-specific noise modeling (SLR 2026; Appendix B). The model estimated existing ambient conditions [redacted] The lowest ambient sound levels apply to areas described as "very quiet suburban and rural residential," which correspond to areas with population densities of less than 200 people per square mile. The estimated ambient sound level for this land-use category is 40 dBA during daytime hours and 34 dBA during nighttime hours, which was used to predict ambient noise at the Bradshaw, Harris, and Stallworth Compressor Stations (SLR 2026). The Swann Compressor Station is located in Montgomery County, where population densities are greater than 200 people per square mile;

therefore, SLR used estimated ambient sound levels of 45 dBA during daytime hours and 39 dBA during nighttime hours for that portion of the Project (SLR 2026).

The modeling developed Noise Areas (NAs) based on noise from general construction, potential construction blasting, and operational activities of the Boost Project during the daytime and nighttime (SLR 2026). For compressor station construction activities (collectively termed "general construction"), the model [redacted]

3.3.1. Sources of Noise

The Boost Project will generate noise during construction, operation, and maintenance. Noise during the construction phase will result from the construction/expansion of the compressor stations, with prevalent noise sources coming from internal combustion engines of construction equipment. On average, noise levels emitted from construction equipment measure approximately 85 dBA at 50 feet when operating at full capacity during daytime hours (FHWA 2006). Nighttime construction is not anticipated except where noted in the following paragraphs.

Blasting during construction in limited areas at the Swann and Harris Compressor Stations may be necessary but will not occur at night. Sound produced during a blasting event is instantaneous and varies based on the type and amount of explosive used, below-ground depth of detonation, and implementation of any noise mitigation measures. [redacted]

Finally, noise during operation of the Boost Project will result from the operation of compressor units (Section 2).

3.3.2. Noise Production and Movement Distance

Sounds generated by Boost Project construction activities may cause a short-term increase in localized environmental sound levels. These increases will be present for short periods of time at a given location within the Boost Project Action Area while construction activities progress. The general construction and operation NAs extend outward to all locations where sound levels from construction and compressor stations operation are equal to the ambient sound levels without the contribution of construction or operational noise.

[redacted]

[redacted]

3.3.2.1. Traffic Noise Levels

In addition to the estimated ambient sound levels based on residential land-use category, sound levels for primary traffic arteries were included in the model. Due to the remote locations of Bradshaw, Harris, and Stallworth Compressor Stations, noise due to local traffic was determined to not significantly impact the ambient sound levels in the areas around the sites (SLR 2026). [redacted] into account when calculating traffic emission noise levels and propagation.

3.3.2.2. General Construction and Operational Equipment and Activities

To assess general construction noise, the model included construction equipment of the type and number anticipated for constructing the Boost Project. The construction source sound levels will be temporary and mobile and will vary depending on the specific locations and concentrations of activities (SLR 2026).

The following equipment was included in the noise model for compressor station operation (SLR 2026):

- Gas aftercoolers
- Turbine lube oil coolers
- Turbine inlet and exhaust openings
- Station suction and discharge piping and suction separators
- Fuel gas skid
- Capstone microturbine generators
- Control valves

3.3.2.3. Blasting

Blasting during construction may be required during construction activities at the Harris and Swann Compressor Stations, depending on the ground conditions encountered onsite. The same general modeling approach discussed above was used to assess the impact of potential blasting for the Harris and Swann Compressor Stations.

The ISEE 18th revision of the "Blasters' Handbook" (ISEE 2011) average construction blasting curve and highly confined construction blasting were used to calculate the distance [redacted]

Blasting sound levels were calculated using the following methodology:

- [redacted]
- [redacted]
- [redacted]

This methodology was used to calculate the peak sound level from construction blasting in the surrounding area as blasting may occur anywhere within the defined blasting areas for the Harris and Swann Compressor Stations.

3.3.3. Noise Areas

Figures 3-1, 3-2, 3-3, and 3-4 show the extent of the general construction, blasting, operation during the daytime and nighttime NAs for each compressor station. The contour lines in the general construction and operation figures represent the locations at which sound levels from Boost Project activities are expected to be equal to the ambient sound levels. This contour line generally moves farther away from the compressor stations in areas with lower estimated ambient levels and closer to the compressor stations in areas with a higher estimated ambient level (i.e., areas closer to busy roads). The contour lines in the blasting figures show the location at which the peak sound levels from construction blasting are expected to be equal to [redacted] at the Harris and Swann Compressor Stations. These NAs are used in defining the Boost Project Action Area because the scopes of the other potential environmental stressors are expected to extend no farther than the NAs.

In order to identify a single NA that can be used to inform the Boost Project Action Area, Mountain Valley conservatively uses the largest composite area (greatest distance from the Boost Project Area) across all four modeled NA boundaries. That Composite Noise Area is shown in Figure 3-5, 3-6, 3-7, and 3-8 and is used to define the Boost Project Action Area.

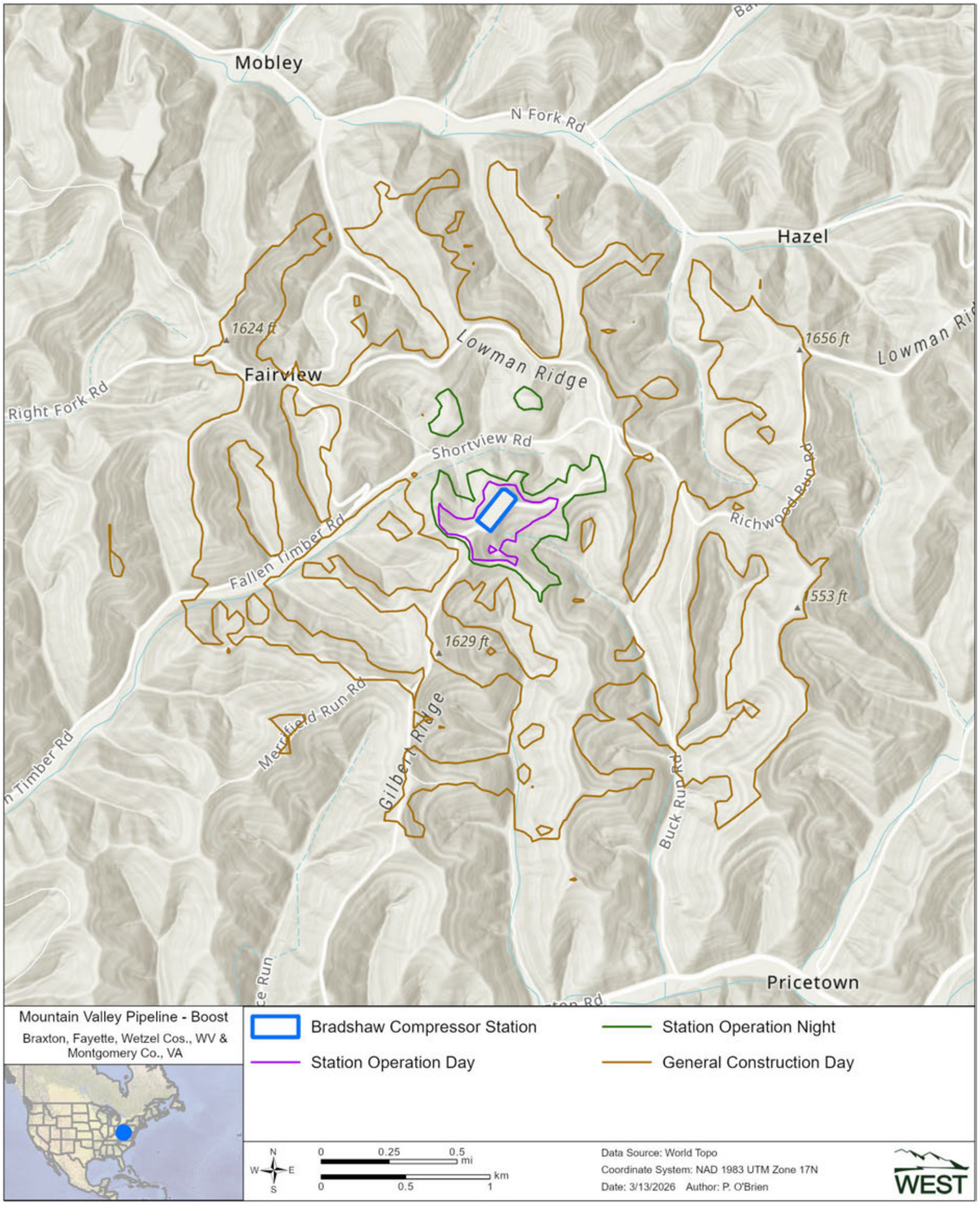

Figure 3-1: Construction day, operation day, and operation night noise areas for the Bradshaw Compressor Station.[7]

[7] The noise areas for the Bradshaw Compressor Station site do not include the existing Bradshaw laydown yard, as the laydown yard will not require new ground disturbance, and any noise from activities there is not expected to exceed ambient conditions. Therefore, the laydown yard does not contribute to noise beyond the laydown yard LOD.

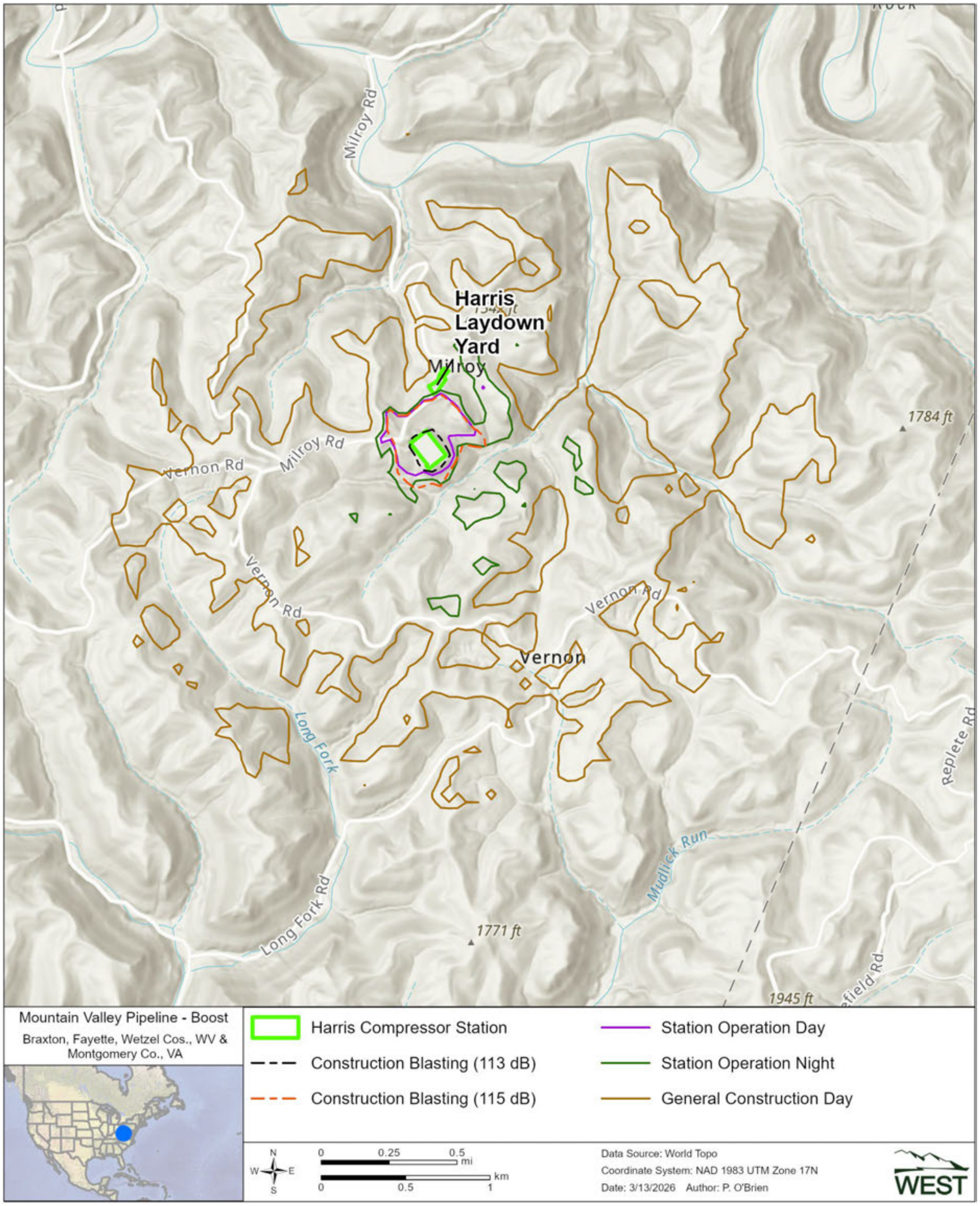

Figure 3-2: Construction day, blasting, operation day, and operation night noise areas for the Harris Compressor Station.[8]

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[8] The noise areas for the Harris Compressor Station site do not include the Harris laydown yard, as noise from repurposing those existing features is not expected to exceed ambient conditions. Therefore, the laydown yard does not contribute to noise beyond the laydown yard LOD.

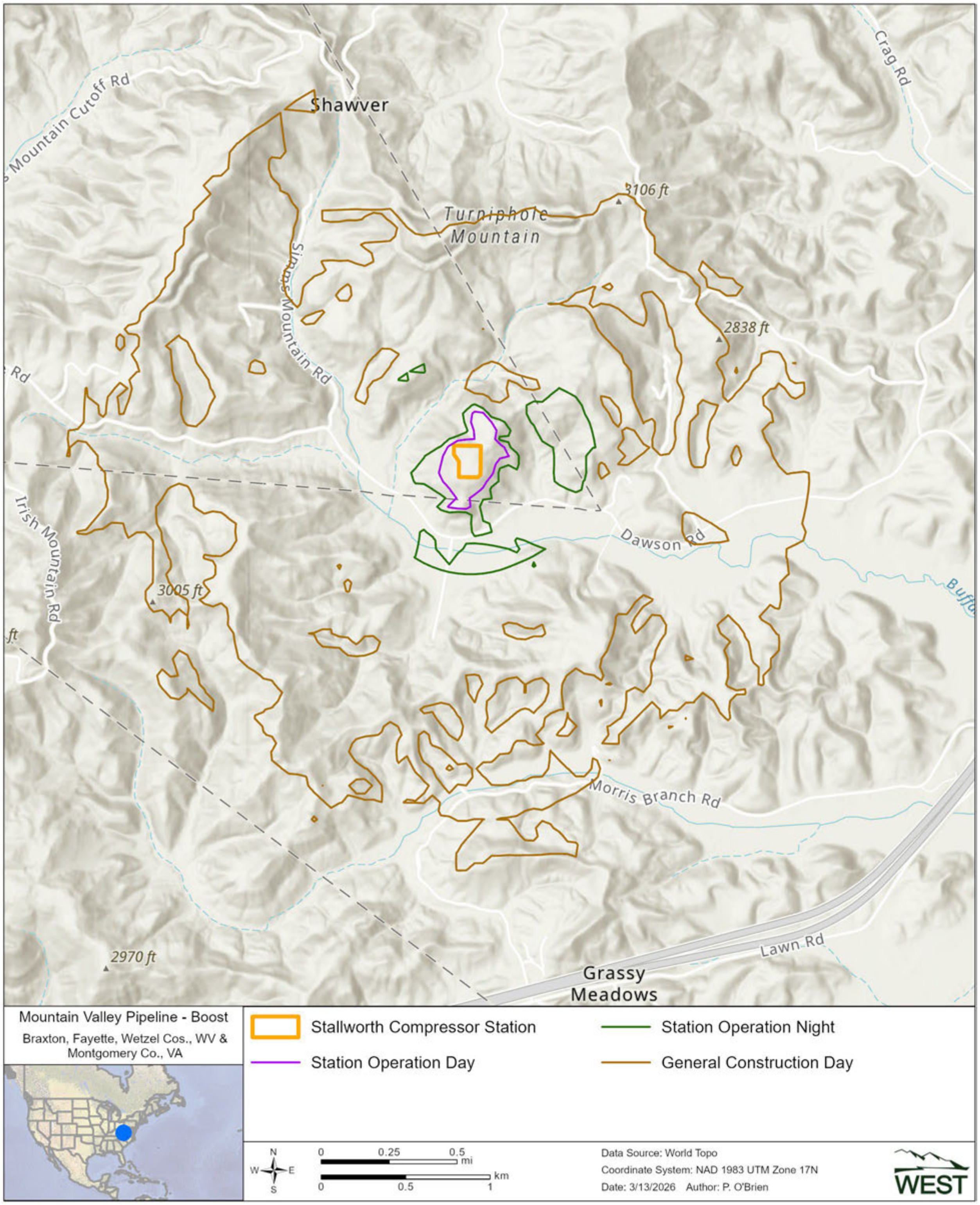

Figure 3-3: Construction day, operation day, and operation night noise areas for the Stallworth Compressor Station.

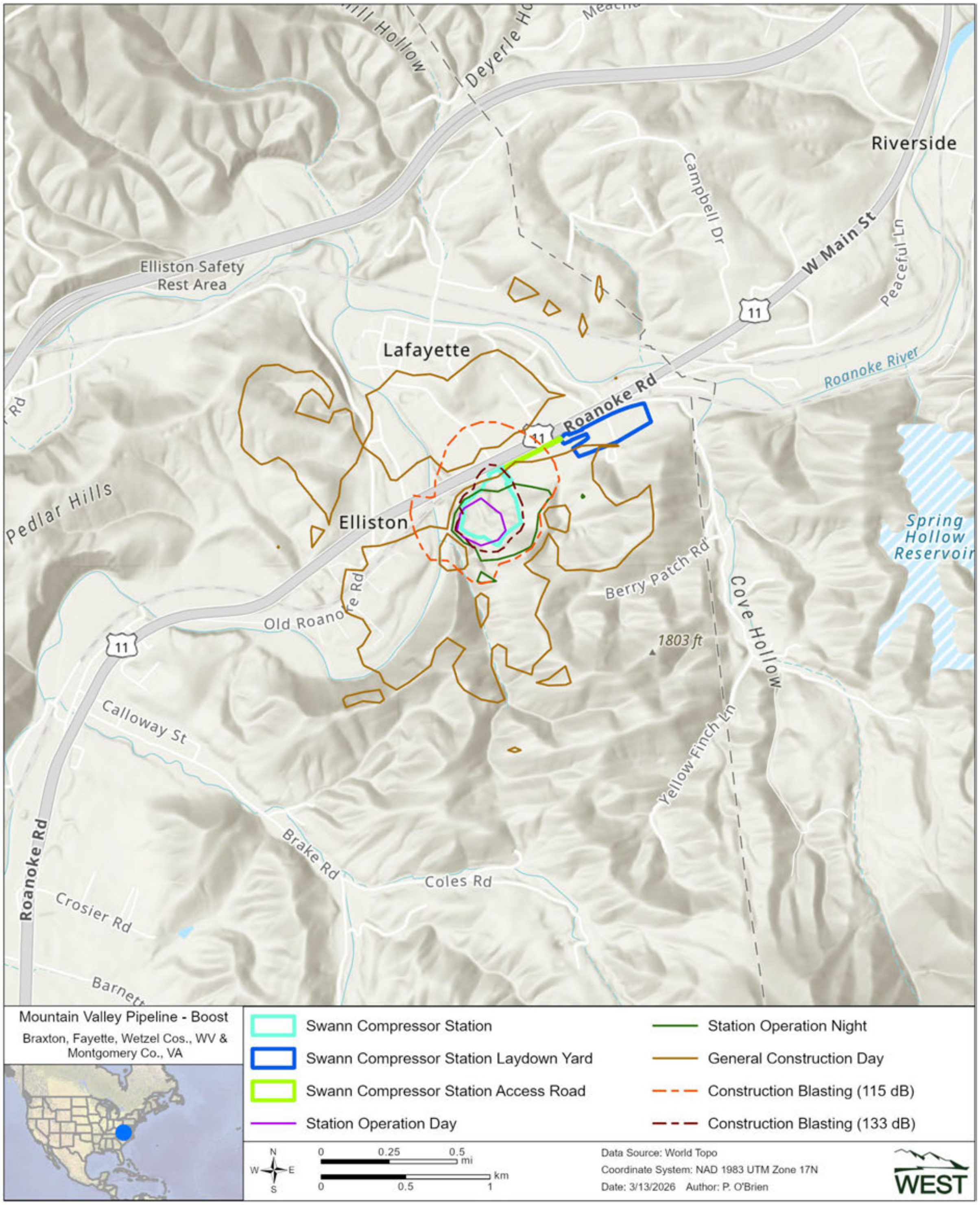

Figure 3-4: Construction day, blasting, operation day, and operation night noise areas for the Swann Compressor Station.[9]

[9] The noise areas for the Swann Compressor Station do not include the Swann laydown yard and access road features, as noise from repurposing those existing features is not expected to exceed ambient conditions. Therefore, the laydown yard does not contribute to noise beyond the laydown yard LOD.

3.4. Sedimentation

For purposes of delineating the Boost Project Action Area in the aquatic environment, Mountain Valley identified potential sediment inputs to streams attributable to Boost Project construction activities. Accordingly, Mountain Valley delineated the Action Area associated with each component of the Boost Project that will involve earth disturbing activity that could generate and transport sediment to a nearby stream or drainage.

To do this, Mountain Valley did the following:

- For each component of the Boost Project that will involve earth disturbing activity, Mountain Valley used the National Hydrography Dataset (NHD; US Geological Survey 2023) to identify any streams that reasonably could receive measurable sediment from the Project.

- For each identified stream, Mountain Valley used the Trace Downstream tool in ArcGIS (ESRI 2026) on a digital elevation model of the watershed topography to delineate the farthest upstream and downstream points where sediment from the Boost Project could enter the waterbody.

- Mountain Valley then conservatively[10] defined the Action Area in each stream as 200 meters upstream of the upper sediment input point to 800 meters downstream of the lower sediment input point (USFWS and Virginia Department of Game and Inland Fisheries 2018).

The Boost Project Action Area in the aquatic environment is presented in Figures 3-5 to 3-8.

3.5. Boost Project Action Area

For the Boost Project, the Action Area includes the Boost Project plus the distance or location where potential stressors resulting from Boost Project activities may occur in amounts likely to be detectable above ambient conditions.

The following distances were used to define the Boost Project Action Area with regards to dust, light, and noise associated with Project construction, maintenance, and operation:

- The distance that meaningful concentrations of dust will travel outside the Boost Project area, estimated to be less than 50 meters;
- The distance that emitted nighttime light will travel from the Boost Project area, estimated to be within the distance that sound will travel; and
- The distance that air- or substrate-borne sound or vibration will travel.

When combined, the scope of the above impacts lie within the Composite Noise Area associated with the maximum distance that sound from the Boost Project will occur above ambient conditions, with the

[10] The upstream and downstream termini for the Action Area in each stream are based on the maximum distances identified in the joint USFWS-VDGIF Freshwater Mussel Survey Guidelines (USFWS and Virginia Department of Game and Inland Fisheries 2018). While those distances likely are overly conservative given the minor amount of the earth disturbing activity associated with each Boost Project component, the significant distances and extensive vegetated upland areas that exist between the locations of earth disturbance and any receiving waters, and Mountain Valley's implementation and maintenance of approved E&SCs that will minimize and confine sediment losses, the scope of the Action Area in these streams ensures that any listed species or critical habitat that could experience Project-related sediment are accounted for.

exception of the Swann and Bradshaw Compressor Station laydown yards.[11] Due to the topographical variability surrounding each compressor station site, the modeled Noise Areas include a contiguous area around each station as well as more distant "islands" where Project-related noise is expected to exceed ambient conditions. To ensure consistency at each compressor station site, Mountain Valley defined the Action Area to encompass all locations within a circle drawn around the most distant modeled points of the Composite Noise Area, which includes both the contiguous areas and all "islands", at each compressor station. As a result, as shown in Figures 3-5, 3-6, 3-7, and 3-8, the upland portion of the Boost Project Action Area is all locations within the circular area plus the respective LODs at the Swann and Bradshaw Compressor Station laydown yards.

The boundary for the aquatic portion of the Boost Project Action Area in each stream is defined as 200 meters upstream from the uppermost point where sediment from Project-related ground disturbance could enter the stream to 800 meters downstream of the lowermost point where such sediment could enter the stream. These portions of the Action Area are shown in Figure 3-5 (Bradshaw Compressor Station), Figure 3-6 (Harris Compressor Station and laydown yard), Figure 3-7 (Stallworth Compressor Station), and Figure 3-8 (Swann Compressor Station and laydown yard) below. As no ground disturbing activity is planned for the existing laydown yard that Mountain Valley will use to support its works at the Bradshaw Compressor Station, the Boost Project will not generate sediment from that laydown yard that could reasonably be expected to reach any stream.

In sum, the Boost Project Action Area consists of 11,266.6 acres of land and approximately 6.5[12] miles of stream. The portion of the Action Area associated with the Bradshaw Compressor Station consists of 3,282.2 acres and 1.5 miles of stream. The portion of the Action Area associated with the Harris Compressor Station consists of 3,110.3 acres and 1.6 miles of stream. The portion of the Action Area associated with the Stallworth Compressor Station consists of 3,635.9 acres and 0.9 miles of stream. The portion of the Action Area associated with the Swann Compressor Station consists of 1,238.2 acres and 2.5 miles of stream.

[11] The Bradshaw laydown yard is an existing feature that previously was developed for other purposes and, therefore, will require no new construction in order to be utilized for the Boost Project. The Swann laydown yard was previously used for construction of MVP Mainline and will be reused, following minor site work, for the Boost Project. Both extend beyond the modeled Composite Noise Area (Figures 3-5, 3-6, 3-7, and 3-8) but are not expected to contribute concentrations of dust, light, or sound above ambient conditions outside their respective LODs (Section 2.4.4). Accordingly, the Action Area for the Swann laydown yard and for the Bradshaw laydown yard is the LOD of each feature.

[12] Sums can differ from totals shown due to rounding.

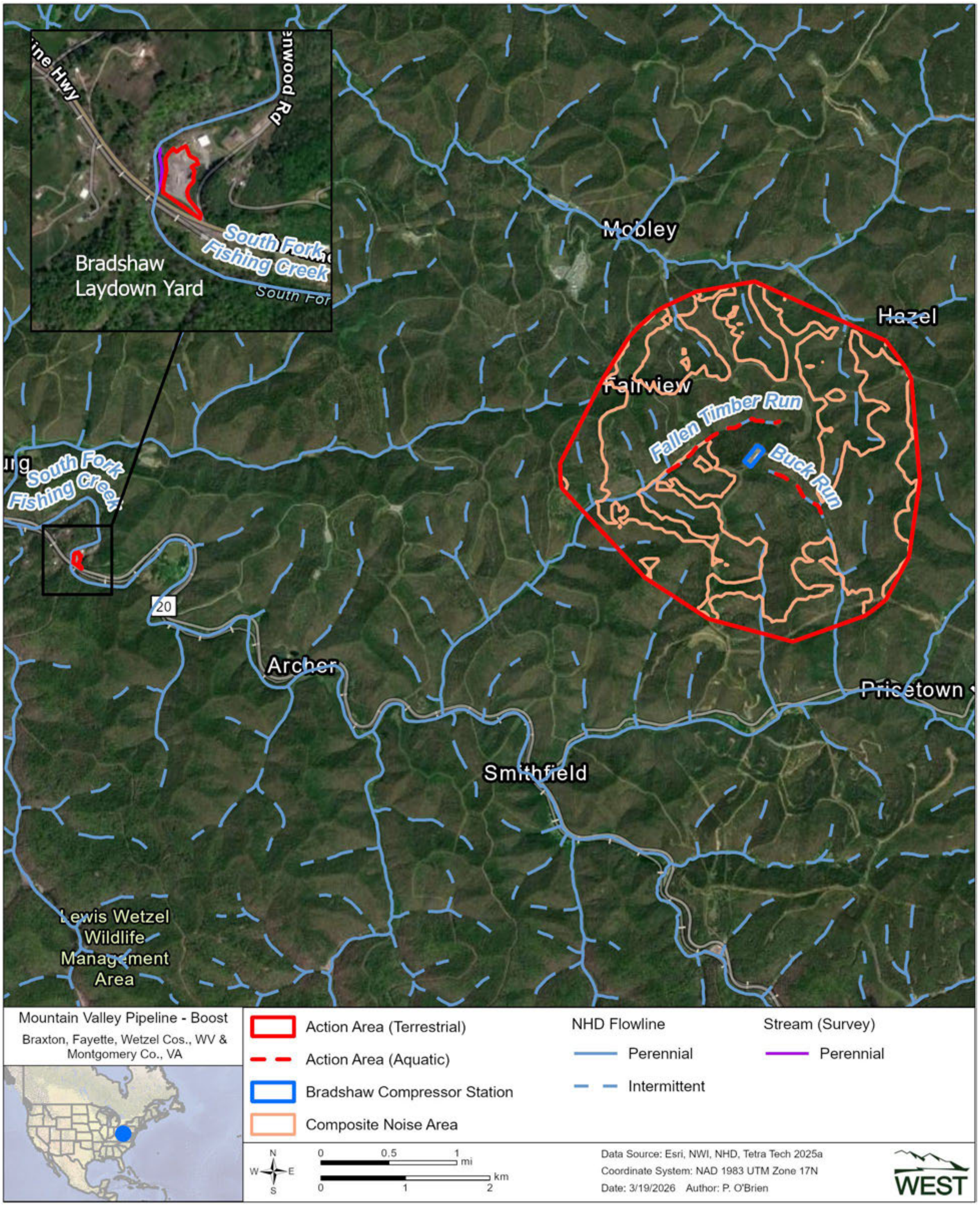

Figure 3-5: Action Area associated with the Bradshaw Compressor Station site.

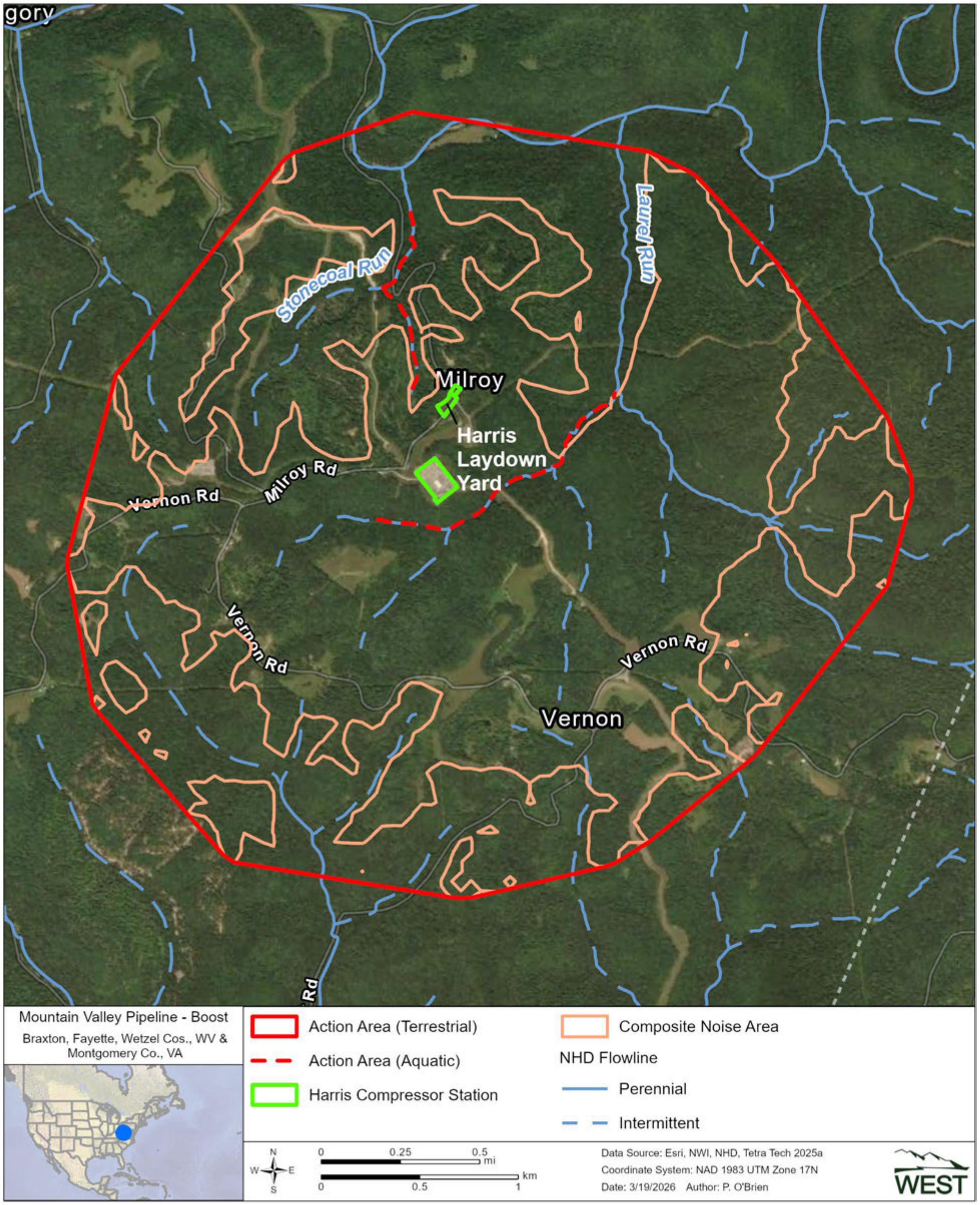

Figure 3-6: Action Area associated with the Harris Compressor Station site.

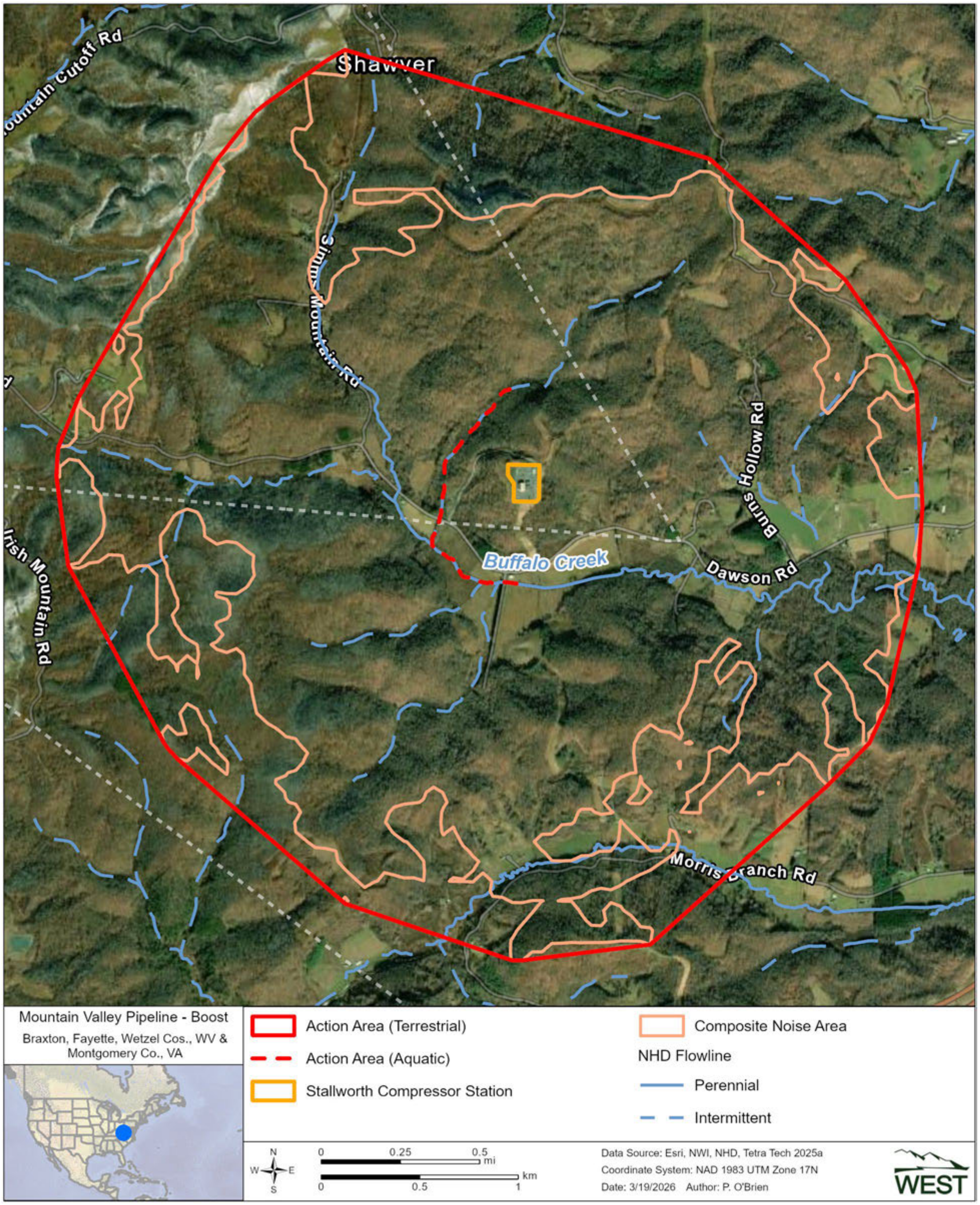

Figure 3-7: Action Area associated with the Stallworth Compressor Station site.

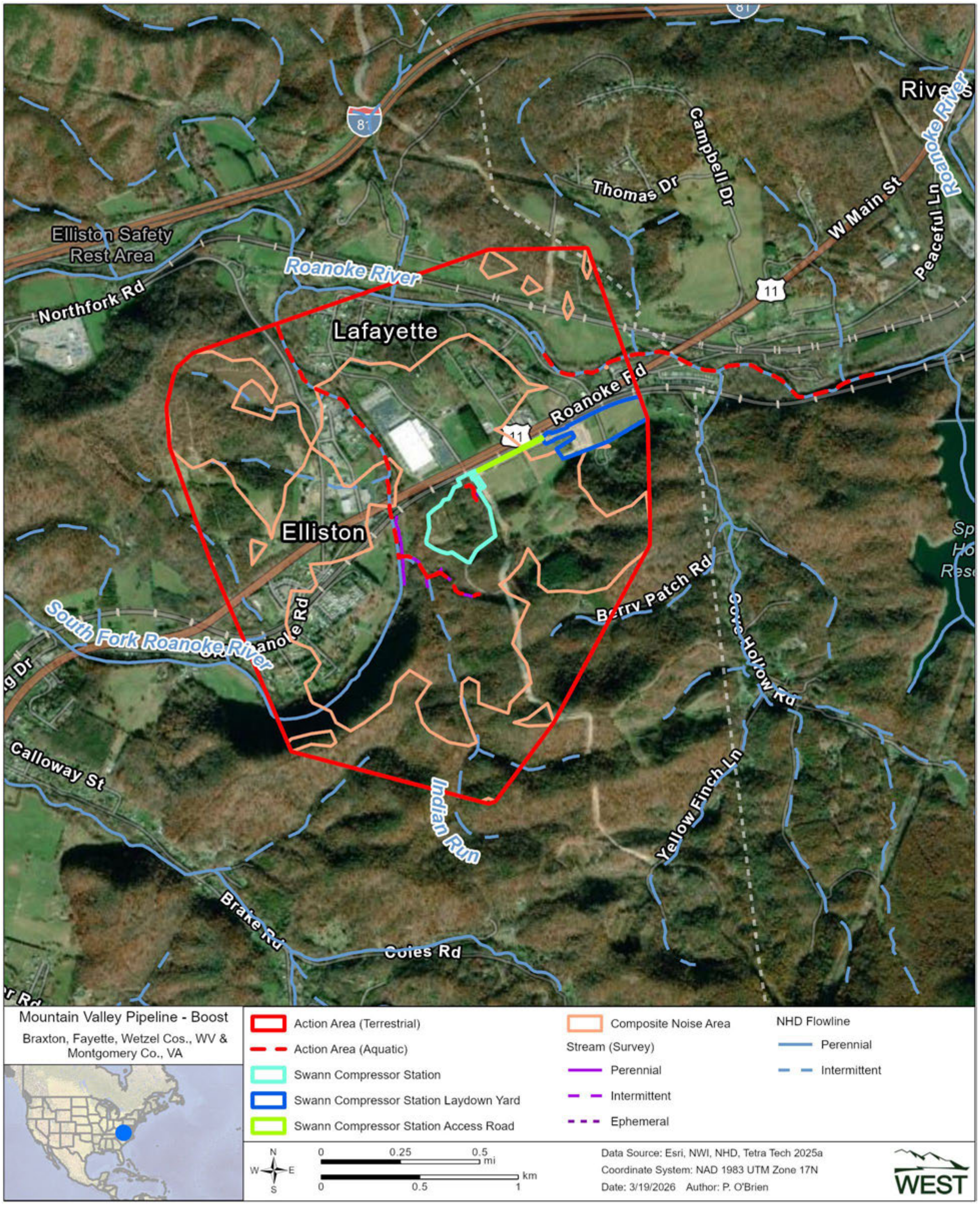

Figure 3-8: Action Area associated with the Swann Compressor Station site.

4. Species within the Action Area

4.1. Indiana Bat

Indiana bats are in the genus *Myotis*. The fur of Indiana bats is a dull grayish chestnut color; and the basal portion of the hairs on the back of Indiana bats is a dull-lead color. The underparts of Indiana bats are pinkish to cinnamon. The calcar (heel of the foot) of Indiana bats has a predominant keel. The average body length of Indiana bats ranges from 1.6 to 1.9 inches (USFWS 2007).

Indiana bats occur across the eastern and midwestern U.S. (USFWS 1967, Figure 4-1). The range-wide Indiana bat population is estimated to have declined by 28 percent between 2010 and 2019 due to white-nose syndrome (WNS; Cheng et al. 2021).[13] However, the most recent (2024) winter count was 631,786 individuals from 194 hibernacula (overwintering sites) in 15 states, an increase of approximately 17.6 percent since 2019 (USFWS 2024c). The range-wide population is within 2.8 percent of reaching the pre-WNS 2007 population estimate (USFWS 2024c). Indiana bats in West Virginia were heavily impacted by WNS, with an estimated 99 percent population reduction from 2007 – 2024. However, between the last two winter hibernacula population counts, the West Virginia population of Indiana bats showed a minor increase of 8 individuals (4.4 percent) from 2022 to 2024. The Virginia population of Indiana bats increased by 44 individuals (6 percent) from 2007 – 2024 in the portion of Virginia within the Appalachian Recovery Unit (RU; USFWS 2024c).

Based on a review of the USFWS IPaC online tool for determining species presence (February 2026, USFWS 2025b, 2025c, 2025d, 2025e, 2026) and state agency information, Indiana bats potentially occur in relevant proximity to the Boost Project Action Area for the Bradshaw, Harris, Stallworth, and Swann Compressor Stations (Figure 4-1).

Indiana bats typically roost in trees in summer and hibernate in caves or cave-like structures (e.g., mines, buildings, tunnels) in winter and migrate between the two habitats in the spring and fall (Winhold and Kurta 2006, USFWS 2007). Summer habitat typically includes riparian, bottomland, and upland forested areas (USFWS 2007). During spring staging and fall swarming, Indiana bats roost in forested areas near hibernacula (USFWS 2007). The annual life cycle of Indiana bats (Figure 4-2, USFWS 2024f)[14] includes the use of the following habitat types:

- Winter habitat (hibernation)
- Staging/swarming habitat (spring staging and fall swarming)
- Migration habitat (spring and fall migration)
- Summer habitat[15] (summer activity[16])

[13] WNS is a disease caused by the fungus *Pseudogymnoascus destructans* that affects hibernating bats and often leads to mortality (USFWS 2019).

[14] Dates relevant to West Virginia and Virginia in USFWS's Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines (USFWS 2024f) are used for developing ESA compliance and species-specific survey guidelines.

[15] Summer habitat includes maternity roosts, non-reproductive female and male roosts, roosts after the pups start to fly, and foraging habitat.

[16] Summer activity includes maternity, pup rearing, non-reproductive female and male roosting activity, and foraging.

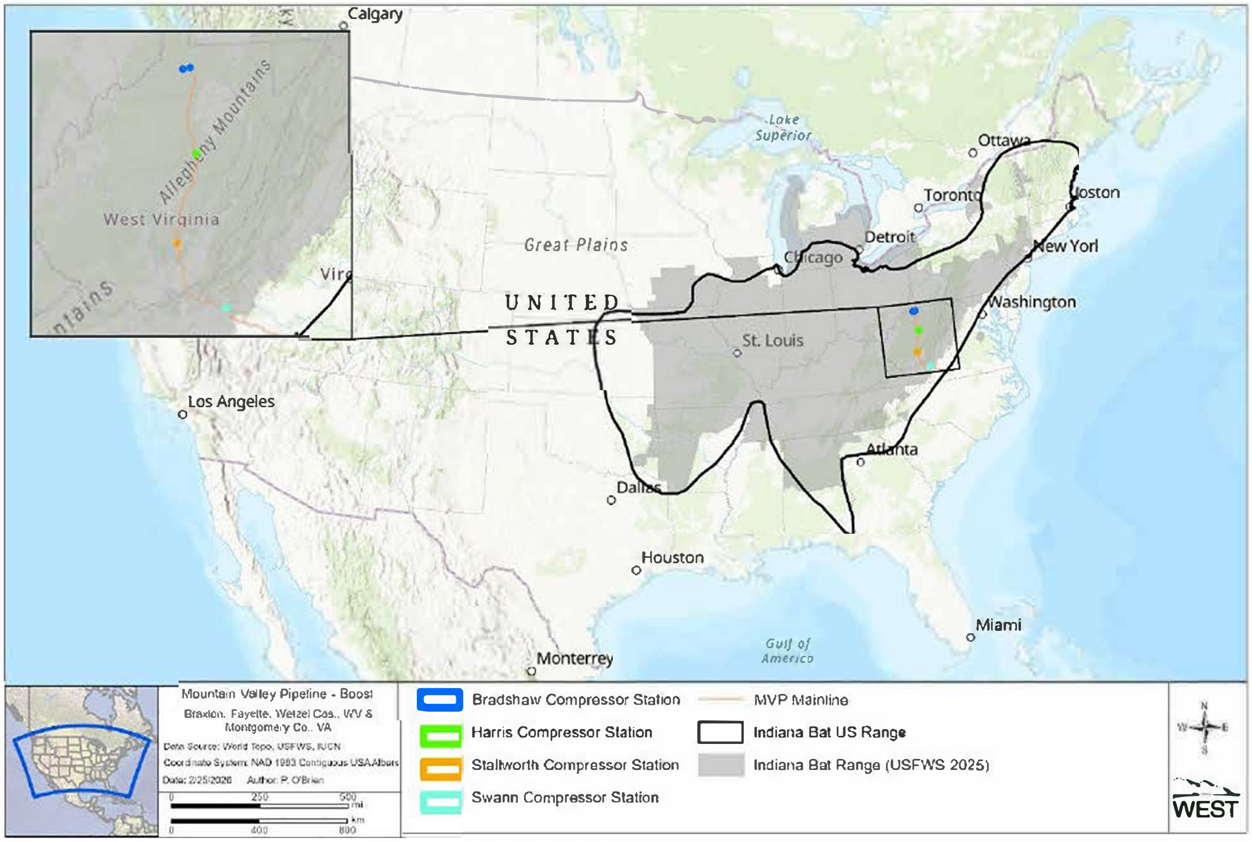

Figure 4-1: Indiana bat range in the United States.

1. Dates relevant to West Virginia and Virginia in USFWS's *Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines* (USFWS 2024f).
2. Dates may vary by location and year but generally show when Indiana bats are most likely to be engaging in each seasonal activity.

Figure 4-2: Annual life history diagram for Indiana bats.

4.1.1. Listing Status

Indiana bats were one of 78 species first listed as being in danger of extinction in 1967 under the Endangered Species Preservation Act of 1966 (USFWS 1967). The species is currently listed as endangered under the ESA.[17]

4.1.2. Critical Habitat Designation

Indiana bat critical habitat is designated in Illinois, Indiana, Kentucky, Missouri, North Carolina, Tennessee, and West Virginia (USFWS 1967, 2023c, 2025a, 2025i). No critical habitat occurs within or in relevant proximity to the Boost Project Action Area (USFWS 2023c).

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[17] 16 USC 1531-1544.

4.1.3. Environmental Baseline and Stressors

In its most recent 5-year status review for the species, the USFWS recognized that many of the existing Indiana bat populations continue to experience the effects of past and ongoing stressors (USFWS 2019). These stressors include disease and parasites (especially WNS), habitat impacts (anthropogenic destruction, modification, and fragmentation, as well as natural hazards), human disturbance of caves, wind energy development, nonnative and invasive species, light pollution, other development, predation and competition, and climate change (USFWS 2007, 2019). A summary of these stressors, as described in the 2019 5-Year Review (USFWS 2019) is provided below, except climate change, which is addressed in Section 4.1.4.

- Disease and Parasites – WNS has significantly and rapidly increased the degree of threat against Indiana bats by causing reduction in fitness, reproductive success, and survival, which has lowered the species' overall recovery potential. WNS infection leads to mortality through homeostatic imbalance, diminished and elevated immunological responses, and loss of stored fat needed for overwinter survival (USFWS 2019). Parasites also can affect the species.
- Habitat Impacts – Destruction and degradation of the species' winter hibernacula, such as caves and mines, and summer, fall, and spring habitat is a long-standing and ongoing threat to the species (USFWS 2019). Many key sites are vulnerable to vandalism, modification of entrances, microclimate changes, and incompatible surrounding land use. Development and conversion of forest and habitat threaten bat populations. Energy production and transmission such as oil, coal, gas, solar, and wind also contribute to forest and habitat conversion. Development can also increase forest fragmentation and decrease the amount of core forested land in portions of the Indiana bat's range (USFWS 2019). Natural hazards, such as flooding, freezing, and mine ceiling collapse, and flooding of caves by dams or reservoir developments also affect the species (USFWS 2019).
- Human Disturbance – Human disturbance was originally identified as one of the primary threats to the species and remains a threat at several important hibernacula in the species' range (USFWS 2019). This disturbance results from cave commercialization such as cave tours, vandalism, and research-related activities. While steady progress has been made to reduce the number of caves and mines subject to disturbance that threatens hibernating bats, the threat has not been eliminated. Other stressors such as indiscriminate scientific collecting, handling and banding of hibernating bats by biologists, exclusion of bats from caves by poorly designed gates, and man-made changes to hibernacula microclimate such as blocking or adding entrances had caused declines in the past but "do not appear to account for the [recent] declines" (USFWS 2019). A related issue is the ownership of Indiana bat habitat. Around 53 percent of the 85 Priority 1 and 2 hibernacula are privately owned (USFWS 2019). Private ownership limits recovery options, but most private hibernacula owners cooperate in efforts to protect Indiana bats.
- Wind Energy and Turbines – While large-scale fatalities of bats (especially tree-roosting species such as hoary [*Lasiurus cinereus*], eastern red [*L. borealis*] and silver haired bats [*Lasionycteris noctivagans*]) have occurred at multiple wind energy facilities across the species' range, documented Indiana bat fatalities at wind turbines have been limited (USFWS 2019).
- Nonnative and Invasive Species – The emerald ash borer (*Agrilus planipennis*) and other nonnative and invasive species can negatively impact Indiana bat habitat. Emerald ash borer larvae feed on ash trees resulting in damage and eventual death of the trees. While dying ash trees may provide temporary benefits to Indiana bats by increasing available roosting sites, the long-term loss of ash trees is more likely to be negative due to the elimination of ash species as suitable roost trees (USFWS 2019). Adverse impacts are more likely in portions of the Indiana bat's range where ash trees are the primary source of roost trees, such as in southern Michigan. Asian bush honeysuckles (*Lonicera* spp.), Russian

olive (*Elaeagnus angustifolia*), Oriental bittersweet (*Celastrus orbiculatu*), and kudzu (*Pueraria lobata*) can also outcompete and choke out native trees, thereby altering the long-term succession of forests (USFWS 2019). These nonnative plants can also reduce the insect diversity and biomass available to Indiana bats and disrupt terrestrial and aquatic food webs. USFWS noted other nonnative and invasive species such as fungi and exotic earthworms could affect forest dynamics, but the impacts are not well studied or easily controlled (USFWS 2019).

- Light Pollution – Because Indiana bats are nocturnal, they may be affected by light pollution. Artificial lighting can cause bats to desert roosts, delay emergence from roosts thereby shortening time available for foraging, and avoid drinking, foraging, or commuting in lit areas (USFWS 2019).
- Other Development – Deforestation, stream channelization, pesticide poisoning, quarrying and mining operations, silvicultural practices, indiscriminate firewood collection, and other environmental contaminants also impact Indiana bats (USFWS 2019). Outside of wind turbines, collisions with other man-made objects such as communication towers, airplanes, and vehicles also affect the species (USFWS 2019).
- Predation and Competition – Predation of the species and competition with other bat species for limited resources also affect Indiana bats (USFWS 2019).
- Synergistic Effects: The above stressors may act synergistically and additively on the species, and exposure to a combination of multiple stressors may be more harmful than a single stressor acting alone (USFWS 2019).

Based on best available information, the baseline conditions for Indiana bat populations in areas relevant to the Boost Project are as follows.

- Virginia – Virginia's small Indiana bat population (primarily in the Appalachian RU, occurring along the border with West Virginia) declined with the initial onset of WNS but began increasing again in 2019. The population has increased 6 percent overall 2007-2024, to 646 individuals (USFWS 2024c).
- West Virginia – West Virginia saw steep declines in Indiana bat populations beginning in 2011 but exhibited a slight recovery 2022-2024 (USFWS 2024c). The most significant population of Indiana bats in West Virginia [redacted], and it has seen steep declines (USFWS 2019). There are 189 Indiana bats in West Virginia according to the most recent population estimate from the USFWS (USFWS 2024c).

Specific information is not available regarding activities or land uses that have resulted in these stressors occurring within the counties where the Boost Project occurs or within the Boost Project Action Area. As a result, Mountain Valley undertook a comprehensive review of the Boost Project Action Area and the surrounding vicinity to identify land uses, specific activities, and related stressors that reasonably could have affected the baseline condition of the Boost Project Action Area.

4.1.3.1. Land Cover in the Action Area

To establish the environmental baseline conditions across the Boost Project Action Area where Indiana bats may potentially occur during their annual life history cycle (Figure 4-2), Mountain Valley identified and evaluated the land cover classifications within the Boost Project Action Area using the NLCD (2024; Section 4.1.3.1.2).

4.1.3.1.1. Physiography

The Boost Project occurs in the Western Allegheny Plateau and Central Appalachian ecoregions in West Virginia and the Ridge and Valley ecoregion in Virginia (USEPA 2006, 2013). The Western Allegheny Plateau is characterized by unglaciated rounded hills with forest land cover. Bedrock is composed of sedimentary rock that is frequently mined for coal (USEPA 2013). The Bradshaw Compressor Station is located in this ecoregion. The Central Appalachian ecoregion is a rugged plateau with high hills and mountains composed of sandstone, shale, conglomerate and coal deposits. Soils are relatively infertile with extensive forest land cover (USEPA 2013). The Harris and Stallworth Compressor Stations are located in this ecoregion. The Ridge and Valley ecoregion is characterized by parallel ridges and valleys with a variety of widths and rock types. Springs and caves are common in this ecoregion. Forest land cover is found in higher, steeper terrain while agricultural land use is common in valleys and at lower elevations (USEPA 2013). The Swann Compressor Station is located in this ecoregion.

4.1.3.1.2. Land Cover Types

The NLCD is a large-scale, public-domain collection of satellite imagery and supplementary datasets used for a variety of environmental, land management, and modeling applications in the United States (NLCD 2024). The NLCD, because of its 30-meter by 30-meter resolution, is best used for large-scale analyses of relatively homogenous land cover. NLCD cover is divided into 15 types:

- Deciduous Forest: These are areas dominated by trees that are generally greater than 5 meters tall and comprise greater than 20 percent of total vegetation cover. More than 75 percent of the tree species shed foliage in response to seasonal change.
- Evergreen Forest: These are areas dominated by trees that are generally greater than 5 meters tall and comprise greater than 20 percent of total vegetative cover. More than 75 percent of the tree species maintain their leaves all year. Canopy is never without green foliage.
- Mixed Forest: These are areas dominated by trees that are generally greater than 5 meters tall and comprise greater than 20 percent of total vegetation cover. Neither deciduous nor evergreen species are greater than 75 percent of total tree cover.
- Woody Wetlands: These are areas where forest or scrubland vegetation accounts for greater than 20 percent of vegetative cover, and the soil or substrate is periodically saturated with or covered by water. This habitat is identified remotely in the NLCD on the basis of vegetation and may differ from actual wetland boundaries confirmed during a field evaluation.
- Developed Open Space: These are 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: These are 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: These include 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: Developed, high intensity includes highly developed areas where people reside or work in high numbers. Apartment complexes, row houses, and commercial/industrial represent examples of developed, high-intensity land use. Impervious surfaces account for 80 to 100 percent of the total cover.
- Shrub/Scrub: Shrub/scrub includes areas dominated by shrubs that are less than 5 meters tall, with a shrub canopy typically greater than 20 percent of total vegetation. This NLCD class includes true shrubs, young trees in an early successional stage, or trees stunted from environmental conditions.

- Emergent Herbaceous Wetlands: Emergent herbaceous wetlands are defined by 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 by water. This habitat is identified remotely in the NLCD on the basis of vegetation and may differ from actual wetland boundaries confirmed during a field evaluation.
- Cultivated Crops: Cultivated crops include areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and perennial woody crops, such as orchards and vineyards. Crop vegetation accounts for greater than 20 percent of total vegetation. This NLCD class also includes all land actively tilled.
- Pasture/Hay: Pasture/hay includes 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.
- Grassland/Herbaceous: Grassland/herbaceous comprises 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 used for grazing.
- Open Water: Open water land use includes all areas of open water, generally with less than 25 percent cover of vegetation or soil.
- Barren Land: Barren land includes 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.

The NLCD (2024) was used to generate a desktop land cover evaluation to determine the general community types and suitability of the land cover as habitat for Indiana bats within the Boost Project Action Area and Boost Project LOD*.* Table 4-1 provides information on the vegetation cover types within the Boost Project LOD and Action Area. As described in section 2.4.4 MVP has modified the land use information within the Boost Project LOD based on aerial photography and field investigations to reflect land use changes that have occurred since the NLCD information was published. Therefore, this updated land use information is used in place of the corresponding NLCD cover types. Land use types within the Boost Project LOD are herein classified into the following 5 classifications based on predominant land uses:

- Agricultural: cultivated land or land used for the purpose of raising livestock;
- Open land: utility rights-of-way, open field, vacant land, herbaceous and scrub uplands, non-forested lands, emergent wetland, scrub-shrub wetland, golf courses, and municipal land
- Forest/woodland: upland and wetland forest and pine plantations;
- Developed:
    - Industrial/commercial: manufacturing or industrial plants, paved areas, landfills, mines, quarries electric power or natural gas utility facilities; developed areas, roads, railroads and railroad yards, and commercial or retail facilities;
    - Residential: existing developed residential areas and planned residential developments. This may include large developments, low-, medium-, and high-density residential neighborhoods, urban/suburban residential, multi-family residences, ethnic villages, and residentially and zoned areas that have been developed; and Open water: waterbodies greater than 100 feet wide and streams visible on aerial photography but less than 100 feet in width.

Analysis of the NLCD and field-collected data identified 5 distinct land cover types within the Boost Project Action Area totaling 11,266.6 acres (Table 4-1). The largest land cover type in area is forest/woodland (9,333.3 acres, 82.8 percent) followed by open land (1,002.7 acres, 8.9 percent).

Table 4-1: Land Cover Types and Acreages within the Boost Project LOD and Boost Project Action Area as indicated by NLCD and Field Assessments.

Compressor Station and Vegetative Cover Type	Boost Project Action Area (acres)	Boost Project LOD[1]	
		Construction (acres)	Operation (acres)
Bradshaw			
Developed[2]	12.6	2.7	6.3
Open Land[3]	149.0	0	0
Agricultural[4]	2.5	0	0
Forest Woodland[5]	3,118.3	0	0
Open Water	0	0	0
Total[6]	**3,282.2**	**2.7**	**6.3**
Harris			
Developed[2]	7.9	0	5.6
Open Land[3]	204.5	1.5	<0.1
Agricultural[4]	84.1	0	0
Forest Woodland[5]	2,813.8	0	0
Open Water	0	0	0
Total[6]	3,110.3	**1.5**	**5.6**
Stallworth			
Developed[2]	15.3	0	5.9
Open Land[3]	468.5	0	0.5
Agricultural[4]	375.0	0	0
Forest Woodland[5]	2,776.7	0	0
Open Water	0.4	0	0
Total[6]	3,635.9	**0**	**6.4**
Swann			
Developed[2]	229.6	4.2	1.8
Open Land[3]	180.7	0	5.8
Agricultural[4]	202.5	13.5	3.6
Forest Woodland[5]	624.7	0	12.6
Open Water	0.7	0	0
Total[6]	**1,238.2**	**17.7**	**23.8**
Total for Boost Project Action Area[6]	**11,266.6**	**21.9**	**42.1**

Compressor Station and Vegetative Cover Type	Boost Project Action Area (acres)	Boost Project LOD[1]	
		Construction (acres)	Operation (acres)

1. Construction acres include land that will be temporarily and permanently disturbed by the Boost Project. Operation acres include land that will be permanently disturbed by the Boost Project.
2. Developed includes Low Intensity, Medium Intensity, and High Intensity.
3. Open land includes Barren Land, Open Space, Emergent Herbaceous Wetlands, Grassland/Herbaceous, and Shrub/Scrub.
4. Agricultural includes Cultivated Crops and Pasture/Hay.
5. Forest Woodland includes Deciduous Forest, Mixed Forest, Evergreen Forest, and Woody Wetlands
6. Sums can differ from totals shown due to rounding.

4.1.4. Climate Change

According to the USFWS, climate change "poses a serious and increasing threat" to Indiana bats in the future (USFWS 2019). The species is vulnerable to disruption from extreme weather events and disease, both of which are expected to increase with a changing climate (USFWS 2019). In addition, because climate influences food availability, timing of hibernation and migration, frequency and duration of torpor, rate of energy expenditure, reproduction, and development rates of juveniles, each of these factors could be affected by climate change (USFWS 2019).

Researchers have indicated that warmer climates might benefit female Indiana bats by causing earlier parturition and weaning of young, allowing more time to mate and store fat reserves in preparation for hibernation, while earlier gestation and parturition may benefit juveniles by providing a longer growth period prior to the breeding season (USFWS 2019). On the other hand, disruption of hibernation, extreme weather events, reduced water availability in arid environments, and the spread of disease may also cause significant mortalities (USFWS 2019).

Climate change could cause suitable habitat for Indiana bats to decrease within its historic range (USFWS 2019). As temperatures warm, the western part of the range (Missouri, Iowa, Illinois, Kentucky, Indiana, and Ohio)—currently considered the heart of Indiana bat maternity range—would become unsuitable under most future climate scenarios that researchers have modeled (USFWS 2019). Scientific models predict that long-term projected temperature changes could cause the most suitable summer range of Indiana bats to decline and become concentrated in the northeastern U.S. and Appalachian Mountains, where Indiana bats might benefit from increased precipitation coupled with warmer winter conditions that may allow for higher reproduction and winter survival (USFWS 2019). If this occurs, the Northeast and Appalachian RUs for Indiana bats might become climatic refugia for the species, due to abundant habitat in those locations.

Rising temperatures may also affect hibernation periods for Indiana bats. With sufficient warming, bats could emerge from hibernation earlier or more frequently, which likely would result in depleted energy stores (USFWS 2019). This would make female bats in particular more vulnerable to other stressors when migrating to maternity habitat and separately would pose a threat to the viability of bat pups (USFWS 2019). As a result, the USFWS has suggested that finding suitable maternity sites might become a function of finding new hibernacula, and summer and winter range shifts may occur concurrently (USFWS 2019).

Notwithstanding the various predictions summarized above, the USFWS has made clear that "questions about the degree to which negative effects of climate change will be offset by positive effects on other life history features, whether population losses in one part of the species' range will be offset by gains in other regions, and the degree to which bats can adapt by adjusting their behavioral, ecological, and phenological characteristics, remain largely unanswered. Further monitoring and research are needed to better understand the impacts of climate change on Indiana bats and their habitat" (USFWS 2019).

4.1.5. Recovery Status and Efforts

A USFWS Indiana Bat Recovery Plan was first developed and signed on October 14, 1983 (USFWS 1983). An agency draft of the Revised Recovery Plan was released in March 1999 (USFWS 1999) but was never finalized. The *Indiana Bat (Myotis sodalis) Draft Recovery Plan: First Revision* (draft Revised Recovery Plan) was made available for public comment on April 16, 2007 (72 FR 72:19015-19016; USFWS 2007). The draft Revised Recovery Plan describes three recovery objectives for reclassification of the species as threatened (USFWS 2007):

1. Permanent protection of 80 percent of Priority 1 hibernacula.
2. A minimum overall population number equal to the 2005 estimate (457,000).
3. Documentation of a positive population growth rate over five sequential survey periods.

In addition, the draft Revised Recovery Plan describes three recovery objectives for delisting of the species (USFWS 2007):

1. Permanent protection of 50 percent of Priority 2 hibernacula.
2. A minimum overall population number equal to the 2005 estimate.
3. Continued documentation of a positive population growth rate over an additional five sequential survey periods.

Since 2007, no further revisions have been made to the Recovery Plan. The most recent (2019) 5-year status review was the first to include the very large, previously unknown hibernacula (now known as the Sodalis Nature Preserve, located near Hannibal, Missouri). When fully surveyed for the first time in January 2017, there were over 197,000 hibernating Indiana bats; this addition became the largest known hibernacula and had evidence of multi-decadal persistence. The 2019 5-Year Review assessed progress towards achieving the recovery objectives for reclassification and delisting and determined that the shared second goal of the objective lists has been achieved due to the addition of the Sodalis Nature Preserve population. The other goals have not yet been met (USFWS 2019).

4.1.6. Habitat

4.1.6.1. Summer Habitat

Indiana bats exhibit site fidelity to summer roosting and foraging areas (Kurta and Murray 2002; Kurta et al. 2002). Females form maternity colonies under exfoliating bark of dead, dying, and living trees in a variety of habitat types, including uplands and riparian habitats. A wide variety of tree species, including occasional pines (Britzke et al. 2003), are used as maternity[18] colonies, indicating that it is tree form, not species that is important for roosts. Individual roost trees may be habitable for one to several years, depending on the species and condition of the tree (Callahan et al. 1997). Roost trees are typically located in canopy gaps in a forest, along fence lines, or within 50 feet of a forest edge and receive direct sunlight for more than half of the day. The amount of direct sunlight needed per day may vary with latitude. Indiana bats may also roost in human-made structures such as bridges and bat houses (USFWS 2024f).

Indiana bats switch roosts frequently and use primary and secondary roost trees (Kurta et al. 2002, Kurta 2005, USFWS 2007). Roosts that contain more than 20 bats are generally referred to as primary roosts, while secondary roosts are occupied by fewer bats. Primary roost trees are typically greater than 18 inches in diameter at breast height (DBH) while secondary roost trees may be as small as 9 inches DBH (Gardner et al. 1991, Callahan et al. 1997, Kurta et al. 2002, Miller et al. 2002, Carter 2003). As many as 20 suitable

[18] Groups of roosting reproductive females and their pups (young bats) born that year (USFWS 2007).

roost trees per acre may be required to support a single maternity colony (Gardner et al. 1991, Miller et al. 2002, Carter 2003). Female Indiana bats produce one pup each year that is born in June or early July and is able to fly within 3-5 weeks of birth (Kurta and Rice 2002). Maternity colonies begin to disperse soon after the young begin to fly.

Most male Indiana bats remain near hibernacula throughout summer (Whitaker and Brack 2002). The woodland roosts of male bats appear similar to maternity roosts (Kiser and Elliott 1996, Schultes and Elliott 2002, Brack and Whitaker 2004, Brack et al. 2004), although smaller diameter trees may also be used.

Members of maternity colonies forage in a variety of woodland settings, including upland and floodplain forest (Humphrey et al. 1977, Brack 1983, Gardner et al. 1991). Foraging activity is concentrated above and around foliage surfaces, such as over the canopy in upland and riparian woods, around crowns of individual or widely spaced trees, and along forest edges. They forage less frequently over old fields, and occasionally over bushes in open pastures. Forest edges, small openings, and woodlands with patchy trees provide a better supply of insects for foraging on than dense wooded areas (Tibbels and Kurta 2003).

4.1.6.2. Winter Hibernation, Spring Staging, and Fall Swarming

In Virginia and West Virginia, Indiana bats hibernate from mid-November to late-March (Figure 4-2; USFWS 2024f) in natural caves or cave-like structures, such as abandoned coal or limestone mines (USFWS 2007, 2024f). Indiana bats may also use tunnels for winter hibernation (USFWS 2024f). Indiana bats typically require low, stable temperatures (3-8 °C; 37-46 degrees Fahrenheit [°F]; Brack 2004, Tuttle and Kennedy 2002), and individuals typically return to the same hibernaculum each year (LaVal and LaVal 1980). There is an inverse relationship between ambient roost temperature and hibernating cluster size; larger clusters are usually found at colder hibernacula (Clawson et al. 1980, Brack et al. 1984). Caves with the largest populations of Indiana bats are generally large, complex systems with multiple entrances that allow for noticeable airflow, yet buffer or slow changes in temperature (Brack 2004, USFWS 2007). Indiana bats hibernate in dense clusters, potentially for thermal benefits, and in hibernacula with small populations. Indiana bats are known to cluster with other bat species including gray bats (*M. grisescens*), Virginia big-eared bats (*Corynorhinus townsendii virginianus*), little brown bats (*M. lucifugus*), and northern long-eared bats (LaVal and LaVal 1980, Kurta and Teramino 1994) to maintain this thermoregulatory advantage (USFWS 2007).

Spring staging occurs after Indiana bats emerge from hibernation and before migrating to summer habitat. Fall swarming occurs after migration from summer habitat and before winter hibernation. During staging and swarming, bats use the area around hibernacula for roosting and foraging, and for mating in fall (USFWS 2007). During spring staging and fall swarming, Indiana bats may roost more than 20 miles from hibernacula which may minimize competition for food and roost sites; at smaller caves, however, most individuals likely roost within 10 miles (USFWS 2007). Shortly after emergence from hibernacula, female Indiana bats migrate in relatively direct flight patterns from hibernacula to summer ranges (Butchoski and Turner 2005, Roby et al. 2019), generally between the end of March and late May (USFWS 2007). The USFWS has not provided formal guidance for conservation buffers around known or potentially occupied Indiana bat hibernacula; however, the USFWS recommends a 5-mile conservation buffer around known or potentially occupied northern long-eared bat hibernacula (USFWS 2024g). Therefore, a 5-mile conservation buffer around known or potentially occupied Indiana bat hibernacula is used in this BA to identify and evaluate any Project activities with potential to affect swarming and staging Indiana bats (Section 5.1.5).

4.1.6.3. Migration Habitat

Spring migration in Virginia and West Virginia typically occurs from April to mid-May (Figure 4-2; USFWS 2024f). During this period, Indiana bats leave spring staging habitat near their winter hibernacula to move to summer habitat to establish maternity colonies. Fall migration, when the bats leave summer maternity habitat to move to fall swarming habitat near hibernacula, typically occurs from mid-August to mid-November in Virginia and West Virginia (Figure 4-2; USFWS 2024f). Flights vary in duration depending on the distance between these habitats, and migration distances up to 348 miles have been documented for Indiana bats (Kurta and Murray 2002, Roby et al. 2019).

Indiana bats may use day roosts and temporary night roosts to rest during migration throughout their range (Roby et al. 2019). Migrating Indiana bats typically roost in trees, snags and live trees; however, other structures such as bridges, buildings, and bat boxes may be used temporarily as both night and day roosts (USFWS 2007). Many bat species, including Indiana bats, select edge habitat for foraging and as travel corridors and may use edge habitat as migration travel corridors. Indiana bats often use open flyways as travel corridors, such as streams, woodland trails, small infrequently used roads, and possibly utility corridors, regardless of suitability for foraging or roosting (Brown and Brack 2003).

4.1.7. Occurrence

4.1.7.1. Summer Occurrence

The Boost Project occurs within the summer range of Indiana bats (Figure 4-1). Data from state agencies and previous surveys and monitoring conducted for the MVP Mainline Project indicate no known Indiana bat summer occurrence records in the Boost Project Action Area or within 2.5 miles[19] of the Boost Project Action Area (MVP 2017, 2022). [redacted]

4.1.7.2. Winter Hibernation, Spring Staging, and Fall Swarming

The Boost Project occurs within Indiana bat's hibernating range (USFWS 2024f; Figure 4-1). Data from state agencies and previous surveys and monitoring conducted for the MVP Mainline Project indicate no known Indiana bat hibernacula in the Boost Project Action Area or within 5.0 miles of the Boost Project Action Area (MVP 2017, 2022). [redacted]

4.1.7.3. Migration Occurrence

The presence of suitable roost trees in the Boost Project Action Area would potentially provide migrating Indiana bats opportunities to roost during migration. Accordingly, migrating Indiana bats could potentially

[19] For purposes of evaluating the potential for impacts to forest roosting individuals, USFWS recommends a 5.0-mile conservation buffer to the location around any Indiana bat acoustic detection when the location of the detected bat's roost tree is unknown (USFWS 2024f). Within the 5.0-mile conservation buffer, a 2.5-mile buffer is designated as the inner tier of that occurrence, which is considered the maternity colony home range for the species and reflects USFWS's understanding that the maternity roost tree will be located somewhere within 2.5 miles of the detection site (2.5-mile inner-tier buffer; USFWS 2024f).

be temporarily present in the Boost Project Action Area during the spring and/or fall migration periods. However, Indiana bats have not been documented during any season within the relevant vicinity of the Bradshaw, Stallworth, and Swann Compressor Stations, and these compressor stations are not located directly between known destinations or origins (i.e., hibernacula, staging/swarming occurrence, or summer occurrence) for migrant Indiana bats and therefore they would not be expected to migrate near these three compressor stations. [redacted]

[redacted]

4.2. Northern Long-Eared Bat

Northern long-eared bats are characterized by relatively long ears (1.8 centimeters), which extend past the muzzle when laid forward, as well as a long, pointed and narrow tragus (part of the ear; 10.2 millimeters; Whitaker and Mumford 2009). Northern long-eared bats are typically medium to dark brown on the dorsal side and light brown on the ventral side (Caceres and Barclay 2000, Whitaker and Mumford 2009). Ear and wing membranes are usually dark brown (USFWS 2022d). Northern long-eared bats weigh approximately 5 to 8 grams at maturity, and forearms measure approximately 33 to 39 millimeters (USFWS 2022d). The wing membrane connects to the foot at the base of the first toe (Schmidt et al. 2021). Female northern long-eared bats give birth to one young per year and can live as long as 18 years or more (USFWS 2022d).

Northern long-eared bats occur throughout most of the east and north-central US and eastern and central Canada (USFWS 2022d, 2024a, 2025g; Figure 4-4). In 2016, there were an estimated 6.5 million adult northern long-eared bats range-wide (USFWS 2016b). However, WNS has caused estimated population declines of 97 to 100 percent across 79 percent of the species' range (Cheng et al. 2021), making WNS the most severe threat facing this species (USFWS 2022d). In 2023, the estimated range-wide population of northern long-eared bats was 201,266 adults (USFWS 2024a). In 2024, the estimated summer population of northern long-eared bats was 14,664 individuals (adults and pups) in Virginia and 17,511 individuals (adults and pups) in West Virginia (USFWS 2024a).

Based on the best scientific and commercial information available, including review of the USFWS IPaC online tool for determining species presence (February 2026; USFWS 2025b, 2025c, 2025d, 2025e, 2026) and state agency information (VDWR 2025), northern long-eared bats may occur within the Boost Project Action Area for the Bradshaw, Harris, Stallworth, and Swann Compressor Stations (Figure 4-4).

Northern long-eared bats typically roost in trees in summer and hibernate in caves or mines in winter. The annual life cycle of northern long-eared bats is considered the same as Indiana bats (Figure 4-2, USFWS 2024f)[20] and also includes the use of the following habitat types:

- Winter habitat (hibernation)
- Staging/swarming habitat (spring staging and fall swarming)
- Migration habitat (spring and fall migration)
- Summer habitat[21] (summer activity[22])

[20] Dates relevant to West Virginia and Virginia in USFWS's Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines (USFWS 2024f) are used for developing ESA compliance and species-specific survey guidelines.

[21] Summer habitat includes maternity roosts, non-reproductive female and male roosts, roosts after the pups start to fly, and foraging habitat.

[22] Summer activity includes maternity, pup rearing, non-reproductive female and male roosting activity, and foraging.

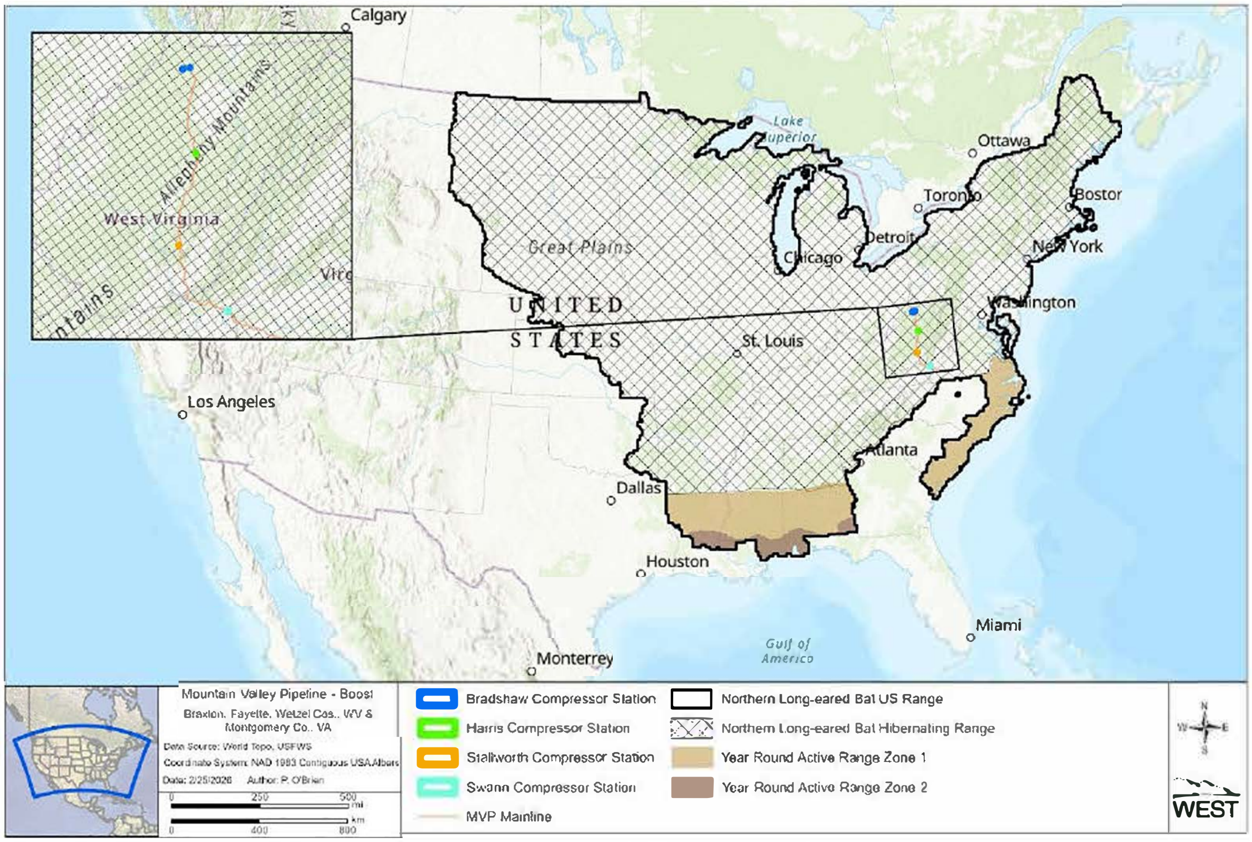

Figure 4-4: Northern long-eared bat range in the United States.[23]

4.2.1. Listing Status

On April 2, 2015, the USFWS published a final rule to list northern long-eared bats as a threatened species and an interim 4(d) rule to provide measures that are necessary and advisable to provide for the conservation of the species (USFWS 2015b). At the time of listing, the USFWS determined that issuance of a 4(d) rule[24] was the most appropriate regulatory action it could take for the species, which helped ensure northern long-eared bats were adequately protected when they are most vulnerable (e.g., from birth to flight and when in and around hibernacula), and acknowledged WNS reduction as the primary measure to arrest and reverse the decline of the species. the USFWS identified other factors that affect the species but acknowledged WNS was the most severe and immediate threat and the primary reason the species is facing dramatic declines (USFWS 2015b).

On March 23, 2022, the USFWS issued a proposed rule to uplist northern long-eared bats from threatened to endangered status (USFWS 2022b). This rule went into effect on March 31, 2023, elevating northern long-eared bats to endangered status and nullifying the 4(d) rule, which means that unauthorized incidental take is prohibited throughout the species' range (USFWS 2022a, 2023b).

[23] Within the Year-Round Active Zones, bats remain active and feed year-round. Individual northern long-eared bats remain active year-round where the portion of their entire range overlaps the Year-Round Active Zones. No portion of the Year-Round Active Zone overlaps the Boost Project Action Area.

[24] USFWS issued a final 4(d) rule for the species on January 14, 2016. The final 4(d) rule prohibited purposeful take of northern long-eared bats throughout the species' range, except in certain limited instances. It also prohibited incidental take for a limited number of activities in the WNS zone.

4.2.2. Critical Habitat Designation

No northern long-eared bat critical habitat has been designated. At the time of the northern long-eared bat listing as a threatened species in 2015, the USFWS concluded that critical habitat was not determinable, although the USFWS indicated a determination would be prudent (USFWS 2015b). On April 27, 2016, USFWS reassessed its initial conclusion and found that the designation of critical habitat was not prudent or determinable (USFWS 2016a). The USFWS indicated that northern long-eared bat summer habitat and summer roost selection are too diverse to qualify for a critical habitat designation. Further, it indicated that the designation of winter habitat would result in cave locations being made public, which could increase disturbance to the species, resulting in more harm than good (USFWS 2016a).

4.2.3. Environmental Baseline and Stressors

In the final rule to list northern long-eared bats as endangered in 2022 and the *Species Status Assessment Report for the Northern long-eared bat (Myotis septentrionalis)*, Version 1.2, the USFWS recognized that WNS was the predominant threat to the species (USFWS 2022a, 2022d). In the 2015 rule to list northern long-eared bats as threatened with a 4(d) rule and the 2024 *Standing Analysis and Implementation Plan-Northern Long-eared Bat and Tricolored Bat Assisted Determination Key*, the USFWS also discussed other stressors that influence northern long-eared bat population stability to a lesser extent than WNS (USFWS 2015b, 2024g). Many of the existing local populations continue to face the effects of less impactful past and ongoing stressors. These stressors include impacts to the integrity of bat hibernacula, cave commercialization and other sources of disturbance to hibernating bats, land use changes and development, forest conversion and management (including prescribed burning), other diseases, scientific collection, predation, wind energy development, climate change, and pesticides (USFWS 2015b, 2024g). These stressors have occurred and continue to occur in areas across the northern long-eared bat's range. Impacts associated with climate change (discussed in Section 4.2.4) are also expected to occur across the northern long-eared bat's range and continue into the future.

- Disease and Predation: WNS is the foremost stressor to northern long-eared bats (USFWS 2022d). WNS invades the bats' skin and increases the frequency and duration of arousals during hibernation, eventually depleting fat reserves, often resulting in mortality (USFWS 2022d). WNS has caused around 97 to 100 percent population declines across 79 percent of the species' range (USFWS 2022d). Other diseases affect the species, such as rabies, histoplasmosis, St. Louis encephalitis, and Venezuelan equine encephalitis, but to a much lesser extent (USFWS 2015b). Rabies can lead to mortality but is not known to have an appreciable effect on the population (USFWS 2015b). There is limited information on histoplasmosis, St. Louis encephalitis, and Venezuelan equine encephalitis, but no population declines have been associated with these other diseases (USFWS 2015b). The species is known to carry a variety of pests, including chiggers, mites, and bat bugs, but the level of mortality caused by WNS far exceeds any mortality from pests (USFWS 2015b). Animals including owls, hawks, raccoons, skunks, and snakes prey upon bats; however, information about northern long-eared bat predation is limited and predation does not appear to be a population-changing cause of mortality (USFWS 2015b).
- Wind Energy Development: Wind energy-related mortality is considered a consequential stressor at local and regional levels (USFWS 2022d). Most bat mortality is caused by collision with moving turbine blades, and wind energy projects kill an estimated 122 individual northern long-eared bats annually (USFWS 2022d). Bats may also collide with turbine towers (USFWS 2015b). If wind projects are sited in forested areas, effects from wind energy development may include tree clearing associated with turbine placement, road construction, turbine lay-down areas, transmission lines, and substations (USFWS 2015b). Wind energy development continues to increase throughout the northern long-eared bat's range. There is, however, no evidence that wind energy development has led to population-level

declines. Nevertheless, sustained annual mortality of northern long-eared bats could result in negative impacts to local populations (USFWS 2015b).

- Habitat Loss: Habitat loss includes loss or degradation of suitable roosting or foraging habitat, including fragmentation of maternity colony networks and loss or modification of winter roosts (USFWS 2022d). While forest land cover acreage throughout the species' range has been fairly stable, deciduous forest land cover decreased by 1.4 million acres from 2006 – 2016 (USFWS 2022d). Other land cover types that provide foraging habitat, such as emergent wetlands, have also decreased across the species' range (USFWS 2022d). As for winter roosts, modifications to bat hibernacula, including placement of physical barriers to control cave and mine access, intentional or accidental filling or sealing of entries, or creation of new openings, can alter the species' ability to access the site and/or can affect the airflow and microclimate needed for successful hibernation (USFWS 2015b, 2022d). Human entry or other disturbance during hibernation can also impact the species (USFWS 2015b, 2022d). Mining operations, mine passage collapse, and mine reclamation activities can also affect bats (USFWS 2015b). Loss of potential winter habitat through mine closures is a concern in Virginia (USFWS 2015b). Generally, these threats to integrity of bat hibernacula for all species have decreased since the USFWS listed Indiana bats as endangered in 1967 (USFWS 2015b).
- Human Disturbance: The primary forms of human disturbance to northern long-eared bats include cave commercialization such as tours, recreational caving, vandalism, and research-related activities (USFWS 2015b). Changes in sound exposure above baseline conditions can cause bats to arouse more frequently during hibernation, resulting in premature depletion of energy stores and starvation (USFWS 2015b, 2024g). Northern long-eared bats may avoid vehicle noise on roads, resulting in roads becoming a barrier for commuting and foraging (USFWS 2024g). Roads may also create a collision risk for northern long-eared bats (USFWS 2024g). There have been isolated instances of intentional killing, but there is no evidence that this occurs on a scale large enough to have population-level effects (USFWS 2015b).
- Land-Use Changes: Forest conversion, the loss of forest to another land cover type, may result in loss of suitable roosting and/or foraging habitat, habitat fragmentation, removal or creation of travel corridors, and injury or mortality during clearing activities (USFWS 2015b). The rate of forest conversion across the species' range is fairly stable (USFWS 2015b). Development, such as wind energy projects discussed above and surface coal mining, contributes to the loss of forest habitat (USFWS 2015b). Surface coal mining is a driver of land change and may destroy forest habitat (USFWS 2015b). In addition, urban development, energy production and transmission, and natural gas extraction are expanding and may affect habitat necessary for establishing maternity colonies and foraging, thereby reducing the amount of forest habitat available to the species (USFWS 2015b). Tree removal for these land-use changes may result in longer flights to find alternative suitable habitat and colony disruption from the removal of roosting or foraging habitat (USFWS 2015b). Depending on the degree of forestation, the impact of tree clearing would change; impacts in areas with little forest or highly fragmented forest would be disproportionately greater than similar-sized losses in heavily forested areas like the Appalachians (USFWS 2015b). Tree-removal activities outside the species' summer home range or away from hibernacula, however, would not likely impact northern long-eared bats (USFWS 2015b).
- Forest Management: Timber harvesting is the primary forest management stressor on the species (USFWS 2015b). Impacts from forest management would vary depending on the timing, location, and extent of tree removal (USFWS 2015b). Forest management activities outside the summer home ranges or away from hibernacula should not result in species impacts (USFWS 2015b). Prescribed burning generally has a beneficial effect on bat habitat, making trees vulnerable to pathogens, thereby providing roosting and foraging habitat and opening the tree canopy, facilitating faster juvenile development (USFWS 2015b). Vegetation growth stimulated by prescribed burns has been shown to

increase the abundance of insect prey for northern long-eared bats (USFWS 2024g). Prescribed burns may directly expose bats to heat, smoke and gases, but carbon monoxide levels do not reach critical thresholds that could harm bats during low intensity burns (USFWS 2024g). Heat exposure could cause injury but can be avoided through appropriate management practices (USFWS 2024g). There is no evidence that prescribed burns have a significant population-level effect on the species (USFWS 2015b).

- Dust and Contaminants: Fugitive dust generation, such as that produced during site preparation and infrastructure construction and use, can accumulate and coat natural and anthropogenic surfaces, which could damage plants and affect the diversity of ecosystems. This damage could in turn lead to a decrease in food supply (i.e., insects) for northern long-eared bats. Dust accumulation could also adversely affect water quality, which could decrease the availability of clean drinking water and aquatic insects. As a result, northern long-eared bats may have to travel farther than otherwise necessary to find clean water and food, which could result in increased energy expenditure (USFWS 2015b). Contaminants of exposure concern include organochlorine pesticides, organophosphates, carbamates, neonicotinoid insecticides, polychlorinated biphenyls, polybrominated diphenyl ethers, pyrethroid insecticides, and inorganic contaminants such as mercury (USFWS 2015b). Bats typically are exposed to these contaminants through consumption of prey and water (USFWS 2015b). Increased sedimentation from construction activities could degrade water quality and result in reduced abundance of aquatic insects that bats consume (USFWS 2024g). There is no evidence of population declines associated with contaminant exposures (USFWS 2015b).
- Light Pollution – Because northern long-eared bats are nocturnal, they may be affected by light pollution. Artificial lighting can cause bats to desert roosts, delay emergence from roosts thereby shortening time available for foraging, and avoid drinking, foraging, or commuting in lit areas (USFWS 2015b, 2024g). Artificial changes in light can cause bats to arouse more frequently during hibernation, resulting in premature depletion of energy stores and starvation (USFWS 2015b, 2024g).
- Synergistic Effects: The above stressors may act synergistically and additively on the species, and exposure to a combination of multiple stressors may be more harmful than a single stressor acting alone (USFWS 2015b).

Specific information was not available regarding activities or land uses that have resulted in these stressors occurring within the counties the Boost Project occurs in or within the Boost Project Action Area. As a result, Mountain Valley undertook a comprehensive review of the Boost Project Action Area and the surrounding vicinity to identify land uses, specific activities, and related stressors that reasonably could have affected the baseline condition of the Boost Project Action Area. Baseline conditions across the Boost Project Action Area where northern long-eared bats may potentially occur during their annual life history cycle (Figure 4-2) are the same as Indiana bat and are described in Section 4.1.3.1.

4.2.4. Climate Change

Although there may be some benefit to northern long-eared bats from a changing climate, overall negative impacts are anticipated, especially at local levels (USFWS 2022d). According to the USFWS, although any climate change effects to northern long-eared bats to date are considered “low,” there is growing concern about impacts to bat populations overall due to climate change (USFWS 2022d).

Researchers have identified several climate change factors that may impact bats, including changes in hibernation; mortality from extreme drought, cold, or excessive rainfall; cyclones; loss of roosts from sea-level rise; and impacts from human responses to climate change (e.g., wind turbines; the USFWS 2022d). Climate change may also influence factors such as temperature, humidity, phenology, and other factors which may affect disease dynamics and interactions between WNS and hibernating bats (USFWS 2022d).

In addition, climate change could result in a phenological mismatch (e.g., timing of various insect hatches not aligning with key life-history periods of spring emergence, pregnancy, lactation, or fall swarming) and cause shifts in the distribution of forest communities, invasive plants, invasive forest pest species, or insect prey (USFWS 2022d). the USFWS further recognizes that changes in temperature and precipitation likely will influence northern long-eared bat resource needs, such as suitable roosting habitat for all seasons, foraging habitat, and prey availability (USFWS 2022d).

The USFWS has cautioned that northern long-eared bats' risk of exposure to climate change is range-wide (USFWS 2022d). However, the magnitude, direction, and seasonality of climate variable changes may not be consistent range-wide. In addition, the resiliency of populations and inherent differences among populations (e.g., genetics, summer roost microclimates) may result in differing ability for the species to respond to the same types of changes across the range. While researchers have not observed these impacts in northern long-eared bats to date, based on studies of other insectivorous bat species, the USFWS has identified the following potential future risks: reduced reproduction due to drought conditions leading to decreased availability of drinking water and reduced adult survival during dry years; decreased insect availability and reduced echolocation effectiveness resulting in decreased foraging success during heavy precipitation events (Geipel et al. 2019); and reduced reproduction during cooler, wetter springs (USFWS 2022d). As a result, the USFWS predicts a "medium impact" to northern long-eared bats from climate change in the future (Somerville 2022, USFWS 2022d).

4.2.5. Recovery Status and Efforts

The USFWS has not prepared a recovery plan for northern long-eared bats. Information associated with updates to conservation measures and recovery efforts have been primarily documented in biological opinions issued since the initial 2015 threatened listing (USFWS 2015b), the subsequent uplisting to endangered in 2022, which went into effect March 31, 2023 (USFWS 2023b), and the 2022 SSA (USFWS 2022d). The *Programmatic Biological Opinion for Transportation Projects in the Range of the Indiana Bat and Northern Long-Eared Bat* (USFWS 2018) provided some updates about the species related to recent research (e.g., documented habitat use) and stressors, identifying the additional stressors of vibration, lighting, alteration of clean drinking water, foraging habitat, and composition of insect prey base. The 2022 SSA (USFWS 2022d) and endangered listing (USFWS 2022b) also largely restate information related to conservation measures associated with WNS reduction efforts, wind energy production, and habitat loss.

To address the threat from WNS, the USFWS has been working with state and federal agencies, tribes, conservation organizations, institutions, and individuals on management strategies to control the spread of WNS and to minimize the impact WNS is having on northern long-eared bats (USFWS 2014a, 2022d). Since the species' original threatened listing, the agencies responsible for many state and federal forests have proactively closed caves to the public to control the spread of WNS. Many private landowners and private parties, including Mountain Valley, have installed "bat friendly" gates on their caves to control public access and the possible spread of WNS (USFWS 2020c). The USFWS has funded WNS-related research and coordinates the WNS National Response Team (USFWS 2025k). Many state and federal agencies, as well as universities and other organizations are also undertaking research and monitoring efforts to gain more information about habitat needs of and use by northern long-eared bats (USFWS 2015c, 2025k).

4.2.6. Habitat

4.2.6.1. Summer Habitat

During the summer season, reproductive female northern long-eared bats congregate in maternity colonies to raise their young (USFWS 2022d). Maternity colonies are typically found in mature-growth forests with dead/decaying trees and/or live trees with cavities or exfoliating bark, although they may also use bat houses, buildings, bridges, culverts, and other anthropogenic structures[25] during the summer in some locations (Foster and Kurta 1999, Lacki and Schwierjohann 2001, Amelon and Burhans 2006, Ford et al. 2006, USFWS 2022d). Northern long-eared bats use multiple types of trees for roosts throughout their range, including different species of oak (*Quercus* spp.), maple (*Acer* spp.), and even pine (*Pinus* spp.) trees (Foster and Kurta 1999, Caceres and Barclay 2000, Carter and Feldhamer 2005, Perry and Thill 2007b). Since the arrival of WNS, maternity colonies typically consist of 1 to 11 individuals (Gorman et al. 2023), while they typically consisted of 30 to 60 individuals before the arrival of WNS (Whitaker and Mumford 2009). Pups are born as early as late May or early June but may be born as late as mid-July (Whitaker and Mumford 2009). Pups usually become volant (able to fly) by 21 days of age (Kunz 1971, Krochmal and Sparks 2007). The number of bats per maternity roost declines from pregnancy to post-lactation (Lacki and Schwierjohann 2001, Sparks et al. 2004).

Canopy coverage surrounding a northern long-eared bat summer roost tree can range from approximately 50 percent to more than 80 percent (Sasse and Pekins 1996, Lacki and Schwierjohann 2001, Perry and Thill 2007b, Timpone et al. 2010). Within a given tree stand, maternity colonies are typically located in larger-diameter trees, relatively open areas, and on upper and middle slopes. Larger trees and open areas are likely to increase sun exposure, which aids in the development of young bats (Perry and Thill 2007b, Taylor et al. 2020). Locations with fewer trees surrounding maternity roosts may also present fewer obstacles and thereby benefit juvenile bats that are learning to fly (Perry and Thill 2007b).

Unlike the communally roosting reproductive females, male northern long-eared bats usually select solitary roosts (Caceres and Barclay 2000). Both non-reproductive females and males often roost in live tree cavities (Caceres and Barclay 2000, Lacki and Schwierjohann 2001, Broders and Forbes 2004) and occasionally in caves and mines (Barbour and Davis 1969). Structurally, summer roosts used by males are similar to those used by maternity colonies, although trees used by males may be smaller diameter than those used by maternity colonies (Perry and Thill 2007b).

Northern long-eared bats demonstrate site fidelity to summer habitat and switch between multiple roost trees within the summer habitat every one to three days (Foster and Kurta 1999, Arnold 2007, Timpone et al. 2010). Between roost trees, females may move up to approximately 2,000 meters and males up to approximately 1,000 meters (Broders et al. 2006). Bats switch roosts for a variety of reasons, including temperature, precipitation, predation, parasitism, and roost trees falling (Carter and Feldhamer 2005).

Roost trees may be habitable for one to several years, depending on the species and condition of the tree (Perry and Thill 2007b). The many different species used as roosts suggest that tree form, not species, is most important for choosing roost locations (Foster and Kurta 1999). Northern long-eared bats often form groups nested within networks of roost trees that contain a central, primary roost tree (Johnson et al. 2012a). Northern long-eared bats may roost singly or in small groups among networks of 1 to 16 roost trees spread over areas ranging from less than 1 acre to 85 acres (Henderson and Broders 2008, Johnson et al. 2012a).

4.2.6.2. Winter Hibernation, Spring Staging, and Fall Swarming Habitat

In Virginia and West Virginia, hibernation is expected to occur from November 16 to March 31 (Figure 4-2; USFWS 2025g). For hibernation, northern long-eared bats require areas in caves or mines with constant winter temperatures, high humidity, and no air currents (Griffin 1940, Whitaker and Winter 1977, Stones 1981). Within hibernacula, northern long-eared bats are most often located in small crevices or cracks,

[25] No buildings or structures will be modified or removed for this Project; therefore, buildings and structures are not being evaluated in this assessment.

often with only the nose and ears visible (USFWS 2015a). In areas where caves or mines are not present, northern long-eared bats may use non-traditional hibernacula, such as buildings or bridges, or atypical hibernacula,[26] such as talus slopes, rock shelters, or rock crevices/outcroppings[27] (USFWS 2022d, 2024e). While northern long-eared bats generally exhibit strong philopatry to a hibernaculum, they have been documented moving between hibernacula during the winter (Whitaker and Rissler 1992; USFWS 2014b, 2024e). Northern long-eared bats hibernate as individuals or in small groups, with hibernating population sizes ranging from a few individuals to rarely more than 100 within a hibernaculum (Barbour and Davis 1969, Caire et al. 1979, USFWS 2024e).

Spring staging occurs after northern long-eared bats emerge from hibernation and before migrating to summer habitat. Fall swarming occurs after migration from summer habitat and before winter hibernation. During staging and swarming, bats use the area around hibernacula for roosting and foraging, and for mating in fall (USFWS 2024a). During swarming and staging, northern long-eared bats were found to use roost trees up to 4.5 miles from hibernacula in fall and up to 1.2 miles from hibernacula in spring (USFWS 2024a). Therefore, the USFWS conservatively recommends a 5-mile conservation buffer around any known or potentially occupied hibernacula for project activities that may affect possible swarming and staging habitat (USFWS 2024g).

4.2.6.3. Migration Habitat

Spring migration in Virginia and West Virginia typically occurs from April to mid-May (Figure 4-2; USFWS 2025g). During this period, northern long-eared bats leave spring staging habitat near their winter hibernacula to move to summer habitat to establish maternity roosts. Fall migration, when the bats leave summer maternity habitat to move to fall swarming habitat near hibernacula, typically occurs from mid-August to mid-November in Virginia and West Virginia (Figure 4-2; USFWS 2025g). While little is known about northern long-eared bat behavior during migration, short regional migratory movements have been documented between summer roost and winter hibernacula (USFWS 2022d). Flights vary in duration depending on the distance between these habitats, and migration distances up to 55 miles have been documented for northern long-eared bats (USFWS 2022d).

Northern long-eared bats may use day roosts and temporary night roosts to rest during migration throughout their range (USFWS 2022d). Lewis et al. (2022) found that northern long-eared bats occupied the same roost trees in fall that were used as maternity roosts during the summer, indicating habitat use characteristics are similar between seasons. Similarly, during migration, northern long-eared bats may use human-made structures that may be used during the summer such as buildings, bridges, and bat houses (USFWS 2022d; Section 4.2.6.1). Many bat species, including northern long-eared bats, select edge habitat for foraging and as travel corridors and may use edge habitat as migration travel corridors (USFWS 2022d).

4.2.7. Occurrence

4.2.7.1. Summer Occurrence

The Boost Project occurs within the summer range of northern long-eared bats (Figure 4-4). Data from state agencies and previous surveys and monitoring conducted for the MVP Mainline Project indicate no known northern long-eared bat summer occurrence records within the portions of the Action Area associated with

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[26] Use of atypical hibernacula by northern long-eared bats is documented in five states: Maine, Nebraska, Ohio, Pennsylvania, and Kentucky (USFWS 2024g).

[27] Northern long-eared bats have not been documented hibernating in atypical hibernacula, bridges, or culverts in Virginia or West Virginia (USFWS 2024g), and no buildings or structures will be modified or removed for this Project; therefore, atypical hibernacula, bridges, culverts, buildings and structures are not being evaluated as hibernacula in this assessment.

the Bradshaw or Swann Compressor Station sites or within 1.5 miles[28] of their associated Action Areas (MVP 2017, 2022, VDWR 2025). [redacted]

4.2.7.2. Winter Hibernation, Spring Staging and Fall Swarming Occurrence

The Boost Project occurs within the northern long-eared bat's hibernating range (USFWS 2025g; Figure 4-4). Data from state agencies and previous surveys and monitoring conducted for the MVP Mainline Project indicate no known northern long-eared bat winter occurrence records within the portions of the Action Area associated with the Bradshaw, Stallworth, and Swann Compressor Station sites or within 5 miles[30] of their associated Action Areas (Mountain Valley 2017, 2022; VDWR 2025). [redacted]

4.2.7.3. Migration Occurrence

The presence of suitable roost trees in the Boost Project Action Area would provide any northern long-eared bats that might migrate through the area an opportunity to establish night or day roosts during migration. Accordingly, migrating northern long-eared bats could potentially be temporarily present in the Boost Project Action Area during the spring and/or fall migration periods. However, northern long-eared bats have not been documented during any season within the Action Area associated with the Bradshaw and Swann Compressor Stations, and these compressor stations are not located directly between known destinations or origins (i.e., hibernacula, staging/swarming occurrence, or summer occurrence) for migrant northern long-eared bats, and therefore they would not be expected to migrate near these compressor

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[28] To evaluate the potential for impacts to forest roosting individuals, the USFWS recommends a 3.0-mile conservation buffer around the location of any northern long-eared bat acoustic detections when the location of the detected bat's roost tree is unknown (USFWS 2024g, 2025g). Within the 3.0-mile conservation buffer, a 1.5-mile buffer is designated as the inner tier of that occurrence, which is considered the maternity colony home range for the species and reflects the USFWS's understanding that the maternity roost tree will be located somewhere within 1.5 miles of the detection site (1.5-mile inner-tier buffer; USFWS 2024g, 2025g).

[29] USFWS's survey guidance indicates that survey results typically are considered valid for a period of five years. Although the mist-net surveys for the 2017 MVP Mainline Biological Assessment were completed in 2015, the results of these surveys are summarized in this document as relevant—though not conclusive—data.

[30] The USFWS recommends implementing a 5.0-mile conservation buffer to the location of any known or potentially occupied northern long-eared bat hibernacula to evaluate impacts to any individuals engaged in spring staging and fall swarming associated with those features (USFWS 2024g).

stations. [redacted]

[redacted]

[redacted]

4.3. Tricolored Bat

Tricolored bats are one of the smallest bats in North America (Barbour and Davis 1969, USFWS 2021). Named for the three colors on each hair—black at the base, yellow in the middle, and brown on the tips—tricolored bats are distinguished from other bats by their yellowish appearance overall and the pink coloration of their forearms. Tricolored bats weigh 3.97 to 7.94 grams (0.14 to 0.28 ounces; Fujita and Kunz 1984).

Across its range (most of the eastern, Midwestern and central US along with southeast Canada, eastern Mexico and northern Central America; Figure 4-7), winter abundance and the number of extant winter colonies of tricolored bats have declined since the onset of WNS by 52 percent and 29 percent, respectively (USFWS 2021). Over 59 percent of their range, population declines are as high as 93 percent (Cheng et al. 2021). However, recent research at a tricolored bat hibernaculum in South Carolina has shown that the number of hibernating bats at this site is stable or increasing after experiencing steep declines for three years after WNS was first detected (Loeb and Winters 2022).

Based on the best scientific and commercial information available, including review of the USFWS IPaC online tool for determining species presence (February 2026; USFWS 2025b, 2025c, 2025d, 2025e, 2026) and state agency information (VDWR 2024), tricolored bats potentially occur within the Boost Project Action Area for [redacted] (Figure 4-7).

Tricolored bats typically roost in trees in summer and hibernate in caves or mines in winter. The annual life cycle of tricolored bats is considered the same as Indiana bats (Figure 4-2, USFWS 2024f)[31] and also includes the use of the following habitat types:

- Winter habitat (hibernation);
- Staging/swarming habitat (spring staging and fall swarming);
- Migration habitat (spring and fall migration); and
- Summer habitat[32] (summer activity[33]).

[31] Dates relevant to West Virginia and Virginia in USFWS's Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines (USFWS 2024f), which is approved to be used for tricolored bats, are used for developing ESA compliance and species-specific survey guidelines.

[32] Summer habitat includes maternity roosts, non-reproductive female and male roosts, roosts after the pups start to fly, and foraging habitat.

[33] Summer activity includes maternity, pup rearing, non-reproductive female and male roosting activity, and foraging.

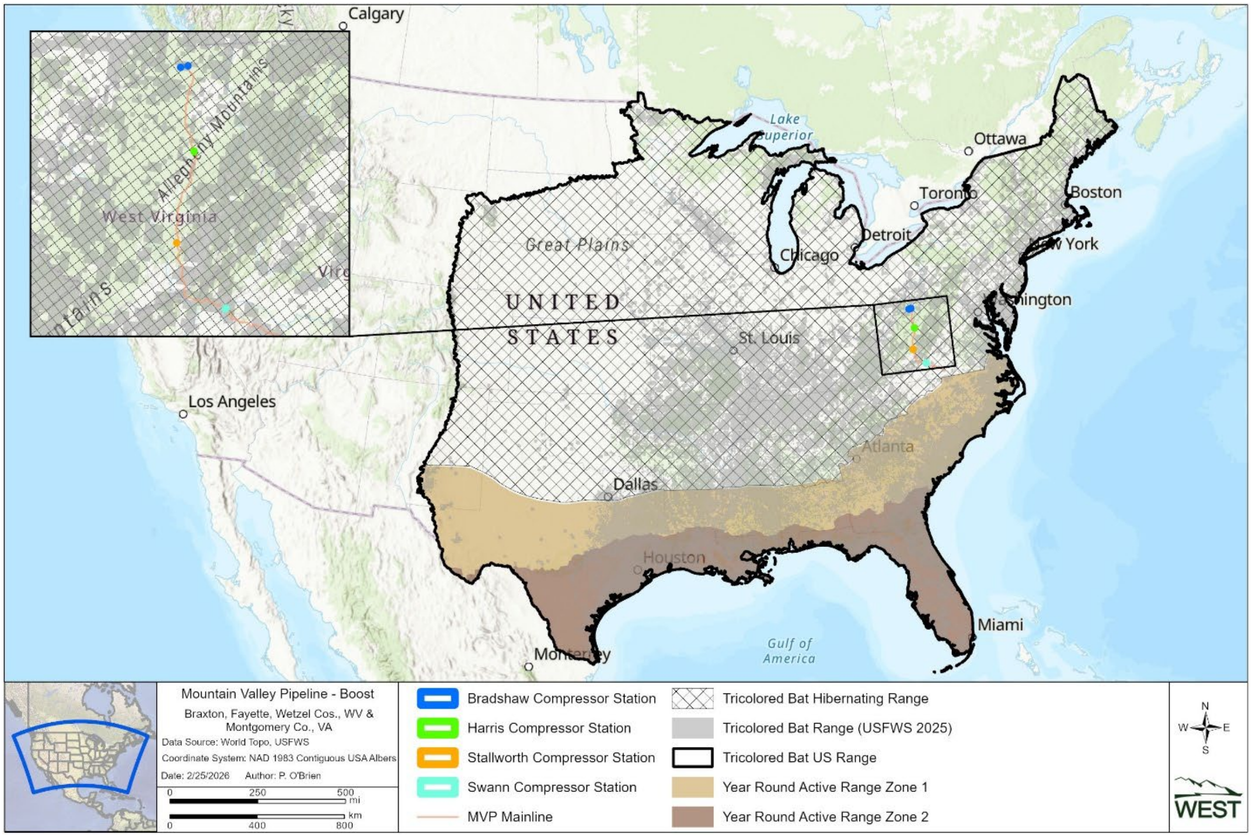

Figure 4-7: Tricolored bat range in the United States.[34]

4.3.1. Listing Status

On September 14, 2022, the USFWS published a proposed rule to list tricolored bats as an endangered species (USFWS 2022c). A SSA for tricolored bats was published in December 2021. The SSA used the best scientific and commercial data available regarding the status of the species, including the impacts of past, present, and future factors (both negative and beneficial) affecting the species (USFWS 2021). At the time of the proposed listing, the USFWS acknowledged that WNS reduction would be the primary measure to arrest and reverse the decline of the species. the USFWS identified other factors that affect the species, including wind energy-related mortality, habitat loss and degradation, and climate change (USFWS 2021). If listed as endangered, the prohibitions of section 9(a)(1) of the ESA, would mean that unauthorized incidental take would be prohibited throughout the species' range.

4.3.2. Critical Habitat

No tricolored bat critical habitat has been proposed. At the time of the tricolored bat proposed listing in 2022, the USFWS indicated that designating critical habitat would not be prudent for this species (USFWS 2022c). The USFWS indicated that, while individual tricolored bats can be killed due to habitat loss, summer and winter habitat is available throughout the range of the species (USFWS 2022c). Further, the USFWS cautioned that designating hibernacula as critical habitat on publicly available maps could increase the

[34] Within the Year-Round Active Range bats remain active and feed year-round. Individual tricolored bats remain active year-round where the portion of their entire range overlaps the Year-Round Active Range. No portion of the Year-Round Active Range overlaps the Boost Project Action Area.

threat from human entry and lead to spread of WNS by identifying specific locations where tricolored bats are present (USFWS 2022c).

4.3.3. Environmental Baseline and Stressors

In addition to WNS, stressors to tricolored bats include impacts from exposure to parasites, wind-energy facilities, habitat loss and disturbance, and climate change (USFWS 2021, 2022c). These stressors have occurred and continue to occur in areas across tricolored bat's range. Impacts associated with climate change (discussed in Section 4.3.4) are also expected to occur across the bat's range and continue into the future.

- Disease and Parasites: The primary stressor affecting tricolored bats is WNS. WNS infection leads to mortality through homeostatic imbalance, changes in immunological responses, and loss of stored fat needed for overwinter survival. Parasites can also affect the species (USFWS 2021).
- Wind Energy and Turbines: Tricolored bats are killed by wind energy projects primarily through collision with moving turbine blades. Wind energy has presented an increasing threat as it has expanded due to changes in state energy goals, recent technological advancements, and declining costs. While tricolored bats are not one of the three bat species that make up the majority of bat fatalities related to wind energy, an estimated 3,300 tricolored bats are killed annually at wind facilities across the species' range (USFWS 2021).
- Habitat Disturbance and Loss: There are various forms of habitat degradation potentially affecting tricolored bats, including forest removal or conversion and hibernacula disturbance or destruction. While habitat loss may occur throughout the species' range, impacts to tricolored bats and their habitat typically occur at a local scale and vary depending on the timing, location, and extent of the disturbance. While tricolored bats are known to cross cleared corridors and open landscapes, forest removal may impact tricolored bats by causing loss of suitable roosting or foraging habitat, longer flights between suitable roosting and foraging due to habitat fragmentation of remaining forest patches, fragmentation of maternity colonies, and direct injury or mortality during active season tree removal. Tree-removal activities outside the species' summer home range or away from hibernacula, however, would not likely impact tricolored bats (USFWS 2021). Disturbance during hibernation results in increased arousal, which can lead to an increased metabolic rate at a time when food and water resources are scarce or unavailable. Additionally, bats present during excavation or filling of hibernacula or roost sites may be crushed or suffocated (USFWS 2021).
- Human Disturbance: Changes in sound exposure above baseline conditions resulting from human activity can cause bats to arouse more frequently during hibernation, resulting in premature metabolic energy stores and starvation (USFWS 2024g). Tricolored bats may forage less in areas with nighttime vehicle noise (USFWS 2024g). Tricolored bats may flush from roosts when exposed to daytime noise, resulting in potential increased predation and stress that results in changes in foraging habits (USFWS 2024g). Roads may create a collision risk for tricolored bats (USFWS 2024g).
- Dust and Contaminants: Fugitive dust can accumulate and coat natural and anthropogenic surfaces, which could damage plants and affect the diversity of ecosystems. This damage could in turn lead to a decrease in food supply (i.e., insects) for tricolored bats. Dust accumulation could also adversely affect water quality, which could decrease the availability of clean drinking water and aquatic-based insect prey. As a result, tricolored bats may have to travel farther than otherwise necessary to find water and food, which could result in increased energy expenditure (USFWS 2021). Bats may be exposed to contaminants through consumption of prey and water (USFWS 2021). Increased sedimentation from construction activities could degrade water quality and decrease the number of aquatic insects that bats consume (USFWS 2024g).

- Light Pollution: Because tricolored bats are nocturnal, they may be affected by light pollution. Artificial lighting can cause bats to desert roosts, delay emergence from roosts thereby shortening time available for foraging, and avoid drinking, foraging, or commuting in lit areas (USFWS 2024g). Artificial changes in light can cause bats to arouse more frequently during hibernation, resulting in premature depletion of energy stores and starvation (USFWS 2024g).
- Synergistic Effects: The above stressors may act synergistically and additively on the species, and exposure to a combination of stressors may be more harmful than a single stressor acting alone (USFWS 2021).

Specific information was not available regarding activities or land uses that have resulted in these stressors occurring within the counties the Boost Project crosses or within the Boost Project Action Area. As a result, Mountain Valley undertook a comprehensive review of the Boost Project Action Area and the surrounding vicinity to identify land uses, specific activities, and related stressors that reasonably could have affected the baseline condition of the Boost Project Action Area. Baseline conditions of the portions of the Action Area associated with the Bradshaw, Harris, and Swann Compressor Station sites, where tricolored bats may potentially occur during their annual life history cycle (Figure 4-2), are the same as Indiana bat at those sites and are described in Section 4.1.3.1.

4.3.4. Climate Change

According to the USFWS, there is “growing concern” about impacts related to climate change (USFWS 2021). While the impact of climate change on tricolored bats is unknown and difficult to measure, the USFWS identified several related factors that may impact the species. These factors include changes in hibernation; mortality from extreme drought, cold, or excessive rainfall; cyclones; loss of roosts from sea level rise; and impacts from human responses to climate change (e.g., wind turbines; USFWS 2021). Disease dynamics is another factor, as climate change can influence temperature, humidity, phenology, and other factors affecting the interactions between the fungus-causing WNS and hibernating bats (USFWS 2021). Climate change may cause a phenological mismatch, causing the timing of various insect hatches to no longer align with key tricolored bat life history periods and may cause shifts in the distribution of forest communities, invasive species, and insect prey (USFWS 2021).

Climate-related changes in temperature and precipitation are not consistent range-wide, and population resiliency is variable, thereby making the overall impact from climate change difficult to determine (USFWS 2021). the USFWS stated there may be some benefits from a changing climate but anticipates the impact will be negative overall (USFWS 2021). There are no observations specific to tricolored bats, but relying on information from other insectivorous bats, climate change could cause reduced reproduction from drought conditions, limiting drinking water availability and reducing adult survival, and heavier precipitation events that could decrease insect availability, reduce echolocation effectiveness, and wet fur reducing insulating value and increasing metabolic rate (USFWS 2021).

4.3.5. Recovery Status and Efforts

The USFWS has not prepared a recovery plan for tricolored bats. Information associated with updates to conservation measures and recovery efforts have been primarily documented in the 2021 SSA for the species (USFWS 2021) and the proposed rule to list the species (USFWS 2022c), which largely restate information related to conservation measures associated with WNS reduction efforts, wind energy production, and habitat loss that can be found in guidance for other bat species that exhibit similar habitat requirements such as northern long-eared bats and Indiana bats.

To address the threat from WNS, the USFWS has been working with state and federal agencies, tribes, conservation organizations, institutions, and individuals on management strategies to control the spread of WNS and to minimize the impact WNS is having on bats, including tricolored bats (USFWS 2021). Since other listed bat species are also affected by WNS (e.g., Indiana bat), the agencies responsible for many state and federal forests have proactively closed caves to the public to control the spread of WNS. Many private landowners and private parties, including Mountain Valley, have installed "bat friendly" gates on their caves to control public access and the possible spread of WNS (USFWS 2021). The USFWS has funded WNS-related research and coordinates the WNS National Response Team (USFWS 2025k). Many state and federal agencies, as well as universities and other organizations are also undertaking research and monitoring efforts to gain more information about habitat needs of and use by tricolored bats (USFWS 2025k).

4.3.6. Habitat

4.3.6.1. Summer Habitat

Tricolored bats use forested areas intermixed with non-forested and open landscapes including wetlands, edges of agricultural fields, old fields, and pastures during the summer season (USFWS 2021). Forested areas are used in summer, during migration, and during spring staging and fall swarming (USFWS 2021). Tricolored bats are described as foliage specialists, given their tendency to roost in clumps of live and dead leaves on living trees (Schaefer 2017). Tricolored bats in the eastern U.S. prefer to roost in mature hardwood forests with a preference for oak trees (*Quercus* spp.; Veilleux et al. 2003, Leput 2004, Perry and Thill 2007a) and occasionally dead needles of live, shortleaf pine (*Pinus echinata*; Perry and Thill 2007a). Roosts have also been found within knots, cracks and cavities of live trees (Williams et al. 2024). Hardwood trees comprised 98.2 percent of roost locations while pines made up 1.8 percent of roost sites for tricolored bats in a study in Kentucky (Williams et al. 2024). Tricolored bats return to the same network of summer roosting sites for many years (USFWS 2021). In addition to trees, tricolored bats will use artificial roosts such as barns, buildings, bridges, and culverts, as well as other natural roosts such as rock crevices, throughout their range (Coffin and Pfannmuller 1988, USFWS 2021).

Tricolored bats prefer to roost near water (Leput 2004, Cable and Wilcox 2024) in forested areas (Cable and Wilcox 2024) and forage over and along waterways and forest edges, where they consume a variety of small insects, including moths, beetles, and flies among other genera (USFWS 2021). A study in Tennessee found females traveled 0.3 mile to 5.6 miles from a roost to forage (Cable and Wilcox 2024). In another Tennessee study, the mean maximum distance males traveled while foraging was 7.8 miles (Thames 2020).

Female tricolored bats roost alone or form small summer maternity colonies averaging four to 15 individuals (Whitaker 1998, Veilleux and Veilleux 2004a), while males generally roost singly (Fujita and Kunz 1984, USFWS 2021). Females typically give birth to two offspring between May and July (USFWS 2021). Young tricolored bats grow rapidly, begin to fly around three weeks of age, and are independent five to six weeks after birth (Whitaker 1998). Two studies in Indiana found that the minimum summer habitat area used by tricolored bat females ranged from 0.07 acres (Veilleux et al. 2003) to 5.6 acres (Veilleux and Veilleux 2004b), and Helms (2010) found that tricolored bats flew an average of 1.19 miles between roosts. While primary literature is limited for this species, the best available science indicates that female tricolored bats will switch roost trees within their summer habitat throughout the maternity period, both before and after young are volant (Whitaker 1998, Amelon 2006, Williams et al. 2024), although pregnant females change roosts less frequently (Veilleux et al. 2003).

4.3.6.2. Winter Hibernation, Spring Staging, and Fall Swarming Habitat

Potential hibernacula across the range of tricolored bats includes caves, mines, tunnels, atypical hibernacula (talus slopes, rock shelters, rock crevices/outcroppings), and buildings (McCoshum et al. 2023, USFWS 2024g). Tricolored bats are not known to use culverts as hibernacula in Virginia or West Virginia (J. Utrup, J Stanhope, USFWS, pers. comm., November 17, 2022). Bridges are not commonly used for hibernation across much of the tricolored bat range, and they have not been documented using bridges in winter in Virginia or West Virginia (USFWS 2024g). Use of atypical hibernacula by tricolored bats is documented in five states (Maine, Nebraska, Ohio, Pennsylvania, and Kentucky; USFWS 2024g).[35]

Tricolored bats hibernate singly or in small numbers, frequently in deeper, warmer, and more humid portions of caves than other bat species (Hazard 1982, USFWS 2021). In parts of their range, tricolored bats may hibernate longer than most bat species, typically emerging from hibernacula later in spring (as late as May) and entering hibernacula as early as August (LaVal and LaVal 1980, Sandel et al. 2001, Briggler and Prather 2003, Harvey 2003, Brack 2007, Vincent and Whitaker 2007, USFWS 2021). In Virginia and West Virginia, hibernation is expected to occur from November 16 to March 31 (Figure 4-2; USFWS 2025g). Tricolored bats will share hibernacula and can be found hibernating with other species including northern long-eared bat, Indiana bat, little brown bat, gray bat (*M. grisescens*), southeastern bat (*M. austroriparius*), big brown bat (*Eptesicus fuscus*), Rafinesque big-eared bat (*Corynorhinus rafinesquii*), eastern small-footed bat (*M. leibii*), and Virginia big-eared bat (*C. townsendii virginianus*; Fujita and Kunz 1984; L. Bishop-Boros, WEST, pers. comm., 2016). Tricolored bats have been documented “hibernating in more caves and mines than any other cave-hibernating bat species in eastern North America” and “may use small caves and mines that are unsuitable to other cave-hibernating bat species; however, hibernating tricolored bats have been observed in greater numbers in hibernacula with stable temperatures” (USFWS 2021). Tricolored bats may change roosts within a hibernaculum during the winter but generally arouse less frequently than other bat species that hibernate in caves (Vincent and Whitaker 2007, USFWS 2021).

Beginning in August each year, tricolored bats leave their summer habitat and begin migrating to hibernacula, with fall swarming occurring around hibernacula between late August and the beginning of November (Figure 4-2; USFWS 2025g). The majority of mating occurs in fall during the swarming period before hibernation (Neubaum and Siemers 2021), but some mating may also occur during spring ovulation (Fujita and Kunz 1984). Tricolored bats generally emerge from hibernation between April and May, and then females migrate to summer maternity habitat (Figure 4-2; Davis and Mumford 1962, Vincent and Whitaker 2007, USFWS 2025g). Very little is known about the size of the area around hibernacula, if any, that may be used by tricolored bats during any spring staging and fall swarming activity in which they may engage. Nevertheless, the USFWS conservatively recommends a 3-mile conservation buffer around any known or potentially occupied hibernacula for project activities that may affect possible swarming and staging habitat (USFWS 2024g).

4.3.6.3. Migration Habitat

Spring migration of tricolored bats in Virginia and West Virginia typically occurs from April to mid-May (Figure 4-2). During this period, tricolored bats leave winter hibernacula to move to summer habitat to establish maternity roosts. Fall migration, when the bats leave summer maternity habitat to move to hibernacula, typically occurs from mid-August to mid-November (Figure 4-2; USFWS 2025g). Migration distances for tricolored bats have been documented to range between 27 to 151 miles (Lutsch 2019, Samoray et al. 2019). Fraser et al. (2012) documented long latitudinal migrations, with males generally

[35] Tricolored bats have not been documented hibernating in bridges or atypical hibernacula in Virginia or West Virginia (USFWS 2024g), The USFWS has indicated that tricolored bats are not known to use culverts as hibernacula in Virginia or West Virginia, and no buildings or structures will be modified or removed for this Project. Therefore, atypical hibernacula, bridges, culverts, buildings and structures are not being evaluated as hibernacula for this assessment.

traveling farther than females. Migration habitat for tricolored bats is varied and likely includes all landcover types as they traverse from one point to another. The maximum 151-mile spring migration route of a female tricolored bat tracked by Samoray et al. (2019) occurred over three nights from a cave in southern Tennessee to a roost near Peachtree City, Georgia. Along the migration path the bat would have encountered and crossed many roads, including at least two interstate highways, several state highways, and other open spaces without tree cover such as agricultural fields, lakes, and reservoirs.

Tricolored bats may use day roosts and temporary night roosts to rest during migration throughout their range. During migration, tricolored bats may use human-made structures that are used during the summer such as suitable buildings, bridges, and culverts (USFWS 2021; Section 4.3.6.1). Many bat species, including tricolored bats, select edge habitat for foraging and as travel corridors and may use edge habitat as migration travel corridors (USFWS 2021).

4.3.7. Occurrence

4.3.7.1. Summer Occurrence

Tricolored bats are found throughout Virginia and West Virginia in the summer and the entire Boost Project Action Area occurs within the tricolored bat's summer range (Figure 4-7). Data from state agencies, which are supported by previous surveys and monitoring conducted for the MVP Mainline Project, indicate no known tricolored bat summer occurrence records in the portion of the Action Area associated with the Stallworth Compressor Station site or within 1.5 miles[36] of the portion of the Action Area associated with the Stallworth Compressor Station site (MVP 2017, 2022; VDWR 2025). [redacted]

4.3.7.2. Winter Hibernation, Spring Staging and Fall Swarming Occurrence

The Boost Project occurs within the tricolored bat's hibernating range (USFWS 2024f; Figure 4-7). Data from state agencies and previous surveys and monitoring conducted for the MVP Mainline Project indicate no known tricolored bat winter occurrence records in the Boost Project Action Area for or within 3 miles[37]

[36] To evaluate the potential for impacts to forest roosting individuals, the USFWS recommends a 3.0-mile conservation buffer around the location of any tricolored bat acoustic detection when the location of the detected bat's roost tree is unknown (USFWS 2024g, 2025g). Within the 3.0-mile conservation buffer, a 1.5-mile buffer is designated as the inner tier of that occurrence, which is considered the maternity colony home range for the species and reflects the USFWS's understanding that the maternity roost tree will be located somewhere within 1.5 miles of the detection site (1.5-mile inner-tier buffer; USFWS 2024g, 2025g).

[37] USFWS recommends implementing a 3.0-mile conservation buffer to the location of any known or potentially occupied tricolored bat hibernacula to address impacts to any individuals engaged in spring staging and fall swarming associated with those features (USFWS 2024g).

of the portions of the Action Area associated with the Bradshaw, Harris, and Stallworth Compressor Station sites (MVP 2023, VDWR 2025). [redacted]

4.3.7.3. Migration Occurrence

The presence of suitable roost trees and other natural roosts such as rock crevices, along with artificial roosts (Coffin and Pfannmuller 1988, USFWS 2021), within the Boost Project Action Area would provide any tricolored bats that might migrate through the area an opportunity to establish day or night roosts during their migration. Accordingly, migrating tricolored bats could potentially be temporarily present in the Boost Project Action Area during the spring and/or fall migration periods. However, tricolored bats have not been documented during any season within the Action Area associated with the Stallworth Compressor Station site and this compressor station is not directly between known destinations or origins (i.e., hibernacula, staging/swarming occurrence, or summer occurrence) for migrant tricolored bats. Therefore, they would not be expected near this compressor station. [redacted]

[redacted]

[redacted]

[redacted]

4.4. Monarch Butterfly

The monarch is a large butterfly that is easily identified by orange, black, and white markings and is present throughout the United States, Southern Canada, as well as South and Central America (Butterflies and Moths of North America 2025). Monarchs lay eggs on a variety of milkweed plant species (*Asclepias* spp.) found throughout their range, and larva feed exclusively on milkweeds. After five molts occurring over 9–18 days, a fully grown larva usually leaves its milkweed plant and pupates in a sheltered location as a pale green, golden-spotted chrysalis (USFWS 2024d; Monarch Joint Venture [MJV] 2025). After 6–14 days, a metamorphosed adult monarch emerges. Adult monarchs produce multiple generations, each living approximately two to five weeks during the breeding season (USFWS 2024d).

Monarchs in the eastern North American population migrate north from overwintering sites in Mexico each spring from March to June to summering grounds east of the Rocky Mountains in the United States and southern Canada (USFWS 2020a, Monarch Watch 2025; Figures 4-11 and 4-12). Monarchs breed along their northward migration routes, undergoing two to three successive generations as they migrate (Flockhart et al. 2013); however, monarchs can produce up to five generations per year and the number of generations produced is dependent upon environmental conditions (Brower 1996). In the fall from September to November, monarchs from the eastern North American population migrate south and southwest in one generation to return to their overwintering grounds in the mountains of central Mexico[38], traveling distances of up to 3,000 kilometers (USFWS 2024d, Monarch Watch 2025; Figure 4-11). This generation of monarchs can live for up to nine months from August to March (Monarch Watch 2025). Monarchs mate in early spring (February – March) at the overwintering sites and then the same individuals that migrated south begin flying back north, producing offspring that will start the migration cycle over again (MJV 2025).

Based on review of the USFWS IPaC online tool (February 2026; USFWS 2025b, 2025c, 2025d, 2025e, 2026), monarchs may occur in the Boost Project Action Area (Figure 4-12). As indicated in Figure 4-11, any such occurrence likely would be limited to the April through October timeframe.

	January	February	March	April	May	June	July	August	September	October	November	December
Activity[1,2]	Overwinter[3]			Migration	Breeding				Migration		Overwinter[3]	

[1.] Dates based on information from Monarch Joint Venture (2025) and Journey North (2025).

[2.] Dates may vary by location and year but generally show when monarchs are most likely to be engaging in each seasonal activity.

[3.] Overwinter site is in Mexico.

Figure 4-11: Annual life history diagram for the eastern North American population of monarch butterfly in Virginia and West Virginia.

4.4.1. Listing Status

On December 12, 2024, USFWS published a proposed rule to list the monarch butterfly as a threatened species range-wide with a 4(d) rule and with proposed critical habitat in California (USFWS 2024b). The proposed 4(d) rule would prohibit take of monarchs with certain exceptions that include activities that affect milkweed or nectar plants that do not result in conversion of native or naturalized grassland, shrubland, or forest; implementation of state or federal agency conservation plans; management of U.S. overwintering habitat (i.e., in California); vehicle strikes; scientific research and non-lethal collection of 250 or fewer monarchs per year (USFWS 2024b). An updated SSA was published in 2024 that includes new information relevant to the species status and peer review suggestions (USFWS 2024d). USFWS's proposed listing

[38] The overwinter habitat in Mexico is forests primarily composed of oyamel fir trees (*Abies religiosa*), on which monarchs form dense clusters (Williams and Brower 2015). The overwintering sites occur in mountainous areas west of Mexico City, located between elevations of 2,900 and 3,300 meters (Slayback et al. 2007). The climate at the overwintering sites provides optimal temperatures and moisture for monarch survival during the winter (USFWS 2024d).

decision identified the following factors that affect the species: habitat loss and degradation of breeding, migratory, and overwintering habitat, land management practices such as broadcast herbicide and insecticide application, forest senescence (i.e., forest decline with age), drought, and effects from climate change (USFWS 2024b).

4.4.2. Proposed Critical Habitat

USFWS proposed critical habitat for the western North American monarch population across seven counties in California. No critical habitat for the species has been proposed for the eastern North American monarch population, and no proposed critical habitat areas occur in the Boost Project Action Area (USFWS 2024b).

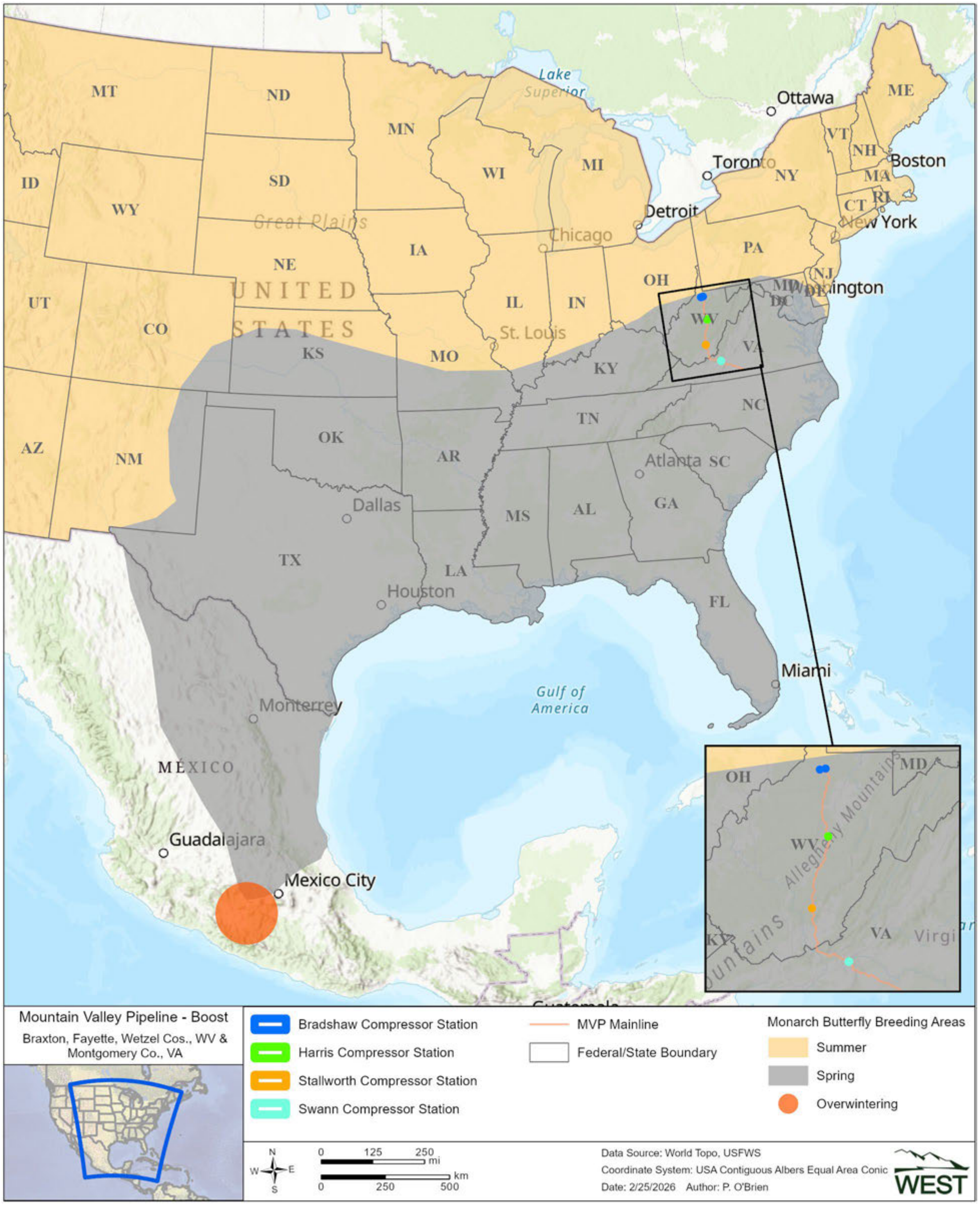

Figure 4-12: Range for the eastern North American monarch population in the United States.

4.4.3. Environmental Baseline and Stressors

In the proposed rule to list monarchs as threatened with a Section 4(d) rule and the SSA, USFWS recognized that reduction in the availability of milkweed is a key driver in monarch population declines throughout North America (USFWS 2024b, 2024d). For the eastern North American monarch population, USFWS also discussed other significant stressors that influence monarch stability, including loss and degradation of habitat, exposure to insecticides and herbicides, and logging at overwintering sites (USFWS 2024d). USFWS discussed other stressors including disease and predation, human disturbance from collection and tourism, and invasive plant species; however, USFWS concluded there is no evidence that these stressors are a principal cause of monarch population declines (USFWS 2024d). While not identified as stressors in the SSA, additional potential stressors could include exposure to noise, artificial light, and dust.

The stressors described below have occurred and continue to occur in areas across the monarch's range. Impacts associated with climate change (discussed in Section 4.4.4) are also expected to occur across the monarch's range and continue into the future.

- Availability of Milkweed: Milkweed is required for the monarch life cycle, and the plant has experienced significant decline in the past 25 years (USFWS 2024b, 2024d). During the breeding season, monarchs lay their eggs on milkweed. Larvae develop and then feed on milkweed, sequestering the plant's toxic cardenolides as a defense against predators (USFWS 2024d). The majority of milkweed loss has occurred in agricultural lands, largely resulting from widespread herbicide use. Milkweed is also lost through conversion of grasslands into cropland and land development.
- Habitat Loss and Degradation: Habitat conversion to agricultural lands has reduced the availability, distribution, and quality of nectar resources throughout the monarch's breeding and migration range (USFWS 2024d). Reduction in nectar availability may have important implications, particularly as nectar resources are critical during the migration seasons for the eastern North American population. Other habitat stressors result from direct and indirect impacts to overwintering habitat, though such habitat occurs in Mexico, well outside of the Boost Project Action Area.
- Dust and Contaminants: Although monarchs are not the intended target of pesticides such as insecticides, fungicides, and herbicides, individuals can be exposed directly and through spray drift. Impacts of insecticides largely depend on exposure which can occur throughout the species' range and are not limited to agricultural areas (USFWS 2024d). Insecticides can affect monarchs through direct spraying and contact with vegetation or nectar contaminated with the substance. Monarchs may also be exposed through plant tissues with systemically incorporated insecticides or dust that drifted off treated seeds (USFWS 2024d). Studies on fungicide impacts are limited, but some have shown direct sub-lethal impacts on monarchs (USFWS 2024d). Herbicide-related impacts stem mostly from reductions in milkweed and nectar resources. USFWS considered direct impacts of herbicides to monarchs and found that the effects of most herbicides were unknown and likely highly variable. Overall, USFWS found that insecticides were the primary driver of monarch population impacts from pesticides (USFWS 2024d). At high levels, dust deposition can damage plants and affect the diversity of ecosystems, thereby degrading foraging and reproductive habitat for monarch butterflies. It is likely that high amounts of dust would be needed to result in an adverse effect to monarchs in all life stages, and potentially only if the dust is toxic (USFWS 2024b). Dust accumulation could also temporarily degrade water quality in areas where monarchs obtain moisture and nutrients from puddling, which involves consuming liquid from moist substances such as damp soil or wet leaves (Lamie et al. 2025).
- Disease and Predation: Monarchs may also be affected by diseases and natural predators. The most well-known parasite is *OE* (*Ophryocystis elektroscirrha*), which infects around 5.5 percent of the eastern North American population (USFWS 2024d). This parasite decreases monarch survival and fitness, and infections have trended upwards since 2002 (USFWS 2024d). Other diseases, such as nuclear

polyhedrosis virus, can infect monarchs, but the USFWS noted most reports are anecdotal (USFWS 2024d). As for predation, both immature (eggs, larvae, and pupae) and adult monarchs are susceptible. Immature monarchs are heavily preyed upon by parasites and other predators: upwards of 90 percent are killed in immature stages (USFWS 2024d). In addition to parasites, predators of immature monarchs include ants, tachinid fly parasitoids, wasps, and various other insects (USFWS 2024d). No conclusive evidence suggests that immature monarch predation rates are increasing. Adult monarch predation has been mainly observed at overwintering sites from birds, mice, and wasps (USFWS 2024d).

- Captive Rearing, Collection, and Tourism: There is some evidence that captive rearing could impact monarchs if practiced on a large scale (USFWS 2024d). The USFWS found little information on vehicle-related mortality to determine the extent of collision impacts on monarchs. Therefore, neither were found to be primary drivers of monarch population changes (USFWS 2024d). Tourism, particularly at overwinter sites, and collection were also identified, but there was no strong evidence that either activity is a primary stressor impacting monarch populations (USFWS 2024d).
- Invasive Species: Black swallow-wort (*Cynanchum louiseae*) and pale swallow-wort (*C. rossicum*) are invasive plants in the milkweed family. Observations have recorded oviposition on these plants resulting in larval monarchs being unable to feed and grow on this food source. Because of the limited evidence for this, the USFWS did not identify these invasive plants as a primary influence for monarch declines (USFWS 2024d).
- Human Activity and Disturbance: Human activity such as the generation of noise and light could disturb monarchs. Changes in sound above baseline conditions may cause a temporary startle response or increased heart rate in monarch larvae, with chronic noise exposure leading to habituation (Davis et al. 2018, Taylor and Yack 2019). Artificial lighting may affect the behavior and biology of monarchs, including initiation and directionality of migration, development rates, and larval feeding behavior. Artificial lighting can induce nighttime activity when monarchs are typically quiescent, which may result in increased metabolic demand and flight during suboptimal conditions (Parlin et al. 2022). Constant light exposure may result in longer development times and decreased survival (Adams et al. 2021). Artificial light may also cause an increase in larval foraging (Haynes et al. 2023).
- Synergistic Effects: The above stressors may act synergistically and additively on monarchs, and exposure to a combination of multiple stressors may be more harmful than a single stressor acting alone (USFWS 2024b, 2024d)

Specific information was not available regarding activities or land uses that have resulted in these stressors occurring within the counties where the Boost Project is proposed or within the Boost Project Action Area. As a result, Mountain Valley undertook a comprehensive review of the Boost Project Action Area and the surrounding vicinity to identify land uses, specific activities, and related stressors that reasonably could have affected the baseline condition of the Boost Project Action Area. Baseline conditions across the Boost Project Action Area where monarchs may potentially occur during their annual life history cycle are the same as Indiana bat and are described in Section 4.1.3.1.

4.4.4. Climate Change

USFWS estimated that climate change likely caused approximately 12.5 percent of the species' eastern population decline (USFWS 2024d). This decline largely reflects impacts on overwintering, breeding, and migratory areas (USFWS 2024d). The species is particularly vulnerable to temperature increases and droughts which can impact fecundity and survival during migration and overwintering (USFWS 2024d).

Optimal temperatures for monarch range between 81–84 °F with an upper lethal thermal limit of 108 °F (USFWS 2024b). Research indicates that cooler nighttime temperatures are crucial for monarchs to survive temperature stress (USFWS 2024b). Temperatures consistently above 91–95 °F are generally unsuitable and will likely result in increased mortality, particularly during spring migration (USFWS 2024b). Additionally, drought and temperature changes may negatively impact the survivorship of nectar-producing plants, limiting the availability of food for the species (USFWS 2024d).

Increased temperatures and storm frequency may also degrade overwintering habitat and impact monarchs in the eastern population during fall migration (USFWS 2024d). Monarchs rely on a specific microclimate at overwintering sites to avoid weather-related mortality (USFWS 2024d). The eastern monarch population overwinters in the mountainous forests of Mexico which is composed primarily of oyamel fir trees (USFWS 2024d). Higher temperatures have made Mexico's overwintering sites less suitable for oyamel fir trees, thereby reducing suitable overwintering habitat (USFWS 2024d). Additionally, severe storms may become more frequent during the winter when monarchs are present in Mexico and in fall along portions of its migratory route (USFWS 2024d). Together, the loss of oyamel fir trees and increased storm frequency associated with climate change may increase overwinter mortality and cause impacts during fall migration (USFWS 2024b, 2024d).

Climate change may benefit monarchs by increasing the range of suitable breeding habitat in northern regions (USFWS 2024d). Expansion of suitable breeding habitat would be limited by milkweed colonization, which monarch caterpillars exclusively rely on as a food source, and physiological constraints on monarch migration, but could increase available habitat by 1–22 percent across the eastern population's regions (USFWS 2024d). However, other factors such as directional flight limitations, insufficient resources, and adverse spring and summer weather conditions may limit any beneficial consequences of climate change (USFWS 2024d).

4.4.5. Recovery Status and Efforts

USFWS has not prepared a recovery plan for monarchs. Protection, restoration, and creation of suitable habitat have been the focus of recent monarch conservation strategies, highlighting the importance of increasing the availability of milkweed and nectar resources. Regional and nationwide conservation plans and efforts supporting the eastern North American population of monarchs include the Mid-America Monarch Conservation Strategy[39] and the Nationwide Candidate Conservation Agreement for Monarch Butterfly on Energy and Transportation Lands[40] (USFWS 2024d). Additionally, 20 states east of the Rocky Mountains have agreed to support goals for planting milkweed created by the Mid-America Conservation strategy (USFWS 2024d). Conservation efforts implemented under agreements through Federal Agencies, such as the Farm Service Agency and the Natural Resource Conservation Service, will be critical for meeting goals to restore and create habitat for monarchs as well as other insect pollinator species.

The Monarch Conservation Database was developed by the USFWS in 2018 to collect information related to monarch conservation plans (USFWS 2024d). As of June 27, 2023, there were over 145,000 monarch conservation efforts records in this database and 126 monarch conservation plans (USFWS 2024d). These efforts represent over 10 million acres in the range of the eastern North American population of monarchs, with a majority of the efforts being implemented by state agencies (USFWS 2024d). The most common conservation effort implemented has been direct planting of milkweed and other nectar producing plants (USFWS 2024d).

4.4.6. Habitat

Adult monarchs in eastern North America require a diversity of blooming nectar plants that they can find in a variety of habitats, including open areas, grasslands and pastures, roadsides, marshes and suburban gardens (MJV 2025) on which they forage during migration and while on their summer breeding grounds

[39] Developed by the Midwest Association of Fish and Wildlife Agencies. Available online: https://mafwa.org/?page_id=2347

[40] Developed by entities from the energy and transportation sectors and the Energy Resources Center at the University of Illinois – Chicago. Available online: https://www.fws.gov/media/nationwide-candidate-conservation-agreement-monarch-butterfly

(spring through fall; USFWS 2024d). Monarchs also need milkweed for both oviposition and larval feeding during their northern migration (spring) and summer reproductive seasons. During fall migration, monarchs roost on trees (primarily pine [*Pinus* spp.] and other conifers, along with maple [*Acer* spp.] and oak [*Quercus* spp.]) at night to feed and build up fat reserves for migration (Davis et al. 2012). Monarchs generally choose roosting locations near foraging habitat that contains high quality nectar plants (Davis et al. 2012).

4.4.7. Occurrence

Monarchs are found throughout Virginia and West Virginia during spring, summer, and fall and the entire Boost Project Action Area occurs within the monarch's spring, summer, and fall range (Figure 4-12). Monarchs typically arrive in Virginia and West Virginia between April and May during their spring migration (Journey North 2025, MJV 2025). During spring and summer (April – July) monarchs breed, reproduce, and forage in suitable habitat (MJV 2025). Fall migration in Virginia and West Virginia generally occurs between August and October (MJV 2025). Overwintering habitat is not present in Virginia or West Virginia or within the Boost Project Action Area (Figure 4-12). [redacted] No monarch occurrences were recorded in Wetzel County, West Virginia (the county in which the Bradshaw Compressor Station is located) between June 2020 and September 2025 (iNaturalist 2025a). However, due to the monarch's expansive range and characteristics of suitable habitat, monarchs are likely to occur in Wetzel County, West Virginia. The date observed and the distance to the closest monarch observation to each compressor station site is provided in Table 4-2.

Table 4-2: Monarch occurrence in proximity to Boost Project compressor station sites

Compressor Station[1]	Date of Occurrence	Distance from Compressor Station Site to Closest Occurrence (miles)
[redacted]	June 17, 2020	[redacted]
	September 8, 2021	
	September 8, 2023	

Source (iNaturalist 2025a)

[1] No monarch occurrences were recorded in Wetzel County, West Virginia (the county in which the Bradshaw Compressor Station is located) between June 2020 and September 2025 (iNaturalist 2025a).

[41] Research grade in iNaturalist indicates that an observation is verifiable (includes a photo, date, location and is not a captive specimen) and at least two other iNaturalist users agree on the identification to the species level. This data is considered high quality and is used in scientific studies, publications and for conservation purposes (iNaturalist 2025b).

[42] [redacted]

[redacted]

[redacted]

[redacted]

5. Effects Analysis

A "No Effect" determination is appropriate when a proposed action will not affect the species. A "May Affect" determination is appropriate when a proposed action could affect the species. A "May Affect – Is Not Likely to Adversely Affect" determination is appropriate when effects on the species are expected to be insignificant, discountable, or completely beneficial. According to the USFWS Section 7 guidance, insignificant effects "relate to the size of the impact and should never reach the scale where take occurs" (USFWS and National Marine Fisheries Service [NMFS] 1998). Discountable effects are those that are extremely unlikely to occur. Beneficial effects are contemporaneous positive effects without any adverse effects. A "May Affect – Likely to Adversely Affect" determination is appropriate if any adverse effect may occur to the listed species as a result of the proposed action (USFWS and National Marine Fisheries Service [NMFS] 1998).

5.1. Bats

Indiana bats, northern long-eared bats, and tricolored bats that occur in relevant proximity to the Boost Project Action Area (Table 5-1) could experience impacts from exposure to dust, noise, light, or water quality degradation generated by construction, operation, or maintenance activities during their annual seasonal life cycle as described below. To avoid and minimize the potential for adverse effects to Indiana bats, northern long-eared bats, and tricolored bats, Mountain Valley will implement the conservation measures discussed in Section 2.5.

Table 5-1: Federally Listed and Proposed Bat Species Potential Seasonal Occurrence in the Boost Project Action Area.

[redacted]

5.1.1. Effects of Dust

Fugitive dust may be generated during construction site preparation, project construction, and use of infrastructure. Dust from construction activities can coat natural and anthropogenic surfaces. At high levels, dust deposition can damage plants and affect the diversity of ecosystems, thereby degrading habitat quality for bats. Whether bats may experience direct effects from exposure to dust is unknown, but it is likely that high concentrations or prolonged exposure to dust would be needed to result in an adverse effect to bats, and potentially only if the dust is toxic. Nevertheless, as discussed in Section 2.5, Mountain Valley will implement dust control and suppression measures that will avoid, minimize, and contain any dust emissions from the Boost Project.

5.1.2. Effects of Light

Lighting can affect the behavior and biology of bats during foraging, commuting, emergence, roosting, or hibernation. Artificial lighting could delay emergence of bats from their roosts at sundown. Given that insect densities decline rapidly at sundown (Speakman et al. 1991), delayed emergence could cause bats to miss important foraging time and negatively affect individuals. Light may also change the species composition and abundance of insect prey, which is potentially harmful if bats harvest fewer or less nutritious prey or prey that require a higher metabolic expenditure to catch and consume. Insects may be attracted away from dark areas, reducing prey availability for bats that do not forage in lit areas. Light can potentially prevent or reduce foraging activity, effectively causing a loss of foraging areas.

Light may also change the ways bats move through a landscape by causing commuting bats to take indirect routes among roosting and foraging sites and by making bats avoid some sites. Bats using sub-optimal routes may fly farther, increasing metabolic costs and flight time, which could increase exposure to predators and adverse weather conditions. If alternative routes are not available, colonies may be isolated from foraging areas, potentially forcing them to abandon their roosts. To avoid and minimize the potential for adverse effects from light, Mountain Valley will implement the light-specific conservation measures discussed in Section 2.5.

5.1.3. Effects of Noise

Exposure to above-ambient noise may startle or displace bats, decrease time spent roosting or foraging, increase time in flight to search for and travel to alternative habitat, or interfere with acoustic communication. While increased noise may mask echolocation signals, bats can reduce signal masking through a variety of behavioral and physiological mechanisms (Ulanovsky et al. 2004, Gillam et al. 2007), allowing them to habituate to noisy environments (Bunkley et al. 2015, California Department of Transportation [Caltrans] 2016). While Boost Project noise impacts will depend on the intensity, frequency, and duration of exposure to sound, acute acoustic trauma is not reasonably anticipated from general construction, operation, or maintenance activities due to bats' physiological adaptations to prevent noise overexposure (Caltrans 2016).

Blasting activities during construction may produce sudden, temporary, loud noise and seismic vibration. Blasting in close proximity could impact the structure of any hibernacula or adversely affect hibernating bats occupying those features. It also could change hydrology or airflow that may impact the suitability of a hibernaculum (USFWS 2024g). Blasting in close proximity to suitable roosting habitat could disturb or displace roosting bats (USFWS 2024g). For the Boost Project, blasting activities during construction are anticipated to occur at the Harris and Swann Compressor Station sites. Mountain Valley analyzed the potential for blasting impact from Boost Project construction and found that ground vibration and overpressure levels from blasting are expected to be below the limits established in regulations for Virginia and West Virginia (MVP 2025e)[43] In addition, Mountain Valley has prepared a Blasting Plan which requires site-specific blasting plans be developed based on the conditions of each location prior to any blasting

[43] Resource Report 9. Air and Noise Quality. FERC Docket No. CP26-14-000, Accession No. 20251023-5112, October 2025.

event. If blasting is necessary during the bat active season (April 1 – November 15), Mountain Valley will implement the conservation measures described in Section 2.5.2 to avoid adversely affecting bats.

During operation, predicted noise levels of the Boost Project will range from 42.8 – 52.3 dBA, L_{dn}[44] (SLR 2025a, 2025b, 2025c, 2025d; Table 5-2), which is below the FERC compressor station noise regulation limit (55 dBA L_{dn}; FERC 2007; SLR 2025a, 2025b, 2025c, 2025d). The potential noise increase at the Boost Project ranges from 0.0 – 3.9 dBA, measured at distances between 0.3 mile and 0.6 mile (Table 5-2). The largest potential increase in noise over existing conditions (3.9 dBA; SLR 2025a, 2025b, 2025c, 2025d) is considered barely perceptible to humans (National Hearing Conservation Association 2018). While measurements were taken to approximate impacts to a human receptor and exposure to noise by bats may not be fully described by these metrics, the minor increase suggests the Boost Project will likely not result in an increase in noise from the operations at the existing stations and the operation of the new compressor station, if perceived at all, would not meaningfully influence bat behavior. Additionally, bats are known to habituate to repeated and prolonged noise exposure (Luo et al. 2014), which further supports that the minor increase in noise at each compressor station will not have a biological impact on bats.

Table 5-2: Boost Project Compressor Station Measured Existing Sound Level and Potential Increase Over Existing Sound Level.

Compressor Station Name	Measured Existing Sound Level dBA, L[illegible] [1]	Measured Existing Sound Level + Total Complete Station Contribution dBA, L_{dn} [2]	Potential Increase Over Existing Sound Level dBA, L_{dn}
Bradshaw	44.2 – 44.6	44.6 – 44.7	0.0 – 0.5
Harris	40.7 – 45.6	43.5 – 47.2	0.8 – 3.9
Stallworth	40.9 – 46.0	42.8 – 46.9	0.9 – 1.9
Swann	43.9 – 49.1	44.3 – 52.3	0.4 – 3.2
Total Range	**40.7 – 49.1**	**42.8 – 52.3**	**0.0 – 3.9**

Notes:
1. [redacted]

Source: SLR 2025a, 2025b, 2025c, 2025d.

5.1.4. Effects of Water Quality

During land-disturbing activities, unmanaged stormwater runoff from upland construction sites could potentially carry sediment and pollutants into any nearby aquatic areas, which could result in increased sediment loads and temporarily degrade water quality. Where that occurs, changes in water quality physical, chemical, or biological parameters could lead to changes in primary productivity, in turn limiting the suitability of streams for aquatic biota, including insects that bats prey upon (Nagorsen and Brigham 1993, Brack and Whitaker 2001, USFWS 2007). The aquatic portion of the Boost Project Action Area includes 6.5 stream miles, of which 1.5 miles are associated with the Bradshaw Compressor Station[45], 1.6

[44] [redacted]

[45] South Fork Fishing Creek is located north of the [redacted], however, no Boost Project-related sediment is expected to reach that creek because the [redacted] is an existing feature and no ground disturbance is planned at the [redacted] E&SC measures will be installed and maintained, and there is a vegetated and forested buffer between the [redacted] and the creek (see Section 3.5).

miles are associated with the Harris Compressor Station site, 0.9 miles are associated with the Stallworth Compressor Station, and 2.5 miles are associated with the Swann Compressor Station site (Section 3, Figures 3-5, 3-6, 3-7, 3-8). While there will be ground disturbance at each compressor station, potential impacts from suspended sediment associated with sedimentation are expected to be localized, and foraging bats are expected to have alternative adequate drinking water and foraging locations in the surrounding landscape. The confined nature of the minimal construction activity planned for the Boost Project and its distance from any perennial and intermittent streams, separated by vegetated buffers, together with Mountain Valley's implementation of appropriate E&SC measures and other conservation measures (Section 2.5), will avoid and minimize the potential for adverse effects to bats. No significant changes in water quality or invertebrate prey are expected to occur as a result of construction, operation, and maintenance activities.

5.1.5. Indiana Bat

Based on the previous survey data and current occurrence data discussed above (Section 4.1.7; Table 5-1), Boost Project construction, operation, and maintenance activities associated with [redacted] could occur in proximity to Indiana bats during the annual life cycle of the species. As a result, individuals potentially could be exposed to project-related stressors there. On the other hand, Indiana bats are not expected to occur in the portions of the Action Area associated with the Bradshaw, Stallworth, or Swann Compressor Stations and, therefore, individuals likely would not be exposed to project-related stressors in those locations. Accordingly, the following sections evaluate potential effects to Indiana bats in [redacted].

5.1.5.1. Winter

When conducted in proximity to hibernacula[46], construction activities such as tree clearing and blasting can impact hibernacula structure and/or microclimate, including changes to hydrology or air flow, impacting the suitability of hibernacula for use by Indiana bats. Additionally, construction activities can directly impact hibernating Indiana bats if the integrity or environment of a hibernaculum is affected. Construction activities, including tree clearing, blasting, and those that generate dust, noise, and light, can disturb or displace hibernating Indiana bats when generated at sufficient levels. Project operation and maintenance activities can similarly generate dust, noise, or light that may disturb or displace Indiana bats hibernating in proximity to those activities. Disturbance that causes arousal from hibernation can be deleterious if it causes depletion of fat reserves needed to sustain Indiana bats during the hibernation period (USFWS 2019).

No tree clearing will occur during construction, operation, or maintenance of [redacted]. There is potential for blasting to occur during construction [redacted], which could produce sudden, short duration, intense noise and seismic vibration. Operation of [redacted] with the additional turbine is expected to result in long-term increased noise levels up to 3.9 dBA over ambient conditions (Section 5.1.3; Table 5-2). But, as discussed below, these potential stressors are not expected to adversely affect any Indiana bats.

USFWS recommends implementing a 0.5-mile conservation buffer (defining an impact analysis distance) to the location of any known or potentially occupied hibernacula to address potential impacts to hibernating Indiana bats (USFWS 2024g). As part of the analysis for this BA, potentially occupied hibernacula were identified [redacted] Identified features were assessed for potential impacts. For purposes of

[46] Hibernacula addressed in this section include "caves and their associated sinkholes, fissures, and other karst features, as well as anthropogenic features such as abandoned mines and tunnels" (USFWS 2024g).

this evaluation, a 0.5-mile buffer was applied to [redacted][47] (Indiana bat hibernacula impact assessment area; Figure 5-1).

Current data from state agencies and data from previous surveys and monitoring conducted for the MVP Mainline indicate no known Indiana bat hibernacula within the Indiana bat hibernacula impact assessment area (MVP 2017, 2022; Section 4.1.7). As a result, no impacts to hibernating Indiana bats or their hibernacula from construction, operation, and maintenance of the Boost Project are expected.

[47] Indiana bats are not expected to occur within the Action Area associated with the Bradshaw, Stallworth, and Swann Compressor Stations (Table 5-1); [redacted]

[redacted]

5.1.5.2. Spring Staging and Fall Swarming

5.1.5.2.1. Forest

After emerging from hibernation, Indiana bats engage in spring staging, where individuals roost in forested areas near hibernacula for a short time (i.e., two to three days) before migrating to summer maternity areas (Section 4.1.6). Swarming occurs over a longer period of time in fall, again with bats roosting in forested areas near hibernacula. Trees and other structures around potential hibernacula could be used as night and/or day roosts by Indiana bats during spring staging and fall swarming. When conducted in staging and swarming habitat, construction and maintenance activities such as tree clearing could permanently remove potential roost sites or fragment areas of suitable habitat. Felling trees during the spring staging or fall swarming periods could adversely affect individual Indiana bats by causing death, injury, or disturbance to bats roosting in a tree that is cut down. No tree clearing will occur during construction, operation, or maintenance of [redacted]

Dust, noise, or light generated by construction, operation, and maintenance activities can also temporarily disturb or displace Indiana bats during spring staging and fall swarming if they experience impactful exposure to those stressors. There is potential for blasting to occur during construction which may produce sudden, short-duration, intense noise and seismic vibration. Operation of [redacted] to result in increased noise levels up to 3.9 dBA over ambient conditions (Section 5.1.3; Table 5-2). But, as discussed below, these potential stressors are not expected to adversely affect any Indiana bats.

USFWS recommends implementing a 5.0-mile conservation buffer[48] to the location of any known or potentially occupied hibernacula to address potential impacts to any individuals engaged in spring staging and fall swarming associated with those features (USFWS 2024g). Mountain Valley, therefore, engaged WEST to identify potentially occupied hibernacula [redacted] to assess potential impacts. For purposes of this impact evaluation, a 5.0-mile buffer was applied to [redacted][49] (Indiana bat staging/swarming impact assessment area).

There are no known Indiana bat hibernacula within the Indiana bat staging/swarming impact assessment area; [redacted]

The Indiana bat staging/swarming conservation buffer covers 44,635.3 forested acres, of which 2,813.8 forested acres overlap the Action Area. Indiana bats may avoid using the forested area that overlaps with the Action Area due to construction, operation, and maintenance activities. However, 41,821.5 forested acres within the Indiana bat staging/swarming conservation buffer that is outside the Action Area will remain available for use by Indiana bats, and suitable forest roosting habitat for Indiana bats extends beyond the

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[48] The USFWS has not provided formal guidance for conservation buffers around known or potentially occupied Indiana bat hibernacula; however, the USFWS recommends a 5-mile conservation buffer around known or potentially occupied northern long-eared bat hibernacula (USFWS 2024g). Therefore, a 5-mile conservation buffer around known or potentially occupied Indiana bat hibernacula was used in the impact assessment for project activities that may affect possible swarming and staging habitat.

[49] Indiana bats are not expected to occur within the Action Areas associated with the Bradshaw, Stallworth, and Swann Compressor Stations (Table 5-1); [redacted]

small area of habitat that will be impacted by the Boost Project. Therefore, [redacted] Further, Mountain Valley will implement conservation measures to avoid and minimize potential impacts to Indiana bats and their staging/swarming habitat (Section 2.5). Additionally, Mountain Valley will develop site-specific blasting plans to avoid adversely affecting Indiana bats. Therefore, construction, operation, and maintenance activities of the Boost Project are not likely to adversely affect any spring staging and fall swarming Indiana bats.

[redacted]

5.1.5.2.2. Culverts and Bridges

Culverts and bridges around potential Indiana bat hibernacula can be used as night and/or day roosts by Indiana bats during spring staging (April 1 – May 14) and fall swarming (August 16 – November 15). The suitability of any culverts/bridges that are used by roosting Indiana bats during spring staging and fall swarming could be impacted by changes to the surrounding environment from construction activities such as tree clearing, blasting, and the generation of dust, noise, or light, which could affect the microclimate of culverts/bridges and, if at sufficient levels, may disturb or displace Indiana bats. Additionally, culvert/bridge removal or modification during spring staging and fall swarming can adversely affect staging/swarming Indiana bats by causing death, injury, or disturbance. Operation and maintenance activities also may produce minor amounts of dust, noise, or light, which can affect the microclimate and suitability of culverts/bridges and, if generated at sufficient levels, disturb or displace Indiana bats. Disturbed or displaced Indiana bats may need to search for and travel to alternative roosts. The Boost Project will not remove or modify any culverts or bridges.

To address potential impacts to Indiana bats, USFWS recommends implementing a 0.25-mile conservation buffer[50] to the location of any culverts or bridges that are known or potentially occupied (USFWS 2024f). Mountain Valley engaged WEST to identify known or potentially occupied culverts or bridges with conservation buffers that overlap with [redacted] For purposes of this evaluation, a 0.25-mile buffer was applied to the portion of the Action Area associated with [redacted]

Culverts less than 4.0 feet in diameter/height and 23.0 feet in length are unlikely to provide suitable roosting habitat for Indiana bats (USFWS 2024f). The 23.0-foot length is based on the typical width of a 2-lane road, and bats are unlikely to be present in shorter culverts. Thus, culverts associated with roads narrower than two lanes are unlikely to support roosting habitat for Indiana bats. WEST and Mountain Valley conducted a desktop evaluation of publicly available sources to identify potentially suitable culverts and bridges within the Indiana bat culvert/bridge impact assessment area by querying the West Virginia Department of Transportation (WVDOT) database (WVDOT 2026). Additional culverts that were documented during wetland delineation surveys conducted for the Boost Project were also included in the desktop review (TetraTech 2025a, 2025b). [redacted] No bridges were identified within the Indiana bat staging/swarming culvert/bridge impact assessment area (Figure 5-3). Therefore, the Boost Project is not likely to adversely affect Indiana bats roosting in culverts or bridges during spring staging and fall swarming.

[50] The USFWS has not provided formal guidance for conservation buffers around culverts and bridges that are known or potentially occupied by Indiana bats; however, the USFWS recommends a 0.25-mile conservation buffer around culverts and bridges that are known or potentially occupied by northern long-eared and tricolored bats (USFWS 2024f). Therefore, a 0.25-mile conservation buffer around culverts and bridges that are known or potentially occupied by Indiana bats was used in this impact assessment for Indiana bats.

[redacted]

5.1.5.3. Summer

5.1.5.3.1. Forest

Construction activities can permanently or temporarily remove, fragment, or degrade portions of suitable forest roosting habitat. Additionally, tree clearing during the summer occupancy season (April 1 – September 30, Figure 4-2) can injure or kill adult Indiana bats or non-volant pups (May 15- July 31) or disturb bats roosting in a tree that is cut down. Forested areas that are suitable for Indiana bat roosting also can be impacted by changes to the surrounding environment due to construction activities including tree clearing, blasting, or the generation of dust, noise, or light. Likewise, exposure to dust, noise, or light generated by construction activities can disturb any Indiana bats occurring in daytime roosts in proximity to such activities, while nighttime construction activities can displace individuals from foraging habitat and travel corridors. As a result, any Indiana bats subjected to impactful levels of these stressors may need to search for and locate to alternative roost trees, foraging habitat, and travel corridors.

For purposes of evaluating the potential for impacts to forest roosting individuals, USFWS recommends a 5.0-mile conservation buffer around the location of any Indiana bat acoustic detection when the location of the detected bat's roost tree is unknown (USFWS 2024f). Within the 5.0-mile conservation buffer, a 2.5-mile buffer is designated as the inner tier of that occurrence, which is considered the maternity colony home range for the species and reflects USFWS's understanding that the maternity roost tree will be located somewhere within 2.5 miles of the detection site (2.5-mile inner-tier buffer; USFWS 2024f).

[redacted] The 2.5-mile inner-tier buffer around the Indiana bat detection covers 11,363.7 forested acres, of which 1,488.0 forested acres overlap the Action Area. That said, no trees will be cleared during construction, operation, or maintenance [redacted] and there will be no loss of potential forest roosting habitat [redacted].

There is potential for increased noise and vibration due to blasting and the operation of [redacted] (Section 5.1.3; Table 5-2). As a result, Indiana bats might avoid using the forest roosting habitat that overlaps with portions of the Action Area associated with [redacted] due to construction, operation, and maintenance activities, which may cause them to seek alternative roosting and foraging areas. However, Indiana bats switch roosts frequently and use primary and secondary roost trees (Kurta et al. 2002, Kurta 2005, USFWS 2007), which may allow them to better adapt to roost loss. Roost trees are also ephemeral in nature, which suggests that Indiana bats have evolved to relocate or shift to adjacent roosts. Moreover, there are 9,875.7 forested acres within the 2.5-mile inner-tier buffer that is outside [redacted] and will remain available for use by Indiana bats. Additionally, suitable forest roosting habitat for Indiana bats extends beyond the area that may be impacted. Therefore, any Indiana bats displaced by construction, operation, and maintenance activities at [redacted] would likely relocate to suitable forest roosting habitat in adjacent areas without adverse effects. Mountain Valley will implement conservation measures to avoid or minimize potential impacts to Indiana bats and their forest roosting habitat (Section 2.5). Additionally, Mountain Valley will develop site-specific blasting plans to avoid

[51] These dates reflect the summer survey period in the USFWS's *Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines* (USFWS 2024f) and what was used for acoustic monitoring for the MVP Mainline Project.

adversely affecting Indiana bats. Therefore, construction, operation, and maintenance activities at the Boost Project are not likely to adversely affect any forest-roosting Indiana bats.

5.1.5.3.2. Culverts and Bridges

The suitability of culverts/bridges that are used by roosting Indiana bats can be impacted by changes to the surrounding environment from construction activities such as tree clearing, blasting, and the generation of dust, noise, or light, which may affect the microclimate of culverts/bridges and, if at sufficient levels, disturb or displace Indiana bats. Additionally, culvert/bridge removal or modifications during the summer occupancy period (April 1 – September 30) can adversely affect roosting adults and non-volant pups (May 15 – July 31) by causing death, injury, or disturbance. Operation and maintenance activities also may produce minor amounts of dust, noise, or light, which could affect the microclimate and suitability of culverts/bridges and, if generated at sufficient levels, may disturb or displace Indiana bats. Disturbed or displaced Indiana bats may need to search for and travel to alternative roosts.

To address potential effects to Indiana bats, USFWS recommends implementing a 0.25-mile conservation buffer[52] to the location of any culverts or bridges that are known or potentially occupied (USFWS 2024f). Mountain Valley engaged WEST to identify known or potentially occupied culverts or bridges with [redacted] For purposes of this evaluation, a 0.25-mile conservation buffer was applied to [redacted] (Indiana bat summer culvert/bridge impact assessment area; Figure 5-4).

Similar to the analysis to identify culverts/bridges for staging/swarming use by Indiana bats (Section 5.1.5.2.2), culverts and bridges were evaluated throughout the Indiana bat summer culvert/bridge impact assessment area. [redacted] No bridges were identified within the Indiana bat summer culvert/bridge impact assessment area (Figure 5-4). Additionally, the Boost Project will not remove or modify any culverts or bridges; therefore, the Boost Project is not likely to adversely affect Indiana bats roosting in culverts or bridges.

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[52] The USFWS has not provided formal guidance for conservation buffers around culverts and bridges that are known or potentially occupied by Indiana bats; however, the USFWS recommends a 0.25-mile conservation buffer around culverts and bridges that are known or potentially occupied by northern long-eared and tricolored bats (USFWS 2024f). Therefore, a 0.25-mile conservation buffer around culverts and bridges that are known or potentially occupied by Indiana bats was used in this impact assessment.

[redacted]

5.1.5.4. Migration

While transient Indiana bats could potentially migrate across the Boost Project Action Area, any that do would be expected to only be present for short periods of time. During migration, potential impacts to roosting bats from dust, noise, or light generated by construction, operation, and maintenance activities are similar to potential impacts described for staging/swarming and summer roosting bats (Sections 5.1.5.2 and 5.1.5.3). However, during migration, any such impacts likely would be shorter in exposure duration and intensity, as bats are transient during migration, would only temporarily be near the potential stressor, and could simply move away from any stressor they might experience. Furthermore, any potential impacts to migrating bats would be avoided and minimized by implementation of the conservation measures described above (Section 2.5).

The lack of records of Indiana bats within the portions of the Action Area associated with the Bradshaw, Stallworth, and Swann Compressor Station sites suggest that migration occurrence is not likely in those locations. [redacted]

[redacted] No trees will be cleared during construction, operation, or maintenance of [redacted] therefore, there will be no loss of potential Indiana bat roost habitat or risk of direct effects to roosting bats during migration. Moreover, Mountain Valley will implement the conservation measures described above (Section 2.5) to avoid and minimize potential Boost Project impacts. Therefore, the Boost Project is not likely to adversely affect migrating Indiana bats.

5.1.5.5. Effects Determination

The proposed construction, operation, and maintenance of the Boost Project may affect but is not likely to adversely affect Indiana bats. This conclusion is supported by the following:

- The proposed construction, operation, and maintenance of the Bradshaw, Stallworth, and Swann Compressor Stations will have no effect on Indiana bats given that no Indiana bats are expected to occur in the portions of the Boost Project Action Area associated with those stations.
- Mountain Valley will implement conservation measures (Sections 2.5) that will avoid and minimize potential impacts to Indiana bats and their habitat in the Boost Project Action Area.
- No Indiana bat hibernacula were identified in relevant proximity to the portion of the Action Area associated with the Harris Compressor Station site.
- No trees will be cleared for construction, operation, or maintenance of [redacted]
- The Boost Project will not remove or modify bridges or culverts.
- Operation of [redacted] is expected to result in increased noise levels up to 3.9 dBA over ambient conditions. This minor increase in the operational noise at [redacted] would not meaningfully influence bat behavior.

- 41,821.5 forested acres within the Indiana bat staging/swarming conservation buffer that is [redacted] would remain available for use by Indiana bats.
- 9,875.7 forested acres within the 2.5-mile conservation buffer that is outside [redacted] would remain available for use by Indiana bats.

5.1.6. Northern Long-Eared Bat

Based on the previous survey data and current occurrence data discussed above (Section 4.2.7; Table 5.1), Boost Project construction, operation, and maintenance activities [redacted] could occur in proximity to northern long-eared bats during the annual seasonal life cycle of the species. As a result, individuals potentially could be exposed to Project-related stressors in those locations. On the other hand, northern long-eared bats are not expected to occur in the portions of the Action Area associated with the Bradshaw or Swann Compressor Stations and, therefore, individuals likely would not be exposed to project-related stressors in those locations. Accordingly, the following sections evaluate potential effects to northern long-eared bats in [redacted]

5.1.6.1. Winter

When conducted in proximity to hibernacula[53], construction activities such as tree clearing and blasting can impact hibernacula structure and/or microclimate, including changes to hydrology or air flow, impacting the suitability of hibernacula for use by northern long-eared bats. Additionally, construction activities can directly impact hibernating northern long-eared bats if the integrity or environment of a hibernaculum is affected. Construction activities including tree clearing, blasting, and those that generate dust, noise, and light can disturb or displace hibernating northern long-eared bats when generated at sufficient levels. Project operation and maintenance activities can similarly generate dust, noise, or light that may disturb or displace northern long-eared bats hibernating in proximity to those activities. Disturbance that causes arousal from hibernation can be deleterious if it causes depletion of fat reserves needed to sustain northern long-eared bats during hibernation (USFWS 2022d).

No tree clearing will occur during construction, operation, or maintenance at [redacted] There is a potential for blasting to occur during construction of [redacted], which could produce sudden, short duration, intense noise and seismic vibration. Operation of [redacted] is expected to result in long-term increased noise levels up to 3.9 dBA over ambient conditions (Section 5.1.3; Table 5-2). But, as discussed below, these potential stressors are not expected to adversely affect any northern long-eared bats.

The USFWS recommends implementing a 0.5-mile conservation buffer (defining an impact analysis distance) to the location of any known or potentially occupied hibernacula to address potential impacts to hibernating northern long-eared bats (USFWS 2024g). As part of the analysis for this BA, [redacted] Identified features were assessed for potential impacts. For purposes of this impact evaluation, a 0.5-mile buffer was applied to [redacted]

[53] Hibernacula addressed in this section include "caves and their associated sinkholes, fissures, and other karst features, as well as anthropogenic features such as abandoned mines and tunnels" (USFWS 2024g).

[redacted][54] (northern long-eared bat hibernacula impact assessment area).

Current data from state agencies and data from previous surveys and monitoring conducted for the MVP Mainline Project indicate no known northern long-eared bat hibernacula within the northern long-eared bat hibernacula impact assessment area (MVP 2022; Section 4.2.7.2; Figure 5-5). As a result, no impacts to hibernating northern long-eared bats or their hibernacula from construction, operation, and maintenance of the Boost Project are expected.

[54] Northern long-eared bats are not expected to occur within portions of the Action Area associated with the Stallworth Compressor Station in winter (Table 5 1); [redacted]

[redacted]

5.1.6.2. Spring Staging and Fall Swarming

5.1.6.2.1. Forest

After emerging from hibernation, northern long-eared bats engage in spring staging, where individuals roost near hibernacula for a short time (i.e., two to three days) before migrating to summer maternity areas (Section 4.2.6). Swarming occurs over a longer period of time in fall, again with bats roosting in forested areas near hibernacula. Trees and other structures around potential hibemacula could be used as night and/or day roosts by northern long-eared bats during spring staging and fall swarming. When conducted in staging and swarming habitat, construction and maintenance activities such as tree clearing could permanently remove potential roost sites or fragment areas of suitable habitat. Felling trees during the spring staging or fall swarming periods could adversely affect individual northern long-eared bats by causing death, injury, or disturbance to bats roosting in a tree that is cut down. However, no tree clearing will occur during construction, operation, or maintenance of [redacted][55], and there will be no loss of potential northern long-eared bat staging/swarming habitat or risk of related effects to bats within the portion of the Action Area associated with [redacted].

Dust, noise, or light generated by construction, operation, and maintenance activities can temporarily disturb or displace northern long-eared bats during spring staging and fall swarming if they experience impactful exposure to those stressors. There is a potential for blasting to occur at [redacted] during construction, which could produce sudden, short-duration, intense noise and seismic vibration. Operation of [redacted] is expected to result in increased noise levels up to 3.9 dBA over ambient conditions (Section 5.1.3; Table 5-2). But, as discussed below, these potential stressors are not expected to adversely affect any northern long-eared bats.

The USFWS recommends implementing a 5.0-mile conservation buffer to the location of any known or potentially occupied northern long-eared bat hibernacula to address potential impacts to any individuals engaged in spring staging and fall swarming associated with those features (USFWS 2024g). Mountain Valley engaged WEST to identify potentially occupied hibernacula with conservation buffers that overlap with [redacted] to assess potential impacts. For purposes of this impact evaluation, a 5.0-mile buffer was applied to [redacted] (northern long-eared bat staging/swarming impact assessment area).

[redacted] The northern long-eared bat staging/swarming conservation buffer covers 44,576.7 forested acres, of which 2,813.8 forested acres overlap [redacted] Northern long-eared bats may avoid using the forested area that overlaps with that portion of the Action Area due to construction, operation, and maintenance activities. However, 41,762.9 forested acres within the northern long-eared bat staging/swarming conservation buffer that is outside [redacted] will remain available for use by northern long-eared bats, and suitable forest roosting habitat for northern long-eared bats extends beyond the area that will be impacted by the Boost Project. Therefore, any northern long-eared bats displaced by construction,

[55] Northern long-eared bats are not expected to occur in winter within relevant proximity to the Stallworth Compressor Station site (Table 5-1); [redacted]

operation, and maintenance of [redacted] would likely relocate to suitable forest staging/swarming habitat in adjacent areas without adverse effect. In addition, Mountain Valley will implement conservation measures to avoid and minimize potential impacts to northern long-eared bats and their staging/swarming habitat (Section 2.5). Among those measures, Mountain Valley will develop site-specific blasting plans to avoid adversely affecting northern long-eared bats. Therefore, construction, operation, and maintenance activities of the Boost Project are not likely to adversely affect spring staging and fall swarming northern long-eared bats.

[redacted]

5.1.6.2.2. Culverts and Bridges

Culverts and bridges around potential northern long-eared bat hibernacula can be used as night and/or day roosts by northern long-eared bats during spring staging (April 1 – May 14) and fall swarming (August 16 – November 15). The suitability of any culverts/bridges that are used by roosting northern long-eared bats during spring staging and fall swarming can be impacted by changes to the surrounding environment from construction activities such as tree clearing, blasting, and the generation of dust, noise, or light, which could affect the microclimate of culverts/bridges and, if at sufficient levels, may disturb or displace northern long-eared bats. Additionally, culvert/bridge removal or modification during spring staging and fall swarming can adversely affect staging/swarming northern long-eared bats by causing death, injury, or disturbance. Operation and maintenance activities also may produce dust, noise, or light, which can affect the microclimate and suitability of culverts/bridges and, if generated at sufficient levels, disturb or displace northern long-eared bats. Disturbed or displaced northern long-eared bats may search for and travel to alternative roosts.

To address potential impacts to northern long-eared bats, the USFWS recommends implementing a 0.25-mile conservation buffer to the location of any culverts or bridges that are known to be or are potentially occupied (USFWS 2024f). Mountain Valley engaged WEST to identify known or potentially occupied culverts or bridges with conservation buffers that overlap [redacted][56]. For purposes of this evaluation, a 0.25-mile buffer was applied to [redacted] (northern long-eared bat staging/swarming culvert/bridge impact assessment area; Figure 5-7).

Culverts less than 4.0 feet in diameter/height and 23.0 feet in length are unlikely to provide suitable roosting habitat for northern long-eared bats (USFWS 2024f). The 23.0-foot length is based on the typical width of a 2-lane road, and bats are unlikely to be present in shorter culverts. Thus, culverts associated with roads narrower than two lanes are unlikely to support roosting habitat for northern long-eared bats. WEST and Mountain Valley conducted a desktop evaluation of publicly available sources to identify potentially suitable culverts and bridges within the northern long-eared bat staging/swarming culvert/bridge impact assessment area by querying the WVDOT database (WVDOT 2026). Additional culverts that were documented during wetland delineation surveys conducted for the Boost Project were also included in the desktop review (TetraTech 2025a, 2025b). Based on the desktop evaluation, there is 1 culvert within the northern long-eared bat staging/swarming culvert/bridge impact assessment area, but it does not meet the minimum diameter requirements to be considered potentially suitable for northern long-eared bats (USFWS 2024f; Figure 5-7). No bridges were identified within the northern long-eared bat staging/swarming culvert/bridge impact assessment area (Figure 5-7). Additionally, the Boost Project will not remove or modify any culverts or bridges. Therefore, the Boost Project is not likely to adversely affect northern long-eared bats roosting in culverts or bridges during spring staging and fall swarming.

[56] Northern long-eared bats are not expected to occur within relevant proximity to the Stallworth Compressor Station site in winter (Table 5-1); [redacted]

[redacted]

5.1.6.3. Summer

5.1.6.3.1. Forest

Construction activities can permanently or temporarily remove, fragment, or degrade portions of suitable forest roosting habitat. Additionally, tree clearing during the summer occupancy season (April 1 – September 30) can injure or kill adult northern long-eared bats or non-volant pups (May 15 – July 31; Figure 4-2) or disturb bats roosting in a tree that is cut down. Nevertheless, no trees will be cleared during construction, operation, or maintenance of [redacted], and there will be no loss of potential forest roosting habitat.

Forested areas that are suitable for northern long-eared bat roosting also can be impacted by changes to the surrounding environment due to construction activities including tree clearing, blasting, or the generation of dust, noise, or light. Likewise, exposure to dust, noise, or light generated by construction activities can disturb northern long-eared bats occurring in daytime roosts in proximity to such activities, while nighttime construction activities can displace individuals from foraging habitat and travel corridors. As a result, any northern long-eared bats subjected to impactful levels of these stressors may search for and locate to alternative roost trees, foraging habitat, and travel corridors. There is potential for increased noise and vibration due to blasting at [redacted] and long-term increase in noise due to the operation of [redacted] (Section 5.1.3; Table 5-2). But, as discussed below, these potential stressors are not expected to adversely affect any northern long-eared bats.

To evaluate the potential for impacts to forest roosting individuals, USFWS recommends a 3.0-mile conservation buffer around the location of any northern long-eared bat acoustic detections when the location of the detected bat's roost tree is unknown (USFWS 2024g, 2025g). Within the 3.0-mile conservation buffer, a 1.5-mile buffer is designated as the inner tier of that occurrence, which is considered the maternity colony home range for the species and reflects the USFWS's understanding that the maternity roost tree will be located somewhere within 1.5 miles of the detection site (1.5-mile inner-tier buffer; USFWS 2024g, 2025g).

[redacted] The 1.5-mile inner-tier buffers around the detections overlap [redacted] (Figure 4-5 and 4-6). The 1.5-mile inner-tier buffers around the northern long-eared bat detections include 7,582.7 and 4,894.4 forested acres, of which 2,749.6 and 2,776.7 forested acres overlap [redacted]. Northern long-eared bats may avoid using the forest roosting habitat that overlaps with those portions of the Action Area due to construction, operation, and maintenance activities which may cause them to seek alternative roosting and foraging areas. Nevertheless, northern long-eared bats often use a variety of alternative roosts, and this flexibility in roost selection may allow them to better adapt to roost loss, especially in areas where roosting habitat is abundant (Silvis et al. 2015, USFWS 2022d; Section 4.2.6.1). There are 4,833.1 and 2,117.7 forested acres within the 1.5-mile inner-tier buffers that are outside [redacted], respectively, all of which will remain available for use by northern long-eared bats. Additionally, suitable forest roosting habitat for northern long-

57 These dates reflect the summer survey period in the USFWS's *Range-wide Indiana Bat and Northern Long-eared Bat Survey* Guidelines (USFWS 2024f) and what was used for acoustic monitoring for the MVP Mainline Project.

eared bats extends beyond the area that could be affected by the Project. Therefore, any northern long-eared bats displaced by construction, operation, and maintenance activities [redacted] would likely relocate to suitable forest roosting habitat in adjacent areas without adverse effects. Moreover, Mountain Valley will implement conservation measures to avoid and minimize potential impacts to northern long-eared bats (Section 2.5). Among those measures, Mountain Valley will develop site-specific blasting plans to avoid adversely affecting northern long-eared bats. Therefore, Boost Project construction, operation, and maintenance activities are not likely to adversely affect forest-roosting northern long-eared bats.

5.1.6.3.2. Culverts and Bridges

The suitability of culverts or bridges that are used by roosting northern long-eared bats can be impacted by changes to the surrounding environment from construction activities such as tree clearing, blasting, and the generation of dust, noise, or light, which may affect the microclimate of culverts/bridges and, if at sufficient levels, may disturb or displace northern long-eared bats. Additionally, culvert/bridge removal or modification during the summer occupancy period (April 1 – September 30) can adversely affect roosting adults and non-volant pups (May 15 – July 31; Figure 4-2) by causing death, injury, or disturbance. Operation and maintenance activities also can produce minor amounts of dust, noise, or light, which can affect the microclimate and suitability of culverts/bridges and, if generated at sufficient levels, may disturb or displace northern long-eared bats. Disturbed or displaced northern long-eared bats may need to search for and travel to alternative roosts.

To address potential impacts to northern long-eared bats, USFWS recommends implementing a 0.25-mile conservation buffer to the location of any culverts or bridges that are known or potentially occupied (USFWS 2024f). Mountain Valley engaged WEST to identify known or potentially occupied culverts and bridges with conservation buffers that overlap [redacted]. For purposes of this evaluation, a 0.25-mile buffer was applied to [redacted] Because northern long-eared bats are only known to occur [redacted] (northern long-eared bat summer culvert/bridge impact assessment area; Figure 5-8 and 5-9).

Similar to the analysis to identify culverts/bridges for staging/swarming use by northern long-eared bats (Section 5.1.6.2.2), culverts and bridges were evaluated throughout each northern long-eared bat summer culvert/bridge impact assessment area. Two culverts, neither of which meets the minimum diameter requirements to be considered potentially suitable for northern long-eared bats (USFWS 2024f), were identified, and no bridges were identified within the northern long-eared bat summer culvert/bridge impact assessment area (Figure 5-8 and 5-9). Additionally, the Boost Project will not remove or modify any culverts or bridges. As a result, the Boost Project is not likely to adversely affect northern long-eared bats roosting in culverts or bridges.

[redacted]

[redacted]

5.1.6.4. Migration

While transient northern long-eared bats could potentially migrate across the Boost Project Action Area, any that do would be expected to only be present for short periods of time. During migration, potential impacts to roosting bats from dust, noise, or light generated by construction, operation, and maintenance activities are similar to potential impacts described for staging/swarming and summer roosting bats (Sections 5.1.5.2 and 5.1.5.3). However, during migration, any such impacts likely would be shorter in exposure duration and intensity, as bats are transient during migration, would only temporarily be near the potential stressor, and could simply move away from any stressor they might experience. Furthermore, any potential impacts to migrating bats would be avoided and minimized by implementation of the conservation measures described above (Sections 2.5).

The lack of records of northern long-eared bats within the portions of the Action Area associated with the Stallworth and Swann Compressor Station sites suggest that migration occurrence is not likely in those locations. [redacted]

The [redacted] both fall within the 30 to 100 percent forest density category (USFWS 2024g). Therefore, there is an abundance of forested area in relevant proximity to these compressor stations. Any northern long-eared bats that migrate into these areas and are displaced by construction, operation, and maintenance of [redacted] would likely locate to forest roosting habitat in adjacent areas without adverse effect. No trees will be cleared during construction, operation, or maintenance of [redacted], and there will be no loss of potential northern long-eared bat roost habitat or risk of direct effects to roosting bats during migration. Moreover, Mountain Valley will implement the conservation measures described above (Section 2.5) to avoid and minimize potential Boost Project impacts. Therefore, the Boost Project is not likely to adversely affect migrating northern long-eared bats.

5.1.6.5. Effects Determination

The proposed construction, operation, and maintenance of the Boost Project may affect but is not likely to adversely affect northern long-eared bats. This conclusion is supported by the following:

- The proposed construction, operation, and maintenance of the Bradshaw and Swann Compressor Stations will have no effect on northern long-eared bats given that no northern long-eared bats are expected to occur in the portions of the Boost Project Action Area associated with those locations.
- Mountain Valley will implement conservation measures (Section 2.5) that will avoid and minimize potential impacts to northern long-eared bats in the Boost Project Action Area.
- No trees will be cleared for construction, operation, or maintenance of [redacted].
- The Boost Project will not remove or modify bridges or culverts.
- Operation of [redacted] is expected to result in increased noise levels up to 3.9 and 3.2 dBA over ambient conditions, respectively. These minor increases in the operational noise [redacted] would not meaningfully influence bat behavior.

- 41,762.9 forested acres within the northern long-eared bat staging/swarming conservation buffer that is outside [redacted] would remain available for use by northern long-eared bats.
- 4,833.1 and 2,117.7 forested acres that are within the 1.5-mile inner-tier buffers that are outside [redacted] respectively, would remain available for use by northern long-eared bats.

5.1.7. Tricolored Bat

Based on the previous survey data and current occurrence data discussed above (Section 4.3.7; Table 5-1), Boost Project construction, operation, and maintenance activities associated with [redacted] could occur in proximity to tricolored bats during the annual life cycle of the species. As a result, individuals potentially could be exposed to Project-related stressors in those locations. Tricolored bats [redacted] during winter or spring staging and fall swarming [redacted] Tricolored bats are not expected to occur in the vicinity of the Stallworth Compressor Station at any time during the species' annual life cycle. Accordingly, the following sections evaluate potential effects to tricolored bats in the [redacted].

5.1.7.1. Winter

When conducted in proximity to hibernacula[58], construction activities such as tree clearing and blasting can impact hibernacula structure and/or microclimate, including changes to hydrology or air flow, impacting the suitability of hibernacula for use by tricolored bats. Construction activities can also directly impact hibernating tricolored bats if the integrity or environment of a hibernaculum is affected. Construction activities including tree clearing, blasting, and those that generate dust, noise, and/or light and can disturb or displace hibernating tricolored bats when generated at sufficient levels. Project operation and maintenance activities can similarly generate dust, noise, or light that may disturb or displace tricolored bats hibernating in proximity to those activities. Disturbance that causes arousal from hibernation can be deleterious if it causes depletion of fat reserves needed to sustain tricolored bats during hibernation (USFWS 2021).

No tree clearing will occur during construction, operation, or maintenance of [redacted]; however, Mountain Valley plans [redacted]. There is a potential for blasting to occur during construction o[redacted] which could produce sudden, short duration, intense noise and seismic vibration. Operation of the [redacted] is expected to result in long-term increased noise levels up to 3.9 dBA over ambient conditions (Section 5.1.3; Table 5-2). Operation of [redacted] is expected to result in long-term increased noise levels up to 3.2 dBA over ambient conditions (Section 5.1.3; Table 5-2).

USFWS recommends implementing a 0.5-mile conservation buffer (defining an impact analysis distance) to the location of any known or potentially occupied hibernacula to address potential impacts to hibernating tricolored bats (USFWS 2024g). As part of the analysis for this BA, potentially occupied hibernacula were

[58] Hibernacula addressed in this section include "caves and their associated sinkholes, fissures, and other karst features, as well as anthropogenic features such as abandoned mines and tunnels" (USFWS 2024g).

identified within conservation buffers that overlap [redacted]. Identified features were assessed for potential impacts. For purposes of this impact evaluation, a 0.5-mile buffer was applied to those portions of the Action Area[59] (tricolored bat hibemacula impact assessment area; Figure 5-10 and 5-11).

Current data from state agencies and data from previous surveys and monitoring conducted for the MVP Mainline Project indicate no known tricolored bat hibernacula within the tricolored bat impact assessment area [redacted] (VDWR 2025; Section 4.3.7.2; Figure 5-10 and 5-11). Therefore, no impacts to hibernating tricolored bats from construction, operation, and maintenance of the Boost Project are expected.

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[59] Tricolored bats are not expected to occur within relevant proximity to the Bradshaw Compressor Station in winter (Table 5-1) [redacted]

[redacted]

[redacted]

5.1.7.2. Spring Staging and Fall Swarming

5.1.7.2.1. Forest

After emerging from hibernation, tricolored bats may engage in spring staging, where individuals roost in forested areas near hibernacula for a short time (i.e., two to three days) before migrating to summer maternity areas (Section 4.3.6). Swarming occurs over a longer period of time in fall, again with bats roosting in forested areas near hibernacula. Trees and other structures around potential hibernacula could be used as night and/or day roosts by tricolored bats during spring staging and fall swarming. The suitability of forested habitat used by roosting tricolored bats during spring staging and fall swarming can be impacted by changes to the surrounding environment from construction activities such as tree clearing, blasting, and the generation of dust, noise, or light, which may, if at sufficient levels, disturb or displace tricolored bats. When conducted in staging and swarming habitat, construction and maintenance activities such as tree clearing could permanently remove potential roost sites or fragment areas of suitable habitat. Felling trees during the spring staging or fall swarming periods could adversely affect individual tricolored bats by causing death, injury, or disturbance to bats roosting in a tree that is cut down.

No tree clearing will occur during construction, operation, or maintenance of [redacted] and there will be no loss of potential tricolored bat staging/swarming habitat associated with that location However, [redacted] but that clearing is planned outside of the bat active season (April 1 – November 15). Dust, noise, or light generated by construction, operation, and maintenance activities may temporarily disturb or displace tricolored bats during spring staging and fall swarming if they experience impactful exposure to those stressors. There also is a potential for blasting to occur [redacted] during construction, which could produce sudden, short-duration, intense noise and seismic vibration. In addition, operation of [redacted] is expected to result in increased noise levels up to 3.9 dBA over ambient conditions (Section 5.1.3; Table 5-2), while operation of [redacted] is expected to result in long-term increased noise levels up to 3.2 dBA over ambient conditions (Section 5.1.3; Table 5-2). But, as discussed below, these potential stressors are not expected to adversely affect any tricolored bats.

USFWS recommends implementing a 3.0-mile conservation buffer to the location of any known or potentially occupied tricolored bat hibernacula to address potential impacts to any individuals engaged in spring staging and fall swarming associated with those features (USFWS 2024g). Mountain Valley engaged WEST to identify potentially occupied hibernacula with conservation buffers that overlap [redacted] o assess potential impacts. For purposes of this impact evaluation, a 3.0-mile buffer was applied to [redacted][60] (tricolored bat staging/swarming impact assessment areas; Figure 5-12 and 5-13).

There is one known tricolored bat hibernaculum within the tricolored bat staging/swarming impact assessment area, a feature that occurs [redacted] (VDWR 2025; Section 4.3.7.2 and 5.1.7.1; Figure 4-7). Mountain Valley applied the 3.0-mile staging/swarming conservation buffer (USFWS 2024g) to the location of that hibernaculum to evaluate the potential for impacts to staging/swarming individuals (tricolored bat staging/swarming conservation buffer; Figure 5-12). The tricolored bat staging/swarming conservation buffer covers 13,170.3

[60] Tricolored bats are not expected to occur within relevant proximity to the Bradshaw Compressor Station sites in winter (Table 5-1) [redacted]

forested acres, of which 561.2 forested acres overlap [redacted]. During Boost Project construction, [redacted]. As a result, total forested area impacts attributed to [redacted] make up less than 1 percent of the available forested area within the tricolored bat staging/swarming conservation buffer. Tricolored bats might avoid using the forested area that overlaps that portion of the Action Area due to construction, operation, and maintenance activities. However, 12,609 forested acres within the tricolored bat staging/swarming conservation buffer will remain available for use by tricolored bats, and suitable forest roosting habitat for tricolored bats extends beyond the area that will be impacted by the Boost Project.

The Boost Project falls within the 30 to 100 percent forest density category (USFWS 2024g). Per the USFWS (2024g, 2025g), clearing up to 100 acres of suitable forest in this category within staging/swarming habitat outside the spring staging (April 1 – May 14) and fall swarming (August 16 – November 15; Figure 4-2) periods is not expected to result in adverse effects to tricolored bats. Boost Project tree clearing [redacted] will be less than 100 acres and will occur outside the bat active season (April 1 – November 15), which includes the period of time when tricolored bats will engage in spring staging (April 1 – May 14) and fall swarming (August 16 – November 15). As a result, forest removal is not likely to adversely affect staging/swarming tricolored bats in the portion of the Action Area [redacted].

[redacted] Based on this tricolored bat acoustic detection, Mountain Valley conservatively applied a 3.0-mile staging/swarming conservation buffer (USFWS 2024g) to the tricolored bat acoustic detection to evaluate the potential for impacts (tricolored bat staging/swarming conservation buffer; Figure 5-13). That tricolored bat staging/swarming conservation buffer includes 16,251.1 forested acres, of which 2,275.1 forested acres overlap [redacted]. Tricolored bats might avoid using the forested area that overlaps that portion of the Action Area due to Boost Project construction, operation, and maintenance activities, which would cause them to seek alternative roosting and foraging areas. That said, there are 13,976 forested acres within the tricolored bat staging/swarming conservation buffer that are outside [redacted]nd will remain available for use by tricolored bats, and suitable forest roosting habitat for tricolored bats extends beyond the area that could be affected by the Boost Project.

Any tricolored bats displaced by Boost Project activities would likely locate to new roosts in adjacent areas without adverse effects. In addition, Mountain Valley will implement conservation measures to avoid and minimize potential impacts to tricolored bats and their staging/swarming habitat (Section 2.5.2). For example, unless surveys document absence of federally listed species prior to construction, Mountain Valley will not clear trees between April 1 and November 15 to avoid direct impacts to staging/swarming bats (USFWS 2025g; Section 2.5). If tree removal is required for emergency reasons between April 1 and November 15, Mountain Valley will coordinate with the USFWS and FERC to ensure that any such activity is not likely to adversely affect bats (Section 2.5). Additionally, Mountain Valley will develop site-specific blasting plans to avoid adversely affecting bats. Therefore, construction, operation, and maintenance activities of the Boost Project are not likely to adversely affect any spring staging/fall swarming tricolored bats.

[redacted]

[redacted]

5.1.7.2.2. Culverts and Bridges

Culverts and bridges around potential tricolored bat hibernacula can be used as night and/or day roosts by tricolored bats during spring staging (April 1 – May 14) and fall swarming (August 16 – November 15). The suitability of any culverts/bridges that are used by roosting tricolored bats during spring staging and fall swarming can be impacted by changes to the surrounding environment from construction activities such as tree clearing, blasting, and the generation of dust, noise, or light, which could affect the microclimate of culverts/bridges and, if at sufficient levels, may disturb or displace tricolored bats. Additionally, culvert/bridge removal or modification during spring staging and fall swarming can adversely affect staging/swarming tricolored bats by causing death, injury, or disturbance. Operation and maintenance activities also may produce minor amounts of dust, noise, or light, which can affect the microclimate and suitability of culverts/bridges and, if generated at sufficient levels, disturb or displace tricolored bats. Disturbed or displaced tricolored bats may need to search for and travel to alternative roosts.

To address potential impacts to tricolored bats, USFWS recommends implementing a 0.25-mile conservation buffer to the location of any culverts or bridges that are known or potentially occupied (USFWS 2024f). Mountain Valley engaged WEST to identify known or potentially occupied culverts or bridges with conservation buffers that overlap [redacted][61]. For purposes of this evaluation, a 0.25-mile buffer was applied to those locations. [redacted] (tricolored bat staging/swarming culvert/bridge impact assessment area; Figure 5-14 and 5-15).

Culverts less than 3.0 feet in diameter/height and 23.0 feet in length are unlikely to provide suitable roosting habitat for tricolored bats (USFWS 2024f). The 23.0-feet length is based on the typical width of a 2-lane road, and bats are unlikely to be present in shorter culverts. Thus, culverts associated with roads narrower than two lanes are unlikely to support roosting habitat for tricolored bats. WEST and Mountain Valley conducted a desktop evaluation to identify potentially suitable culverts and bridges within the tricolored bat staging/swarming culvert/bridge impact assessment area by querying publicly available sources, including VDOT (2020) and the WVDOT database (WVDOT 2026). Additional culverts that were documented during wetland delineation surveys conducted for the Boost Project were also included in the desktop review (TetraTech 2025a, 2025b).

Based on the desktop evaluation, 1 culvert, which does not meet the minimum diameter requirements to be considered potentially suitable for tricolored bats (USFWS 2024f), and no bridges were identified within the tricolored bat staging/swarming culvert/bridge impact assessment area [redacted] (Figure 5-15). [redacted]

[61] Tricolored bats are not expected to engage is staging or swarming in the Action Area associated with the Bradshaw Compressor Station (Table 5-1); [redacted]

[redacted]

The Boost Project will not remove or modify any culverts or bridges. If tricolored bats become federally listed, Mountain Valley will implement conservation measures that will avoid and minimize potential impacts to tricolored bats associated with culverts or bridges, such as conducting surveys in accordance with current USFWS survey guidelines on the potentially suitable culverts and bridges within the tricolored bat staging/swarming culvert/bridge impact assessment [redacted] and, after conferring with USFWS, implementing appropriate conservation measures to ensure that any staging/swarming tricolored bats are not adversely affected (Section 2.5.2). Therefore, the Boost Project is not likely to adversely affect tricolored bats roosting in culverts or bridges during spring staging and fall swarming.

[redacted]

[redacted]

5.1.7.3. Summer

5.1.7.3.1. Forest

Construction activities can permanently or temporarily remove, fragment, or degrade suitable forest roosting habitat. Additionally, tree clearing during the summer occupancy season (April 1 – September 30) can injure or kill adult tricolored bats or non-volant pups (May 15 to July 31; Figure 4.2) or disturb bats roosting in a tree that is cut down. No trees will be cleared for construction, operation, or maintenance of [redacted]

Forested areas that are suitable for tricolored bat roosting also can be impacted by changes to the surrounding environment due to construction activities involving tree clearing, blasting, or the generation of dust, noise, or light. Exposure to dust, noise, or light generated by construction activities can disturb tricolored bats occurring in daytime roosts in proximity to those activities, while nighttime construction activities can displace individuals from foraging habitat and travel corridors. As a result, any tricolored bats subjected to impactful levels of these stressors might need to search for and locate to alternative roost trees, foraging habitat, and travel corridors. There is potential for increased noise and vibration due to blasting at [redacted] and long-term increase in noise due the operation [redacted] and construction of [redacted] (Section 5.1.3; Table 5-2). Nevertheless, as discussed below, these potential stressors are not expected to adversely affect tricolored bats.

To evaluate the potential for impacts to forest-roosting individuals, USFWS recommends a 3.0--mile conservation buffer around the location of any tricolored bat acoustic detection when the location of the detected bat's roost tree is unknown (USFWS 2024g, 2025g). Within the 3.0-mile conservation buffer, a 1.5-mile buffer is designated as the inner tier of that occurrence, which is considered the maternity colony home range for the species and reflects USFWS's understanding that the maternity roost tree will be located somewhere within 1.5 miles of the detection site (1.5-mile inner-tier buffer; USFWS 2024g, 2025g).

[redacted] The 1.5-mile inner-tier buffer around the tricolored bat detections cover 14,889.2 and 4,205.9 forested acres, of which 1,132.0 and 231.1 forested acres overlap [redacted], respectively. A [redacted] (VDWR 2025; Section 4.3.7.1; Figure 4-8). The 1.5-mile inner-tier buffer around the tricolored bat detection covers 2,771.2 forest acres, of which 417.3 forest acres overlap [redacted].

Tricolored bats might avoid using portions of the forest roosting habitat that overlap [redacted] sites due to impacts

[62] These dates reflect the summer survey period in the USFWS's *Range-wide Indiana Bat and Northern Long-eared Bat Survey Guidelines* (USFWS 2024f) and what was used for acoustic monitoring for the MVP Mainline Project.

from construction, operation, and maintenance activities. Additionally, tree clearing may permanently remove suitable summer habitat within [redacted]. This in turn could cause tricolored bats to seek alternative roosting and foraging areas when they return to summer habitat following spring migration. Female tricolored bats generally return to the same summer roost habitat area each year (Veilleux and Veilleux 2004b) but have been found to switch roost trees regularly during the summer season (Cable and Wilcox 2024, Veilleux and Veilleux 2004b). Roost switching and the use of a variety of roosts suggest that flexibility in roost selection may allow tricolored bats to better adapt to roost loss, especially in areas without limited roosting habitat, similar to northern long-eared bats (Silvis et al. 2015, USFWS 2022c). There are 13,757.2, 3,974.8, and 2,353.9 forested acres within the 1.5-mile inner-tier buffers that are outside [redacted], respectively, all of which will remain available for use by tricolored bats. Additionally, suitable forest roosting habitat for tricolored bats extends beyond the area that could be affected by the Boost Project. Therefore, any tricolored bats displaced by Boost Project activities would likely relocate to new roosts in adjacent areas without adverse effects. Additionally, [redacted] is located within the 30 to 100 percent forest density category (Section 5.1.7.2.1) and Boost Project tree clearing will be less than 100 acres [redacted] USFWS 2024g, 2025g).

Unless surveys document probable absence of the species prior to construction, to avoid direct impacts to roosting tricolored bats, Mountain Valley will not clear trees between April 1 and November 15, which includes the pup season in Virginia (May 15 – July 31; USFWS 2025g; Section 2.5). If tree removal is required for emergency reasons between April 1 and November 15, Mountain Valley will coordinate with the USFWS and FERC to ensure that any such activity is not likely to adversely affect bats (Section 2.5). Additionally, Mountain Valley will develop site-specific blasting plans and implement the conservation measures described in Section 2.5.2 to avoid and minimize potential effects to adult bats or non-volant pups from dust, noise, and light. Therefore, construction, operation, and maintenance activities of the Boost Project are not likely to adversely affect any forest-roosting tricolored bats.

5.1.7.3.2. Culverts and Bridges

The suitability of culverts or bridges that are used by roosting tricolored bats can be impacted by changes to the surrounding environment from construction activities such as tree clearing, blasting, and generation of dust, noise, or light, which may affect the microclimate of culverts/bridges and, if at sufficient levels, disturb or displace tricolored bats. Additionally, culvert/bridge removal or modification during the summer occupancy period (April 1 – September 30) can adversely affect roosting adults and non-volant pups (May 15 – July 31; Figure 4-2) by causing death, injury, or disturbance. Operation and maintenance activities can produce minor amounts of dust, noise, or light, and may include hazard tree removal, which can affect the microclimate and suitability of culverts/bridges and, if generated at sufficient levels, may disturb or displace tricolored bats. Disturbed or displaced tricolored bats may search for and travel to alternative roosts.

To address potential impacts to tricolored bats, USFWS recommends implementing a 0.25-mile conservation buffer to the location of any culverts or bridges that are known or potentially occupied (USFWS 2024f). Mountain Valley, therefore, engaged WEST to identify known or potentially occupied culverts and bridges with conservation buffers that overlap [redacted]. For purposes of this evaluation, a 0.25-mile buffer was applied to [redacted]

[redacted] (tricolored bat summer culvert/bridge impact assessment area; Figures 5-16, 5-17, and 5-18).

Similar to the analysis to identify culverts/bridges for staging/swarming use by tricolored bats (Section 5.1.7.2), publicly available resources were evaluated for occurrence of culverts and bridges throughout each tricolored bat summer culvert/bridge impact assessment area. No culverts or bridges were identified within the tricolored bat summer culvert/bridge impact assessment area [redacted] (Figure 5-16). [redacted]

The Boost Project will not remove or modify any culverts or bridges. If tricolored bats become federally listed, Mountain Valley will implement conservation measures that will avoid and minimize potential impacts to tricolored bats associated with culverts or bridges, such as conducting surveys in accordance with current USFWS survey guidelines on the potentially suitable culverts and bridges within the tricolored bat staging/swarming culvert/bridge impact assessment [redacted] and, after conferring with USFWS, implementing appropriate conservation measures to ensure that any staging/swarming tricolored bats are not adversely affected (Section 2.5.2). As a result, the Boost Project is not likely to adversely affect tricolored bats roosting in culverts or bridges.

[redacted]

[redacted]

[redacted]

5.1.7.4. Migration

While transient tricolored bats could potentially migrate across the Boost Project Action Area, any such migrating bats would be expected to only be present for short periods of time. During migration, potential impacts to roosting bats from dust, noise, or light generated by construction, operation, or maintenance activities are similar to potential impacts described for staging/swarming and summer roosting bats (Sections 5.1.5.2 and 5.1.5.3). However, during migration, any such impacts likely would be shorter in exposure duration and intensity, as bats are transient during migration, would only temporarily be near the potential stressor, and could simply move away from any stressor they might experience. Furthermore, any potential impacts to migrating bats would be avoided and minimized by the implementation of the conservation measures described above (Section 2.5).

The lack of records of tricolored bats within the portions of the Action Area associated with the Stallworth Compressor Station site suggests that migration occurrence is not likely in the Action Area there. [redacted]

[redacted] fall within the 30 to 100 percent forest density category (USFWS 2024g). Therefore, there is an abundance of forested area in relevant proximity to these compressor stations. No trees will be cleared during construction, operation, or maintenance [redacted] therefore, there will be no loss of potential tricolored bat migration habitat or risk of direct effects to bats at those locations. During Boost Project construction, [redacted] That planned clearing area makes up 2 percent of the forested area in [redacted], 612.1 forested acres of which will remain available for migrating tricolored bats. However, forest removal would not likely affect migrating tricolored bat individuals because of their dispersed nature and the species' propensity to roost singly or in small groups that may flush easily in response to a potential stressor and switch roosts. Any migrating tricolored bats that are displaced by construction, operation, and maintenance of the Boost Project would likely move to nearby forest roosting habitat in adjacent areas without adverse effect. Moreover, Mountain Valley will implement the conservation measures described above (Section 2.5) to avoid and minimize potential Boost Project impacts. Therefore, the Boost Project is not likely to adversely affect migrating tricolored bats.

5.1.7.5. Effects Determination

Based on the best available information, potential effects to tricolored bats were evaluated [redacted]. Currently, tricolored bats are proposed for listing under the ESA as an endangered species. In this regard, proposed federal actions may not jeopardize the continued existence of the species. In anticipation that the final rule for tricolored bat status may classify the species as federally endangered, this effects analysis focuses on whether effects from the Boost Project are likely to adversely affect tricolored bats. Based on the best scientific and commercial information available, the proposed construction, operation, and maintenance of the Boost Project may affect but is not likely to adversely affect tricolored bats. This conclusion is supported by the following:

- The proposed construction, operation, and maintenance of the Stallworth Compressor Station will have no effect on tricolored bats given that no tricolored bats are expected to occur in the portion of the Boost Project Action Area associated with the Stallworth Compressor Station site.
- Mountain Valley will implement conservation measures (Sections 2.4.2.4 and 2.5) that will avoid and minimize potential impacts to tricolored bats in the Boost Project Action Area.
- The Boost Project will not remove or modify bridges or culverts. If tricolored bats become federally listed, after conferring with the USFWS, Mountain Valley will implement additional conservation measures that will avoid adverse effects to tricolored bat associated with culverts or bridges.
- [redacted]s expected to result in long-term increased noise levels up to 0.5 and 3.9 dBA over ambient conditions, respectively. [redacted] is expected to result in long-term increased noise levels up to 3.2 dBA over ambient conditions. These minor increases in the operational noise [redacted] would not meaningfully influence bat behavior.
- During Boost Project construction, [redacted] which is below the 100-acre threshold at which the USFWS recognizes adverse effects to tricolored bats can result from tree clearing for projects in the 30 to 100 percent forest density category (USFWS 2024g).
- No tree clearing will occur between April 1 and November 15, which includes the pup season (May 15 – July 31).
- 13,976 and 12,609 forested acres within the tricolored bat staging/swarming conservation buffer that is outside [redacted] respectively, would remain available for use by tricolored bats.
- 13,757.2, 3,974.8, and 2,353.9 forested acres that are within the 1.5-mile inner-tier buffers that are outside [redacted], respectively, would remain available for use by tricolored bats.

Because the Boost project is not likely to adversely affect tricolored bats, it will not create the potential to jeopardize the continued existence of the species.

5.2. Monarch Butterfly

Based on occurrence information discussed above (Section 4.4.7), Boost Project construction, operation, and maintenance activities associated with all four compressor stations could occur in proximity to monarchs from spring migration through fall migration, which is generally April to October (Section 4.4.6).

5.2.1. Effects of Dust

Fugitive dust may be generated during site preparation, construction, use of infrastructure, and, to a lesser extent, maintenance. Dust can coat natural and anthropogenic surfaces. At high levels, dust deposition can damage plants and affect the diversity of ecosystems, thereby degrading foraging and reproductive habitat for monarch butterflies. Whether monarch eggs, larvae, pupae, or adults experience direct effects from dust exposure is unknown, but it is likely high amounts of dust would be needed to result in an adverse effect to monarchs in all life stages, and potentially only if the dust is toxic (USFWS 2024b). Nevertheless, as discussed in Section 2.5, Mountain Valley will apply water to control dust and implement other suppression measures that will avoid, minimize, and contain any dust emissions from the Boost Project such that dust is not likely to adversely affect monarchs.

5.2.2. Effects of Light

Lighting may affect the behavior and biology of monarchs, including initiation and directionality of migration, development rates, and larval feeding behavior. Adult monarchs rely on the position of the sun and internal circadian clocks to navigate during migration (Perez et al. 1997, Merlin et al. 2009). Artificial lighting can induce nighttime activity when monarchs are typically quiescent, which may result in increased metabolic demand and flight during suboptimal conditions (Parlin et al. 2022). Constant light exposure may result in longer development times and decreased survival (Adams et al. 2021). However, despite frequent exposure to light pollution along fall migration flyways, there are no documented reports of monarchs flying at night (Parlin et al. 2022). Artificial light may also affect foraging behavior of monarch caterpillars. Exposure to artificial light at night may increase larval foraging; however, one study found no difference in development time or body mass compared to larvae not exposed to artificial light (Haynes et al. 2023). Nevertheless, as discussed in Section 2.5, Mountain Valley will implement specific conservation measures to limit the time of light generation from the Boost Project and the distance that the minimal light generated may travel from the isolated locations lighting is used, including workday schedule restrictions, directional shielding, and use of full cut-off type lighting fixtures. Therefore, exposure to Boost Project lighting is not anticipated to adversely affect monarchs.

5.2.3. Effects of Noise

Above-ambient noise levels can occur during construction, operation, and maintenance activities, which may temporarily disturb monarchs. Impacts to monarchs from exposure to noise are anticipated to be limited to a startle response or increased heart rate in larvae, with chronic noise exposure leading to habituation (Davis et al. 2018, Taylor and Yack 2019). However, unlike monarch larvae (Taylor and Yack 2019), adult monarchs have no known auditory structures and are unlikely to be stressed by noise disturbance (Davis et al. 2018). If monarchs were disturbed by Boost Project activities, larvae might have a brief stress response then habituate to the disturbance, while adults would likely not be stressed or affected by noise disturbance. While Boost Project noise impacts will depend on noise exposure intensity, frequency, and duration, given the availability of extensive suitable habitat outside the Boost Project Action Area (where project-related noise levels will be the greatest) any temporary startle response or short-term displacement of individuals is not expected to adversely affect monarchs. Further, monarchs use a variety of habitats, including urban areas and roadside areas containing nectar producing plants and milkweed (Pitman et al. 2018, USFWS 2024d, U.S. Forest Service 2025), where significant noise levels are common, which suggests the species likely is not sensitive to this potential stressor. Thus, exposure to above-ambient noise levels from construction, operation, and maintenance activities is not likely to adversely affect monarchs.

5.2.4. Effects of Water Quality

Unmanaged stormwater runoff from upland construction sites could potentially carry sediment and pollutants such as excavated soil contaminants, accumulated heavy metals from vehicle emissions, fluid leaked from vehicles, and pesticides through the environment. Such inputs may result in increased sediment loading and temporarily degrade water quality. Some butterfly species, including monarchs, obtain moisture and nutrients from puddling, which involves consuming liquid from moist substances such as damp soil, carrion, or wet leaves (Lamie et al. 2025).

The aquatic portion of the Boost Project Action Area includes 8.3 stream miles, of which 1.7 miles are associated with the Bradshaw Compressor Station[63], 2.0 miles are associated with the Harris Compressor Station site, 1.3 miles are associated with the Stallworth Compressor Station, and 3.2 miles are associated with the Swann Compressor Station site (Section 3, Figures 3-5, 3-6, 3-7, 3-8). While there will be ground disturbance at each compressor station, E&SC measures will be applied throughout the Boost Project to protect water quality (Section 2.5). Additionally, as described in Section 2.5, Mountain Valley will implement AMMs for all aspects of Boost Project construction, operation and maintenance to protect against water quality impacts and related potential adverse effects to monarchs. As a result, potential water quality impacts are not expected to adversely affect monarchs during Boost Project construction, operation, or maintenance.

5.2.5. Effects of Habitat Loss or Modification

Construction activities could permanently or temporarily remove, fragment, or degrade portions of suitable reproductive[64], roosting[65], and foraging[66] habitat (collectively, monarch habitat) in the Boost Project Action Area. Monarch habitat occurring in or in close proximity to the Boost Project could be impacted by changes due to activities that result in tree clearing, ground disturbance, or the generation of dust, noise, or light. No tree clearing will occur [redacted] but there still may be minor ground disturbance at those locations. Tree clearing and habitat impacts from ground disturbance will occur [redacted].

Impacts to potentially suitable reproductive and foraging habitat for monarchs are provided in Table 5-3. Loss of potentially suitable reproductive and foraging habitat from the Boost Project will be less than 5 percent of the available potentially suitable reproductive and foraging habitat within the Action Area associated with each location (Table 5-3), and potentially suitable reproductive and foraging habitat for monarchs extends beyond the area that will be impacted by the Boost Project.

[63] South Fork Fishing Creek is located north of the Bradshaw laydown yard, but (as explained in Section 3), no Boost Project-related sediment is expected to reach that creek because the laydown yard is an existing feature and no ground disturbance is planned at the laydown yard, E&SC measures will be installed and maintained, and there is a vegetated and forested buffer between the laydown yard and the creek.

[64] According to the Electric Power Research Institute (EPRI) Monarch Habitat Model, the following NLCD land cover classes are considered high or medium suitability for milkweed: developed low intensity, developed open space, pasture/hay, herbaceous, and shrub/scrub (EPRI 2023; Section 4.1.3.1). These landcover types, therefore, are considered potential reproductive habitat in this analysis.

[65] NLCD landcover classes that are considered roosting habitat for this analysis include deciduous and mixed forest and woody wetlands (Section 4.1.3.1).

[66] NLCD landcover classes that are considered foraging habitat for this analysis include all landcover classes in reproductive habitat (Section 4.1.3.1).

Table 5-3: **Impacts to Potentially Suitable Reproductive and Foraging Habitat for Monarchs.**

Site	Total Action Area (acres)	Reproductive and Foraging Habitat in the Action Area (acres)[1]	Total Habitat Impacts in the LOD (acres)		Total Habitat Impacts in the Action Area (%)	Permanent Habitat Impacts in the Action Area (%)
			Permanent	Temporary[2]		
[redacted]	3,282.2	155.1	0	0	0	0
[redacted]	3,110.3	289.7	<0.1	1.5	0.5	0
[redacted]	3,635.9	826.9	0.5	0	<0.1	<0.1
[redacted]	1,238.2	517.0	9.4	13.5	4.4	1.8
Total[3]	**11,266.6**	**1,788.7**	**9.9**	**15**	**1.4**	**0.6**

1 All NLCD landcover types that are considered high or medium suitability for milkweed (EPRI 2023) are conservatively considered potentially suitable reproductive habitat for purposes of this BA. Reproductive habitat overlaps with foraging habitat due to the presence of flowering herbaceous plants in both habitat categories.

2 Temporary impact acres will be restored to herbaceous vegetation following construction, which could provide potentially suitable reproductive and foraging habitat soon after construction is complete.

3 Sums can differ from totals shown due to rounding.

In addition to potentially suitable reproductive and foraging habitat, 1 [redacted]. Total permanent impacts to roosting habitat attributed to [redacted] make up less than 2.1 percent of the available roosting habitat within [redacted]. Roosting habitat for monarchs extends beyond the area that will be permanently impacted by [redacted]. Therefore, any adult monarchs displaced by [redacted] construction activities would likely locate to nearby roosting habitat in adjacent areas without adverse effect.

To avoid and minimize impacts to monarch habitat from construction, operation, and maintenance activities, Mountain Valley will implement conservation measures, including mowing [redacted] between August 1 – April 15 and once every three years to prevent woody vegetation encroachment (Section 2.5). If monarchs become federally listed, Mountain Valley will implement additional conservation measures to avoid and minimize adverse effects from routine vegetation maintenance activities (Section 2.5.3).

Ground disturbance created by construction equipment or by operation and maintenance activities could create an opportunity for noxious weeds and invasive plants (collectively, weeds) to become established and subsequently invade adjacent areas. Weeds could out-compete milkweed plants (monarch reproductive habitat) and other flowering plants that are foraging resources for monarchs. Mountain Valley will mainly rely on mowing to control weeds while avoiding the use of herbicides and insecticides except in compliance with the conservation measures detailed in Section 2.5. However, herbicides and insecticides may be used on a limited basis to control insect pests (e.g., army worms) and weeds that cannot effectively be treated with mowing. Although it would be limited to spot treatments, herbicide use still might affect nectar and milkweed plants on a very localized basis, which could result in plant injury and growth malformation depending on the herbicide used (Lizotte-Hall and Hartzler 2019, Saghi 2021). Mountain Valley will avoid using herbicides and insecticides unless needed to spot treat weeds or pest species that present a safety risk when mowing is not sufficient for control, along with the other conservation measures described in Section 2.5. Additionally, timely and successful vegetation restoration of temporarily disturbed areas with native herbaceous plant species would lower the likelihood that weeds will invade and degrade monarch reproductive and foraging habitat.

5.2.6. Physical Injury

Construction, operation, and maintenance activities can potentially cause physical injury to monarchs in any life stage. Crew workers and equipment can crush or destroy eggs, larvae, and pupae during construction activities in reproductive habitat, while any adult monarchs displaced from those areas would likely relocate to suitable reproductive and foraging habitat in adjacent areas without adverse effect. Mowing as part of construction and maintenance activities can lead to physical injury of developing monarchs if mowing is conducted in reproductive habitat from spring through fall (April 1 – September 30). Tree removal during fall migration can injure, kill, disturb, or displace adult monarchs roosting in a tree that is cut down. Adult monarchs could be injured or killed by vehicle strikes at the Boost Project when present from spring through fall.

Monarchs in all life stages can be exposed to herbicides and insecticides through direct contact, or foraging, depending on the timing and location of the application, conditions at the time of application, and type and concentration of product used. Herbicides can adversely affect pollinators through communication disruption or feeding aversion (Farina et al. 2019, Olaya-Arenas and Kaplan 2019), reduced egg-laying and hatching (Albanese 2019, Olaya-Arenas and Kaplan 2019), and reduced weight and mortality (Morton and Moffett 1972, Freydier and Lundgren 2016), which may lead to a decline in local populations. However, USFWS has concluded that few monarchs will likely experience measurable adverse effects from direct exposure to herbicides (USFWS 2020b, 2024b). Monarch eggs, larvae, and pupae are more susceptible to insecticide exposure than adults (Krishnan et al. 2020, McCollough et at. 2025). Exposure to insecticides can injure, kill, or result in impaired growth, development, and reproduction of monarchs (McCollough et al. 2025).

To avoid and minimize the potential exposure to risks from mowing, tree clearing, vehicle strikes, and exposure to herbicides and insecticides, Mountain Valley will implement a variety of impact avoidance and minimization measures. Mountain Valley will implement conservation measures for bats that will also avoid and minimize impacts to monarchs, such as tree clearing restrictions from April 1-November 15, delaying mowing until after August 1 each year, and targeted herbicide and insecticide application (if needed; Section 2.5.2). Mountain Valley will also implement reduced speed limits for the Boost Project which will minimize the risk of adverse effects to monarchs from vehicle strikes (Section 2.4.3). If monarchs become federally listed, Mountain Valley will implement additional conservation measures to further reduce the potential for adverse effects from mowing and the use of herbicides and insecticides (Section 2.5.3).

5.2.7. Effects Determination

Monarchs are assumed to be present in the Boost Project Action Area from April through October.

During project activities for the Boost Project 24.9 acres of potentially suitable reproductive and foraging habitat will be cleared, of which 9.9 acres will be permanently cleared, and 15.5 acres will be temporarily cleared, and 1,763.8 acres of potentially suitable reproductive and foraging habitat will remain in the Boost Project Action Area (Table 5-3). In addition to habitat-related impacts to monarchs, Boost Project construction, operation, and maintenance activities could potentially cause physical injury or death to any life stage of monarchs. To reduce these risks, Mountain Valley will implement a variety of conservation measures (Section 2.5) and, if monarchs become federally listed, Mountain Valley has committed to implementing additional conservation measures designed to further reduce the risk of adverse effects from Boost Project construction, operation, and maintenance (Section 2.5.3). Nevertheless, given the species' reliance on diverse habitat types and assumed presence during construction, operation, and maintenance activities, it is reasonable to anticipate some adverse effects.

Based on this analysis, the Boost Project May Affect and is Likely to Adversely Affect monarchs but Not Jeopardize the Continued Existence of the species.

6. Cumulative Effects

Cumulative effects are the effects of future state or private activities that are reasonably certain to occur within the Action Area of the federal action subject to consultation (50 CFR § 402.02). "…(P)ast and present impacts of non-federal actions are part of the environmental baseline" (USFWS and NMFS 1998). Cumulative effects may result from specific future activities that are reasonably certain to occur and aggregate with Boost Project-related effects to alter the baseline conditions in the Boost Project Action Area. The occurrence of a non-federal activity that will cause or contribute to a loss of forest lands, increased sedimentation, additional noise, and/or the other above-identified stressors in the Boost Project Action Area could potentially add to the effects of the Boost Project.

Such impacts could result from a variety of non-federal activities, including tree cutting and removal; agricultural activities; mining; industrial, commercial, and residential development; construction and operation of transportation infrastructure; and traditional and renewable energy development and operation.

6.1. Identification of Planned Projects

To ensure a comprehensive list of potential future projects was identified, Mountain Valley reviewed publicly available information from numerous state, county, and local agencies, including the Virginia Department of Environmental Quality; VDOT; Virginia Regulatory Town Hall; West Virginia Department of Environmental Protection; and WVDOT. Mountain Valley requested information about possible planned projects from Montgomery and Roanoke counties in Virginia and Wetzel, Fayette, and Braxton counties in West Virginia. To date, no planned projects have been identified.

Nevertheless, in currently developed areas there is likely to be future industrial project construction and operation, although the type and location of such activities are not known or reasonably certain at this time. However, because any such future development would reasonably be expected to occur in areas with existing similar industrial activity, it would not be likely to contribute additional sound, light, dust, or other environmental impacts appreciably above baseline conditions, or to influence cumulative effects from the Boost Project along with these other effects. Mountain Valley will provide an update if it receives additional information on any planned future projects within the Boost Project Action Area that could contribute to cumulative effects from the Boost Project.

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