Chapter 105: Water Obstruction and Encroachment Permit

Comprehensive Environmental Assessment

National Fuel Gas Supply Corporation
FM 100 Project
Cameron, Clearfield, Clinton, Elk, McKean, and Potter Counties, Pennsylvania

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Joint Permit Application - Chapter 105: Water Obstruction and Encroachment Permit

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Public

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Acronyms

APE	Area of Potential Effect
Application	Certificate application as filed with the Federal Energy Regulatory Commission
ATWS	Additional Temporary Workspace
BMP	Best Management Practices
CEII	Critical Energy Infrastructure Information
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
Commission	Federal Energy Regulatory Commission
CRGIS	Cultural Resources Geographic Information System
CWF	Cold Water Fishery
dBA	A-weighted Decibels
DBH	Diameter at Breast Height
Dominion	Dominion Energy Transmission, Inc.
EA/EIS	Environmental Assessment/Environmental Impact Statement
EFH	Essential Fish Habitat
EI	Environmental Inspector
ESA	Endangered Species Act
ESCAMP	Erosion and Sediment Control and Agricultural Mitigation Plan
EV	Exceptional Value Waters
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FERC Plan	FERC Upland Erosion Control, Revegetation, and Maintenance Plan
FERC Procedures	FERC Wetland and Waterbody Construction and Mitigation Procedures
ft	Feet
GIS	Geographic Information System
GPS	Global Positioning System
HDD	Horizontal Directional Drill
HGM	Hydrogeomorphic
hp	Horsepower
HQ	High Quality Waters
HUC	Hydrologic Unit Code
IPaC	Information for Planning and Consultation
KV	Kilovolt
Ldn	Day-night Equivalent Level
LNG	Liquefied Natural Gas
M	Magnitude
M&R	Metering and Regulation
MAOP	Maximum Allowable Operating Pressure
Manual	Corps of Engineers Wetlands Delineation Manual, Environmental Laboratory, 1987
MBTA	Migratory Bird Treaty Act
MF	Migratory Fishes

MLV	Mainline Valve
MP	Milepost
NAAQS	National Ambient Air Quality Standards
National Fuel	National Fuel Gas Supply Corporation
NDE	Non-Destructive Examination
NEPA	National Environmental Policy Act
NFHL	National Flood Hazard Layer
NGA	Natural Gas Act
NHD	National Hydrography Database
NHPA	National Historical Preservation Act
NMFS	National Marine Fisheries Services
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NRT	Natural reproduction trout
NSA	Noise Sensitive Area
NSQS	National Sediment Quality Survey
NWI	National Wetlands Inventory
OHWM	Ordinary High-Water Mark
PA	Pennsylvania
PA SHPO	Pennsylvania State Historic Preservation Office
PADCNR	Pennsylvania Department of Conservation and Natural Resources
PADEP	Pennsylvania Department of Environmental Protection
PAGWIS	Pennsylvania Groundwater Information System
PAR	Permanent Access Road
PASDA	Pennsylvania Spatial Data Access
PEM	Freshwater Emergent Wetland
PennDOT	Pennsylvania Department of Transportation
PFBC	Pennsylvania Fish and Boat Commission
PFO	Palustrine Forested Wetland
PGC	Pennsylvania Game Commission
PHMC	Pennsylvania Historical and Museum Commission
PHMSA	Pipeline and Hazardous Materials Safety Administration
PL	Public Law
PNDI	Pennsylvania Natural Diversity Index
ppm	Parts Per Million
Project	FM100 Project
PSA	Project Study Area
PSS	Palustrine Scrub Shrub
PSU	Pennsylvania State University
PUB	Palustrine unconsolidated bottom wetland
RCV	Remote controlled valves
ROI	Region of Influence
ROW	Right(s)-of-Way

SCADA	Supervisory Control and Data Acquisition
Seneca Resources	Seneca Resources Company, LLC
SHPO	State Historic Preservation Office
SPRP	Spill Prevention and Response Procedures
SSURGO	Soil Survey Geographic Database
SWPPP	Stormwater Pollution Prevention Plan
TAR	Temporary Access Road
TGP	Tennessee Gas Pipeline Company, L.L.C.
Transco	Transcontinental Gas Pipeline Company, LLC
TSF	Trout Stocked Fishery
TWS	Temporary Workspace
UNT	Unnamed Tributary
USACE	United States Army Corp of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WWF	Warm Water Fishery

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1 General Project Description

1.1 Introduction

This Pennsylvania Water Obstruction and Encroachment Permit Comprehensive Environmental Assessment (EA) is being submitted as a required part of a complete Chapter 105 permit application. The Project is water dependent; in that it will require access or proximity to or siting within water to fulfill the basic purposes of the project. This permit follows the outline provided in the EA form and EA instructions on the Pennsylvania Department of Environmental Protection (PADEP) ELibrary website (www.depgreenport.state.pa.us/elibrary, accessed 2/25/2019). The Sections in this report follow the Modules in the EA form. In areas where maps and figures are required in other elements of the application, they have been referenced to prevent duplication as requested.

This section includes the Project description, inclusive of proposed project facilities and related non-jurisdictional facilities, other state application and registrations, and land requirements.

1.2 Purpose and Need

The primary purpose of the Project, as initially designed and pre-filed with Federal Energy Regulatory Commission (FERC) Docket No. PF17-10-000), is to modernize a portion of National Fuel's existing pipeline system. The Project will allow for the removal from service and abandonment of approximately 44.9 miles of vintage steel pipe. National Fuel's risk analysis has prioritized the replacement of these aging facilities. In order to continue to provide the existing transportation and storage services provided by the facilities proposed to be abandoned, approximately 29.5 miles of new 20-inch-diameter coated steel pipeline, 0.4 miles of 12-inch-diameter coated steel pipeline to be used as a suction/discharge header, and 4,055 horsepower (hp) of compression and related facilities at the proposed Marvindale Compressor Station will be installed. The Project will enhance the reliability and safety of the National Fuel system for transportation services, local distribution market needs, storage management purposes and local production collection and transportation. Line FM100 is National Fuel's only connecting pipeline between its western and eastern operating systems.

In addition to modernizing its existing system, National Fuel also proposes to construct additional facilities designed to create 330,000 Dekatherm/day of incremental transportation capacity ("Transportation Capacity") from the Sergeant Township area to Transco at Leidy, PA. These additional facilities include 11,110 hp at the proposed Marvindale Compressor Station, 22,220 hp at the proposed Tamarack Compressor Station, an increase in the Line YM58 pipe diameter to 20-inch, and measurement upgrades at National's interconnection with Transco at Leidy.

The Transportation Capacity, which is fully subscribed to Transco under a proposed capacity lease, will provide upstream gas supply from shale producing areas in central PA to Transco's "Leidy South Project" (Docket No. PF19-1-000) on behalf of Transco's foundation shipper. The companion projects will allow abundant, reliable, and economic gas supply to access the interstate pipeline system grid where it can reach key consuming market centers in the northeastern United States via the Transco pipeline system.

Should the Commission grant the certificate of convenience and necessity for the Project and all other necessary permits be secured, it is anticipated that clearing and grading will commence in

Q4 2020, with construction beginning in Q1 2021 and being complete by Q4 2021. The proposed in-service date for the completed Project is December 2021. A detailed construction plan by Project segment will be submitted with the Implementation Plan. This plan will address timeframes for pre-construction activities (e.g., environmental clearance surveys, staking, clearing/grading, construction, restoration, and commissioning).

1.3 Proposed Facilities

The Project is described in detail below, and in Tables 1.4-1 through 1.4-6, and 1.6-1:

- Installation of approximately 29.5 miles of 20-inch-diameter steel pipeline (Line YM58) from the proposed Marvindale Interconnect near the proposed Marvindale Compressor Station site in Sergeant Township, McKean County, PA and extending to the proposed Carpenter Hollow OPP Station adjacent to existing Station HEP0 840T in Hebron Township, Potter County, PA. The proposed alignment generally parallels the existing Tennessee Gas Pipeline (TGP) 300 Lines.
- Installation of approximately 0.4 miles of 12-in-diameter steel pipeline (extension of existing Line KL).
- Installation of approximately 1.41 miles of 24-inch-diameter steel pipeline looping the existing National Fuel Line YM224 in Potter County, PA

Compressor Stations:

- Installation of the proposed 15,165 hp Marvindale Compressor Station in Sergeant Township, McKean County, PA
  - Install one natural gas fired Caterpillar G3516 (1,380 hp)
  - Install one natural gas fired Caterpillar G3608A4 (2,675 hp)
  - Install one natural gas fired Solar T-70 (11,110 hp)
- Installation of the proposed 22,220 hp Tamarack Compressor Station in Clinton County, PA
  - Install two natural gas fired Solar T-70 (11,110 hp each)

Interconnections/Stations:

- Proposed Marvindale Interconnect/meter station near the new Marvindale Compressor Station (Sergeant Township, McKean County, PA);
- New OPP Station, Carpenter Hollow OPP Station, adjacent to existing Station HEP0 840T, between Line YM50 and Line YM224 (Hebron Township, Potter County, PA); and
- Modification of existing Leidy Interconnect LDC 2245 with Transco at the Leidy M&R Station (Clinton County, PA); evaluated under FERC Docket PF19-1-000.

Abandonments:

- Abandonment and removal of Costello Compressor Station (Potter County, PA);
- Abandonment in place of approximately 44.9 miles of Line FM100 12-inch steel and appurtenances (Cameron, Clearfield, Elk and Potter Counties, PA); and
- Abandonment and removal of meter Station WHP-MS-4317X (Wharton Township, Potter County, PA).

The following criteria were used to select the proposed route and aboveground facility locations:

- use of existing utility corridors;
- avoiding environmental resources (e.g., waterbodies, fisheries, wetlands, threatened and endangered species/significant habitats, etc.) and cultural resources, geologic/topographic hazards, and existing residential structures to the extent possible;
- the presence of existing access roads to accommodate construction along the proposed route;
- land uses (both existing and planned); potential impacts (both positive and negative) to local communities and landowners;
- engineering constraints, construction feasibility, topography and cost, including consideration of route length and opportunities to use existing corridors; and
- hydraulic design.

An overview map of the Project workspace is provided as Figure 1.1-1, along with a USGS topographic quadrangle map and aerial imagery as Figures 1.1-2 and 1.1-3 in Appendix B. Additional details on facilities and impacts will follow.

1.4 Land Requirements

The typical construction right(s)-of-way (ROW) for the new pipeline and the Line YM224 loop will be limited to 75 feet in width, with 50 feet of permanent ROW and 25 feet of temporary workspace (TWS) on the working side of the ROW. Additional temporary workspace (ATWS) will be limited to the extent practicable to provide adequate workspace for road crossings, horizontal directional drill (HDD) or conventional bore locations, access roads turnarounds, topsoil stripping, foreign line crossings, equipment maneuverability, stream crossings, and to allow crews to safely construct facilities. Conversely, in areas where the construction ROW must be restricted (e.g., near residential areas, through wetlands, etc.) ATWS would be reduced.

Line FM100 will require periodic removal of aboveground appurtenances and exposure of the pipeline for grouting purposes at select locations (e.g., wetland, waterbody, road and railroad crossings). In these circumstances, disturbance will generally be limited to National Fuel's existing ROWs and 25 feet by 200 feet of ATWS where bell hole locations will be excavated to allow for exposure of the existing pipeline and grouting as required. National Fuel has completed the necessary environmental surveys of the proposed ATWS.

Following construction of Line YM58 and Line YM224 Loop, National Fuel will maintain a 50-foot wide permanent easement for operation and maintenance of the pipeline; however, only a 10-foot wide area (centered on the pipeline) will be maintained through wetlands for operational and maintenance purposes. TWS, ATWS and most of the permanent ROW will return to pre-construction land uses. In total, 58 non-public access roads will be utilized for construction of the Project, most of which are existing roads; totaling 44.1 miles. Sixteen of the proposed access roads will be maintained after construction to access the ROW and aboveground facilities for operations and maintenance purposes; the rest of the aboveground facilities can be accessed directly off public ROWs or via existing access roads. For abandonment activities, eighteen non-public access roads will be temporarily utilized, totaling 5.4 miles, all of which are existing roads.

Access roads will be necessary to transport equipment, crews, and materials to the construction ROW. The Project will use existing and new temporary access roads (TAR) for this purpose. Permanent access roads (PAR) will be used to support regular and ongoing operational and maintenance activities (e.g., periodic inspections, ROW maintenance). National Fuel will seek and obtain the necessary property rights and/or governmental approvals prior to the use of such

roads. Public roads are available for use as access roads without approvals, subject to posted weight restrictions. Safe and accessible conditions (e.g., posted warnings, roadways clear of significant debris) will be maintained at public roadway crossings and access points where appropriate during construction of the Project.

Table 1.4-1 defines all project related impacts.

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Table 1.4-1: Land Requirements for Project Activities

Project Component	Township; County	Permanent Easement[1] (acres)	Aboveground Facilities[1] (acres)	Pipeline Temporary Workspace (acres)	Aboveground Facilities Temporary Workspace (acres)	Additional Temporary Workspace (acres)	Contractor Yard and Staging Areas (acres)	Temporary Access Roads (acres)	Permanent Access Roads (acres)	Totals (acres)
Line YM58	> Sergeant, Norwich, Keating, Liberty; McKean > Roulette, Pleasant Valley, Clara, and Hebron; Potter	178.5	0.2	85.9	--	31.4	36.6	58.3	57.6	**448.5**
Carpenter Hollow OPP Station	Hebron; Potter	--	0.4	--	--	--	--	--	--	**0.4**
Line YM224 Loop	Hebron and Allegany; Potter	8.5	0.2	4.3	--	1.2	--	--	1.5	**15.7**
Line KL Extension	Sergeant; McKean	4.3	0.1	0.9	--	0.1	--	--	--	**5.4**
Marvindale Interconnect	Sergeant; McKean	--	1.6	--	6.5	--	--	--	--	**8.1**
Marvindale Compressor Station	Sergeant; McKean	--	3.7	--	8.2	--	5	0.5	3.1	**20.5**
Tamarack Compressor Station	Leidy; Clinton	--	4.6	--	7.6	--	2.8	--	0.6	**15.6**
Line FM100 Abandonment	> Huston and Lawrence; Clearfield > Jay and Benezette; Elk > Gibson, Driftwood, Lumber, and Grove; Cameron > Portage and Wharton; Potter	--	--	5.6	--	9	--	6.6	--	**21.2**
Abandon and Remove Costello Compressor Station	Portage; Potter	--	1.1	--	--	--	--	0.2	--	**1.3**
Abandon and Remove Station WHP-MS-4317X	Wharton; Potter	--	0.5	--	--	--	--	0.9	--	**1.4**
TOTALS[2]		**191.3**	**12.4**	**96.7**	**22.3**	**41.7**	**44.4**	**66.5**	**62.8**	**538.1**

[1] Anode beds and MLV's have been included in the applicable pipeline segment.

[2] Total calculations subject to rounding error.

1.4.1 Pipeline Facilities

Pipeline facilities (Table 1.4-2) described herein will be designed, constructed, tested, operated, and maintained to conform with or exceed the requirements of 49 CFR Part 192, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards, and other applicable governmental regulations. National Fuel will install the pipeline with a minimum of three feet depth of cover, which is compliant with the U.S. Department of Transportation (USDOT) Pipeline and Hazardous Materials Safety Administration (PHMSA) minimal pipeline burial requirements. Additional cover may be required in agricultural areas, at waterbodies, road crossings or other areas as necessary to maintain the integrity of the pipeline.

The new pipe will be protected from corrosion by a fusion-bonded epoxy coating and an impressed current cathodic protection system.

Table 1.4-2: Proposed Pipeline Facilities

Facility	Township; County	Facility Type	MP	Land temporarily disturbed during construction (acres)[1]	Land required for operations (acres)[2]
Line YM58					
Pipeline Facilities	> Sergeant, Norwich, Keating, Liberty; McKean > Roulette, Pleasant Valley, Clara, and Hebron; Potter	Pipeline	0.0 - 29.5	212.2	232.1
AB-1	Sergeant; McKean	Anode bed	1.7	--	0.7
AB-2	Norwich; McKean	Anode bed	6.5	--	1.4
AB-3	Liberty; McKean	Anode bed	13.8	--	0.9
AB-4	Liberty; McKean	Anode bed	15.6	--	1.0
Line YM224 Loop					
Pipeline Facilities	Hebron and Allegany; Potter	Pipeline	0.0 - 1.4	5.5	10.0
Line KL Extension					
Pipeline Facilities	Sergeant; McKean	Pipeline	0.0 - 0.4	1.0	4.3
TOTALS				**218.7**	**250.1**

[1] Land temporarily disturbed during construction includes TWS, ATWS, staging areas, and temporary access roads.

[2] Land required for operation includes permanent ROW, facility footprint and permanent access roads.

[3] National Fuel will operate all pipeline facilities under easement and/or license agreements (for state properties), no property will be purchased for non-above ground facilities.

1.4.1.1 Abandonment in Place

National Fuel proposes to abandon in place approximately 44.9 miles of existing 1950's vintage pipeline. This includes approximately 43.9 miles of 12-inch-diameter uncoated steel pipeline and one mile of 12-inch-diameter coated steel pipeline on the existing FM100 system. Appurtenant facilities such as mainline block valves, aboveground piping, test posts, rectifiers, and pipeline markers will be removed. National Fuel will accommodate reasonable landowner requests to remove abandoned pipe where pipe can be removed safely and with minimal environmental impacts.

1.4.1.2 Proposed Line YM58 Pipeline

National Fuel proposes to construct approximately 29.5 miles of new 20-inch-diameter pipeline extending from the proposed Marvindale Interconnect near the proposed Marvindale Compressor

Station site in Sergeant Township, McKean County, PA and extending to the proposed Carpenter Hollow OPP Station adjacent to the existing Station HEP0 840T in Hebron Township, Potter County, PA. The pipeline is proposed to predominantly parallel the existing TGP Line 300 corridor, a short segment of Dominion Energy Transmission, Inc.'s (Dominion) Line LN-20 corridor, and a short segment of National Fuel's Line Y2T.

1.4.1.3 Proposed Line KL Extension

National Fuel proposes to install approximately 0.4 miles of new 12-inch-diameter pipeline, extending the existing Line KL to the proposed Marvindale Compressor Station. The proposed Line KL Extension will be constructed in the same ROW as the proposed Line YM58 pipeline.

1.4.1.4 Proposed Line YM224 Loop

In addition to the new pipelines, National Fuel proposes to install approximately 1.41 miles of 24--inch-diameter pipeline loop to accommodate the redirected transportation services from Ellisburg Compressor Station on Line YM224. The loop pipeline is bounded by Dwight Road and Nelson Run Road and has been sited to minimize resource impacts and optimize construction efficiencies while paralleling existing Line YM224.

1.4.2 Aboveground and Other Facilities

The new compression, and meter and regulator facilities (Table 1.4-3) described herein will be designed, constructed, tested, operated, and maintained to conform with or exceed the requirements of 49 CFR Part 192, Transportation of Natural and Other Gas Pipeline: Minimum Safety Standards, and other applicable governmental regulations.

Table 1.4-3: Proposed Aboveground and Other Facilities

Facility	Township; County	Facility Type	MP	Land temporarily disturbed during construction (acres)[1]	Land required for operations (acres)[2]	Property Size (acres)
Line YM58						
Carpenter Hollow OPP Station	Hebron; Potter	Interconnect Site	29.5	--	0.4	28.6
MLV-1	Norwich; McKean	Valve Site	8.1	--	0.1	0.8
MLV-2	Liberty; McKean	Valve Site	15.6	--	0.1	222.6
		LINE YM58 TOTAL:		**--**	**0.6**	**252.0**
Line YM224 Loop						
MLV-3	Hebron; Potter	Valve Site	0.0	--	0.1	10.0
MLV-4	Allegany; Potter	Valve Site	1.4	--	0.1	129.2
		LINE YM224 TOTAL:		**--**	**0.2**	**139.2**
Line KL Extension						
KL Valve Set	Sergeant; McKean	Valve Site	0.0	--	0.1	43.7
		LINE KL EXTENSION TOTAL:		**--**	**0.1**	**43.7**
Marvindale Compressor Station						

Marvindale Compressor Station	Sergeant; McKean	Compressor Station	0.4	13.7	6.8	173.0
	MARVINDALE COMPRESSOR STATION TOTAL:			**13.7**	**6.8**	**173.0**
Marvindale Interconnect						
Marvindale Interconnect	Sergeant; McKean	Interconnect Site	0.0	6.5	1.6	69.0
	MARVINDALE INTERCONNECT TOTAL:			**6.5**	**1.6**	**69.0**
Tamarack Compressor Station						
Tamarack Compressor Station	Leidy; Clinton	Compressor Station	N/A	10.4	5.2	8.8
	TAMARACK COMPRESSOR STATION TOTAL:			**10.4**	**5.2**	**8.8**
TOTALS				**30.6**	**14.5**	**685.7**

[1] Land temporarily disturbed includes aboveground facility TWS, staging areas, and temporary access roads.
[2] Land disturbed during operation includes facility footprint and permanent access roads.

1.4.2.1 Abandonment and Removal of Costello Compressor Station

National Fuel proposes to remove the Costello Compressor Station and associated facilities at the eastern terminus of the existing Line FM100 near Costello, PA. The compressor station is located on a portion of the parcels totaling approximately 44 acres owned in fee by National Fuel; all work associated with the removal of this facility will occur within the existing compressor station fenced boundaries. Costello Compressor Station currently utilizes 1,440 hp to provide transportation between the existing Line FM100 system and the "YM" system; however, this compression will be stranded following the abandonment of this portion of the Line FM100 system.

The current land use at the proposed compressor station site is mostly forested with a minor portion characterized as developed industrial. Following abandonment and removal of the compression facilities, National Fuel plans to grade the site, reseed in grass and maintain the area for ancillary uses such as temporary storage of company equipment. The removed compressors may be used for parts or salvage as they cannot be reused at the Marvindale Compressor Station due to current Pennsylvania Department of Environmental Protection (PADEP) emissions regulations (i.e., they do not meet best available technology emissions standards as required for new facilities). Impacts associated with abandonment activities are accounted for in Table 1.6-1.

1.4.2.2 Marvindale Compressor Station

National Fuel proposes to install compression facilities near an existing NFG Midstream Clermont, LLC facility at the western terminus of the proposed new pipeline. Marvindale Compressor Station will be located on a portion of the parcels totaling approximately 173 acres owned in fee by National Fuel's affiliate, Seneca Resources Corporation, LLC (Seneca Resources); however, National Fuel will be securing the land rights to this location by agreement. The preliminary estimated size of the facility is 15,165 hp. This compression is required to pump existing contract volumes from National Fuel's Line K system to Nationals Fuel's YM system and transportation capacity.

The Marvindale Compressor Station's permanent footprint will be 3.7 acres of stoned compressor pad in addition to minor post-construction stormwater management facilities, with 8.2 acres of temporary workspace and 5.0 acres required for contractor staging (for both compressor station and general pipeline construction) during construction. The current land use at the proposed

compressor station site is mostly forested with a minor portion characterized as developed industrial. In addition to the compressor station, other aboveground facilities will include:

- One (1) storage shed;
- Associated fuel gas regulation/filtration process skid; and
- Graveled access roads and parking.

1.4.2.3 Tamarack Compressor Station

National Fuel proposes to install compression facilities on the existing Line YM53 pipeline near the Leidy Interconnect LDC2245 with Transco at the Leidy M&R Station in Clinton County, PA. The Tamarack Compressor Station will be located on a portion of a parcel totaling approximately 8.8 acres under Option Agreement by National Fuel. The preliminary estimated size of the facility is 22,220 hp.

Tamarack's permanent footprint will be 4.6 acres of stoned compressor pad and the total anticipated limit of disturbance for the project will be approximately 16.6 acres. The current land use at the proposed compressor station site is mostly forested (recently logged). Based on preliminary engineering activities, the proposed compressor station may include the following components: the compressor station pad, an approximately 0.3-mile-long new access road, soil berms to provide a visual barrier from the adjacent property, and permanent post-construction stormwater management facilities. In addition to the compressor station, other aboveground facilities will include:

- Associated fuel gas regulation/filtration process skid; and
- Graveled access roads and parking.

1.4.2.4 Marvindale Interconnect

The Marvindale Interconnect is a proposed producer interconnect with NFG Midstream Clermont LLC. The Marvindale Interconnect's permanent footprint will be 1.6 acres of stoned pad in addition to minor post-construction stormwater management facilities, with 6.5 acres required during construction. The current land use at the proposed compressor station site is mostly industrial and commercial land forested with minor portions characterized as open land and forest/woodland.

1.4.2.5 Carpenter Hollow OPP Station

National Fuel proposes to construct the Carpenter Hollow OPP Station, which will be built on National Fuel Property adjacent to existing Station HEP0 840. The proposed facilities will be installed for the purpose of over pressure protection of National Fuel's YM50/YM224 pipeline. These facilities will include, but not be limited to, a pig launcher/receiver, gas filtration, piloted operated worker monitor valves, remote controlled valves, power and communication equipment, and other appurtenances such as piping and valves. The Carpenter Hollow OPP Station's permanent footprint will be 0.4 acres of stoned pad in addition to minor post-construction stormwater management facilities. The current land use at the proposed OPP station site is 50% open land and 50% industrial and commercial land.

1.4.2.6 Additional Aboveground Facilities

Additional aboveground facilities for Line YM58 include two (2) mainline block valve settings with remote controlled valves (RCV), associated telecommunication and electric power equipment and blowdown valves. All aboveground facility sites will be graveled and surrounded by chain link

fence enclosures, as necessary. A drive gate and man gate will provide access to these sites and other appurtenances such as aboveground pipeline markers/test stations will be installed.

Additional aboveground facilities for Line KL Extension will include one above grade flange with blowdown valve (to tie into existing KL pipeline) and the facility site will be graveled and surrounded by chain link fence enclosures, as necessary and other appurtenances such as aboveground pipeline markers/test stations will be installed.

Additional aboveground facilities for Line YM224 Loop will include two (2) mainline block valves with blowdown valves and the facility sites will be graveled and surrounded by chain link fence enclosures, as necessary. A drive gate and man gate will provide access to these sites. In addition, a drip at MP 0.0, and other appurtenances such as aboveground pipeline markers/test stations will be installed.

1.4.3 Contractor Yards and Staging Areas

Multiple contractor staging areas are proposed for use during construction. The current land use for the proposed pipe and contractor yards are described below (Table 1.4-4). The primary pipe and contractor yard to be utilized is located southeast of the town of Port Allegany, PA, along State Route 155. This contractor yard is under long term lease and has been used on numerous projects. However, for this project it will not be used for operational purposes after construction is complete. No permanent facilities will be constructed at this or other contractor yards in conjunction with the Project.

Table 1.4-4: Proposed Contractor Staging Areas

Facility/County	Staging Area[2]	Location (milepost)	Area (acres)	Current Use	Improvements/ Modification Required
Line YM58					
McKean	SA 2	2.7	2.3	Industrial Land	Minor grading
McKean	SA 3	8.1	0.6	Open Land	None
McKean	SA 6[1]	14.1	8.1	Industrial	None
Potter	SA 5	29.5	13.9	Open Land	None
McKean	SA 7[1]	N/A	11.7	Industrial	Minor clearing/grading
Marvindale Compressor Station					
McKean	SA 1	0.1	5.0	Industrial and Open Land	Minor clearing/grading
Tamarack Compressor Station					
Clinton	SA-8[1]	N/A	2.8	Industrial and Open Land	Minor clearing/grading
TOTALS			**44.4**		

[1] Staging area not adjacent to construction ROW.
[2] Other project components will be served by these staging areas.

1.4.4 Horizontal Directional Drills or Conventional Bore Locations

As identified below in Table 1.4-5, certain resources crossed by the Project will utilize HDD construction methods to minimize surface impacts. The reduction in acreage impact due to HDD crossings is not reflected in the total Project impact numbers discussed herein.

Table 1.4-5: Project Resources Crossed by HDD or Conventional Bore

Resource Name	Entry/Exit	Crossing Length (ft)	Area[1] (acres)	Drill Rig Location[2]
Potato Creek	6.7/7.0	1,060	1.07	Exit side

Portage Creek	14.0/14.2	1,070	1.07	Exit side
Allegheny River	14.8/15.0	950	0.98	Exit side
TOTALS		**3,080**	**3.12**	

[1] Area crossed by HDD reported includes the full length and width of the permanent ROW.
[2] If geotechnical strata indicates high amounts of unconfined material, the drill rig location may change or potentially be from both sides as a drill/intersect. The rig will be located as indicated for pullback operations.

1.4.5 Access Roads

Access to the Project will be achieved via maintained State and County roads, existing public and private access roads, and proposed new temporary and permanent access roads. National Fuel proposes to utilize 40 access roads for proposed construction activities and 18 existing access roads for abandonment activities (e.g., total of 58 project-wide). In general, only minor modifications are proposed at existing access roads which may include placement of gravel entry/exit pads at road junctures, and maintenance of the road throughout construction. On occasion, NFG may propose to widen discrete locations where necessary to allow for turning radius of equipment, passing lanes and pipe delivery. When widening is proposed, NFG will ensure that no sensitive environmental resources such as waterbodies, wetlands, cultural resources or sensitive species habitat will be impacted. It is not possible at this time to specifically identify all of these areas because the construction contractor has not been selected and the identification of these sites is highly dependent upon the type of equipment available to the contractor. As such, NFG has provided a typical drawing of how these areas would be handled if proposed for use within the Project LOD (see Drawing "DETAILS 001" (Figure 3B) within the ESCGP-3 Application materials). Access roads that are non-public and require landowner agreements are listed in Table 1.4-6. Non-public access road impact calculations are based on a 30-foot-wide corridor. National Fuel surveyed a 50-foot-wide corridor based on the road centerline; ATWS required along access roads for turnouts, turnaround areas, parking, and general maneuverability of construction vehicles will be captured within this 50-foot-wide corridor. Seventeen of the access roads will be maintained for operations and maintenance purpose.

Table 1.4-6: Non-Public Access Roads Proposed for the Project

Access Road	MP	Status	Proposed Use	Surface Type	Length (mi)	Width (ft)	Area (acres)	Improvements/ Modifications Required
Lines YM58 and KL Extension								
PAR 3	2.6	Existing	Permanent	Gravel/dirt	1.3	30	4.4	None
PAR 5	4.5	Existing	Permanent	Gravel/dirt	3.5	30	11.8	None
PAR 9	8.1	New	Permanent	Gravel/dirt	<0.1	15	0.1	Grading
PAR 12	9.6	Existing	Permanent	Gravel/dirt	2.2	30	7.5	None
PAR 21	14.1	Existing	Permanent	Gravel/dirt	<0.1	30	0.1	None
PAR-37	15.6	New	Permanent	Gravel/dirt	<0.1	15	0.1	Grading
PAR 25	17.7	Existing	Permanent	Gravel/dirt	4.3	30	15.5	None
PAR 30	21.2	Existing	Permanent	Gravel/dirt	3.6	30	10.4	None
PAR 31	23.6	Existing	Permanent	Gravel/dirt	1.2	30	3.6	None
PAR 33	25.2	Existing	Permanent	Gravel/dirt	1	30	3.5	None
PAR-35	29.5	Existing	Permanent	Gravel/dirt	0.2	30	0.6	None
TAR 4	2.6	Existing	Temporary	Gravel/dirt	0.2	30	0.5	None
TAR 6	4.9	Existing	Temporary	Gravel/dirt	2.1	30	7.5	None
TAR 7	6.5	Existing	Temporary	Gravel/dirt	0.1	30	0.2	None
TAR 8	6.9	New	Temporary	Gravel/dirt	<0.1	30	0.1	Grading

TAR 10	9.1	Existing	Temporary	Gravel/dirt	1.7	30	5.9	None
TAR 11	9.1	Existing	Temporary	Gravel/dirt	0.5	30	1.7	None
TAR 13	9.6	Existing	Temporary	Gravel/dirt	2.1	30	7.1	None
TAR 14	11.3	Existing	Permanent	Gravel/dirt	2.4	30	7	None
TAR 15	12	Existing	Temporary	Gravel/dirt	0.3	30	1	None
TAR 16	12.2	Existing	Temporary	Gravel/dirt	0.3	30	1.2	None
TAR-35	6.9	Existing	Temporary	Gravel/dirt	0.1	10	<0.1	None
TAR 17	12.6	Existing	Temporary	Gravel/dirt	1.8	30	6.4	None
TAR 18	12.6	Existing	Temporary	Gravel/dirt	0.4	30	1.3	None
TAR 19	12.7	Existing	Temporary	Gravel/dirt	<0.0	30	<0.1	None
TAR 20	12.9	Existing	Temporary	Gravel/dirt	0.2	30	0.7	None
TAR 22	14.8	Existing	Temporary	Paved	0.5	30	1.8	None
TAR 23	14.4	Existing	Temporary	Gravel/dirt	0.3	30	1.2	None
TAR 24	17	Existing	Temporary	Gravel/dirt	0.6	30	2.4	None
TAR 26	18	Existing	Temporary	Gravel/dirt	1.4	30	4.9	None
TAR 28	18	Existing	Temporary	Gravel/dirt	<0.1	30	<0.1	None
TAR 27	18.4	Existing	Temporary	Gravel/dirt	0.3	30	1	None
TAR 29	18.4	Existing	Temporary	Gravel/dirt	<0.1	30	0.1	None
TAR 32	24	Existing	Temporary	Gravel/dirt	1	30	4	None
TAR 34	25.2	Existing	Temporary	Gravel/dirt	0.6	30	2.3	None
				LINE YM58 TOTAL:	**34.2**	**1000**	**115.9**	
Line YM224 Loop								
PAR 36	0	Existing	Permanent	Gravel/dirt	0.4	30	1.4	None
PAR 40	1.4	New	Permanent	Gravel/dirt	<0.1	15	0.1	Grading
				LINE YM224 TOTAL:	**0.4**	**45**	**1.5**	
Marvindale Compressor Station								
PAR-1	0.0	Existing	Permanent	Pavement	0.5	50	3.1	Widening
TAR-2	0.2	Existing	Temporary	Gravel/dirt	0.2	30	0.6	None
				MARVINDALE COMPRESSOR STATION TOTAL:	**0.7**	**80**	**3.7**	
Tamarack Compressor Station								
PAR-44	N/A	New	Permanent	Gravel/dirt	0.3	20	0.6	Grading
				TAMARACK COMPRESSOR STATION TOTAL:	**0.3**	**20**	**0.6**	
Line FM100 Abandonment								
HSC-832-Access	0	Existing	Temporary	Gravel/dirt	<0.1	15	0.1	None
RR Access	0.1	Existing	Temporary	Gravel/dirt	0.3	15	0.6	None
UNK AC 4	10	Existing	Temporary	Gravel/dirt	<0.1	15	<0.1	None
Rectifier 167, 168 Access	11.4	Existing	Temporary	Gravel/dirt	0.3	15	0.5	None
MLV BZE0-5810 Access	12	Existing	Temporary	Gravel/dirt	0.1	15	0.2	None
MLV GIC0-5042 Access	22.3	Existing	Temporary	Gravel/dirt	0.6	15	1.1	None
UNK AC 3	23	Existing	Temporary	Gravel/dirt	0.1	15	0.1	None
RR South Access	23.1	Existing	Temporary	Gravel/dirt	<0.1	15	<0.1	None

Rectifier 171 Access	23.5	Existing	Temporary	Gravel/dirt	0.1	15	0.2	None
SR 555 North Access	23.6	Existing	Temporary	Gravel/dirt	0.3	15	0.4	None
RR Access	26.2	Existing	Temporary	Gravel/dirt	0.6	15	1.1	None
UNK AC 1	27	Existing	Temporary	Gravel/dirt	<0.1	15	0.1	None
SR 120 North Access	27.4	Existing	Temporary	Gravel/dirt	0.5	15	0.9	None
Rectifier 873, 872 Access	29.7	Existing	Temporary	Gravel/dirt	0.3	15	0.5	None
UNK AC 2	30.8	Existing	Temporary	Gravel/dirt	0.3	15	0.5	None
MLV LUC0-5039 Access	33.4	Existing	Temporary	Gravel/dirt	0.1	15	0.3	None
				FM100 ABANDONMENT TOTAL:	**3.6**	**240**	**6.6**	
WHP-MS-4317X								
POP0 4317 Access	40.3	Existing	Temporary	Gravel/dirt	0.5	15	0.9	None
				WHP-MS-4317X TOTAL:	**0.5**	15	**0.9**	
Costello Compressor Station								
POP0 1370 Access	44.1	Existing	Temporary	Gravel/dirt	0.1	15	0.2	None
				COSTELLO COMPRESSOR STATION TOTAL:	**0.1**	**15**	**0.2**	
					39.8	**1,725**	**129.3**	

[1] Acreage calculation subject to rounding error. Areas less than 0.1 acre will not show up in total.

[2] Access roads indicating "None" for Improvements/Modifications will require maintenance during construction activities. This may include minor grading to maintain surface conditions and temporary measures such as matting to protect resources and other erosion control best management practices as identified within the ESCGP-3 application; however, these access road will be restored to pre-construction conditions following completion of construction activities.

1.5 Related Non-Jurisdictional Facilities

In addition to the Project facilities, there are several "Non-Jurisdictional Facilities" that are required to support the project. In FERC parlance, non-jurisdictional facilities are associated facilities that are required to operate the Project but are under the jurisdiction of other authorities. The following non-jurisdictional facilities will be constructed as part of the Project.

The Marvindale Compressor Station will require installation of electric power and communications lines. The electrical line will be permitted, constructed, owned and operated by West Penn Power. The typical ROW to construct the line will be 20 feet in width. Based on an initial installation length of 1,200 feet National Fuel estimates the total acreage required to construct the electrical line ROW is approximately 0.5 acres. In support of future permitting of the electrical line, National Fuel has conducted a cultural resources inventory and species surveys and wetland delineations.

The proposed Tamarack Compressor Station will require installation of utility services for power and telecommunications. Tri-County Rural Electric will provide the electric service to the facility. The full scope of installation is being developed through the utility's preliminary engineering process. To the extent there are any permits or approvals required for these non-jurisdictional facilities the owners of these facilities would seek these permits or approvals prior to construction.

In addition to the electrical distribution line, typical communication lines for the compressor stations may include a combination of standard cable, microwave radio, or satellite link for Supervisory Control and Data Acquisition (SCADA) and voice communications. A determination

of the required communication facilities has not been made at this time. If cable is selected, the cable would likely be mounted on the poles used by the power line to the compressor stations and would not require any additional ROW.

Similarly, MLV-1 and MLV-2 will require the install of electrical utility service for power and telecommunications. Power to MLV-1 will be installed along the existing driveway that will be used for permanent access. West Penn Power will provide a new approximately 200-ft long electric service distribution line to the facility. Power to MLV-2 will be installed along Benson Hollow Road within the limit of disturbance (LOD) depicted for AB-2 at approximately MP 6.5. West Penn Power will provide a new approximately 1,000-ft long electric service to the facility from the existing electrical distribution line that runs along SR 6.

1.6 Construction Procedures and Schedule

All facilities will be designed, constructed and inspected in accordance with National Fuel standards and governing USDOT (49 CFR 192) requirements. National Fuel will adhere to the terms and conditions within federal and state permits obtained for the Project. Construction of the proposed facilities will follow industry-accepted practices and procedures. During construction and restoration activities, National Fuel will implement the procedures and mitigation measures contained in the Project's Erosion and Sedimentation Control Plan. The E&S Control Plan will be developed using National Fuel's Erosion and Sediment Control & Agricultural Mitigation Plan (ESCAMP) found in Appendix C. The ESCAMP incorporates the protocol and procedures contained within the Federal Energy Regulatory Commission's Upland Erosion Control, Revegetation, and Maintenance Plan (Plan); and FERC's Wetland and Waterbody Construction and Mitigation Procedures (Procedures), collectively "FERC Plan and Procedures". The ESCAMP is also consistent with PADEP's published Erosion, Sediment and Pollution Control Manual. It is noted that the ESCAMP also contains decades worth of practical construction knowledge developed by National Fuel from previous pipeline construction projects in Pennsylvania. The ESCAMP is not intended to replace any of these published materials; only provide a singular location where all the information can be conveniently accessed. Care has been taken to prevent conflicting information between these documents and the ESCAMP; however, if there are any inadvertent conflicting standards the agency-published documents take precedence. The construction work areas will be clearly marked prior to the start of construction. Wetland and waterbody protection measures are described in Section 2.3.

Construction on Lines YM28 and YM224 is proposed to begin in Q1 2021 and be completed by Q4 2021 using one construction spread. Construction is anticipated to take approximately twelve months. Abandonment activities on the existing Line FM100 are anticipated to commence in Q2 2022 and be completed by Q4 2022. Construction of the Project will follow a conventional pipeline construction sequence. Following any required pre-construction surveys, the ROW will be cleared which includes the removal of vegetation within the construction workspace. The ROW will be flagged before clearing operations commence in order to mark the outside limits of the construction workspace. Perimeter controls and clean water diversions will be installed directly after clearing operations and prior to grubbing. The purpose of installing perimeter controls and clean water diversions during clearing operations is to have access to the construction work area in areas that are forested. In certain situations, minor grubbing may need to occur in order install erosion control devices; in these situations grubbing and E&S controls will be installed concurrently. The construction workspace will be graded as necessary to allow for safe passage of equipment and installation of environmental control devices, to prepare the work surface for pipeline installation activities. Rootstock in upland areas within TWS will be left within the TWS wherever practicable to encourage natural revegetation. In addition, wetland vegetation will be cut off at ground level leaving existing root systems intact unless grading is required for safety

reasons. In agricultural areas, topsoil will be stripped and stockpiled along the ROW unless otherwise requested by a landowner. The mixing of topsoil and subsoil will also be minimized in wetlands by using topsoil segregation construction methods (except when standing water or saturated soils are present).

Once the ROW has been cleared, graded, and topsoil segregated, a trench will then be excavated to the proper depth to allow for the burial of the new pipe. In general, the trench will be deep enough to provide for approximately three feet of cover over the pipeline in accordance with 49 CFR Part 192 of USDOT regulations. Though not expected, depth may be less than three feet if rock is encountered. Deeper burial is required for specific areas such as road crossings, waterbody crossings, utility ROW crossings, and other areas as necessary to maintain the integrity of the pipeline. After trench excavation is complete, the pipe will be strung along the trench; individual steel pipe segments will be placed along the excavated trench in a single continuous line which allows for welding operations to proceed efficiently. Pipe bending will be utilized in some situations such as to allow the pipeline to cross ditches and to follow the natural grade and direction changes of the ROW; this will be done before line-up and welding. Welding will be done following stringing and bending; the ends of the pipe segments will be aligned and welded together using multiple passes to allow for a full penetration weld. Completed welds will be non-destructively tested by qualified technicians. Any uncoated ends of the pipe at weld joints will be epoxy coated and visually inspected and inspected by using an electronic holiday (i.e., coating flaw) detector with the voltage calibrated for the type and thickness of coating. Any damaged areas identified will be repaired.

Before lowering the pipe into the trench, the trench will be inspected to verify it is free of rocks and other debris that could damage the pipe or its coating and to verify that the trench is free of water. Once the pipe has been lowered into the trench, the trench will be backfilled with all suitable previously excavated material. In areas where excavated material is unsuitable for backfilling, additional select fill may be required. The pipe will be padded as necessary and then the trench will be backfilled. The top of the trench may be slightly crowned to compensate for settling except for in paved areas where standard compaction methods will be employed. The topsoil will then be spread across the graded construction ROW where applicable. The soil will be inspected for compaction and scarified as necessary.

The entirety of the pipeline will be pressure tested prior to being placed into service in accordance with National Fuel standards and USDOT requirements to ensure its integrity for the intended service and operating pressures. Any leaks detected will be repaired and the segment retested. There will be two hydrostatic test sections for the Project Operation and Maintenance Procedures.

Cleanup and restoration procedures will be initiated as soon as possible after backfilling or removal of aboveground facilities. Cleanup and restoration will be performed in accordance with the ESCAMP and other federal, state, and local agency requirements, as applicable.

National Fuel will operate and maintain the proposed facilities in accordance with the applicable safety standards established by the USDOT (49 CFR 192). The standards imposed are in accordance with the Natural Gas Pipeline Safety Act of 1968, as amended. This Project will not require the hiring of additional operational personnel.

National Fuel will modify, as necessary, existing procedures to properly operate the pipeline facilities in accordance with applicable governmental regulations; permit requirements and authorizations; manufacturer recommendations; and National Fuel's Operating and Maintenance Procedures.

Periodic aerial inspections and/or ground patrols will be conducted to visually inspect the route from above, or on the ground, for activities such as vegetative encroachment, evidence of

unauthorized activity, damaged or exposed pipeline facilities, areas of environmental concern (e.g., subsidence, erosion), and other concerns that could affect public safety and operation of the Project.

Vegetation along the permanent ROW would be maintained to prevent woody growth from encroaching onto the permanent easement (e.g., brush cutting, tree trimming) according to the ESCAMP. The maintenance is necessary for pipeline integrity and ROW accessibility

1.6.1 Abandonment Procedures

The abandonment and removal procedures will be coordinated to minimize the total time a tract of land is disturbed, reducing erosion potential and loss of normal use. Removal activities will be confined to the certificated areas of disturbance and will be conducted in accordance with the ESCAMP and applicable permit requirements. Abandonment procedures will vary by site; a general description of the removal procedures for each facility type is provided below.

1.6.1.1 Pipeline, Minor Aboveground Facilities and Appurtenant Facilities

National Fuel intends to abandon the pipelines in-place with the exception of isolated sections where landowners have request the pipeline be removed. Prior to abandonment National Fuel will use a pig to clean the pipeline which will then be purged of natural gas with an inert gas such as nitrogen; cleaning fluids will be disposed of as hazardous waste. National Fuel has accommodated landowner requests to remove sections of pipe on an individual basis. As part of ongoing landowner coordination several landowners have requested National Fuel remove the abandoned pipeline on their property. Pipe segments removed at landowner request will have a trench excavated either directly above or adjacent to the pipe; then the exposed pipe will be pulled into the excavated trench and removed. The pipe will be cut and capped at the property lines and the pipe hauled away to one of the proposed contractor yards or other appropriate site (such as a scrap yard). The trenchline will be backfilled as soon as practicable after removal of the pipe. National Fuel will minimize impacts by implementing the ESCAMP; the trenchline of the removed pipe will be backfilled as soon as practicable after removal of the pipe to minimize workspace requirements associated with storage of subsoil. Typical pipeline construction equipment will be used to expose and remove pipe sections and appurtenances, replace, backfill the trench, restore the grade and contour of the disturbed workspace, and revegetate the disturbed areas.

In cases where the pipe will be abandoned in-place grouting or expandable foam may be used at certain road/railroad crossings, waterbodies, wetlands, and other locations to plug the pipeline and avoid creating a conduit for water. National Fuel has identified potential cut/plug/cap locations as identified in Table 1.6-1. At these locations, typical pipeline construction equipment will be used to expose and cut a hole in the pipe to allow access for a grout/foam plug to be inserted/pumped into a section of pipe. Deciding whether cement grout or expandable foam is used for a certain location involves a variety of factors such as diameter, length and the purpose for the plug (e.g., supporting a road v. a plug to prevent a water conduit). Expandable foam is the material of choice when large section of pipe must be filled because it is highly flowable and can be pumped over long distances. Alternatively cement slurry or grout is used in applications where shorter runs are involved that must support significant loads over time. Following grouting the bell hole excavation will be backfilled, the grade and contour of the disturbed workspaces restored, and workspaces revegetated. National Fuel will minimize impacts by implementing the ESCAMP.

Table 1.6-1: Abandonment Activities by Milepost

Facility/County	MP/Station Begin	MP/Station End	Site ID	Workspace (acres)	Proposed Work	Rationale/Justification
Line FM100 Abandonment						
Clearfield County						
Clearfield	0.0 / 0+00	0.0 / 0+20	AS-1	0.1	Remove valve setting and fencing	Remove above ground facilities to minimize landuse conflicts
Clearfield	0.0 / 0+20	0.1 / 3+63	--	--	Abandon in Place	Minimize disturbance
Clearfield	0.1 / 3+63	0.1 / 4+16	AS-2	<0.1	Grout	Crossing State Highway 255
Clearfield	0.1 / 4+16	0.2 / 8+82	--	--	Abandon in Place	Minimize disturbance
Clearfield	0.2 / 8+82	0.3 / 18+52	AS-4	1.2	Remove pipeline	Landowner request
Clearfield	0.3 / 18+52	0.4 / 19+42	AS-3	<0.1	Cut/Cap/Grout	Crossing railroad
Clearfield	0.4 / 19+42	0.4 / 19+42	AS-5	0.1	Remove rectifier facilities and fencing	Remove above ground facilities to minimize landuse conflicts
Clearfield	0.4 / 19+42	1.8 / 97+58	--	--	Abandon in Place	Minimize disturbance
Clearfield	1.8 / 97+58	1.8 / 97+58	AS-6	<0.1	Cut/Cap	Crossing Tyler Road
Clearfield	1.8 / 97+58	4.8 / 250+21	--	--	Abandon in Place	Minimize disturbance
Clearfield	4.8 / 250+21	4.8 / 250+21	AS-7	0.1	Cut/Cap/Foam	Crossing Laurel Run (waterbody)
Clearfield	4.8 / 250+21	4.9 / 254+51	--	--	Abandon in Place/foam pump will be pumped from AS-8 to minimize impacts to this site; foot traffic only	Crossing Laurel Run (waterbody)
Clearfield	4.9 / 254+51	4.9 / 254+51	AS-8	0.1	Cut/Cap/Foam	Crossing Laurel Run (waterbody)
Clearfield/Elk[1]	4.9 / 254+51	7.9 / 416+15	--	--	Abandon in Place	Minimize disturbance
		Clearfield County Total:		**1.8**		
Elk County						
Elk	7.8 / 416+15	7.8 / 416+15	AS-9	<0.1	Cut/Cap/Foam	Crossing Medix Run (waterbody)
Elk	7.8 / 416+15	7.9 /419+36	--	--	Abandon in Place/foam pump will be pumped from AS-10 to minimize impacts to this site; foot traffic only across Medix Run	Crossing Medix Run (waterbody) and Medix Run Road
Elk	7.9 / 419+36	8.0 / 419+79	AS-10	<0.1	Foam/Remove valve setting and fencing	Remove above ground facilities to minimize landuse conflicts, also crossing Medix Run Road

Elk	8.0 / 419+79	10.0 / 527+22	--	--	Abandon in Place	Minimize disturbance
Elk	10.0 / 527+22	10.0 / 527+22	AS-11	0.1	Remove rectifier facilities and fencing	Remove above ground facilities to minimize landuse conflicts
Elk	10.0 / 527+22	11.1 / 587+61	--	--	Abandon in Place	Minimize disturbance
Elk	11.1 / 587+61	11.1 / 587+61	AS-12	0.1	Cut/Cap/remove rectifier facilities	Remove above ground facilities to minimize landuse conflicts
Elk	11.1 / 587+61	11.1 / 588+46	--	--	Grout,	Crossing Quehanna Highway,
Elk	11.1 / 588+46	11.1 / 588+46	AS-13	0.1	Cut/Cap	Grout insertion location
Elk	11.1 / 588+46	11.3 / 598+59	--	--	Abandon in Place	Minimize disturbance
Elk	11.3 / 598+59	11.3 / 598+59	AS-14	<0.1	Remove rectifier facilities and fencing	Remove above ground facilities to minimize landuse conflicts
Elk	11.3 / 598+59	12.0 / 633+47	--	--	Abandon in Place	Minimize disturbance
Elk	12.0 / 633+47	12.0 / 633+47	AS-15	0.1	Cut/Cap	Crossing Grant Trail Road
Elk	12.0 / 633+47	12.8 / 673+86	--	--	Abandon in Place	Minimize disturbance
Elk	12.8 / 673+86	12.8 / 673+86	AS-16	<0.1	Cut/Cap	Crossing Grant Trail Road
Elk	12.8 / 673+86	15.8 / 836+46	--	--	Abandon in Place	Minimize disturbance
Elk	15.8 / 836+46	15.8 / 836+46	AS-17	0.1	Remove valve setting, rectifier facilities/fencing	Remove above ground facilities to minimize landuse conflicts
Elk/Cameron[1]	15.8 / 836+46	22.1 / 1,168+58	--	--	Abandon in Place	Minimize disturbance
			Elk County Total:	**0.6**		
Cameron County						
Cameron	22.1 / 1,168+58	22.1 / 1,168+58	AS-18	<0.1	Cut/Cap	Crossing Mix Run (waterbody)
Cameron	22.1 / 1,168+58	22.3 / 1,178+01	--	--	Abandon in Place	Minimize disturbance
Cameron	22.3 / 1,178+01	22.3 / 1,178+01	AS-19	<0.1	Remove valve setting, rectifier facilities/fencing	Remove above ground facilities to minimize landuse conflicts
Cameron	22.3 / 1,178+01	23.0 / 1,214+14	--	--	Abandon in Place	Minimize disturbance
Cameron	23.0 / 1,214+14	23.0 / 1,214+14	AS-20	1.4	Cut/Cap/Grout	Grout insertion location
Cameron	23.0 / 1,214+14	23.1 / 1,219+27	--	--	Abandon in Place /Grout	Crossing Mix Run Road & railroad
Cameron	23.1 / 1,219+27	23.1 / 1,219+27	AS-21	<0.1	Cut/Cap/Grout	Remove above ground facilities to minimize landuse conflicts
Cameron	23.1 / 1,219+27	23.5 / 1,239+60	--	--	Abandon in Place	Minimize disturbance

Cameron	23.5 / 1,239+60	23.5 / 1,239+60	AS-22	<0.1	Cut/Cap/Grout, remove rectifier facilities/fencing	Grout Insertion Point, crossing Bridge Street
Cameron	23.5 / 1,239+60	23.5 / 1,242+17	--	--	Abandon in Place /Grout	Crossing Bridge Street
Cameron	23.5 / 1,242+17	23.5 / 1,242+17	AS-23	<0.1	Cut/Cap/Grout, remove rectifier facilities/fencing	Crossing Bridge Street
Cameron	23.5 / 1,242+17	26.1 / 1,378+86	--	--	Abandon in Place	Minimize disturbance
Cameron	26.1 / 1,378+86	26.1 / 1,378+86	AS-24	0.1	Remove rectifier facilities and fencing	Remove above ground facilities to minimize landuse conflicts
Cameron	26. / 1,378+86	26.7 / 1,410+25	--	--	Abandon in Place	Minimize disturbance
Cameron	26.7 / 1,410+25	26.8 / 1,410+25	AS-25-1	0.1	Cut/Cap/Foam	Foam Insertion Point
Cameron	26.8 / 1,410+25	26.9 / 1,418+81	--	--	Abandon in Place /Foam	Crossing Driftwood Branch Sinnemahoning Creek and Railroad tracks
Cameron	26.9 / 1,418+81	27.0 / 1,425+64	--	--	Abandon in Place	Minimize disturbance
Cameron	27.0 / 1,425+64	27.0 / 1,425+64	AS-25-2	<0.1	Cut/Cap/Grout	Grout Insertion Point
Cameron	27.0 / 1,425+64	27.1 / 1,426+96	--	--	Abandon in Place /Grout	Crossing Bucktail Highway
Cameron	27.1 / 1,426+96	27.1 / 1,426+96	AS-26	<0.1	Cut/Cap/Grout, remove rectifier facilities	Remove above ground facilities to minimize landuse conflicts
Cameron	27.1 / 1,426+96	29.6 / 1,566+23	--	--	Abandon in Place	Minimize disturbance
Cameron	29.6 / 1,566+23	29.6 / 1,566+23	AS-27	<0.1	Remove Rectifier Facilities	Remove above ground facilities to minimize landuse conflicts
Cameron	29.6 / 1,566+23	30.6 / 1,618+50	--	--	Abandon in Place	Minimize disturbance
Cameron	30.6 / 1,618+50	31.0 / 1,636+22	AS-28	1.8	Pipe removal, Cut/Cap	Landowner requested removal
Cameron	31.0 / 1,636+22	33.4 / 1,761+11	--	--	Abandon in Place	Minimize disturbance
Cameron	33.4 / 1,761+11	33.4 / 1,761+11	AS-29	<0.1	Remove Rectifier Facilities	Remove above ground facilities to minimize landuse conflicts
Cameron	33.4 / 1,761+11	33.4 / 1,763+65	--	--	Abandon in Place	Minimize disturbance
Cameron	33.4 / 1,763+65	33.4 / 1,763+65	AS-30	<0.1	Remove Valve Facilities	Remove above ground facilities to minimize landuse conflicts
Cameron	33.4 / 1,763+65	38.2 / 2,015+47	--	--	Abandon in Place	Minimize disturbance
Cameron	38.2 / 2,015+47	38.2 / 2,015+47	AS-31	<0.1	Remove Rectifier Facilities	Remove above ground facilities to minimize landuse conflicts
Cameron/Potter[1]	38.2 / 2,015+47	40.1 / 2,119+84	--	--	Abandon in Place	Minimize disturbance
			Cameron County Total:	**12.2**		

Potter County						
Potter	40.1 / 2,119+84	40.1 / 2,119+84	AS-32	0.1	Remove Rectifier Facilities	Remove above ground facilities to minimize landuse conflicts
Potter	40.1 / 2,119+84	40.5 / 2,137+29	--	--	Abandon in Place	Minimize disturbance
Potter	40.5 / 2,137+29	40.5 / 2,137+29	WHP-MS-4317	0.5	Remove Rectifier Facilities and MLV	Remove above ground facilities to minimize landuse conflicts
Potter	40.5 / 2,137+29	44.1 / 2,328+48	--	--	Abandon in Place	Minimize disturbance
Potter	44.1 / 2,328+48	44.1 / 2,328+48	Costello Compressor Station	1.1	Compressor Station Abandonment, remove rectifier facilities	Remove above grade facilities to minimize landuse conflicts
			Potter County Total:	**1.7**		
			Project Total:	**16.2**		

Notes: Plug material will be determined based on the objective of the grout location. For road and waterbody crossings where plugs need to bear load and/or support negative buoyancy of the pipe flowable cementitious grout may be used, whereas locations identified near wetland boundaries may utilize foam.

[1] Portions of the abandoned line may cross from county to county; however, in order to avoid confusion, runs of pipe that will be abandoned in place and cross multiple counties are only shown once on the table. Total impacts by county are not impacted by this accounting.

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National Fuel intends to remove above-ground facilities (e.g., valves and meter stations) by cutting the facility just below grade, remove, haul away, and blind flange the pipe. After a valve is removed, the site will be regraded if necessary, to restore the surrounding ground level to existing grade. Imported weed-free topsoil will also be used to cover the site and prepare the soil for reseeding with an appropriate seed mix to the area. Minor above-ground facilities such as rectifiers, milepost markers, casing vents, and other miscellaneous appurtenances that require no ground disturbance will be removed, capped if necessary, and hauled away. Site specific aerial maps of abandonment work locations are presented in Appendix B, Figure 1.1-3.

1.6.1.2 Abandonment and Removal of Compression Facilities

Two gas-fired 720 HP Ajax DPC-720LE compressor units and one back-up generator at the Costello Compressor Station will be abandoned and completely removed; likewise, all ancillary buildings will also be removed. Once equipment and facility removal are complete, the site will be graded and seeded.

1.7 PNDI Avoidance Measures

National Fuel submitted a PNDI review request on October 15, 2018, as a result of that request, the U.S. Fish and Wildlife Service (USFWS) Ecological Services Field Office in State College, Pennsylvania, Pennsylvania Department of Conservation and Natural Resources (PADCNR), and Pennsylvania Game Commission (PGC) determined there was “Potential Conflict” to threatened and endangered and/or special concern species and resources associated with the Project as proposed. Therefore, additional coordination was required with these agencies. The PAFBC, requested that species specific surveys be conducted to identify critical habitats. Agency correspondence (Appendix D) and the species-specific reports (Appendix L) are included to document the consultation with the agencies and the findings of the species-specific surveys and recommended best management practices and minimization procedures that National Fuel will follow.

National Fuel will conduct clearing activities outside the primary migratory bird nesting season (April 1 through August 31) to minimize impacts to migratory bird species during nesting and breeding season (see attached PNDI correspondence with IPaC report for breeding season chart. Appendix D).

To minimize impacts to wildlife because of activities related to the Project, the following general mitigation measures will be implemented:

- National Fuel has limited the construction ROW to a typical width of 75 feet, with ATWS provided only for areas that require additional workspace such as for spoil storage, and pipeline crossover areas.
- National Fuel will limit habitat disturbance to the approved construction ROW.
- To minimize the potential for species displacement, construction activities will be kept to the minimum time necessary to complete construction.
- Construction personnel will undergo environmental training that will include information on nesting and breeding birds and timber rattlesnakes.
- National Fuel will implement the ESCAMP to reduce potential impacts from sedimentation and erosion.

- National Fuel has conducted species-specific surveys for timber rattlesnake, blue-spotted salamander, various mussel species, and plant species in the project area by qualified biologists to identify critical habitat and create recommendations to reduce impacts to sensitive species habitats. Specific recommendations adopted by National Fuel are outlined in Sections 2.5.12.2 and 2.5.12.3.

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

1.8 Land Ownership and Usage

The Project crosses a variety of land uses and habitat types commonly found in forested regions of northern Pennsylvania. The Project does not cross any National Parks, National Wildlife Refuges, National natural landmarks; federal, state or private wildlife or plant sanctuaries, or designated federal wilderness areas. The Project crosses State Game Lands 34, 59, and 61, Bucktail State Park and Johnson Run Natural Areas, Square Timber Wild Area and Elk, Moshannon, and Susquehannock State Forests. Table 1.8-1 shows Managed Wildlife Habitat Crossed by the Project. The existing landuse and wildlife resources affected by the Project construction and operation include resources identified within the proposed pipeline corridor, access roads, TWS, ATWS, and aboveground facilities.

Prime farmland soil is a special classification of highly productive cropland that is recognized and described by the United Stated Department of Agriculture (USDA) – Natural Resource Conservation Service (NRCS). Prime farmland soil is best suited for producing food, feed, forage, fiber and oilseed crops and can also be used as cropland, pastureland, rangeland, forest land or other land but not land that has been built up, or water. Additionally, farmland soils of statewide importance include those lands that are nearly prime farmland and that produce high yields of crops when managed according to acceptable farming methods (USDA-NRCS, 2016).

Of the 398.7 acres of soils crossed by the proposed Project, soils characterized as Prime Farmland constitute 152.8 acres or 38 percent of the total acreage of soils proposed to be affected by the Project activities. Soils characterized as Farmland of Statewide Importance constitute 48.8 acres or 12 percent of the total acreage of soils proposed to be affected by the Project activities. Note that the acreage of soils crossed by the proposed Project does not include access roads as they are not part of this specific calculation for soils.

Other land uses crossed by the project include residential, industrial and commercial, agricultural (e.g., pasture land and cultivated cropland), and wetlands/waterbodies. For informational purposes, these are addressed in greater detail below.

There are no densely populated residential areas that will be crossed by the Project; only rural single-family homes are located in the Project vicinity. Therefore, there will be minimal impacts to soils in residential areas during construction or operation of the Project. Residential soils will be mitigated consistent with the procedures outlined in the ESCAMP. Pipeline construction is not expected to have permanent impacts to aboveground drainage patterns since agricultural and residential areas will be restored to pre-construction conditions in accordance with National Fuel's ESCAMP.

Agricultural land encompasses both agricultural pasture lands, which include grassland areas that are used for grazing livestock and to produce hay or alfalfa, as well as cultivated cropland. A total

of 58.3 acres (10.8 percent) of agricultural land will be utilized during construction, of which 29.8 acres will be utilized for operations.

Industrial and commercial land uses include roadways, developed facility sites, buildings, industrial parcels, borrow pits, and transportation ROWs. Most of these areas are either sparsely vegetated or lack vegetation due to the presence of impervious or non-natural surfaces such as pavement, gravel pads, excavated material, or bare, compacted lands. A total of 131.1 acres (24.3 percent) of industrial/commercial land will be utilized during construction of the Project, of which 49.4 acres will be utilized for project operations. The Project proposes to use existing industrial/commercial lands for contractor yards, staging areas and access roads.

Wetlands consist of emergent and forest/scrub-shrub types and account for 14.8 acres (approximately 3 percent), of the project area. 0.7 acres will be utilized for project operations. Construction in these areas will be performed in accordance with the ESCAMP, and applicable permit conditions, unless more stringent regulatory requirements apply.

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Table 1.8-1: Managed Wildlife Habitat Crossed by the Project

Facility[1]	MP Begin	MP End	Crossing Length (miles)	County	Resource Name	Area Affected by Construction (acres)	Habitat Types Affected by Construction (acres)
Line YM58							
Access Road – PAR-03	2.8	2.9	0.2	McKean	Elk State Forest	0.8	Industrial/Commercial Areas (Roadway) - 0.8 acres
Access Road – TAR-04	2.8	2.9	0.1	McKean	Elk State Forest	0.5	Industrial/Commercial Areas (Roadway) – 0.5 acres
Construction ROW	10.3	11.2	0.9	McKean	State Game Land 61	8.8	Forest /Woodland – 1.5 acres Industrial/Commercial Areas (Roadway) - <0.1 acres Open Land (Utility ROW) – 6.9 acres Open Land (Prior disturbed, non-forested) – 0.4 acres Open Water – <0.1 acres Wetland Emergent (Utility ROW) – <0.1 acres
Construction ROW	20.0	21.9	1.9	Potter	State Game Land 59	17.9	Forest/Woodland – 4.4 acres Industrial/Commercial Areas (Roadway) - 0.1 acres Open Land (Utility ROW) – 11.0 acres Open Land (Prior disturbed, non-forested) – 2.4 acres Open Water – <0.1 acres
Access Road – PAR-30	21.2	21.2	3.6	Potter	State Game Land 59	13.1	Industrial/Commercial Areas (Roadway) – 13.1 acres
Construction ROW	22.3	22.5	0.2	Potter	State Game Land 59	1.3	Forest & Woodland – 0.5 acres Open Land (Utility ROW) – 0.8 acres
Line YM58 Subtotal			**6.9**			**42.4**	**Forest/Woodland – 6.4 acres** **Industrial/Commercial Areas (Roadway) – 14.5 acres** **Open Land (Utility ROW) – 18.7 acres** **Open Land (Prior disturbed, non-forested) – 2.8 acres** **Open Water – <0.1 acres** **Wetland Emergent (Utility ROW) – <0.1 acres**
Line FM100 Abandonment							
Construction ROW	0.6	12.2	11.6	Clearfield	Moshannon State Forest	0.1	Open Land (Utility ROW) – 0.1 acres
Access Road – Rectifier 167, 168 Access	11.3	11.3	0.3	Clearfield	Moshannon State Forest	0.9	Industrial/Commercial Areas (Roadway) – 0.9 acres
Construction ROW	12.3	12.5	0.2	Elk	State Game Land 034	--	Open Land (Utility ROW) – no impact
Construction ROW	12.5	14.8	2.3	Elk	Moshannon State Forest	0.1	Open Land (Utility ROW) – 0.1 acres

Facility[1]	MP Begin	MP End	Crossing Length (miles)	County	Resource Name	Area Affected by Construction (acres)	Habitat Types Affected by Construction (acres)
Access Road – MLV BZE0 5810 Access	15.2	15.8	0.8	Elk	Moshannon State Forest	2.8	Industrial/Commercial Areas (Roadway) – 2.8 acres
Construction ROW	15.2	16.1	0.9	Elk	Moshannon State Forest	0.1	Open Land (Utility ROW) – 0.1 acres
Construction ROW	16.5	21.6	5.1	Elk	Moshannon State Forest	--	Open Land (Utility ROW) – no impact
Construction ROW	24.9	25.7	0.8	Cameron	Bucktail State Park Natural Area	--	Open Land (Utility ROW) – no impact
Access Road – SR 12-North Access	27.1	27.3	0.2	Cameron	Bucktail State Park Natural Area	0.3	Industrial/Commercial Areas (Roadway) – 0.3 acres
Construction ROW	27.1	27.3	0.2	Cameron	Bucktail State Park Natural Area	--	Open Land (Utility ROW) – no impact
Construction ROW	27.3	27.3	<0.1	Cameron	Johnson Run Natural Area	--	Open Land (Utility ROW) – no impact
Access Road – SR 12-North Access	27.3	27.3	<0.1	Cameron	Johnson Run Natural Area	<0.1	Industrial/Commercial Areas (Roadway) - <0.1 acres
Construction ROW	27.8	28.3	0.5	Cameron	Elk State Forest	--	Open Land (Utility ROW) – no impact
Construction ROW	28.5	29.1	0.6	Cameron	Elk State Forest	--	Open Land (Utility ROW) – no impact
Access Road – Rectifier 873, 872 Access	29.6	29.6	0.1	Cameron	Elk State Forest	0.4	Industrial/Commercial Areas (Roadway) – 0.4 acres
Construction ROW	29.6	30.2	0.6	Cameron	Elk State Forest	0.2	Open Land (Utility ROW) – 0.2 acres
Construction ROW	30.2	30.6	0.4	Cameron	Square Timber Wild Area	<0.1	Open Land (Utility ROW) - <0.1 acres
Construction ROW	31.0	31.5	0.5	Cameron	Square Timber Wild Area	<0.1	Open Land (Utility ROW) - <0.1 acres
Construction ROW	31.5	40.1	8.6	Cameron	Elk State Forest	<0.1	Open Land (Utility ROW) - <0.1 acres
Access Road – MLV LUC0 5039 Access	33.4	33.5	0.2	Cameron	Elk State Forest	0.6	Industrial/Commercial Areas (Roadway) – 0.6 acres
Construction ROW	40.1	44.0	3.9	Potter	Susquehannock State Forest	0.5	Open Land (Utility ROW) – 0.5 acres
Access Road – POP0 4317 Access	40.1	40.4	0.5	Potter	Susquehannock State Forest	1.8	Industrial/Commercial Areas (Roadway) – 1.8 acres
Line FM100 Abandonment Subtotal			**38.3**			**7.8**	**Industrial/Commercial Areas (Roadway) – 6.8 acres** **Open Land (Utility ROW) – 1.0 acres**
TOTALS			**45.2**			**50.3**	

2 Water Use and Quality

2.1 Introduction

Mott MacDonald biologists (resumes and contact information in Appendix E) conducted wetland and waterbody (e.g., streams, ponds, etc.) field delineations from September and October 2017, as well as April and August 2018 along a 300-foot wide survey corridor centered on the pipeline and a 50-foot wide survey corridor centered on access roads. Additional surveys were conducted from July 28 through August 7, 2020 to address comments received by the Pennsylvania Department of Environmental Protection (PADEP) in their Technical Deficiency letter dated July 10, 2020. Revisions to this report include incorporating additional survey data collected in response to PADEP comments. For more information regarding the wetlands and waterbodies located within the Project area, see the Wetland and Waterbody Delineation Report in Appendix E.

The remainder of this section describes the water resources crossed by the Project and any Project-related impacts to water use and quality. Best management practices employed to avoid impacts during the Project are discussed as well as mitigation measures needed to minimize impacts.

2.2 Groundwater Resources

The Project is located within the High Plateau Section, Deep Valleys Section and Pittsburgh Low Plateau Section of the Appalachian Plateaus physiographic province (PADCNR 2016). The High Plateau consists of broad, rounded to flat uplands cut by deep angular valleys (PADCNR 2016a). The Deep Valleys Section consists of many deep, steep-sloped valleys that are separated by narrow, flat to sloping uplands (PADCNR 2016b). The Pittsburgh Low Plateau section consists of a smooth to irregular, undulating surface with narrow, relatively shallow valleys and reclaimed land (PADCNR 2016c).

Aquifers in consolidated sedimentary rocks of the Appalachian Plateaus Province and within the Project area are divided into Pennsylvanian and Mississippian aquifers. Pennsylvanian rocks are the principal coal bearing formations and consist of cyclical sequences of sandstone, shale, conglomerate, clay, coal, and minor limestone. Mississippian rocks consist mostly of shale, sandstone, and siltstone with minor conglomerate and limestone. Sandstone and shale aquifers typically yield groundwater from wells at depths within 80 to 200 feet of the surface [PA State University (PSU), 2016]. The sandstones are the most productive aquifers, although coal beds and limestones also yield water. Yields of wells completed in Pennsylvanian rocks range from 20 to 430 gallons per minute, while yields of wells completed in Mississippian strata range from 20 to 180 gallons per minute. [United States Geological Survey (USGS) 1997].

The chemical quality of water in the freshwater parts of the aquifers of the Appalachian Plateaus Province is variable but generally is satisfactory for municipal use and other purposes. Most of the water in the upper aquifer is not greatly mineralized and is suitable, or can be treated and made suitable, for most uses. Saline water is commonly in the aquifers at depths of only a few hundred feet below the land surface with only a thin transition zone between the freshwater and saltwater (USGS 1997).

Total freshwater withdrawals from consolidated sedimentary-rock aquifers in the Appalachian Plateaus and the Central Lowland Provinces were estimated to be 282 million gallons per day during 1985. About 47 percent of this amount, or about 133 million gallons per day, was withdrawn for domestic and commercial supplies. About 116 million gallons per day, or about 41 percent of the total withdrawals, were pumped for industrial, mining, and thermoelectric power purposes; most of this water was used in coal mining operations (USGS 1997).

A review of available aquifer information indicates no state-designated primary aquifers (PADEP 2019) or United States Environmental Protection Agency (USEPA) designated Sole Source Aquifers are located in the Project area (USEPA 2017).

2.2.1 Public and Private Water Supply Wells

The PA Groundwater Information System (PAGWIS), provided by the PA Department of Conservation and Natural Resources (PADCNR 2019), database was reviewed for the presence of private, community, irrigation, livestock, and municipal/public wells and springs within 150 feet of the proposed construction including the construction right-of-way, access roads, contractor yards/staging areas, and sites for new aboveground facilities. The PAGWIS wells and springs database review returned three wells within 150 feet of proposed construction workspaces. In addition, four springs were identified during field surveys that are within 150 feet of proposed construction workspaces. National Fuel has coordinated with landowners who have wells or springs identified within 150 feet of construction workspaces to determine if they are being used as potable water sources or for other purposes. Table 2.2-1 summarizes the results of this review and landowner coordination.

Table 2.2-1: Water Supply Wells and Springs within 150-feet of Project Work Areas

Facility[1] / County	MP	Latitude	Longitude	Well Type	Well ID	Workspace Type	Approx. Distance from Construction Workspace (feet)	Current Use
Line YM58								
McKean	19.1	41.820862	-78.193240	Spring	N/A	ATWS	91.0	Not a source of potable water
Potter	23.8	41.835457	-78.125261	Spring	N/A	ATWS	114.5	Not a source of potable water
Potter	23.2	41.83570	-78.12474	Spring	N/A	TWS	75.1	Not utilized as a source of potable water
Line KL Extension								
McKean	0.0	41.70135	-78.49992	Irrigation	594683	ATWS	0	Withdrawal
McKean	0.0	41.70167	-78.49972	Domestic	131079	ATWS	0	Withdrawal
Line FM100 Abandonment								
Elk	8.0	41.24098	-78.417066	Spring	N/A	TWS	28.4	Not a source of potable water
Potter	44.0	41.59083	-78.05917	Domestic	N/A	Access Road	53.2	Withdrawal

[1] Project components not addressed in table do not have water supply wells/springs within 150 feet of Project workspaces.

Source: PAGWIS 2018, landowner coordination and Project environmental survey.

In addition, National Fuel contacted landowners surrounding the three proposed HDD paths to determine of additional water wells were located within 400 feet of these pipe installations. A corresponding field review was also completed by NFG personnel. In addition, National Fuel contacted the Jeremy Morey, McKean County Planning Director, to identify any public water supply wells supplying were within 400 feet of the drill path. He confirmed there that there are no public water supply wells within 400 feet of the proposed drill paths. We have also attempted to contact PADEP's regional office but have been unable to reach them at the time of this filing. Table 2.2-2 identifies additional water wells that fall within this category.

Table 2.2-2: Water Supply Wells within 400-feet of Project HDDs

Facility/ County	MP	Latitude	Longitude	Well Type	Parcel ID	Workspace Type	Approx. Distance from Construction Workspace (feet)	Current Use
Line YM58								
McKean	~6.9	41.75516	-78.39358	Domestic	27-002-101.24	ATWS	262	Withdrawal
McKean	~6.9	41.75308	-78.39197	Domestic	27-002-101	ATWS	199	Withdrawal
McKean	~14.9	41.79504	-78.25973	Domestic	26-006-157	TWS	277	Withdrawal
McKean	~15.0	41.79709	-78.25756	Domestic	26-006-171a	ATWS	276	Withdrawal
McKean	~15.0	41.79678	-78.25708	Domestic	26-006-171b	ATWS	189	Withdrawal
McKean	~15.0	41.79589	-78.25685	Domestic	26-006-171.3	TWS	29	Withdrawal

Source: PAGWIS 2018, landowner coordination and Project environmental survey.

A review of PADEP's Well Head Protection Program (PADEP 2000) determined that the Project does not cross any local public water systems that participate in the program within Clinton, Cameron, Elk, McKean and Potter Counties nor do these counties have Source Water Protection Plans in place (PADEP 2018). Clearfield County Municipal Authority does participate in the PADEP Wellhead Protection Program. According to USEPA's Safe Drinking Water Information System database (USEPA 2019), one public water supply area with a groundwater intake site occurs within five miles of the Project. The Crosby Water Association (Town of Crosby, McKean County) maintains a groundwater derived public water supply area approximately 0.63 miles south of the Project (USEPA 2019a); no impacts to this resource is anticipated due to Project activities.

National Fuel proposes to install one new potable water well at the Marvindale Compressor Station. Water derived from this well will be used to supply a small bathroom (e.g., sink and toilet) in the office building at the Marvindale Compressor Station. No water is needed to operate the proposed compressor station. The well will be drilled to an anticipated depth of 250 to 500 feet and is estimated to yield approximately 100 to 1,000 gallons/minute (Pennsylvania State University 2019). The estimated volume of water needed to supply the bathroom facilities is approximately 6,500 to 10,000 gallons annually, or conservatively, 27 gallons/day. A 6-inch-diameter borehole will store approximately 1.5 gallons of water per linear foot. As such, pumping the anticipated volume of water needed to supply daily demand is not anticipated to draw down the aquifer or create a significant cone of depression. Appropriate drilling permits, and water appropriation permits will be secured by National Fuel.

2.2.2 Groundwater Contamination

A review of areas of known groundwater or soil contamination was performed by National Fuel. The review included sites of active or historic solid or hazardous waste treatment, storage, or disposal facilities within 0.25 mile of the entire Project area, utilizing the USEPA Region 03 Geospatial Database of Regulated Facilities or Cleanup Locations, the USEPA Cleanups in My Community Map, and the EPA Superfund National Priorities List to determine if any potential sources of contamination were crossed by the Project (USEPA 2019b, 2019c, and 2019d). No sources of contamination were identified through these database searches.

National Fuel also reviewed state databases to identify state regulated areas of soil and groundwater contamination, including the Pennsylvania Land Recycling Cleanup Program. The Land Recycling Cleanup Program is overseen by PADEP and provides the physical location and other background data regarding contamination commercial and industrial sites (PADEP 2019a). Cleanup locations are divided into different media depending on the nature of contamination, including: Air, Contained Release or Abandoned Container, Groundwater, Sediment, Soil, Surface Water, and Waste. Using the PADEP Open Data Portal, each land recycling cleanup locations database was examined for possible sources of contamination, with a specific focus on Soil Media and Groundwater Media.

No active or unresolved groundwater contamination areas are located within 0.25 miles of the Project (PADEP 2019a). However, one historic/remediated site of soil contamination was found to intersect with the proposed project workspace. The site, titled *Primary Facility #735733: FT Seismic Support Inc. State Gamelands 59*, is identified as an accident cleanup. Under the list of Completed Cleanup Sites on the PADEP website, cleanup at the site was completed on 12/01/2019 and the site is listed as having no restrictions for use. The intersection of the former contamination site with the Project is at MP 21.1, 8 feet south of Line YM58's proposed centerline. A second site of soil contamination, titled *Buffalo Camp*, was identified 0.1 miles south of MP 8.0 on Line FM100 Abandonment but will not be impacted by the Project (PADEP 2019a). Despite the remediation status of the *FT Seismic Support Inc. State Gamelands 59 Accident* site, National Fuel has prepared an Unanticipated Discovery of Contaminated Materials Plan (see Appendix F) which will be implemented across the Project in scenarios where unforeseen contamination is encountered during construction. The environmental inspector (EI) and construction contractor will be notified of this site and will be prepared to respond should there be a need.

In addition to the PADEP Land Recycling Cleanup Location database, the PADEP Residual Waste Operations Database (PADEP 2019b), the PADEP Municipal Waste Operations Database (Pennsylvania Spatial Database 2019c), and PADEP Captive Hazardous Waste Operations Database (Pennsylvania Spatial Database 2019d) were similarly examined for areas of potential soil and groundwater contamination. No sites were located within 0.25 miles of the Project.

National Fuel also reviewed data from PADEP's Legacy Ambient and Fixed Station Network Ground Water Quality Monitoring Program and the Expanded Fixed Station Groundwater Quality Monitoring Network (PADEP 2018a, PADEP 2019e). Unfortunately, the groundwater basins that the Project crosses were not surveyed by these programs (PADEP 2018a, 2019e). In conjunction with the aforementioned desktop research, representatives of National Fuel conducted field surveys in 2017, 2018, and 2020 of all project areas and did not observe any evidence of hazardous sites (e.g., abandoned drums, aboveground fuel pumps, non-vegetated areas, leachate seeps, etc.). Based off the combination of desktop review and field surveys, National Fuel does not anticipate any impacts to groundwater resources as a result of the Project. In the unlikely event that groundwater resources are impacted, National Fuel will coordinate with FERC and appropriate resource agencies to determine the necessary mitigation measures to be taken. During construction, personnel will be instructed on the proper operation and maintenance of

construction equipment to prevent accidental discharge of fuel, oil, and lubricants. Spill prevention briefings with the construction crew will be scheduled and conducted by the EI to assure adequate understanding of spill prevention measures. In the event of a small spill where the EI determines that the construction contractor can safely handle the volume of contaminated material, the contractor will use construction equipment to containerize all spilled material, contaminated soil, and sorbent material in a manner consistent with the spilled materials' characterizations. If the EI determines that a spill cannot be adequately excavated and disposed of by the construction contractor alone, the contractor will contact waste management containment specialists. If damage to a potable water well appears to be unavoidable, National Fuel will relocate the construction ROW to avoid the well. Additionally, National Fuel has provided the Spill Prevention and Response Plan (SPRP) should contaminated materials be encountered during construction (see Appendix F).

2.2.3 Areas of Potential Shallow Groundwater

Based on the topographic elevations and spatial relationship to known surface water features, it is not anticipated that groundwater will be encountered at the above-ground facilities. It is likely groundwater will be encountered along the pipeline particularly near waterbodies and wetlands as identified in Tables 2.3-1 (Appendix G) and 2.4-1 (Appendix H). If groundwater is encountered, National Fuel will implement Best Management Practices (BMPs), which are detailed in its ESCAMP. Specific BMPs for minimizing and mitigating potential impacts to groundwater during construction are found in Section 2.2.4.

2.2.4 Potential Groundwater Impacts and Mitigation

No groundwater will be used for hydrostatic testing and therefore no localized drawdown of the water table is anticipated due to construction activities. Likewise, as discussed in Section 2.2.1, the anticipated volume of water needed to supply daily water demand at the proposed Marvindale Compressor Station is not anticipated to draw down the aquifer or create a significant cone of depression. No reduction in well production is anticipated as none of the proposed construction or operations activities would appreciably alter aquifer levels of available capacity.

With the exception of HDDs, pipeline construction activities are relatively shallow (generally less than 10 feet deep to the bottom of the pipe) and are not likely to impact groundwater turbidity. National Fuel has prepared a HDD and Inadvertent Return Contingency Plan that addresses the downhole operations of HDDs. As documented in that plan, the mechanics of a properly installed HDD largely avoid loss of drilling fluid at depth due to the filter cake that is formed by the bentonite slurry as the drill and reamers pass through the hole. A detailed inspection program as outlined in that plan addresses monitoring of HDD drilling fluid returns which ensures there is not a significant loss of drilling fluid into a cavity which could theoretically impact aquifer turbidity levels.

National Fuel does not propose to construct through any areas of known groundwater contamination. HDDs could migrate contaminants along the drill path if contaminants were to entrain in the recirculated mud; however, no HDDs or drills are anticipated to cross known areas of contamination making this an unlikely scenario.

There is a possibility that a spill of hazardous materials or hydrocarbon-based fluids, if left unattended, could eventually contaminate groundwater. However, National Fuel's construction activities will strictly adhere to FERC's Plan and Procedures as contained in the ESCAMP, as well as the SPRP. These plans clearly address the procedures and best management practices that will govern an inadvertent spill to the ground. Adherence to these plans will ensure potential contaminants do not pose a threat to groundwater contamination.

Finally, construction impacts to wells could pose a risk to groundwater contamination; however, National Fuel has identified wells within 150 feet of proposed workspaces (400 feet of the proposed HDD paths) and will fence off access from ROW near these wells prior to construction to avoid impacting them. As such, National Fuel does not anticipate impacts to ground water due to inadvertent damage to a well head.

Based off the combination of desktop review and field surveys, National Fuel does not anticipate any impacts to groundwater resources as a result of the Project. In the unlikely event that groundwater resources are impacted, National Fuel will coordinate with FERC and appropriate resource agencies to determine the necessary mitigation measures to be taken. As per Section 2.2.2 the UDCMP will be followed.

National Fuel will implement BMPs in addition to the procedures outlined in the ESCAMP to protect groundwater resources. The ESCAMP is provided in Appendix C and BMP Drawings are provided as Attachment 2 in the ESCAMP.

Specific measures for minimizing and mitigating potential impacts to groundwater will include the following:

- Trench Breakers - are intended to slow the flow of groundwater along the pipe trench to prevent soil piping and erosion of the trench alignment. Trench breakers will be constructed of materials such as sand, Sakrete bags, bentonite, or foam polyurethane.
- Trench Dewatering whenever silt laden water is pumped from the pipeline trench to temporarily dewater for construction purposes, sediment filtering bags will be used to prevent downstream sedimentation effects on surface water or groundwater supplies. Sediment filter bags, when implemented and maintained properly, prevent the discharge of heavily silt laden water by trapping particles larger than 150 microns. Filter bags will be positioned in vegetated upland areas, which will provide additional filtration upon discharge. The filter bags will be changed when they become half-full. The pumping rate through the filter bags shall be no greater than 750 gallons per minute or one-half the maximum specified by the manufacturer, whichever is less. If the water being discharged from the filter bag appears “milky” or cloudy, then corrals will be positioned at least 25 feet from any waterbody and closely monitored for proper function to prevent turbid water from entering a waterbody.
- Restricted Storage and Use of Hazardous Materials - Prior to construction National Fuel will identify within the contractor environmental stipulations and within the proposed Implementation Plan all private and public water supply wells within 200 and 400 feet of the ROW respectively. Refueling and storage of hazardous substances will be prohibited within 200 feet of private wells and 400 feet of municipal wells. The stream buffer area is the area 50 feet from the edge of water on both sides of the stream. Activities such as stacking cut logs, burning cleared brush, discharging water from trenches, and refueling and maintaining equipment will be done outside of buffer areas. These areas will also be seeded and mulched immediately after pipeline installation. Construction equipment will not be parked or stored in the buffer area. No overnight parking, fuel storage, fuel transfer, oil change or hydraulic fluid additions will occur within 150 feet of high quality or environmentally sensitive areas, unless the EI finds (in advance) no reasonable alternative, and National Fuel and its contractors have taken appropriate steps (including secondary containment structures) to prevent spills and provide for prompt cleanup in the event of a spill or as designated by an appropriate government authority.

- Environmental Inspection - will be performed by a Project EI to monitor that protective measures are in place to protect groundwater resources.
- Drinking water wells or springs within 150 feet of the proposed construction (400 feet of the HDD paths) will be evaluated through pre-construction testing where permitted by the landowner. National Fuel will continue to work with the landowners to confirm the presence of groundwater wells within 150 feet of the Project workspace and within the ROW, if present. Wells within 150 feet of the construction area will be staked and flagged for visibility. For wells that may be inside or adjacent to a work area, National Fuel will narrow the ROW/work area, where possible, to avoid the well; or, for wells within the workspace itself, National Fuel will surround each well site with a safety fence and use appropriate BMPs regarding protection of the well. Post construction testing will be conducted within 150 feet of the proposed construction at the request of landowners. Evaluation of drinking water well yields and water quality testing will be conducted prior to construction. Unfiltered water samples will be collected and analyzed at a laboratory for water quality parameters including: nitrate, pH, total dissolved solids, sulfate, iron, manganese, lead, hardness, barium, and strontium. Well yield shall be established by a minimally invasive quantity test and will be determined on a site-by-site basis, based on well access, well construction, and well area layout. Similar measures will be taken for water wells identified within 400 feet of the proposed HDD drill paths.

National Fuel identified areas along the proposed pipeline routes where the depth to bedrock is predicted to be within 60 inches (5 feet) of the soil surface (USDA- Natural Resource Conservation Service [NRCS] 2019). However, based on surface appearance observed in National Fuel's geotechnical field review of the Project, lack of outcrops, and proximity to existing pipelines, National Fuel does not anticipate that the need for blasting will be frequent or widespread. National Fuel will utilize other rock excavation techniques including hydraulic hoe hammers and ripper teeth if it encounters weathered or unconsolidated rock. However, it is likely that some isolated areas will encounter competent, consolidated bedrock. In these situations, blasting may be necessary. In such event, blasting will be carefully planned and monitored and will be done in a coordinated manner with the owners of any paralleling utilities. Should blasting occur, National Fuel will adhere to blasting permit requirements within the PAFBC's permit for in-stream blasting, if required.

If it is determined that a private water supply is damaged as a result of the Project, National Fuel will arrange for a temporary source of potable water until the water quality and/or well yield is restored. To minimize the risk of potential fuel or equipment fluid spills, National Fuel has developed a plan for SPRP, which would be implemented throughout the duration of construction (included in Appendix I).

2.3 Surface Water Resources

Surface waterbodies crossed by the Project were identified by field surveys conducted between September and October 2017, and May 2018. A listing of each waterbody identified within the study area is included in the Wetland Delineation and Stream Identification Report, which is provided as Appendix E. Table 2.3-1 of this report (provided as Appendix G) includes the name, type, milepost, designated use, and other descriptive information for each waterbody crossed by the Project. Table 2.3-2 provides the USGS mapped watersheds crossed by the Project, including Hydrologic Unit Code (HUC) eight basins and HUC 12 local watersheds.

National Fuel will cross waterbodies in accordance with the ESCAMP, using open trench or HDD crossing methods. In the event an HDD crossing is not feasible, applicable waterbodies will be

crossed with an open-cut/dry crossing utilizing flumes or dam and pump methods. If an intermittent stream or drainage ditch is dry at the time of construction, it will be open cut. However, all materials required to cross a stream or ditch using the open-cut flume or dam and pump crossing method will be on site in the event of a weather change that causes water flow to return to an intermittent stream. For non-HDD waterbody crossings, the pipeline will be buried with a minimum of five feet of cover. The Project has minimized additional temporary workspace (ATWS) locations and placed them at least 50 feet from wetlands or waterbodies. Construction and mitigation procedures are addressed in Section 2.3.6 of this report. Following construction, if disturbance has occurred within or adjacent to a waterbody, the waterbody crossing will be restored to pre-construction contours, slope, and channel characteristics (or better should erosive conditions exist).

Table 2.3-2: Watersheds Crossed by the Project

Facility & HUC 08 Basin[1]	HUC 12 Watershed[1]	Watershed Name[1, 2]	MP Begin	MP End	Crossing Length (miles)
Line YM58					
Upper Allegheny 05010001	050100010103	Marvin Creek	0.0	0.4	0.4
	050100010102	Red Mill Brook-Potato Creek	0.4	5.6	5.2
	050100010105	Potato Creek Outlet	5.6	10.0	4.4
	050100010308	Skinner Creek-Allegheny River	10.0	12.5	2.5
	050100010307	Allegheny Portage Creek	12.5	14.2	2.3
	050100010306	Card Creek-Allegheny River	14.2	17.6	3.4
	050100010305	Sartwell Creek	17.6	21.2	3.6
	050100010304	Fishing Creek	21.2	27.1	5.9
	050100010201	South Branch Oswayo	27.1	29.5	2.4
Line KL Extension					
Upper Allegheny 05010001	050100010103	Marvin Creek	0.0	0.4	0.4
Line YM224 Loop					
Upper Allegheny 05010001	050100010201	South Branch Oswayo	0.0	1.3	1.3
	050100010202	Clara Creek-Oswayo Creek	1.3	1.4	0.1
Line FM100 Abandonment					
Sinnemahoning 02050202	020502020305	Middle Bennett Branch Sinnemahoning Creek	0.0	0.3	0.3
	020502020305	Middle Bennett Branch Sinnemahoning Creek	1.8	1.8	<0.1
	020502020303	Laurel Run	4.8	4.8	<0.1
	020502020303	Laurel Run	4.9	4.9	<0.1
	020502020304	Medix Run	7.8	7.8	0.1
	020502020304	Medix Run	7.9	7.9	<0.1
	020502020304	Medix Run	10.0	10.0	<0.1
	020502020304	Medix Run	11.1	11.4	0.1
	020502020311	Mix Run	12.0	12.0	<0.1
	020502020311	Mix Run	12.8	12.8	<0.1

	020502020311	Mix Run	15.8	15.8	<0.1
	020502020311	Mix Run	22.1	22.3	0.1
	020502020312	Lower Bennett Branch Sinnemahoning Creek	22.9	23.6	0.4
	020502020207	Canoe Run Driftwood Branch Sinnemahoning Creek	26.1	27.0	0.8
	020502020502	Grove Run-Sinnemahoning Creek	29.6	29.6	0.1
	020502020407	Lower First Fork Sinnemahoning Creek	30.7	31.0	0.3
	020502020407	Lower First Fork Sinnemahoning Creek	33.4	33.5	0.1
	020502020406	Middle First Fork Sinnemahoning Creek	38.2	38.2	<0.1
	020502020406	Middle First Fork Sinnemahoning Creek	40.1	44.1	0.1
Tamarack Compressor Station					
Middle West Branch Susquehanna - 02050203	020502030203	Drury Run	N/A	N/A	0.1
Marvindale Compressor Station and Marvindale Interconnect Station					
Upper Allegheny 05010001	050100010103	Marvin Creek	0.0	0.4	0.3
	050100010102	Red Mill Brook-Potato Creek	0.4	0.4	0.1
Carpenter Hollow OPP Station					
Upper Allegheny 05010001	050100010201	South Branch Oswayo	29.5	29.5	0.00
Costello Compressor Station					
Sinnemahoning 02050202	020502020406	Middle First Fork Sinnemahoning Creek	44.1	44.1	0.1
Leidy Interconnect LDC 2245					
Middle West Branch Susquehanna - 02050203	020502030203	Drury Run	N/A	N/A	0.1
Station WHP-MS-4317X					
Sinnemahoning 02050202	020502020406	Middle First Fork Sinnemahoning Creek	40.5	40.5	0.1

[1] Data Source: USGS National Hydrography Dataset, Watershed Boundary Dataset.

[2] The abandoned facilities also cross the Hunts Run (020502020207) watershed; however, no ground-disturbing activities will occur in this watershed.

2.3.1 Contaminated Waters and Sediments

The EPA's National Sediment Quality Survey (NSQS) National Sediment Inventory was reviewed to generally characterize potential contamination of aquatic bed sediment found throughout the Project area. According to NSQS reports, the Project does not cross EPA-designated Areas of Probable Concern (USEPA, 2004). National Fuel also reviewed PADEP's eMapPA system to identify impaired waterbodies within 500 feet of project workspaces (PADEP 2019f). Seven impaired waterbodies were identified within 500 feet of the project as identified in Table 2.3-3. Of these seven waterbodies, only Fishing Creek will be directly impacted by the project where a dry crossing method (dam/pump and/or flume) is proposed. Fishing Creek does not have a known source linked to its impaired status. The dam and pump and/or flume method will minimize resuspension of potentially contaminated sediments in the river by eliminating flow through the open cut during the time of the river crossing. National Fuel proposes to cross this waterbody in low flow conditions and will have sufficient pumps on site to accommodate flows at the time of the

crossing. Further, a dewatering structure with a fine meshed filter bag will be used if dewatering of the trench is required. Care will be taken to replace fine grained excavated material into the trench around the pipe with course native material at channel bed height additional washed rock will be used augment the native material along the trench line to avoid resuspension of sediment. When removing the dam structures, care will be taken to slowly fill the work area to avoid a large flush of water and resuspension of sediment. This crossing method is further discussed in Section 2.3.6.

National Fuel has contacted Amanda Allison of PADEP Regional Permit Coordination Office to discuss the crossing of Fishing Creek. Specific notes documenting the discussion points of that meeting were sent to Ms. Allison for confirmation on September 25, 2019 and are provided in Appendix D. Ms. Allison confirmed that no specific mitigation measures would be required of National Fuel for the proposed open cut crossing of Fishing Creek.

Table 2.3-3: Impaired Waterbodies within 500-feet of Project Work Areas

Facility[1]/ County	Milepost	Waterbody Name	Contaminant	Distance from Waterbody (ft.)	Potential Project Impacts
Line YM58					
McKean	14.0	Allegheny Portage Creek	Source Unknown - Pathogens	291	HDD, no direct impacts to this waterbody
McKean	14.1	Allegheny Portage Creek	Source Unknown - Pathogens	0	HDD, no direct impacts to this waterbody
Potter	23.0	Fishing Creek	Source Unknown - Pathogens	0	Implementation of ESCAMP will minimize impacts to this waterbody
Potter	23.5	UNT to Fishing Creek	Source Unknown - Pathogens	0[2]	No direct project impacts from use of existing access road
Line FM100 Abandonment					
Clearfield	0.0	UNT to Bennet Branch Sinnemahoning Creek	Source Unknown - Pathogens	0[3]	No direct project impacts because no in-water work is proposed
Clearfield	0.1	Bennet Branch Sinnemahoning Creek	Acid Mine Drainage - pH	0[3]	No direct project impacts because no in-water work is proposed
Cameron	23.3	Bennet Branch Sinnemahoning Creek	Acid Mine Drainage - pH	409	No direct project impacts due to distance from workspace

[1] Project components not addressed in table do no come within 500 feet of impaired waterbodies.
[2] Crossed by PAR-31 (existing access road with no proposed improvements); will not be impacted by any in-water work.
[3] Although the workspace identified crosses these waterbodies all land disturbance associated with the abandonment activity would be limited to upland areas and will not directly impact the waterbody

2.3.2 Public Watershed Areas

The Project is located within two major drainage basins, the Ohio River Drainage Basin and the Susquehanna River Drainage Basin (PA Association of Conservation Districts, 2007). No state designated water protection areas are crossed by the Project. The PA Department of Environmental Protection (PADEP) web-based mapping application (eMapPA) and GIS data obtained from the PADEP Open Data Portal was also reviewed to determine the coverage of

public water supply service areas. Two public water supply service areas extend into the Project area (PADEP 2019f). The first, Huston Township Municipal Authority public water supply (WUDS ID #19054) in Clearfield County, intersects with abandonment site AS-1, AS-2, AS-3, AS-4, and two temporary access roads (HSC_832 Access and RR Access). However, the Huston Township Municipal Authority does not have any groundwater or surface water intake sites, purchasing water from the nearby Jay Township Water Authority upstream of the Project (Huston Township Municipal Authority, 2018). Therefore, no impacts from the Project are anticipated. The second public water supply area is the Borough of Driftwood, which intersects with AS-25 and one temporary access road (RR Access). This public water supply area does have a surface water intake, located along Nanny Run in Gibson Township, 2.2 miles upstream of the Project (Driftwood Borough 2019). As the surface water intake site is located upstream of the Project, no impacts to public drinking water are anticipated. Additionally, all Project activities associated with Line FM100 involve abandoning facilities in place and, with the implementation of the Project ESCAMP, should not interfere with the public water supply systems.

2.3.3 Floodplains/Floodways

The Federal Emergency Management Agency (FEMA) National Flood Hazard Layer (NFHL) geodatabase (FEMA 2019) was reviewed for presence and extent of mapped 100-year floodplains crossed by the Project. The NFHL Flood Zone A mapped areas are equivalent to the 100-year floodplain, also known as areas with a one percent annual chance of flooding. Aboveground facilities have been sited outside of the 100-year floodplains; however, pipeline construction will occur across multiple 100-year floodplains as identified in Table 2.3-4. Temporary impacts to floodplains are unavoidable, due to long linear floodplains, the route of the Project and the nature of the Project activities. The construction methods proposed for the pipeline crossings will not result in any permanent fill of floodplains or alterations to flood capacity as temporary construction impacts will be restored to pre-construction contours. In addition to this Joint Permit Application, National Fuel will prepare and submit required documentation for floodways with the PADEP through the Erosion and Sedimentation General Permit (ESCGP)-3 application to the various county conservation districts for the portions of the proposed pipeline and associated construction ROW, access roads, and additional temporary workspaces located within the FEMA 100-year floodplains (i.e., Flood Zone A). Where 100-year floodplains were not identified for waterbodies, National Fuel adhered to PADEP's guidelines and identified a 150-foot area along the feature as the floodway area. Floodplains/floodways are shown on Attachment B of Appendix E and Appendix P.

Table 2.3-4: FEMA 100-year Floodplains Crossed by the Project

Facility[1]	County	MP Begin	MP End	Construction Area (acres)	Operation Area (acres)	Waterbody Name[2]
Line YM58						
Pipeline	McKean	3.4	3.4	0.1	0.1	Robbins Brook
Pipeline	McKean	3.6	3.7	0.4	0.3	Donley Fork
Pipeline	McKean	6.6	6.8	5.4	1.8	Potato Creek
Pipeline	McKean	8.0	8.0	0.4	0.3	White Hollow
Pipeline	McKean	11.2	11.2	0.3	0.2	Bemis Hollow
Permanent Access Road (PAR)-14	McKean	11.8	11.8	0.1	0.1	Bemis Hollow
Pipeline	McKean	14.0	14.1	1.4	0.7	Allegheny Portage Creek

Staging Area (SA)-6	McKean	13.9	14.0	8.1	0.0	Allegheny Portage Creek
TAR-22	McKean	14.0	14.5	2.6	0.0	UNT to Allegheny Portage Creek
Pipeline	McKean	14.7	15.2	6.9	2.7	Allegheny River
Pipeline	McKean	15.7	15.8	0.4	0.2	Coleman Creek
PAR-25	McKean	17.1	17.1	<0.1	<0.1	Coleman Creek
SA-7	McKean	N/A	N/A	10.6	0.0	Potato Creek
Pipeline	Potter	19.1	19.2	0.3	0.2	Sartwell Creek
Pipeline	Potter	23.0	23.1	0.8	0.5	Fishing Creek
PAR-31	Potter	23.5	23.5	0.2	0.2	White Chopin Hollow
Line FM100 Abandonment						
Pipeline	Clearfield	0.0	0.2	1.67	0.0	Bennett Branch Sinnemahoning Creek
Pipeline	Clearfield	1.4	1.4	<0.1	0.0	UNT to Bennett Branch Sinnemahoning Creek
Pipeline	Clearfield	1.7	1.7	<0.1	0.0	UNT to Bennett Branch Sinnemahoning Creek
Pipeline	Clearfield	2.1	2.1	<0.1	0.0	UNT to Bennett Branch Sinnemahoning Creek
Pipeline	Clearfield	4.8	4.8	0.1	0.0	Laurel Run
Pipeline	Cameron	7.9	7.9	0.1	0.0	Medix Run
Pipeline	Cameron	22.1	22.1	0.1	0.0	Mix Run
Pipeline	Cameron	23.1	23.2	0.5	0.0	Bennett Branch Sinnemahoning Creek
Pipeline	Cameron	23.4	23.5	0.5	0.0	Bennett Branch Sinnemahoning Creek
Pipeline	Cameron	23.9	23.9	<0.1	0.0	Little Dent Run
Pipeline	Cameron	25.0	25.0	<0.1	0.0	Boyer Run
RR Access	Cameron	26.0	26.0	1.0	0.0	Driftwood Branch Sinnemahoning Creek
Pipeline	Cameron	26.8	27.0	0.7	0.0	Driftwood Branch Sinnemahoning Creek
Pipeline	Cameron	27.0	27.3	0.4	0.0	Driftwood Branch Sinnemahoning Creek
Pipeline	Cameron	27.4	27.4	<0.1	0.0	Johnson Run
Pipeline	Potter	41.2	41.2	<0.1	0.0	Bailey Run
Pipeline	Potter	42.5	42.5	<0.1	0.0	West Darian Run

[1] Facilities not identified in the table do not cross floodplains.
[2] Waterbody names per PADEP's Chapter 93 Designated Use Streams database.

2.3.4 Hydrostatic Test Water

The new pipelines will be hydrostatically tested prior to placing the pipelines into service. National Fuel will utilize approximately 850,000 gallons of water to test Line YM58, 12,280 gallons of water to test Line KL Extension, and 165,088 gallons to test Line YM224 Loop. National Fuel plans to obtain water from a local producer freshwater pond, near the Marvindale Compressor Station. The pond has a 2,000,000 gallon capacity and is filled from the local producer's water wells. Used hydrotest water will be filtered and returned to the pond. Alternatively, National Fuel may elect to obtain water from municipal water sources. Groundwater is not proposed as a water source for construction (e.g., hydrostatic testing). The following procedure will be followed for any hydrostatic test.

The new pipelines will be cleaned using a cleaning pig propelled by compressed air. The pipelines will then be filled with water, without the use of additives (chemicals), and hydrostatically tested. Multiple test sections will be necessary to complete hydrostatic testing of the pipeline; the quantify of water necessary for each test section will vary depending on length of pipe in each test section. At present National Fuel does not have a contractor secured for the construction of the project and will not have a fully-developed hydrostatic test plan detailing number of test sections and discharge locations until a contractor is secured; however, National Fuel has estimated the gallons of water necessary for hydrotesting as follows:

- Line YM58 – 850,000 (to be used in multiple sections of the Line YM58
- Line KL Extension – 12,208
- Line 224 Loop – 165,088

Prior to hydrostatic testing, National Fuel would fully permit all water withdrawals or discharges in a manner which complies with state and federal regulatory requirements, as well as the National Fuel ESCAMP. If National Fuel cannot obtain permits for surface water withdrawal in a timely fashion, hydrostatic test water and resultant discharge will be trucked to and from the project (from a private or municipal source).

Used hydrotest water will be filtered and discharged in an approved, location and in accordance with the ESCAMP and industry BMPs.

2.3.5 Sensitive Surface Waters

Table 2.3-1 lists waterbodies crossed by the Project, including information relevant to sensitive surface water resources, as summarized below.

PA Title 25 Chapter 93 sets forth water quality standards for surface waters. The provisions of PA Title 25 Chapter 93 are issued under Sections 5 and 402 of the Clean Streams Law. Waterbodies in PA are assigned one of the following aquatic life water quality classifications based upon PA Title 25 Chapter 93: Cold Water Fishes (CWF), Warm Water Fishes (WWF), Migratory Fishes (MF), and Trout Stocked Fishery (TSF). Waterbodies in PA may also be assigned one of the following special protection water quality classifications based upon PA Title 25 Chapter 93: High Quality (HQ) or Exceptional Value (EV) waters. Waterbodies in PA may also be assigned a water quality classification that combines aquatic life and special protection (i.e., HQ-WWF or HQ-CWF). Sensitive surface waters with a designated use classification of HQ or EV are listed in Table 2.3-1.

PA Clean Streams Law (35 P.S. §691.1 et seq.) and regulations at PA Code Title 25, including Chapters 91, 92, 93, 95, 96, 102, and 105 are also known as antidegradation rules. The basic concept of antidegradation is to promote the maintenance and protection of existing water quality for HQ and EV waters, and protection of existing uses for surface waters because it recognizes that existing water quality and uses have inherent value worthy of protection and preservation.

Existing uses are protected when PADEP makes a final decision on any permit or approval for an activity that may affect a protected use (PADEP 2019g). Existing water quality is also protected for HQ and EV waters through the antidegradation rules and there are also additional requirements, such as antidegradation performance standards for erosion and sediment control. Sensitive surface waters with an existing use classification of EV include Whitney Creek and South Branch Oswayo Creek.

All streams crossed by the Project are considered sensitive surface waters due to their being either listed by the PFBC as a stream section that supports the natural reproduction of trout (NRT) or are an UNT that contributes to the water quality of the naturally reproducing trout stream (PFBC 2019a). Pennsylvania Code Title 58, Chapters 57.4 and 57.11 defines Wild Trout Waters as: 1) Naturally Reproducing, 2) Class A, 3) Trout Stocked, or 4) Wilderness Trout waters. In-stream work restrictions for Wild Trout Waters follow:

- Naturally Reproducing Trout Waters: October 1 to December 31,
- Class A: October 1 to April 1, and
- Trout Stocked Waters: March 1 to June 15.

No streams crossed by the Project are listed on the PFBC website as being Class A wild trout streams or wilderness trout streams (PFBC, 2019c and 2019d). These listings can be found on Table 2.3-1. National Fuel will abide by these in-stream work restrictions as well as FERC published instream restrictions for cold water fisheries, unless expressly permitted in writing by PAFBC. Specific PAFBC in-stream work restrictions or conditions places upon any stream crossed by the project will not be known until PADEP issues the ESCGP-3 and Chapter 105 permits. However, National Fuel will abide by any in-stream work time of year restrictions and anti-degradation performance standards for erosion and sediment control that are identified in those permits by the respective agencies.

The Project does not cross any scenic rivers (PADEP 2019f). Project waterbody crossings are not considered impaired (PADEP 2019f). There are two public drinking water surface water intakes are located within five miles downstream of the Project waterbody crossings, as discussed in Section 2.3.2. No National Wild and Scenic Rivers have been identified within the USGS eight-digit HUC watershed where the Project facilities are located (USGS 2017).

National Fuel will follow the ESCAMP; the Commission's Upland Erosion Control, Revegetation, and Maintenance Plan (Plan), (2013a); and the Commission's Wetland and Waterbody Construction and Mitigation Procedures (Procedures), (2013b), to minimize impacts to streams during construction.

2.3.6 Waterbody Construction and Mitigation Procedures

National Fuel has developed and will follow BMPs based on the requirements in the ESCAMP and the Commission's Procedures. Crossing methods for each of the waterbodies are indicated on Table 2.3-1.

- Dam and Pump Crossing Method – will be used where pumps can adequately transfer water around the work area and there are no concerns about sensitive species passage. The Dam and Pump method ensures stream flow is maintained. Potential water quality impacts are minimized or avoided by screening pump intakes and preventing streambed scour at the pump discharge by utilizing an energy dissipater.
- Flume Stream Crossing Method – requires installation of one or more flume pipe(s) to convey water across the trench and a diversion structure to funnel water into the flume pipe(s). The Flume crossing method ensures stream flow is maintained. Water quality

impacts are minimized because trench spoil does not come into contact with stream water and, therefore, stream sediment is not mobilized.

- Dry Non-Specified Crossing – this crossing method designation means that either the Dam and Pump or Flume crossing method will be utilized, or the selection will be determined in the field at the time of crossing by the construction contractor in consultation with National Fuel's EI. The method selected will be that method which provides the least disturbance and most expedient crossing to minimize overall impact.
- Multi-Flume Method – this crossing method will be implemented where stream flow is too high to be accommodated by a single flume. Similar to the single flume method, in which a flume pipe is installed to convey water across the trench, the Multi-Flume method can utilize several flumes in areas of high flow. Water quality impacts are minimized by limiting trench spoils contact with stream water. All in stream pipe fabrication is completed prior to stream ditching to minimize duration of stream diversion. In stream pipe is installed five feet below designed bottom of drain.
- Open-Cut Method – this crossing method will be used to cross intermittent streams and manmade channelized drainages in instances where there is no flow during the time of pipeline installation.
- HDD Method – this crossing method involves drilling a borehole under an area pulling a prefabricated segment of pipe through the borehole, thereby avoiding direct disturbance to the waterbody traversed. HDDs are most commonly used to cross underneath sensitive or difficult to construct areas such as areas with slope stability issues, roads, wetlands and waterbodies. HDDs provide several advantages over typical pipeline construction and installation methods, such as avoidance of surface disturbance, riparian tree clearing, impacts to banks, substrates, and potential sedimentation from construction activities.

National Fuel intends, to the extent practicable, to perform stream crossings during the dry season to minimize impacts to the stream. Weather forecasts will be factored into scheduling work for individual crossings. Based on the characteristics of the waterbodies, it is anticipated that the majority of the minor (10 feet or less from water's edge to water's edge) and intermediate streams identified in Table 2.3-1 may be dry (no flow) at the time of crossing. Crossing of intermittent streams during no flow situations will be via open-cut with provisions to employ a dry crossing if conditions change during construction.

Under conditions of stream flow, dry non-specified methods will be implemented at the contractor's discretion and the approval of National Fuel's EI and scaled accordingly to prevent interruption of stream flow and maintain water quality. In the event that silt laden water is encountered below the dry streambed, trench dewatering will be performed in accordance with the ESCAMP, which specifies the use of sediment filtering bags whenever silt laden water is pumped from the pipeline trench.

National Fuel will conduct construction activities adjacent to and when crossing waterbodies in accordance with the ESCAMP an in accordance with PADEP requirements. In addition, the Project has developed, and will construct in accordance with, the Project SPRP Plan. These mitigation efforts, along with construction BMPs will be strictly enforced by the EI during construction to avoid and minimize impacts to waterbodies and their adjacent wetlands and/or riparian buffers.

National Fuel will utilize a variety of mitigation measures to minimize potential adverse impacts to waterbodies resulting from the construction of the proposed facilities. These measures may include but not be limited to:

- Expediting construction in the waterbody, thereby reducing disturbance to the streambed and adjacent soils and the quantity of suspended sediments.
- HDD may be utilized when practicable to cross waterbodies and wetlands. HDD avoids or minimizes direct impacts to waterbodies and wetlands. However, in the event the HDD fails or there is an inadvertent return associated with the HDD, National Fuel has prepared a HDD and Inadvertent Return Contingency Plan to respond to these situations (see Appendix J).
- Construction of the waterbody crossing as perpendicular to the axis of the channel when engineering and routing conditions allow.
- Maintaining ambient downstream flow rates.
- Removing construction materials and related structures from each waterbody promptly after construction.
- Restoring the waterbody to its original configuration and contour to the extent possible.
- Stabilizing the banks of the waterbody and adjacent areas using erosion control measures and vegetative cover as soon as possible after construction.
- Inspecting the crossing point periodically during and after construction, and repairing areas as needed.

Restoration activities associated with stream crossings will be performed immediately after completion of pipeline installation. Channel stability is not perceived as a construction or restoration problem at any of the surface crossing locations observed to date. During clearing operations, vegetative strips will be maintained along the bank of the waterbody. Trees will be cut flush with the surface, but no stumps or roots will be removed except in the trenchline and where needed to safely construct bridges or travel lanes. The length of actual, temporary bank disturbance will be limited to the width of trench excavation necessary to place fabricated pipe in the crossing (typically less than 10 feet) and the travel area which will be bridged across the stream. Native stone will be used to the extent possible during streambed restoration and stabilization. During the operational phase, native plant species, with the exception of deep rooting trees, will be allowed to reestablish along the banks of the waterbody. The bank conditions will be inspected twice annually during the operational phase of the Project. Evidence of bank instability caused by pipeline construction or posing a threat to the pipeline will be promptly addressed.

BMPs will be implemented throughout construction to protect the environment and to minimize potential effects of the pipeline Project.

Construction equipment will be limited to that needed to clear and grade the construction right-of-way, excavate the trench, fabricate and install the pipeline, backfill the trench and restore the construction ROW. Equipment crossings will be performed utilizing travel mats or portable bridges elevated above the water level. Additionally, the mats will be inspected and periodically cleaned of built-up soil to reduce the potential impact of sediment entering the water.

Temporary impacts to surface water environments associated with each crossing method include degradation of water quality and minimal loss of aquatic habit. Controls will be utilized to minimize turbidity and siltation. Crossings performed perpendicular to the waterbody will minimize the stream channel's temporary and short-term habitat loss. Little or no long-term impacts are anticipated. Careful consideration of pre-construction conditions of the waterbody and its banks, and efforts to reinstate these features to pre-construction conditions will prevent permanent impacts to the waterbody as a result of the construction of the Project.

2.4 Wetlands

2.4.1 Existing Resources

Wetland delineation field surveys were completed to identify the location, extent, and total number of wetlands crossed by the Project, and in order to assess the overall wetland impacts attributable to the Project. Mott MacDonald, on behalf of National Fuel Gas Supply Corporation (National Fuel), conducted a wetland and waterbody field delineation from September 29 through October 11, 2017, as well as on June 13, 2018, and July 31 through August 8, 2018 to identify potential "Waters of the United States," as defined by the United States Army Corps of Engineers (USACE) (33 CFR 328.3) present within the environmental survey corridor developed for the proposed FM100 Project (Project). The Project is located within portions of Cameron, Clearfield, Clinton, Elk, McKean, and Potter Counties Pennsylvania. Additional surveys were conducted from July 28 through August 7, 2020 to address comments received by the Pennsylvania Department of Environmental Protection (PADEP) in their Technical Deficiency letter dated July 10, 2020.

The wetland delineation was based on Mott MacDonald's professional judgment and interpretation of the technical criteria presented in the Corps of Engineers Wetlands Delineation Manual, Environmental Laboratory, 1987 (Manual), JD Form Instructional Guidebook (USACE 2007) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0) (USACE 2012). Wetland boundaries, where present, were delineated using the routine onsite determination method described in the Manual supplemented by The National Wetland Plant List (Lichvar 2016) and U.S. Department of Agriculture (USDA) Natural Resources Conservation Service's Soil Survey Geographic Database (SSURGO) and metadata (NRCS 2019). Personnel reviewed U.S. Geological Survey (USGS) topographic mapping, U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) Mapping, USDA's SSURGO maps, existing aerial photography, and the hydric soils list from the SSURGO's metadata file. These resources were used to identify potential wetland areas prior to conducting the fieldwork. Other potential jurisdictional water bodies located within the Project area, such as streams and ponds, were also identified from these resources.

The MP, classification, length of crossing, and acreage of impact of total wetlands crossed (construction and operation) by the Project are shown in Table 2.4-1 (Appendix H). Results of the wetland delineation are shown on aerial mapping (Appendix E) which identifies the boundaries of delineated wetlands and waterbodies in relation to Project work areas. Survey results, methodology, and copies of the wetland delineation field forms are provided in the Delineation Report in Appendix E. There are no wetlands intersecting proposed aboveground facilities.

All delineated wetlands were palustrine, non-tidal wetlands classified as either emergent, scrub-shrub, or forested wetlands. A description of the wetland communities observed in the Project area are provided below.

2.4.1.1 Palustrine Emergent Wetlands

Palustrine Emergent (PEM) wetlands observed within the Project area were classified as either depressional, flat, slope or riverine wetlands under the hydrogeomorphic (HGM) classification system; which are wetlands that periodically receive overbank flooding from rivers or streams. In general, PEM wetlands have less than 30-percent areal coverage by woody vegetation and are dominated by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants. PEM wetlands were commonly observed in disturbed areas such as utility ROWs, depressions related to construction or maintenance activities, excavated depressions, ditches, or swales.

PEM wetlands were primarily dominated by sedges (*Carex* spp.), reedgrass (*Calamagrostis* spp.), deertongue (*Dichanthelium clandestinum*), spinulose woodfern (*Dryopteris carthusiana*), mannagrass (*Glyceria* spp.), jewelweed (*Impatiens capensis*), rushes (*Juncus* spp.), rice cutgrass (*Leersia oryzoides*), Japanese stiltgrass (*Microstegium vimineum*), sensitive fern (*Onoclea sensibilis*), cinnamon fern (*Osmundastrum cinnamomeum*), New York fern (*Parathelypteris noveboracensis*), swamp dewberry (*Rubus hispidus*), woolgrass (*Scirpus cyperinus*), violets (*Viola* spp.), and mosses. In the Project area, emergent wetlands were found on 11.7 acres of construction workspaces.

2.4.1.2 Scrub-Shrub Wetlands

Palustrine Scrub-shrub (PSS) wetlands primarily consisted of riparian communities classified as either slope or riverine wetlands under the HGM classification system. Slope wetlands are developed and maintained primarily by groundwater discharge (i.e., seeps and springs) and riverine wetlands periodically receive overbank flooding from rivers or streams (i.e., banks and floodplains). In general, PSS wetlands are dominated by woody vegetation including true shrub species and tree species less than 20-feet tall and having an average DBH less than three inches.

PSS wetlands were primarily dominated by black willow (*Salix nigra*); however, other commonly observed tree saplings included red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), Eastern hemlock (*Tsuga canadensis*), and hornbeam (*Carpinus caroliniana*). Other shrubs commonly observed included swamp rose (*Rosa palustris*), meadow-sweet (*Spirea alba*), and dogwoods (*Cornus* spp.). The herbaceous strata were commonly dominated by sedges (*Carex* spp.), deertongue (*Dichanthelium clandestinum*), spinulose woodfern (*Dryopteris carthusiana*), jewelweed (*Impatiens capensis*), rushes (*Juncus* spp.), Japanese stiltgrass (*Microstegium vimineum*), sensitive fern (*Onoclea sensibilis*), cinnamon fern (*Osmundastrum cinnamomeum*), New York fern (*Parathelypteris noveboracensis*), swamp dewberry (*Rubus hispidus*), woolgrass (*Scirpus cyperinus*), violets (*Viola* spp.), and mosses. In the Project area, PSS wetlands were found on 1.8 acres of construction workspaces.

2.4.1.3 Forested Wetlands

Palustrine Forested (PFO) wetlands primarily consisted of a mature deciduous bottomland hardwood wetland forested community. Forested wetlands within the Project Study Area (PSA) were classified as either depressional, flat, slope, or riverine wetlands under the HGM classification system. Depressional wetlands occur within closed topographic basins, often created by prior excavations, and maintained by either groundwater discharge, runoff, or direct precipitation. Flat wetlands are developed and maintained primarily by direct precipitation, whereas slope wetlands are developed and maintained primarily by groundwater discharge (i.e., seeps and springs), and riverine wetlands periodically receive overbank flooding from rivers or streams (i.e., banks and floodplains). In general, forested wetlands are dominated (areal extent greater than 30% cover) by woody vegetation greater than 20-feet tall with tree species having an average DBH greater than three inches.

Common trees found in PFO wetlands throughout the Project Study Area (PSA) include red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), Eastern hemlock (*Tsuga canadensis*), and hornbeam (*Carpinus caroliniana*). Primary midstory and understory associates include saplings of the tree species previously identified, as well as, black willow (*Salix nigra*), swamp rose (*Rosa palustris*), meadow-sweet (*Spirea alba*), and dogwoods (*Cornus* spp.). The herbaceous strata were commonly dominated by sedges (*Carex* spp.), deertongue (*Dichanthelium clandestinum*), spinulose woodfern (*Dryopteris carthusiana*), jewelweed (*Impatiens capensis*), rushes (*Juncus* spp.), Japanese stiltgrass (*Microstegium vimineum*), sensitive fern (*Onoclea sensibilis*), cinnamon fern (*Osmundastrum cinnamomeum*),

New York fern (*Parathelypteris noveboracensis*), swamp dewberry (*Rubus hispidus*), woolgrass (*Scirpus cyperinus*), violets (*Viola* spp.), and mosses. In the Project area, PFO wetlands were found on 1.1 acres of construction workspaces.

2.4.1.4 Palustrine Unconsolidated Bottoms

Palustrine Unconsolidated Bottom (PUB) wetland areas are characterized as open water ponds that may include fringe wetlands with vegetative cover less than 30 percent. All ponds identified in the PSA were man-made features excavated or impounded for agriculture. In the Project area, PUB wetlands were found on 0.1 acres of construction workspace for the Project.

2.4.1.5 Wetland Soils

Soils at the PFO wetland data points were determined to be hydric and the characteristics were within the range described by the NRCS for these mapping units (NRCS 2019). The typical soil profile had a clay loam texture and a gleyed matrix color of dark gray (Munsell color of N 4/) throughout the upper 20 inches of the profile. No redoximorphic features (i.e., concentration mottles, oxidized rhizospheres, gleyed pore linings, moderately cemented concretions of iron and/or manganese, or matrix depletions) were observed in the upper 20 inches of the profile. The soils within wetland plot locations were determined to meet the USACE Regional Supplement hydric soil indicator for Loamy Gleyed Matrix (F2).

At upland plot locations, soils had no evidence of reducing conditions. These upland soils were determined to be non-hydric and characteristics were within the range described by the NRCS for these mapping units (NRCS 2019). The typical upland soil profile had a clay loam texture, with a matrix color of very dark gray to grayish brown (Munsell color of 2.5Y 3/1 or 3/2).

Wetlands that were associated with manmade drainage ditches located in agricultural areas were identified based on visual observations of standing water (hydrology indicator), the presence of hydrophytic vegetation, and the presence of ordinary high-water mark (OHWM) indicators along ditch banks. All agricultural pastures, fallow fields, and open land were sampled to determine whether wetland indicators were present in the upper 20-inches of the soil profile. Cultivated cropland fields in the Project area were planted in cotton or sorghum. All cultivated cropland fields were considered upland areas due to managed activities such as plowing, furrowing, irrigating, harvesting, and drainage ditches that have significantly altered the natural hydrology, soil structure, and plant communities. Cultivated cropland soils that were sampled did not meet hydric soil criteria in the upper 20-inches of their profiles.

2.4.2 Construction and Operation Impacts and Mitigation

All wetlands intersecting the Project workspace, including the permanent ROW, TWS, ATWS, contractor yards, and access roads are accounted for in Table 2.4-1. Temporary and permanent impacts to affected wetlands are also summarized in Table 2.4-1. National Fuel has minimized the construction ROW in wetlands wherever possible; however, due to the co-location of the project with other facilities, steep terrain or other workspace constraints, total workspace exceeding 75 feet is required at certain wetland crossings. Table 2.4-2 identifies locations where workspaces exceeds 75 feet in width in wetlands and provides justifications for these workspaces. Minimization of the construction ROW within wetlands is determined by the amount of topsoil that must be segregated and the width necessary to maintain a trench under varying degrees of soil saturation. It will not be possible to reduce the width of the construction ROW in wetland areas where the depth of topsoil is 12 inches or greater due to the space requirements to safely segregate and stockpile the topsoil.

In general, the following protocols will be followed for dry wetlands:

- Standard pipeline construction methods can be used in wetlands where soils are dry enough at the time of construction to support equipment.
- In dry wetlands topsoil segregation must be used (as long as there is sufficient topsoil present to allow for mechanical separation by equipment).
- Install filter fence across ROW at edge of wetland.
- If spoil and silt cannot be contained within the ROW (i.e., approved working limits), install filter fence at the edge of the construction ROW; remove during cleanup.
- Minimize vegetation clearing and stump removal within the wetland, only remove cut vegetation and stumps in trench line or to safely install travel lane.
- Segregate topsoil over trench-line.
- Install trench breakers at each wetland boundary (on upland side) and trench plugs every 100-ft through wetlands.

In general, the following protocols will be followed for saturated wetlands:

- Wetlands topsoil segregation is not required.
- Minimize vegetation clearing and stump removal, only remove cut vegetation and stumps in trench line or to safely install travel lane.
- Permanent slope breakers will be installed at the base of all slopes adjacent to wetlands.
- Clean rock with Geo-textile or timber mats can be used for the temporary road.
- Timber mats can only be two layers deep.
- Remove any timber mats used during construction in wetlands.
- Weld pipe outside the wetlands and carry in or use the push pull method.
- Install trench breakers at each wetland boundary (on upland side) and trench plugs every 100-ft through wetlands.
- Do not use brush mats.
- Do not use upland soils for temporary roads.

Most impacts to wetland vegetation resulting from the proposed Project are expected to be minor and short-term. PEM wetlands are expected to revegetate and continue to perform their functions and values. Impacts to PSS and PFO wetlands are anticipated to be short-term in nature; however, routine vegetative maintenance in accordance with the Commission's Plan and Procedures will maintain some PSS and PFO wetlands in an emergent state. National Fuel will coordinate with the PADEP and USACE regarding appropriate mitigation measures for vegetation conversion impacts to PSS and PFO wetland types.

Wetland crossings, restoration and revegetation will be performed in accordance with National Fuel's ESCAMP which incorporates the Commission's Procedures and other BMPs developed by National Fuel in response to decades of experience constructing pipelines in Pennsylvania.

In general, revegetation of most wetland areas disturbed during construction should occur naturally and is generally favored. During routine maintenance of the permanent ROW, tree size vegetation will be controlled within the permanently maintained ROW. Temporary revegetation using annual rye grass will be used. Mulch, lime, or fertilizer will not be applied to wetland areas of the construction ROW, unless requested by a state or local regulating agency.

The success of wetland revegetation will be monitored and recorded annually until revegetation is successful. Wetland revegetation shall be considered successful if the wetland satisfies the current federal definition for a wetland (i.e., soils, hydrology, and vegetation), vegetation is at least

80 percent of either the cover documented for the wetland prior to construction or in adjacent wetland areas not disturbed by construction, and invasive species and noxious weeds are absent unless they are abundant in adjacent areas not disturbed by construction. Within three years after construction, a report will be filed with the Commission identifying the status of the wetland revegetation efforts and documenting success. For any wetland where revegetation is not successful at the end of three years, a remedial revegetation plan to actively revegetate wetlands will be developed and implemented (in consultation with a professional wetland ecologist), and a progress report will be filed annually until wetland revegetation is successful.

National Fuel has identified all necessary permits and approvals that will be required for construction of the Project through wetlands. The USACE is the regulating federal agency for impacts to wetlands and the Project. In compliance with federal and state regulatory permitting frameworks relative to wetland protection, National Fuel has developed a Project-specific wetland mitigation plan for the review of the USACE and PADEP (see Appendix Q).

Table 2.4-2: Areas where Construction Workspace is greater than 75-feet in Wetlands

Wetland ID	MP Begin	MP End	ROW Width (ft)	Site-Specific Justification
Line YM58				
Wetland 039	6.7	6.7	150	ATWS #44 is needed for HDD pad and drill operations. Timber mats will be used to cover this wetland to avoid impacts.
Wetland 051	7.8	7.8	100	ATWS #52 is needed to stage equipment and stockpile topsoil in support of stream crossing (Stream 041).
Line KL Extension				
Wetland 004b	0.2	0.3	125	Two lines are being constructed here – larger ROW needed

2.5 Biological Resources

2.5.1 Fisheries and Other Aquatic Resources

Fisheries are surface waterbodies supporting fish species that are managed and harvested for value either commercially, recreationally, or for subsistence. Waterbodies are characterized as either capable of supporting warm water fish species or capable of supporting cold water fish species. Fisheries of special concern are surface waters containing fisheries of exceptional recreational value, such as those that support cold water fishes through natural reproduction, those that provide habitat for protected species, or those that are assigned special state fishery management regulations [Pennsylvania Fish and Boat Commission (PFBC) 2019]. Other special concern fisheries may include those where economic investments, such as stocking programs, have been implemented.

2.5.2 Fisheries Classification

As discussed in Section 2.3.2, the PADEP classifies waterbodies according to water quality and the type of aquatic communities supported. Waterbodies in the state of Pennsylvania are defined under PA Code Title 25, Chapter 93 and classified as: CWF, WWF, migratory fishes (MF), and TSF. Selected waterbodies are further classified as High Quality (HQ) or EV based on designated or existing uses and given special protection as outlined in PA Code Title 25 Chapter 93.4b. Waterbodies within the Project area were identified and described based on field surveys, PADEP geographic information system (GIS) shapefiles identifying designated or existing uses, and by their presence on USGS 7.5-minute series topographic maps. Section 2.3.2 further describes each waterbody crossed by the Project, the corresponding milepost (MP) at the crossing location,

and the proposed crossing method for each waterbody. Table 2.5-1 contains a description of the representative fish species likely to occur within the Project area.

Table 2.5-1: Representative Game and Commercial Fish Species Known to Occur in Waterbodies near the Project

Common Name	Scientific Name	Type
Brook Trout (Stocked)	*Salvelinus fontinalis*	Cold Water
Lake Trout (Stocked)	*Salvelinus namaycush*	Cold Water
Black Crappie	*Pomoxis nigromacultaus*	Warm Water
Pumpkinseed	*Lepomis gibbosus*	Warm Water
Tiger Muskellunge (Stocked)	*Esox masquinongy*	Warm Water
Walleye (Stocked)	*Sander vitreus*	Warm Water
Rock Bass	*Ambloplites rupestris*	Warm Water

[1] PFBC 2004.
[2] PFBC 2015.

2.5.3 Fisheries of Special Concern/Essential Fish Habitat

PA Clean Streams Law (35 P.S. §691.1 et seq.) and regulations at PA Code Title 25, including Chapters 91, 92, 93, 95, 96, 102, and 105 are also known as antidegradation rules. Antidegradation rules promote the maintenance and protection of existing water quality for HQ and EV waters, and protection of existing uses for surface waters. Existing water quality is protected for HQ and EV waters through the antidegradation rules and additional requirements, such as antidegradation performance standards for erosion and sediment control. Ultimately, existing uses are protected when PADEP makes a final decision on any permit or approval for an activity that may affect a protected use (PADEP, 2013).

The PFBC further protects fishery resources considered to be Class A wild trout streams, wilderness trout streams, and streams with natural reproduction of trout. No Class A wild trout or wilderness trout streams are crossed by the Project as listed by PFBC (PFBC, 2019a and 2019b). The Project crosses sensitive surface waters identified by the PFBC as stream sections that support the natural reproduction of trout or are unnamed tributaries (UNT) that contribute to the water quality of the naturally reproducing trout stream (PFBC, 2019c). Additional sensitive surface waters are those considered as an approved trout water by the PFBC (PFBC, 2019d). These listings can be found in Table 2.3-1 in Section 2.3.

Based on the National Marine Fisheries Services' (NMFS) online essential fish habitat (EFH) mapper tool, there is no EFH within the Project area (NMFS 2018). Impacts to waterbodies described in this section will be minimized by using construction techniques described in Section 2.5.4. The Project is outside the National Oceanic and Atmospheric Administration's jurisdiction over Endangered Species Act (ESA)-listed species under the NMFS, therefore, ESA Section 7 consultation with the NMFS is not required. National Fuel will continue to consult with appropriate federal and state fish and wildlife agencies to avoid or limit impact on wildlife and fisheries, as needed.

2.5.4 Project Impacts and Mitigation

Impacts to stream habitats and aquatic life include the potential for sediment transport into a waterbody during precipitation events, inadvertent returns from HDD construction methods, removal of riparian vegetation, and fugitive dust migration resulting from ROW construction

activities. Resulting direct impacts of waterbody crossings could include temporary displacement of fish and other aquatic species, and temporary increases in sedimentation and turbidity.

Stream relocations, enclosures, or dredging are not proposed, therefore permanent impacts to water quality and streamflow from the Project are not anticipated. The Project will cause minor, temporary impacts to watercourse hydrology during pipeline construction. Diverting water during open trench crossings may temporarily inhibit natural water filtration by preventing sediments from settling out of the water column in stream channels. This function is expected to resume outside of the construction corridor and should not permanently affect downstream resources. Following construction, stream substrate will be returned to the stream channel and pre-construction flow characteristics will be restored. Refer to Section 2.3 and Table 2.3-1 for information regarding individual stream proposed crossing methods.

To protect fisheries within the Project area, National Fuel will also follow state and federal time-of-year restrictions on in-stream construction, unless other written approval is obtained by those governing bodies. Specifically, National Fuel will comply with time of year restrictions for stocked trout streams (no in stream work per the standards set forth in Section 2.3.5). If construction is anticipated to require in-stream work within this timeframe National Fuel would coordinate with the PFBC to request a waiver prior to construction in that waterbody.

By following these time-of-year restrictions, impacts to fish spawning migrations will be avoided and/or minimized. At a minimum, National Fuel will implement its ESCAMP (Appendix C) which outlines the necessary protection measures to minimize direct impacts to waterbodies. National Fuel will restrict workspace and construction activities near the waterbodies to the extent practicable to further minimize risks from spills or leaks, erosion and sedimentation, and stormwater runoff from construction areas with exposed soils.

Where conditions permit the use of HDD, National Fuel may use this crossing method to minimize impacts to aquatic habitats. Drilling equipment will be located outside of waterbodies and adjacent riparian habitats. The probability of an inadvertent return of drilling fluids is greatest when the drill bit is working near the surface at entry and exit points and could affect waterbodies or riparian habitat resulting in increased turbidity or sedimentation. An Environmental Inspector(s) (EI) will be present during HDD operations, to watch for signs of an inadvertent return of drilling fluids, and to coordinate the appropriate response in such an event. Additionally, if HDD methods are employed and an inadvertent return occurs, National Fuel will follow the procedures in its Horizontal Directional Drilling Inadvertent Return and Contingency Plan (HDD Contingency Plan) (Appendix J). The HDD Contingency Plan was developed to protect environmentally sensitive areas within or near HDD locations and to outline the clean-up response procedures and timelines in the event of an inadvertent return. Impacts from any unforeseen sedimentation and turbidity would be controlled by employing erosion control devices, such as silt fence and straw bales/wattles, and by implementing BMP specific to each location and situation. When construction activities are completed, areas will be restored to preconstruction conditions.

National Fuel recognizes that fuels, lubricants, or other potentially toxic materials used during routine construction, if released to the environment, can temporarily impact aquatic habitats and resources. To avoid or minimize these potential impacts, National Fuel will restrict the location of storage and use of hazardous materials. Refueling and storage of hazardous materials will be prohibited within 150 feet of high quality or environmental sensitive areas during construction, unless the EI finds, in advance, no reasonable alternative and National Fuel and its contractors have taken appropriate steps (including secondary containment structures) to prevent spills and provide for prompt cleanup in the event of a spill or as designated by an appropriate governmental authority.

National Fuel will utilize approximately 850,000 gallons of water to test Line YM58, 12,280 gallons of water to test Line KL Extension, and 165,088 gallons to test Line YM224 Loop. National Fuel plans to obtain water from a local producer freshwater pond, near the Marvindale Compressor Station. The pond has a 2,000,000 gallon capacity and is filled from the local producer's water wells. Used hydrotest water will be filtered and returned to the pond. Alternatively, National Fuel may elect to obtain water from municipal water sources. Further details describing hydrostatic testing for the Project are included in Section 2.3.4.

The implementation of National Fuel's ESCAMP will minimize impacts to fisheries and riparian habitats. National Fuel will utilize the following steps to protect and minimize potential adverse impacts streams:

- To the extent possible, maintain stream banks and existing vegetation in place;
- Restrict the amount of construction equipment and accelerate construction time at crossings;
- Coordinate construction activities to avoid high flow and spawning periods;
- Install erosion controls to prevent sediment and siltation from entering streams;
- Remove all construction material and structures following construction;
- Restore stream channels and bottoms to their pre-construction state;
- Permanently stabilize stream banks and adjacent upland areas following construction;
- Inspect ROWs regularly during and after construction; and
- Repair any erosion controls or restoration as needed.

2.5.5 Wildlife and Habitat

The Project crosses a variety of landuse and habitat types commonly found in forested regions of northern PA, summarized in Table 2.5-2. The existing landuse and wildlife resources affected by the Project construction and operation include resources identified within the proposed pipeline corridor, access roads, TWS, ATWS, and aboveground facilities. The Project area provides habitat for wildlife native to or adapted to the High Allegheny Plateau. Wildlife habitat within the Project area can be generally characterized as utilizing eight different vegetation/land cover types: forest and woodland; agricultural land (includes agricultural pasture and cultivated cropland); industrial/commercial land; open land; open water; utility ROW; emergent wetlands; and forested/scrub-shrub wetlands. These land cover types correspond with the land uses discussed in Section 2.5.6. According to field surveys, the predominant vegetation/land cover types within the Project area are forest and woodland with approximately 28.2 percent (151.6 acres) of the Project workspace and industrial/commercial, which is approximately 24.4 percent (131.1 acres) of the workspace. A discussion of these habitat and land cover types found within the Project area is provided below.

Habitat level field surveys were conducted September to October 2017, and follow-up surveys were conducted in May and August 2018 (Appendix E). The Project area was mapped and classified by biologists using Global Positioning System (GPS) surveyed plot locations, field notes, and aerial imagery. The results of the field surveys are provided in the Wetland Delineation and Stream Identification Report, provided in Appendix E.

A summary of the habitat types identified during field surveys that intersect the construction limits for the proposed Project is provided in Section 2.5.6 of this report. National Fuel proposes to utilize 35 existing access roads for proposed construction activities and 18 existing access roads for abandonment activities. Five new access roads will also be required for Project construction. Post-construction, sixteen access roads will be maintained for operations and maintenance

purposes. Habitat types occurring alongside the existing and proposed access roads will not be cleared or otherwise impacted as a result of this Project except where ATWS is identified for vehicle turn-outs and general maneuverability.

2.5.6 Wildlife Habitat and Vegetation

For the purposes of this evaluation, wildlife habitat and vegetation types within the Project area are generally characterized as one of six different land use types: agricultural land; industrial/commercial land; residential land; open land; forest and woodland; and open water. Three of these categories are generally poor wildlife habitat therefore focus on land use (i.e., agricultural land, industrial/commercial, and residential) and the remaining vegetation/land use categories are descriptive of habitats and/or vegetative cover (i.e., forest and woodland, open land, and open water). The land use types observed, including the typical plant communities present and available species habitat, are discussed below and in Table 2.5-2 (Appendix K).

2.5.6.1 Agricultural Areas

The agricultural pasture crossed by the Project consist of agricultural pasture areas for grazing cattle or other livestock as well as areas that are currently or were previously planted with hay, and cultivated cropland, which is described as areas where there are currently or were previously planted crops. Agricultural lands within the Project area are intensively managed with farming machinery. As such, these areas provide minimal habitat for wildlife species.

Vegetation identified during the surveys included late-flowering thoroughwort (*Eupatorium serotinum*), Canada goldenrod (*Solidago canadensis*), bracken fern (*Pteridium sp.*), wild rye (*Elymus sp*.) and common rush (*Juncus effuses*).

Cultivated croplands include areas under active row crop production such as corn, soybean, or sunflower. Cultivated croplands crossed by the Project consisted of corn and sunflower.

2.5.6.2 Industrial/Commercial Areas

The industrial/commercial lands consist of impervious and semi-impervious surfaces, as well as routinely maintained herbaceous vegetation. Most of these areas are either sparsely vegetated or lack vegetation due to the presence of impervious or non-natural surfaces such as pavement, gravel pads, excavated material, or bare, compacted lands such as roadways, developed facility sites, industrial parcels, borrow pits, and transportation ROWs. These areas provide limited wildlife value due to maintenance of the land use and human activities.

Observed areas of vegetation typically consisted of Kentucky bluegrass (*Poa pratensis*), knotroot bristle grass (*Setaria parviflora*), tall fescue (*Festuca arundinacea*), common dandelion (*Taraxacum officinale*), Canada goldenrod (*Solidago canadensis*), broom sedge (*Andropogon virginicus*), white clover (*Trifolium repens*), red clover (*Trifolium pretense*), and English plantain (*Plantago lanceolata*). Maintained turf grasses were observed in the vicinity of most of the industrial/commercial buildings.

2.5.6.3 Residential Areas

Residential land is developed land that includes both single and multiple family dwellings and may contain developed subdivisions. A minor portion of the Project area crosses vegetative communities in residential areas. These community types provide limited wildlife value due to maintenance of the land use and other ongoing human activities.

These landscapes are comprised primarily of maintained turf grasses, ornamental plantings, and transitional vegetative areas bordering forested or wetland communities. Dominant species

located within these bordering areas included multiflora rose, common greenbrier (*Smilax rotundifolia*), silver maple (*Acer saccharinum)* northern red oak (*Quercus rubra*), and red maple (*Acer rubrum*). Maintained turf grasses were found throughout residential parcels along the Project area. Residential areas may include some plants that could be considered "invasives" as they are not native to the project area, however they have a low potential for propagating outside of residential gardens and the majority are annuals and do not survey the Pennsylvania winter season. There are many weeds from residential gardens that do have potential to spread into the surrounding areas as invasive plants that can compete with both crop lands and forest lands. These plants include crown-vetch (*Coronilla varia)*, jimson weed (*Datura stramonium)*, goat's rue (*Galega officinalis*) a federal and state noxious weed that is poisonous to livestock, and a variety of others. During the wetland and habitat surveys, none of these noxious weeds were observed.

2.5.6.4 Forest/Woodland Areas

Forest and woodland areas crossed by the Project are predominantly privately owned and managed for hardwood logging enterprises; however, the Project also crosses Pennsylvania State forests and Game Lands. The Project area is located within the Laurentian Mixed Forest Province (U.S. Forest Service (USFS) 2004). The Laurentian Mixed Forest Province includes forests from early to late successional stage with some coniferous components along with a mosaic of pure deciduous forest in favorable habitats with good soils and pure coniferous forest in less favorable habitats with poor soils (USFWS 1996). Common deciduous species identified along the Project included sugar maple (*Acer saccharum*), red maple (*Acer rubrum*), black cherry (*Prunus serotine*), American beech (*Fagus grandifolia*), and eastern hemlock (*Tsuga canadensis*). Forest and woodland habitats occur on both private and public lands and were observed in all successional stages including recently logged areas returning as early successional woodlands, immature forests dominated by saplings, and mature forests with canopy heights exceeding 60-feet.

Forests and woodlands are preferred habitats for passerine and migratory birds, upland game birds such as wild turkey (*Meleagris gallapova*), and raptors such as Cooper's hawk (*Accipiter cooperii*) and red-tailed hawk (*Buteo jamaicensis*). Mammals commonly observed in the forested areas include white-tailed deer (*Odocoileus virginianus*), red fox (*Vulpes vulpes*), striped skunk (*Mephitis mephitis*), eastern chipmunk (*Tamias striatus*), eastern gray squirrel (*Sciurus carollnensis*), and woodland vole (*Microtus pinetorum*).

2.5.6.5 Open Land

Open land is defined as non-forested areas that are utilized as open space or where the utilization does not appear to be agricultural, industrial/commercial, or residential. This also includes utility ROWs such as maintained easements for existing overhead electric lines and existing natural gas pipelines, as well as all wetland areas. For the purposes of this discussion, wetland habitat communities are addressed separately from all other Open Land habitats due to their unique ecological value and function.

During field reconnaissance, open land (excluding wetland habitat types) was observed as maintained grasslands without apparent grazing, cultivation, routine ROW maintenance/mowing, or haying operations. Due to the continued maintenance of this community type, it offers limited wildlife habitat value. These communities were dominated by upland grasses, white clover (*Trifolium repens*), red clover (*Trifolium pretense*), tall fescue (*Festuca arundinacea*), common dandelion (*Taraxacum officinale*), and Canada goldenrod (*Solidago canadensis*), multiflora rose (*Rosa multiflora*) and pin cherry (*Prunus pennsylvanica*).

Wetland communities were also observed across the Project workspaces. They include palustrine emergent wetlands, palustrine forested wetlands, and palustrine scrub-shrub wetlands as

discussed below. These habitat types are some of the most diverse wildlife habitat providing valuable breeding, forage, and shelter for numerous species.

PEM wetlands are characterized by erect, rooted, herbaceous hydrophyte plants adapted to growing in saturated or inundated soil conditions (Cowardin et al. 1979). They are commonly referred to as marshes, fens, wet meadow, potholes, and sloughs. Emergent wetlands provide habitat for a diverse number of wildlife species. Typical wildlife species found within emergent wetland communities include the wood duck (*Aix sponsa*), red-winged blackbird (*Agelaius phoeniceus*), American woodcock (*Scolopax minor*), eastern hellbender (*Cryptobranchus alleganiensis*), spotted salamander (*Ambystoma maculatum*), spring peeper (*Hyla crucifer*), green frog (*Rana clamitans*), spotted turtle (*Clemmys guttata*), and painted turtle (*Chrysemys picta*).

Emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes. Common species observed included sedges (*Carex* spp.), reedgrass (*Calamagrostis* spp.), deertongue (*Dichanthelium clandestinum*), spinulose woodfern (*Dryopteris carthusiana*), mannagrass (*Glyceria* spp.), jewelweed (*Impatiens capensis*), rushes (*Juncus* spp.), rice cutgrass (*Leersia oryzoides*), Japanese stiltgrass (*Microstegium vimineum*), sensitive fern (*Onoclea sensibilis*), cinnamon fern (*Osmundastrum cinnamomeum*), New York fern (*Parathelypteris noveboracensis*), swamp dewberry (*Rubus hispidus*), woolgrass (*Scirpus cyperinus*), violets (*Viola* spp.), and mosses. Please refer to Table 2.4-1 for wetland descriptions.

PFO wetlands are dominated by woody vegetation that is at least 20 feet tall and with diameter-at-breast-height (DBH) greater than 3-inches (Cowardin, et al. 1979), and provide habitat for a diverse number of wildlife species. Typical wildlife species found within forested wetland communities include the wood duck (*Aix sponsa*), American woodcock (*Scolopax minor*), song sparrow (*Melospiza melodia*), black-capped chickadee (*Poecile atricapillus*), spotted salamander (*Ambystoma maculatum*), spring peeper (*Pseudacris crucifer*), green frog (*Lithobates clamitans*), spotted turtle (*Clemmys guttata*), northern watersnake (*Nerodia sipedon*), snapping turtle (*Chelydra serpentine*), white-tailed deer, striped skunk, and northern raccoon.

PSS wetlands are dominated by woody vegetation (either shrub or small trees) less than 20 feet tall (Cowardin, et al. 1979). These wetlands can be transitional from wet meadow to forest or may remain as scrub-shrub depending on hydrology or disturbance. Typical wildlife species found within scrub-shrub wetland communities include the red-winged blackbird (*Agelaius phoeniceus*), American woodcock, swamp sparrow (*Melospiza georgiana*), common yellow throat (*Geothlypis trichas*), masked shrew (*Sorex cinereus*), meadow-jumping mouse (*Zapus hudsonius*), eastern cottontail (*Sylvilagus floridanus*), Virginia opossum (*Didelphis virginiana*), white-tailed deer, common garter snake (*Thamnophis sirtalis*), ribbon snake (*Thamnophis sauritus*), eastern American toad (*Anaxyrus americananus*), gray tree frog (*Hyla versicolor*) and red-spotted newt (*Notophthalmus v. viridescens*).

Common species observed in PSS/PFO wetlands included: black willow (Salix nigra), sedges (Carex spp.), reedgrass (Calamagrostis spp.), deertongue (Dichanthelium clandestinum), spinulose woodfern (Dryopteris carthusiana), mannagrass (Glyceria spp.), jewelweed (Impatiens capensis), rushes (Juncus spp.), rice cutgrass (Leersia oryzoides), Japanese stiltgrass (Microstegium vimineum), sensitive fern (Onoclea sensibilis), cinnamon fern (Osmundastrum cinnamomeum), New York fern (Parathelypteris noveboracensis), swamp dewberry (Rubus hispidus), woolgrass (Scirpus cyperinus), violets (Viola spp.).

Common trees observed in PSS/PFO wetlands included: red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), yellow birch (*Betula alleghaniensis*), Eastern hemlock (*Tsuga canadensis*), hornbeam (*Carpinus caroliniana*), and black willow (*Salix nigra*). Common shrubs observed included: swamp rose (*Rosa palustris*), meadow-sweet (*Spirea alba*), and dogwoods (*Cornus*

spp.). The herbaceous strata were commonly dominated by sedges (*Carex* spp.), deertongue (*Dichanthelium clandestinum*), spinulose woodfern (*Dryopteris carthusiana*), jewelweed (*Impatiens capensis*), rushes (*Juncus* spp.), Japanese stiltgrass (*Microstegium vimineum*), sensitive fern (*Onoclea sensibilis*), cinnamon fern (*Osmundastrum cinnamomeum*), New York fern (*Parathelypteris noveboracensis*), swamp dewberry (*Rubus hispidus*), woolgrass (*Scirpus cyperinus*), violets (*Viola* spp.), and mosses. Refer to Table 2.4-1 for wetland descriptions.

2.5.6.6 Open Water

Open water includes areas delineated as streams, rivers, and ponds. The Project crosses three larger river systems (Potato Creek, Portage Creek and the Allegheny River), which are proposed to be crossed via HDD to avoid or minimize impacts to these systems substrate, water quality, flow, and adjacent riparian vegetation. Common fish species found in these river systems include smallmouth bass (*Micropterus dolomieu*), walleye (*Sander vitreus*), channel catfish (*Ictalurus punctatus*), and brown trout (*Salmo trutta*). True aquatic plant species such as aquatic mosses, algae, duckweed (*Lemna spp.*) and pondweeds (*Potamogeton spp.*) may be present in limited coverages within the Project areas.

2.5.7 Managed Wildlife Habitat Areas

Table 2.5-3 discusses the managed wildlife habitat areas crossed by the Project. The following is a brief discussion of how each state land is actively managed and the consultation that occurred for each land manager. The land and the flora and fauna of this region is more specifically segregated based on the land type and not by the managing agency boundary; therefore, specific species discussion is combined in Section 2.5.6. The complete agency discussion occurs in Section 2.5.13. The Project occurs on land managed by the Pennsylvania Game Commission and PADCNR Bureau of Forestry. Each land management area has different goals for how their property is managed. Below is a brief synopsis for the management goals and focus for the wildlife and vegetation under their care.

2.5.7.1 State Forests

State Forest lands crossed by the property include Moshannon and Elk Forests. Pennsylvania forest lands are managed to provide the state and nation with “pure water, recreations, scenic beauty, plant and animal habitat, sustainable timber and natural gas” and a host of other items. In reviewing the last several years Management Activities and the State Forestry Management Plan (2019a PADCNR). A clearer picture of the current focus of activities in terms of time and money expenditures becomes available. Both Moshannon and Elk Forests are heavily focused on three primary activities, 1) timber sales and management (inclusive of new planting), 2) recreation management, development and repairs, and 3) habitat development, improvement, and management. The habitat management includes the prevention of invasive species, development and maintenance of areas for threatened and endangered species (such as basking areas for timber rattlesnakes). Part of conducting all three of these land management activities includes reviewing and evaluating the requests for work by outside companies for oil and gas projects crossing the state property.

2.5.7.2 State Game Lands

State Game Lands are specifically managed for public use in the form of recreation, hunting, snow mobile trails, and camping. Each state game land has some unique features that may dictate how it is managed and is often related to the terrain. The Project crosses three State Game Lands. State Game Land 34 has three ponds that attract waterfowl frequently hunted that also attract black bear in addition to the more common elk, turkey, deer, and smaller mammals. State Game

Land 59 is a primarily recreation and hunting area with deer, turkey, and smaller game mammals. Game Land 61 features ruffed grouse as well as the more common deer, turkey, and small game mammals for hunting as well as standard recreation opportunities.

2.5.7.3 Wild Areas and Natural Areas

Pennsylvania state forest system has many special wild and natural areas that have been identified and managed "to protect unique or unusual biologic, geologic, scenic and historical features or to showcase outstanding examples of the state forest community" (2019b PADCNR). Three areas of the FM100 abandonment project crosses natural and wild areas and the abandonment of the pipeline in these areas will prevent additional disturbance to these locations (Table 2.5-3).

These areas include the Bucktail Natural Area which was set aside to protect the historic and prehistoric heritage of the area as well as the scenic nature of the State Park. This area has long been used as a crossing of the eastern continental divide between the Susquehanna and Alleghany rivers by Native Americans, known as the Sinnemahoning Trail, and later the American Civil War Regiment of Woodsmen known as the Bucktail Rangers. Johnson Run natural area is within the Elk Forest and is a 216-acre area of old-growth hemlock-hardwoods. The final area is the Square Timber Wild Area, which is part of the Bucktail Natural Area which is a scenic and geologic feature of deep narrow valleys and steep ridges (2019b PADCNR).

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Table 2.5-3: Managed Wildlife Habitat Crossed by the Project

Facility[1]	MP Begin	MP End	Crossing Length (miles)	County	Resource Name	Area Affected by Construction (acres)	Habitat Types Affected by Construction (acres)
Line YM58							
Access Road – PAR-03	2.8	2.9	0.2	McKean	Elk State Forest	0.8	Industrial/Commercial Areas (Roadway) - 0.8 acres
Access Road – TAR-04	2.8	2.9	0.1	McKean	Elk State Forest	0.5	Industrial/Commercial Areas (Roadway) – 0.5 acres
Construction ROW	10.3	11.2	0.9	McKean	State Game Land 61	8.8	Forest /Woodland – 1.5 acres Industrial/Commercial Areas (Roadway) - <0.1 acres Open Land (Utility ROW) – 6.9 acres Open Land (Prior disturbed, non-forested) – 0.4 acres Open Water – <0.1 acres Wetland Emergent (Utility ROW) – <0.1 acres
Construction ROW	20.0	21.9	1.9	Potter	State Game Land 59	17.9	Forest/Woodland – 4.4 acres Industrial/Commercial Areas (Roadway) - 0.1 acres Open Land (Utility ROW) – 11.0 acres Open Land (Prior disturbed, non-forested) – 2.4 acres Open Water – <0.1 acres
Access Road – PAR-30	21.2	21.2	3.6	Potter	State Game Land 59	13.1	Industrial/Commercial Areas (Roadway) – 13.1 acres
Construction ROW	22.3	22.5	0.2	Potter	State Game Land 59	1.3	Forest & Woodland – 0.5 acres Open Land (Utility ROW) – 0.8 acres
Line YM58 Subtotal			**6.9**			**42.4**	**Forest/Woodland – 6.4 acres** **Industrial/Commercial Areas (Roadway) – 14.5 acres** **Open Land (Utility ROW) – 18.7 acres** **Open Land (Prior disturbed, non-forested) – 2.8 acres** **Open Water – <0.1 acres** **Wetland Emergent (Utility ROW) – <0.1 acres**
Line FM100 Abandonment							
Construction ROW	0.6	12.2	11.6	Clearfield	Moshannon State Forest	0.1	Open Land (Utility ROW) – 0.1 acres
Access Road – Rectifier 167, 168 Access	11.3	11.3	0.3	Clearfield	Moshannon State Forest	0.9	Industrial/Commercial Areas (Roadway) – 0.9 acres
Construction ROW	12.3	12.5	0.2	Elk	State Game Land 034	--	Open Land (Utility ROW) – no impact
Construction ROW	12.5	14.8	2.3	Elk	Moshannon State Forest	0.1	Open Land (Utility ROW) – 0.1 acres

Facility[1]	MP Begin	MP End	Crossing Length (miles)	County	Resource Name	Area Affected by Construction (acres)	Habitat Types Affected by Construction (acres)
Access Road – MLV BZE0 5810 Access	15.2	15.8	0.8	Elk	Moshannon State Forest	2.8	Industrial/Commercial Areas (Roadway) – 2.8 acres
Construction ROW	15.2	16.1	0.9	Elk	Moshannon State Forest	0.1	Open Land (Utility ROW) – 0.1 acres
Construction ROW	16.5	21.6	5.1	Elk	Moshannon State Forest	--	Open Land (Utility ROW) – no impact
Construction ROW	24.9	25.7	0.8	Cameron	Bucktail State Park Natural Area	--	Open Land (Utility ROW) – no impact
Access Road – SR 12-North Access	27.1	27.3	0.2	Cameron	Bucktail State Park Natural Area	0.3	Industrial/Commercial Areas (Roadway) – 0.3 acres
Construction ROW	27.1	27.3	0.2	Cameron	Bucktail State Park Natural Area	--	Open Land (Utility ROW) – no impact
Construction ROW	27.3	27.3	<0.1	Cameron	Johnson Run Natural Area	--	Open Land (Utility ROW) – no impact
Access Road – SR 12-North Access	27.3	27.3	<0.1	Cameron	Johnson Run Natural Area	<0.1	Industrial/Commercial Areas (Roadway) - <0.1 acres
Construction ROW	27.8	28.3	0.5	Cameron	Elk State Forest	--	Open Land (Utility ROW) – no impact
Construction ROW	28.5	29.1	0.6	Cameron	Elk State Forest	--	Open Land (Utility ROW) – no impact
Access Road – Rectifier 873, 872 Access	29.6	29.6	0.1	Cameron	Elk State Forest	0.4	Industrial/Commercial Areas (Roadway) – 0.4 acres
Construction ROW	29.6	30.2	0.6	Cameron	Elk State Forest	0.2	Open Land (Utility ROW) – 0.2 acres
Construction ROW	30.2	30.6	0.4	Cameron	Square Timber Wild Area	<0.1	Open Land (Utility ROW) - <0.1 acres
Construction ROW	31.0	31.5	0.5	Cameron	Square Timber Wild Area	<0.1	Open Land (Utility ROW) - <0.1 acres
Construction ROW	31.5	40.1	8.6	Cameron	Elk State Forest	<0.1	Open Land (Utility ROW) - <0.1 acres
Access Road – MLV LUC0 5039 Access	33.4	33.5	0.2	Cameron	Elk State Forest	0.6	Industrial/Commercial Areas (Roadway) – 0.6 acres
Construction ROW	40.1	44.0	3.9	Potter	Susquehannock State Forest	0.5	Open Land (Utility ROW) – 0.5 acres
Access Road – POP0 4317 Access	40.1	40.4	0.5	Potter	Susquehannock State Forest	1.8	Industrial/Commercial Areas (Roadway) – 1.8 acres
Line FM100 Abandonment Subtotal			**38.3**			**7.8**	**Industrial/Commercial Areas (Roadway) – 6.8 acres** **Open Land (Utility ROW) – 1.0 acres**
TOTALS			**45.2**			**50.3**	

[1] Facilities/Project components not identified in the table do not cross areas managed for wildlife habitat and/or other conservation purposes.

2.5.8 Wildlife, Vegetation and Habitat Project Impacts and Mitigation

Pipeline and associated facility construction are expected to have minor short-term impacts on wildlife habitat, causing localized effects on resident fauna. Clearing and grading of the ROW will result in loss of vegetative cover and may result in the loss of less mobile fauna, such as small rodents, and invertebrates that may be unable to escape the construction area. It is anticipated that most wildlife can relocate to suitable adjacent habitat during construction. After construction, wildlife is expected to return and colonize post-construction habitats. Species diversity is expected to remain at or near pre-construction conditions following restoration of the ROW.

A permanent ROW in open areas (e.g., existing ROW and open land) generally will not result in significant fragmentation effects of forested areas. The impacts that are likely from the construction and operation of the Project are not expected to be significant given the mobile nature of the wildlife that occur in the area, the availability of similar habitat adjacent to the Project area, and the compatible nature of the restored ROW with species occurring in the area. It is expected the construction of the Project will have short-term effects on wildlife species. No long-term wildlife impacts are expected, as plentiful and suitable wildlife habitat are present adjacent to the proposed Project area. The removal of vegetation for the Project will cause minor and temporary decreases in the amount of cover and forage available for wildlife species. Construction within unvegetated areas will have little or no effect on wildlife.

The noise generated from the compressor stations may drive certain species away, though the areas designated for compressor station construction are not considered high quality habitat. The Tamarack Compressor Station is located on partially forested land, the Marvindale Compressor Station is located on forested and open land, and the existing Costello Compressor Station is located on industrial/commercial land. The Tamarack compressor station will have a footprint of 4.6 acres; the Marvindale Compressor Station will have a footprint of 3.7 acres, and the Costello Compressor Station has an existing footprint of 1.23 acres but will be removed and maintained an Industrial/Commercial land use type. Although the Tamarack and Marvindale Compressor stations will permanently convert existing habitat to industrial/commercial land, there is ample similar forested land in the surrounding area. As such, the construction of these facilities is not anticipated to have a lasting impact on species.

Total habitat loss due to Project construction and operation will be minimal due to the linear nature of the Project, surrounding suitable habitat, and post-construction revegetation efforts; although, some permanent impacts to habitat will occur due to construction of the compressor stations and proposed above-ground facilities. The displacement impacts to most wildlife as a result of the Project, other than the above-ground facility locations, will be short-term, localized, and minor.

National Fuel will make a concerted effort to conduct clearing activities outside the primary migratory bird nesting season (April 1 through August 31) to minimize impacts to migratory bird species during nesting and breeding season. Timber will be removed from the ROW and limbs and shrubs will be chipped to prevent nesting in downed vegetation. After clearing, construction will proceed in each spread according to the schedule outlined in Section 1.6. Similarly, it is unlikely ground nesting birds will nest in the grubbed ROW following clearing activities due to the disturbance and the short time between clearing and construction activities. National Fuel will conduct a migratory bird awareness training prior to construction with inspectors, contractors, and construction crews. If nesting birds are identified by personnel within the ROW, National Fuel will consult with the USFWS to identify appropriate mitigation measures. By implementing these procedures, the Project activities are not likely to adversely affect raptors or other migratory birds protected under the Migratory Bird Treaty Act (MBTA).

In order to minimize impacts to wildlife as a result of the Project, the following general mitigation measures will be implemented:

- National Fuel has limited the construction ROW to a typical width of 75 feet, with ATWS provided only for areas that require additional workspace such as for spoil storage, HDD work pads, and pipeline crossover areas.
- National Fuel will limit habitat disturbance to the approved construction ROW.
- To minimize the potential for species displacement, construction activities will be kept to the minimum time necessary to complete construction.
- Construction personnel will undergo environmental training that will include information on nesting and breeding birds.
- National Fuel will implement the E&S Plan developed as part of the ESCGP-3 Application and the ESCAMP to reduce potential impacts from sedimentation and erosion.

The proposed Project is not anticipated to significantly add to existing habitat fragmentation. Habitat loss for the Project will primarily be confined to locations where the existing ROW will be expanded into adjacent wooded areas or where necessary rerouted from the existing ROW. As proposed 72.78 percent of the project parallel existing utility ROWs.

In summary, the implementation of the avoidance and minimization measures described herein as well as the abundance of suitable and similar habitat adjacent to the Project are anticipated to alleviate the potential for direct impacts to nesting adults and their young, regional population-level impacts, and the habitat of birds of conservation concern. Significantly measurable negative impacts on sensitive wildlife, migratory birds and their habitats are not anticipated as a result of construction and operation of the Project, therefore, mitigation to comply with Executive Order 13186 is not proposed.

Table 2.5-2 summarizes vegetation community and habitat/landuse impacts resulting from construction and operation of the Project. National Fuel will work in accordance with the ESCAMP, and in accordance with landowner requests for restoration and maintenance of the Project area. Except for the aboveground facilities, all disturbed areas will be reseeded and allowed to revegetate or returned to their prior land use condition. The removal of vegetation within the workspace will be temporary, and these areas will be reseeded with an appropriate seed mix when construction is complete.

Pedestrian surveys will be conducted after the first and second growing seasons across the Project's construction ROW to assess the status of reclamation and restoration efforts and the establishment of vegetative cover. Revegetation in non-agricultural upland areas shall be considered successful if upon visual survey the density and cover of non-nuisance vegetation species are similar in density and cover to adjacent undisturbed lands. In agricultural areas, revegetation shall be considered successful when upon visual survey, crop growth and vigor are similar to adjacent undisturbed portions of the same field, unless the easement agreement specifies otherwise. Wetland revegetation shall be considered successful if all of the following criteria are satisfied:

- The affected wetland satisfies the current federal definition for a wetland;
- Vegetation is at least 80 percent of either the cover documented for the wetland prior to construction, or at least 80 percent of the cover in adjacent wetland areas that were not disturbed by construction;
- If natural rather than active revegetation was used, the plant species composition is consistent with early successional wetland plant communities in the affected ecoregion; and

- Invasive species and noxious weeds are absent, unless they are abundant in adjacent areas that were not disturbed by construction.

National Fuel is dedicated to minimizing long-term impacts, where feasible, through restoration of preconstruction vegetation in temporarily affected areas. National Fuel will take efforts to prevent and control infestations of noxious weeds and exotic plant species. Where practical, soil will be stockpiled adjacent to the area from which it was stripped to prevent the unwanted spread of noxious weeds or exotic plants. Contractor vehicles and construction equipment arriving from out-of-state will be cleaned prior to entering construction areas, and equipment cleaning stations will be available to prevent the spreading of plants from infested areas. During restoration and post-construction monitoring, National Fuel will monitor the non-cultivated portions of the Project area for noxious weeds (noxious weeds addressed in ESCAMP (Appendix C)) and will use spraying or mechanical removal, as appropriate and as allowed or directed by the landowner, to control noxious weeds. Where feasible, manual and mechanical treatment methods will be given greater consideration than herbicide application; however, treatment methods are site- and species-specific and may also be influenced by the proximity to agricultural areas and aquatic resources.

2.5.9 Threatened and Endangered Species

Endangered and threatened species are protected by the Endangered Species Act of 1973 (16 U.S.C.A. §1531-1543, P.L. 93-205). National Fuel has initiated consultation and/or coordination efforts with USFWS Ecological Services Field Office in State College, Pennsylvania, and with the PADCNR and PGC, the state wildlife agencies, including survey work and protocol. Agency correspondence (Appendix D) includes documentation of consultation with the agencies and best management practices developed to avoid, minimize, or mitigate disturbance to special status species and to avoid take.

Based on the USFWS Information, Planning, and Consultation System, the Pennsylvania Natural Heritage Program's Environmental Review, and consultation with the USFWS, PADCNR, and PGC, federal and state protected species of concern with possible habitat in the Project area were identified. Table 2.5-4 describes each protected species' federal and state status, habitat requirements, and potential to occur within the Project area. Habitat presence and absence was determined during the pedestrian surveys conducted during the wetland delineation surveys and during the species-specific habitat surveys.

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Table 2.5-4: Federally and State Listed Species in Cameron, Clearfield, Clinton, Elk, McKean, and Potter Counties, PA with Potential to Occur in the Project Area

Scientific Name	Common Name	Federal Status	State Status	Habitat Description	Potential for Occurrence within Project Area	USFWS Determination[4]
Mammals						
Myotis sodalist	Indiana bat	E	E	Habitat sites usually have some standing or flowing water and noticeable airflow with low temperatures, near freezing. Primary maternity roosts are trees with exfoliating bark and sun exposure that results in high temperatures, while males seek cooler roosts. [12]	Habitat may be present within Project area; however, USFWS states project location is outside of designated critical habitat.	NE
Myotis septentrionalis	Northern Long-eared bat	T	E	Habitat is usually associated in boreal forests, with forest clearings at the tree top level and edges used for hunting. Primary maternity roosts are trees with exfoliating bark. [11]	Habitat may be present within Project area; however, USFWS states project location is outside of designated critical habitat.	NLAA
Lasionycteris noctivagans	Silver-haired Bat	--	SC	Inhabits wooded areas bordering lakes and streams. Roosts in dense foliage, behind loose bark, or in a hollow tree, rarely in a cave. Begins feeding earlier than most bats, often before sunset. Does not hibernate in Pennsylvania, migrates farther south. In summer, a few may breed in the cooler, mountainous sections of the state, but most go farther north. [6]	Habitat may be present within Project area.	N/A
Amphibians						
Ambystoma laterale	Blue Spotted salamander	--	SC	Riparian forested areas/floodplains. Have been found in the Allegheny River, Portage Creek, and Potato Creek waterways. [5]	Habitat may be present within Project area (e.g., Allegheny River, Portage Creek, and Potato Creek). Surveys occurred in July 2019.	N/A
Mussels						
Alasmidonta marginata	Elktoe	--	SC	Occurs in small shallow rivers with a moderately fast current and riffles. Have been found in the Potato Creek, Portage Creek, Allegheny River, and South Branch Oswayo Creek waterways. [14, 15]	Habitat may be present within Project area (e.g., Potato Creek, Portage Creek, and Allegheny River, and South Branch of Oswayo Creek). Surveys occurred in July 2019.	N/A
Pluerobema sintoxia	Round Pigtoe	--	SC	Occurs in a range of habitats, from small rivers in areas of moderate flow with gravel, cobble and boulder substrates to larger rivers in mud, sand and gravel at varying depths. Have been	Habitat may be present within Project area (e.g., Potato Creek, Portage Creek, Allegheny River, and South Branch of Oswayo Creek). Surveys occurred in July 2019.	N/A

				found in the Potato Creek, Portage Creek, Allegheny River, and South Branch Oswayo Creek waterways. [14, 15]		
Lampsilis fasciola	Wavy-rayed Lampmussel	--	SC	Occurs in gravel or sand bottoms of riffle areas in clear, medium-sized streams. Have been found in the Potato Creek, Portage Creek, Allegheny River, and South Branch Oswayo Creek waterways. [14, 15]	Habitat may be present within Project area (e.g., Potato Creek, Portage Creek, Allegany River and South Branch of Oswayo Creek). Surveys occurred in July 2019.	N/A
Villosa fabalis	Rayed bean mussel	E	E	Occur in fine sand in the shallow areas of medium-sized to large rivers. Have been found several miles downstream from port Alleghany in the River. [15, 16]	Habitat may be present within Project area (e.g., Allegheny River). Surveys occurred in July 2019.	NLAA
				Fish		
Lota lota	Burbot	--	E	Prefer deep, cold waters of lakes and rivers. During late winter and early spring, after spawning, they often migrate from lakes to tributary rivers. The only Pennsylvania populations occur in Lake Erie and the Allegheny River headwaters. [9, 15]	Habitat may be present within Project area (e.g., Allegheny River and tributaries). No in-stream activity will be conducted from December 1 to April 1 to avoid adverse impacts during spawning season.	N/A
				Reptiles		
Crotalus horridus	Timber Rattlesnake	--	SC	Occurs in forested, mountains regions. Prefers forested areas to forage for small mammals and southerly-facing slopes for hibernating and other thermoregulatory actives. [4, 8, 15]	Habitat may be present within Project area. Species-specific surveys occurred in July 2019.	N/A
				Plants		
Scirpus ancistrochaetus	Northeastern Bulrush	E	SC	Inhabits small wetlands, sinkhole ponds or wet depressions with seasonally fluctuating water levels. Flowers from June to July, fruits develop in July through September. [10]	Suitable habitat may be present within Project area. No specimens observed during field surveys.	NE
Carex disperma	Soft-leaved Sedge	--	R	May be found in hydrophytic wetland communities such as swamps, bogs, wet meadows, mossy and shady coniferous woods, and along waterbody shorelines; fruiting season is May through August. [4, 7]	Surveys were conducted at the Tamarack Compressor Station site; no suitable habitat is present in the Project area. No specimens observed during field surveys.	N/A
Carex bebbii	Bebb's Sedge	--	E	May be found in hydrophytic wetland communities such as sandy flats and depressions, shore lines of waterbodies, wet meadows, bogs, fens, wet pastures and prairies, and along streams and rivers; fruiting season is June through July. [4, 7]	Surveys were conducted at the Tamarack Compressor Station site; no suitable habitat is present in the Project area. No specimens observed during field surveys.	N/A

Geranuim bicknellii	Cranesbill	--	E	May be found is dry openings; prefers dry open woods, clearings, rocky ledges; flowers June through August. [4, 8]	Suitable habitat occurs within the sphagnum bog wetland identified at Line FM100 Abandonment workspace AS-16, near Grant Trail Road. Visual searches throughout the proposed limits of disturbance at this location within the proposed workspaces yielded no observed individuals of these species.	N/A
Bartonia paniculate	Screwstem	--	PS – R	Obligate wetland species may be found in sphagnum bogs where it prefers hummocks in wet woods, wooded bogs, and sphagnous pond margins. [4, 7]	Suitable habitat occurs within the sphagnum bog wetland identified at Line FM100 Abandonment workspace AS-16, near Grant Trail Road. Visual searches throughout the proposed limits of disturbance at this location within the proposed workspaces yielded no observed individuals of these species.	N/A
Gaultheria hispidula	Creeping snowberry	--	R	Facultative wetland species may be found in sphagnum bogs where it prefers hummocks and tree stumps in northern bogs and swamps. [7, 13]	Suitable habitat occurs within the sphagnum bog wetland identified at Line FM100 Abandonment workspace AS-16, near Grant Trail Road. Visual searches throughout the proposed limits of disturbance at this location within the proposed workspaces yielded no observed individuals of these species.	N/A
Platanthera ciliaris	Yellow-fringed orchid	--	PS – T	Facultative wetland species may be found in wetlands and other moist areas where it prefers bogs, moist meadows and woods. [4, 7]	Suitable habitat occurs within the sphagnum bog wetland identified at Line FM100 Abandonment workspace AS-16, near Grant Trail Road. Visual searches throughout the proposed limits of disturbance at this location within the proposed workspaces yielded no observed individuals of these species.	N/A

[1] As classified by PADCNR and USFWS whereby T = Threatened, E = Endangered, SC = Special Concern, R = Rare, PS = Proposed Status, U = Undetermined.

[2] The listed species of concern were provided by the USFWS IPaC tool, and consultation with the PADNCR and PFBC.

[3] Data sources for habitat description information: NatureServe 2018; Pennsylvania Angler & Boater 2012; Pennsylvania Mammals Atlas 2018; Pennsylvania Natural Heritage Site 2018, 2019; PFBC 2019e; USFWS 2006, 2016a, 2017a, Walsh et al. 2007; PFBC 2018 consultation (Appendix D), Pennsylvania Natural Heritage Site 2019a

[4] NE = no effect, NLAA = may affect, but not likely to adversely affect

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2.5.10 Federally Protected Threatened and Endangered Species

Review of the USFWS IPaC report for the Project area in Cameron, Clearfield, Clinton, Elk, McKean and Potter Counties, Pennsylvania identified threatened, endangered, or candidate species as potentially occurring in the Project area (see Table 2.5-4). Further review of the IPaC provided more detail regarding potential federally listed threatened and endangered species, and other protected species, that may occur within the Project area (USFWS 2018). Of the federally listed species, as FERC's non-federal representative National Fuel consulted with USFWS and determined that there is potential for three listed species to occur within the Project area. These three species are discussed in detail below.

2.5.10.1 Indiana Bat

The Indiana bat (*Myotis sodalist*) is a federal and state-listed endangered species. The Indiana bat inhabits wooded areas in the summer season and roost under loose tree bark on dead or dying trees. In the colder winter months bats hibernate in caves or abandoned mines, where temperatures are cool, stable and the air is humid (USFWS 2017). National Fuel has consulted with the USFWS and it has been determined that the proposed locations of tree removal are outside the range of the Indiana bat; therefore, no impacts to this species are anticipated. The USFWS has determined there would be ***no effect*** for this species.

2.5.10.2 Northern Long-eared Bat

The Northern Long-eared bat (*Myotis septentrionalis*) is federally listed as a threatened species. The Northern Long-eared bat inhabits caves and mines of various sizes, with high humidity and constant temperatures in the winter months to hibernate. During the summer months, bats roost singly or in colonies underneath bark, in cavities or in crevices of both live trees and snags (USFWS 2016b). National Fuel has consulted with the USFWS and it has been determined that the proposed locations of tree removal are not within 1/4 -mile of known hibernacula or within 150 feet of known roost trees; therefore, incidental take of this species is no in violation of the ESA.

On November 6, 2019 an effects determination for the Project (the Action) using the IPaC Northern Long-eared bat key was requested. A verification letter (Appendix D) was received on same date from the USFWS indicating that the Action is consistent with the activities outlined in the Programmatic Biological Opinion (BPO) of the Final 4(d) Rule and that the Action may affect the Northern Long-eared bat; however, any take that may occur is not prohibited under this 4(d) Rule.

The USFWS had the option to respond in 30 days of November 6, 2019 if the letter populated by the IPaC determination key is deemed to be incorrect; no response was received. The USFWS has determined the Project ***may effect, but would not likely adversely affect*** this species.

2.5.10.3 Northeastern Bulrush

The Northeastern Bulrush (*Scirpus ancistrochaetus*) is federally-listed as an endangered species. The Northeastern Bulrush inhabits small wetlands, sinkhole ponds or wet depressions with seasonally fluctuating water levels (USFWS 2006). Flowers from June to July, fruits develop in July through September. No specimens were observed during field surveys. National Fuel, acting as FERC's non-federal representative has determined that the project may affect but is not likely to adversely affect this species. The USFWS has determined there would be ***no effect*** for this species.

2.5.10.4 Rayed bean mussel (mussel)

Rayed bean mussel (*Villosa fabalis*) is federally listed as an endangered species and occurs in fine sand in the shallow areas of medium-sized to large rivers. The Rayed bean mussel have been found several miles downstream from Port Alleghany in the River. Surveys for this species occurred in July 2019 in all aforementioned stream crossings (PANH 2019a, Walsh et al 2007). The surveys extended 20 meters upstream and 30 meters downstream of the centerline of the proposed HDD. The surveys were qualitative in nature, generating data in terms of a list of live species present and their relative abundance. No Rayed bean mussel were found in the South Branch of the Oswayo Creek. National Fuel is proposing to HDD the Allegheny River, Potato Creek, and Portage Creek; therefore, there are no direct impacts anticipated to these waterbodies resulting in no impacts to this mussel species. National Fuel, acting as FERC's non-federal representative has determined that the project may affect but is not likely to adversely affect this species. The USFWS has determined the Project ***may effect, but would not likely adversely affect*** this species.

2.5.11 State-Protected Species

Based on concurrence received from the PADCNR on September 22, 2017 and PGC August 31, 2017, and consultation at an interagency coordination meeting in November 2018, PADCNR and PGC anticipates there may be impacts to rare, threatened, or endangered species and species of concern within the proposed project area. Based on National Fuel's assessment of the Project area habitat types, and correspondence with PADCNR and PGC there is potential for minimal impact to several state-listed species, species of concern, and species proposed for listing (in addition to the species listed as federally protected, as described in Section 2.4.5.1). State-listed species with potential to occur within the Project area, as communicated by PADCNR and PGC are discussed in detail below.

2.5.11.1 Mammals

Silver-haired Bat

Silver-haired bat (*Lasionycteris noctivagans*) is listed as a species of concern by the state of Pennsylvania. The Silver-haired bat is a medium sized bat that inhabits wooded areas bordering lakes and streams. It roosts in dense foliage, behind loose bark, or in a hollow tree, rarely in a cave. In summer, most species migrate north to mountainous sections of the state (PA Mammals Atlas 2018). While habitat suitable for the Silver-haired bat is present in the Project area, no specimens were observed during field surveys. National Fuel has consulted with PGC regarding potential mitigation measures for this species. All work activities in Clearfield and Elk counties will be limited to the existing National Fuel ROW and existing access roads as the only work taking place therein is associated with the Line FM100 Abandonment. The National Fuel ROW has generally been kept clear of trees and snags exceeding 5-inches DBH (i.e., the size limit noted int the PGC restrictions). As such, any clearing of trees or snags will be less than 5-inches DBH in these counties; therefore, these restrictions will not apply to this project.

2.5.11.2 Fish

Burbot (*Lota lota*)

Inland populations of burbot are listed as endangered in Pennsylvania. The Allegheny River population is a relict distribution which has persisted but is vulnerable to physical habitat disturbances such as water quality degradation, specifically increased stream temperatures, sedimentation, and toxic chemical spills. Burbot prefer deep, cold waters of lakes and rivers. The only Pennsylvania populations occur in the Allegheny River headwaters and Lake Erie. Burbot

spawn in midwinter at night, over a sand-gravel bottom in shallow portions of lakes or tributary streams under a covering of ice (PFBC 2019e).

During an interagency consultation meeting on 11/7/2018, the PFBC indicated that Burbot may be present in the Allegheny River and its tributaries. Based on consultation with the PAFBC, it is assumed that burbot may occupy the Allegheny River and its tributaries; thus, no surveys were completed for this species.

National Fuel has proposed to cross the Allegheny River via HDD, thus, avoiding direct impacts to the habitat of this species. Following construction National Fuel will restore the ROW in accordance with the requirements of the FERC Plan and Procedures and the ESCAMP (Appendix C). Implementation of the ESCAMP's BMP will avoid indirect impacts to waterbodies from sedimentation in any potential burbot habitat. National Fuel will abide by the published in-stream work exclusion windows for cold water fisheries to avoid impacts to this species within the Allegheny River and its tributaries. National Fuel believes that no significant impacts to Burbot will occur due to the construction or operation of the Project.

2.5.11.3 Reptiles and Amphibians

Blue Spotted Salamander

Blue-spotted salamander (*Ambystoma laterale*) is listed as a species of concern by the state of Pennsylvania. The Blue Spotted Salamander is a medium sized salamander that inhabits moist, shady forests under leaf litter or in vacant, small burrows up to three feet below the surface (Pennsylvania Angler & Boater, 2012). The species does not like open or cultivated fields According to consultation with PFBC, the salamander has been documented in the floodplains of the Alleghany River, Potato Creek, and Portage Creek waterways. Phase I surveys for the Blue-spotted salamander occurred in July 2019. Survey reports have been submitted to PNDI and the PAFBC has issued a Species Impact Review on 10/8/2019, which can be found in Appendix L (redacted to protect site-specific locations of potential habitat and/or species presence).

Timber Rattlesnake

Timber rattlesnake (*Crotalus horridus*) was listed at the time of original consultation as a species of concern by the state of Pennsylvania. The Timber rattlesnake is a large, heavy-bodied snake that inhabits forested, mountains regions in Pennsylvania. It prefers forested areas to forage for small mammals and southerly-facing slopes for hibernating and other thermoregulatory actives. Critical habitat for the timber rattlesnake is forested areas with a >10% slope. (PFBC 2018 consultation) There are forested areas along and near the Project that could provide suitable foraging habitat for this species. During construction, this species would likely avoid the area and move to other nearby foraging grounds due to the activity and noise associated with construction.

There have been observations of Timber Rattlesnakes near the proposed pipeline project area east of Rattlesnake Road. Projects conducted in the occupied range of the timber rattlesnake have a high risk of encountering this species during construction. Phase I surveys for the timber rattlesnake have been completed. Survey reports have been submitted to PNDI and the PAFBC has issued a Species Impact Review on 10/8/2019, which can be found in Appendix L (redacted to protect site-specific locations of potential habitat and/or species presence).

2.5.11.4 Mussels

The following mussels are of special concern within the Commonwealth of Pennsylvania. Surveys for these species were completed in July and August 2019 at the Project crossings of Potato Creek, Portage Creek, Allegany River, and South Branch Oswayo Creek (PFBC 2018 consultation, Walsh et al 2007). The surveys extended 20 meters upstream and 30 meters

downstream of the centerline of the proposed HDD. The surveys were qualitative in nature, generating data in terms of a list of live species present and their relative abundance. Survey reports have been submitted to PNDI and the PAFBC has issued a Species Impact Review on 10/8/2019, which can be found in Appendix L (redacted to protect site-specific locations of potential habitat and/or species presence). Ultimately however, National Fuel is proposing to HDD the Allegheny River, Potato Creek, and Portage Creek; therefore, there are no direct impacts anticipated to these waterbodies resulting in no impacts to mussel species. No mussel species were identified at the Oswayo Creek crossing.

Elktoe (mussel)

Elktoe (*Alasmidonta marginata*) is listed as a species of special concern by the state of Pennsylvania and occurs in small shallow rivers with a moderately fast current and riffles. PAFBC has confirmed that Elktoe have been found in the Potato Creek, Portage Creek, Allegany River, and South Branch Oswayo Creek.

Round Pigtoe (mussel)

Round Pigtoe (*Pluerobema sintoxia*) is listed as a species of special concern by the state of Pennsylvania and occurs in a range of habitats, from small rivers in areas of moderate flow with gravel, cobble and boulder substrates to larger rivers in mud, sand and gravel at varying depths (PFBC 2018 consultation, Walsh et al. 2007). PAFBC has confirmed that the Round Pigtoe have been found in the Potato Creek, Portage Creek, Allegany River and South Branch Oswayo Creek waterways.

Way-rayed Lampmussel (mussel)

Way-rayed Lampmussel (*Lampsillis fasciola*) is listed as endangered by the state of Pennsylvania and occurs in a range of habitats, in gravel or sand bottoms of riffle areas in clear, medium-sized streams (PFBC 2018 consultation, Walsh et al. 2007). PAFBC has confirmed that the Way-rayed Lampmussel have been found in the Potato Creek, Portage Creek, Allegany River and South Branch Oswayo Creek waterways.

2.5.11.5 Plants

The following plant species were identified during consultations with the USFWS and PADCNR, Natural Heritage Program. Surveys were completed for each species during their respective flowering and/or fruiting seasons; no species were identified during field surveys. Botanical survey reports have been submitted to PNDI and on 10/7/2019. The PADCNR has issued a letter of concurrence that based on the field survey findings they do not anticipate any impacts to these species; this letter can be found in Appendix L.

Cranesbill

Cranesbill (*Geranium bicknellii*) is listed as endangered by the Commonwealth of Pennsylvania and may be found is dry openings; prefers dry open woods, clearings, rocky ledges; flowers June through August (PANH 2019). While habitat suitable for Cranesbill is present in the Project area, no specimens were identified during field surveys.

Soft-leaved Sedge

Soft-leaved Sedge (*Carex disperma*) is listed as a Special Concern Species (i.e., rare, tentatively undetermined, or candidate) by the Commonwealth of Pennsylvania. Soft-leaved sedge has a loose, branching system of slender, pale brown rhizomes. Soft-leaved Sedge may be found in hydrophytic wetland communities such as swamps, bogs, wet meadows, mossy and shady coniferous woods, and along waterbody shorelines. The primary season for mature fruits is May

through August (PADCNR 2018). PADCNR requested botanical surveys be conducted at the proposed Tamarack Compressor Station site. No species or their habitats were identified during the survey.

Bebb's Sedge

Bebb's Sedge (*Carex bebbii*) is currently listed as endangered by the Commonwealth of Pennsylvania; proposed to be down-listed to threatened. Bebb's Sedge is an upright sedge with sharply triangular leaves. Bebb's Sedge may be found in hydrophytic wetland communities such as sandy flats and depressions, shore lines of waterbodies, wet meadows, bogs, fens, wet pastures and prairies, and along streams and rivers. The primary season for mature fruits is June through July (PADCNR 2018), no specimens were identified during field surveys.

Screwstem

Screwstem (*Bartonia paniculata*) is currently not listed by the Commonwealth of Pennsylvania; however, it is proposed to be listed as rare. Screwstem may be found in sphagnum bogs where it prefers hummocks in wet woods, wooded bogs, and sphagnous pond margins; flowers August through October (PADCNR 2018). While habitat suitable for Screwstem is present in the Project area, no specimens were identified during field surveys.

Creeping Snowberry

Creeping Snowberry (*Gaultheria hispidula*) is listed as a rare species by the Commonwealth of Pennsylvania and may be found in sphagnum bogs where it prefers hummocks and tree stumps in northern bogs and swamps. Creeping Snowberry flowers in June and fruits in September (PADCNR 2018). While habitat suitable for Creeping Snowberry is present in the Project area, no specimens were identified during field surveys.

Yellow-fringed orchid

Yellow-fringed orchid (*Platanthera ciliaris*) is currently of undetermined status and not listed by the Commonwealth of Pennsylvania; however, it is proposed to be listed as a threatened species. Yellow-fringed orchid may be found in wetlands and other moist areas where it prefers bogs, moist meadows, and woods; flowers July through August (PADCNR 2018). While habitat suitable for Yellow-fringed orchid is present in the Project area, no specimens were identified during field surveys.

2.5.12 Species of Concern Impacts and Mitigation

Construction of the Project could have both short- and potential long-term impacts on threatened, endangered, and sensitive species. Short-term impacts will be a direct result of the disturbance associated with Project construction activities. Long-term impacts may result from habitat loss associated with the clearing of vegetation. Loss of habitat will be mitigated through implementation of the ESCAMP, minimizing construction and operational impacts to the extent practicable, and by returning temporary workspaces to their land uses prior to construction using native seed mixes outside of agricultural areas.

Avoiding and minimizing impacts to protected species includes planning, proper site placement, minimizing disturbance during construction to the extent practicable, and the timing of the construction. For migratory birds, all effort will be made to avoid vegetation clearing activities in potential nesting habitat in the Project area from April 1 through August 31. Construction impacts and mitigation discussions regarding sensitive species are broadly grouped below into plants and wildlife.

2.5.12.1 Plants

No state or federally-listed plant species were identified in during the September and October 2017 surveys, or the May and August 2018 surveys. Many plants are surveyed for during wetland delineations and habitat surveys, however seven species were targeted in a presence/absence survey at the request of the USFWS and PADCNR (Appendix D). These species include the Northeastern Bulrush (*Scirpus ancistrochaetus*), Cranesbill (*Geranium bicknelli*), Bebb's sedge (*Carex bebbii*), Screwstem (*Bartonia paniculata*), Creeping Snowberry (*Gaultheria hispidula*), Yellow-fringed orchid (*Platanthera ciliaris*), and the soft-leaved sedge (*Carex disperma*).

Suitable habitat with high potential for supporting Screwstem, Creeping Snowberry, and Yellow-fringed orchid occurs within the sphagnum bog wetland identified at Line FM100 Abandonment workspace AS-16, near Grant Trail Road. Visual searches throughout the proposed limits of disturbance at this location within the proposed workspaces yielded no observed individuals of these species. The wetland adjacent to Grant Trail Road, within the existing ROW where cut and cap activities are proposed, occurs on both sides of the road. Due to the wetland having high potential for supporting these species, National Fuel will complete pre-construction botanical surveys to verify proposed work activities will not impact these species. However, if impacts cannot be avoided National Fuel will consider alternatives to the proposed workspace which may include eliminating this cut and cap location from the scope of the Project or possibly restricting the workspace limit of disturbance to the upland areas within the Grant Trail Road ROW.

No potentially suitable habitats for Northeastern bulrush, Bebb's sedge or soft-leaved sedge were identified within the surveyed area for the Tamarack Compressor Station. Visual searches yielded no evidence of any Northeastern bulrush, Bebb's sedge or soft-leaved sedge individuals. No wetlands, streams, or other waterbodies were observed or delineated within the surveyed area for the Tamarack Compressor Station. The USFWS has determined there would be ***no effect*** for this species.

2.5.12.2 Wildlife

Impacts on wildlife species of concern from construction of the Project will be both short and potentially long-term. Short-term impacts will result in the direct displacement and possible mortality of individual species on the ROW during construction. Short-term impacts on avian species could also result in indirect impacts resulting from failed nesting in the vicinity of the ROW; however, this is not likely since clearing for construction activities is proposed outside the nesting season. Because of the mobility of most wildlife species and the variability of breeding seasons, actual construction impacts can vary significantly from season to season. Long-term impacts may result from the permanent conversion of land use due to the compressor station and the additional above-ground facilities. These facilities will be sited mostly in forested and woodlands, in addition to agricultural pasture, industrial/commercial areas, and open land; however, minimal long-term impacts are anticipated since National Fuel will restore land back to preconstruction conditions and high-quality habitat for listed species is not anticipated to be permanently lost.

National Fuel has completed species-specific surveys for timber rattlesnake, blue spotted salamander and various mussel species at the request of PFBC. Mitigation measures identified by the PFBC which the Project will adopt by species includes the following:

Burbot (Lota lota)

- All work in waterbodies should be done during low flow periods and strict erosion and sedimentation controls should be implemented; and

- No in-stream work activities in the upper Allegheny River watershed from December 1 to April 1.

Blue Spotted Salamander

- Implement HDD crossings of identified potential habitat; and
- Install fencing around work areas within 300 feet of suitable or confirmed habitat.

Timber Rattlesnake

- A timber rattlesnake monitor will be on-site during construction during pipeline construction activities (between April 15 and October 15) in the vicinity of two critical habitat areas identified during field surveys.
- If the critical habitats located during the habitat assessment and cannot be avoided, it may be dismantled and reconstructed during the timber rattlesnake inactive season using the habitat creation guidelines set forth by the PFBC.
- Additionally, environmental awareness training will include information on the timber rattlesnake, its status as a state protected species and what that means, and the process for contacting environmental staff to have them removed by trained personnel.

Mussels

- Having an EI on site for the duration of the HDD crossing operation;
- Stop the HDD immediately if there is an inadvertent return;
- Have a vac truck on-site or on-call (within 3 hours response time) to begin clean-up of the release to prevent migration of drilling fluids into waters; and
- Notify PAFBC Bureau of Law Enforcement Regional Office within 24 hours prior to initiating drilling.

In addition, National Fuel recognizes the value of pollinators for the ecosystem and economy and will explore the possibility of using pollinator promoting plants within the standard seed mix proposed for reclamation of the ROW. However, it is noted that most of the ROW is owned privately and landowners have priority when determining final seed mixes.

In general, National Fuel will implement best management practices regarding pollinators which include reducing the permanently maintained ROW to a 50-foot-wide area and to a 10-foot-wide ROW in wetland areas. Full width mowing will occur no more frequently than every 3 years and will be conducted between August 31 and April 15, during the time when flowers are less prevalent to avoid destruction of potential food sources for pollinators. In addition, National Fuel will limit herbicide applications and use spot treatments to avoid overspray. Further National Fuel will work with landowners to add native grasses and wildflowers into the seed mix to promote forage habitat for pollinators.

To date, National Fuel has not had specific conversations with agencies regarding pollinator conservation measures; however, National Fuel will commit to work with agencies to determine priority plants that may be included into the proposed seed mix in-so-far as landowners agree with the final seed mix.

2.5.12.3 Migratory Birds and Raptors

Suitable habitat for migratory birds is present throughout the Project area. During the biological pedestrian surveys conducted in September and October 2017, with follow-up surveys conducted in May and August 2018, ground-based searches for raptor nests were conducted across the Project study area. No raptor nests were observed in the Project study area. These surveys were

general habitat level evaluations and not species-specific surveys. Through consultation, Table 2.5-5 lists bird species identified by the USFWS and PGC as Birds of Conservation Concern within the vicinity of the Project. Appendix D contains the PNDI report that lists species of concern identified by the Pennsylvania Natural Heritage Program within the vicinity of the Project. No bald or golden eagles were observed during field surveys.

Fifteen migratory bird species were identified by the USFWS as Birds of Conservation Concern (see IPaC report in Appendix D). Migratory birds are protected under the MBTA and the Bald and Golden Eagle Protection Act. The MBTA, as amended, prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, or nests unless authorized under a USFWS permit. Executive order 13186 further directs federal agencies to avoid or minimize adverse impacts on migratory birds. The USFWS has statutory authority and responsibility for enforcing the MBTA. National Fuel will abide by the March 2011 Memorandum of Understanding between FERC and the USFWS. On December 22, 2017, the U.S. Department of the Interior Solicitor's Office issued a revised interpretation of the MBTA, known as Opinion M-37050 which concludes that the take of birds resulting from an activity is not prohibited by the MBTA when the underlying purpose of that activity is not to take birds.

The currently anticipated construction schedule assumes National Fuel will begin clearing activities outside of MBTA nesting windows for Pennsylvania (April 1 through August 31). National Fuel has designed the project to minimize tree clearing by paralleling existing utility rights of way to the extent practical. National Fuel will conduct a migratory bird awareness training prior to construction with inspectors, contractors and construction crews. These efforts and the planning of the corridor outside areas of heavy bird populations, for example this project avoids all Audubon Important Bird Areas, rookeries, roosts, and private duck clubs show effort to comply with the USFWS "Adaptive Management Practices for Conserving Migratory Birds" (USFWS 2017b).

Should construction clearing activities begin April 1 and August 31, National Fuel will consult with the USFWS on the appropriate mitigation measures to minimize impacts on nesting birds during construction (these may include but not be limited to pre-construction nesting sweeps, additional awareness training for construction crews, and/or avoidance should a nest be identified). If nesting birds are identified by personnel within the ROW, National Fuel will consult with the USFWS to identify appropriate mitigation measures.

Table 2.5-5: Birds of Conservation Concern Potentially Occurring in the Vicinity of the Project

Common Name[1,2] (Scientific Name)	Breeds in Region	Aquatic Habitat Association	Ground[3]	Shrub[3]	Tree[3]	Cliff[3]	Human Structure[3]	Nesting Range[4]
Bald Eagle (*Haliaeetus leucocephalus*)	X	-	-	-	X	-	-	Jan-July
Black-billed Cuckoo (*Coccyzus erythropthalmus*)	X	-	-	X	X	-	-	May-October
Black-capped Chickadee (*Podecile atricapillus practicus*)	X	-	-	-	X	-	-	Year-round
Bobolink (*Dolichonyx oryzivorus*)	X	-	X	-	-	-	-	May-August
Canada Warbler (*Cardellina canadensis*)	X	-	X	-	-	-	-	May-August
Cerulean Warbler (*Dendroica cerulea*)	-	-	-	-	X	-	-	April-August
Eastern Whip-poor-will (*Antrostomus vociferous*)	X	-	-	-	X	-	-	April-August

Golden Eagle (*Aquila chrysaetos*)	-	-	-	-	-	X	-	October-November
Northern Saw-whet Owl (*Aegolius acadicus acadicus*)	-	-	-	-	X	-	-	March-July
Prairie Warbler (*Dendroica discolor*)	X	-	-	-	X	-	-	April-July
Rusty Blackbird (*Euphagus carolinus*)	-	X	-	X	X	-	-	October-November
Wood Thrush (*Hylocichla mustelina*)	X	-	-	-	X	-	-	May-August
Yellow-bellied Sapsucker (*Sphyrapicus varius*)	X	-	-	-	X	-	-	February-October

[1] Pennsylvania Game Commission (PGC) Consultation.
[2] The Project is located in Bird Conservation Region 28 (Appalachian Mountains).
[3] Preferred nesting substrates.
[4] IPaC report (2018).

2.5.13 Agency Consultation

National Fuel has contacted and consulted with federal and state agencies in Pennsylvania regarding the Project and its potential impacts on the natural environment. An inventory of consultation with federal and state resource agencies is presented in Appendix D. This table is organized by federal, state, and local government agencies, with federal agency consultations appearing first then followed by state and local government agency contacts. Appendix D provides copies of documentation including letters, meeting summaries, contact reports, and electronic correspondence.

2.6 Cultural Resources

Section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations require federal agencies to take into account the effects of their undertakings on historic properties listed in or eligible for listing in the National Register of Historic Places. The NHPA and the regulations also require federal agencies to consult with the appropriate State Historic Preservation Office (SHPO) and federally recognized Native American tribes for undertakings within the potential to affect NRHP listed or eligible properties. The FERC is the lead federal agency on this project and responsible for completing the Section 106 consultation and the Native American tribal coordination. All cultural resource field studies and agency reviews have been completed. The Pennsylvania SHPO (Pennsylvania Historical and Museum Commission, PHMC) and Native American Tribal consultation, and the SHPO letter correspondence for the project is included in Appendix M.

2.6.1 Phase I Archaeological Survey Results

For the purposes of the cultural resources survey the direct area of potential effect was defined by an Environmental Clearing Limit (ECL) that encompassed all elements of proposed new construction associated with the Project and allowed for flexibility in pipeline routing and design of temporary and permanent workspaces and facilities. The proposed 0.4-mile extension of the existing Line KL Extension adjacent to the Marvindale Compressor Station site was completed after the initial survey and submitted in a separate negative findings report.

No cultural resource surveys were required by the PA SHPO for portions of the project involving closure of existing facilities or pipelines. No above-ground surveys within an indirect are of potential effect were required by the PA SHPO following the initial Project consultation in 2017.

In October of 2018 Quaternary Geological and Environmental Consultants, LLC. conducted a geomorphological study along the drainages and streams crossed by the Project. This study determined the method for cultural resource testing and the depth of cultural resource testing at these crossings as required by the Pennsylvania Bureau for Historic Preservation. Six streams were studied, a tributary of the East Branch of Fishing Creek, Fishing Creek, Sartwell Creek, Potato Creek, Allegheny Portage Creek, and the Allegheny River.

The survey resulted in the identification of six prehistoric archaeological sites and one prehistoric isolated find within the ECL. Of these sites only sites 36MC0315, 36MC0316, and the Boorum-Voorhees site 36PO0007 are recommended potentially significant cultural resources Table 2.6-1 provides a complete summary of the sites and the necessary actions for the project to meet Section 106 requirements. The Site 36MC0315 contains a variety and relatively high density of artifacts recovered from predominately natural deposits, which are indicative of possible food processing and tool-making activities. The Site 36MC0316 is recommended potentially significant given the density of artifacts recovered from natural deposits. The Boorum-Voorhees site 36PO0007 is recommended potentially significant given the density of artifacts recovered from natural deposits, including diagnostic material. National Fuel has prepared an archaeological avoidance plan for the three prehistoric sites recommended potentially significant and has coordinated with the PA SHPO to ensure these resources will not be impacted. On October 8, 2019, the SHPO provided approval of the Avoidance and Minimization Plan; and determined that the project will have no significant effects on historic properties.

Table 2.6-1: Summary of Cultural Resources Recorded During Survey

Permanent Trinomial	Cultural Affiliation	Site Type	NRHP Eligibility	Action
36MC0313	Prehistoric	Lithic Scatter	No	None
36MC0314	Prehistoric	Lithic Scatter	No	None
36MC0315	Prehistoric	Camp	Yes	Avoidance and minimization of impacts
36MC0316	Prehistoric	Camp	Yes	Avoidance by HDD
36MC0317	Prehistoric	Lithic Scatter	No	None
36PO0051	Prehistoric	Lithic Scatter	No	None
36PO0007	Prehistoric	Camp	Yes	Avoidance and construction fencing
36MC24	Prehistoric	Isolated Find	No	None

2.6.2 Unanticipated Discoveries Plan

National Fuel's has also prepared an Unanticipated Discovery Plan that includes procedures to be followed if historic properties and/or human remains are encountered during construction. This plan has been reviewed and approved by SHPO and FERC. In summary, if historic properties and/or human remains are encountered during construction, work in the immediate area will cease and a qualified archaeologist will be called to evaluate the finding(s) and provide recommendations for how to manage the resource under the appropriate state's Historic Preservation Plan. All findings will be reported to, and activities coordinated with, the FERC as well as the PA SHPO. If human remains are encountered, all activity that might disturb the remains shall cease and may not resume until authorized by appropriate law enforcement and/or the SHPO representative.

3 Analyses

3.1 Antidegradation Analysis

This Project will affect approximately 538.1 acres (inclusive of permanent and temporary impacts). The antidegradation standards of Pennsylvania include the compliance with Chapter 93, Chapter 95, Chapter 102, and Chapter 105. These antidegradation requirements are intended to promote the protection and maintenance of existing water quality and uses, particularly protecting the existing water quality for HQ and EV waters. This section evaluates the Project against those requirements.

Sections 94.3a(c), 93.4a(d) and Sections 93.4c(b)(1-2) refer to antidegradation requirements for protection of Exceptional Value Waters. The methodology for crossing wetlands and waterbodies was discussed in Section 2.3.4 and Section 2.3.5 and the Project is committed to completing at ephemeral, intermittent or ditches with dry crossing methods if possible. Project-wide BMPs have been established, included in the ESCAMP in Appendix C and the SPRP in Appendix I. The use of the erosion control methods, stormwater plans, and spill response plans will avoid or minimize any secondary impact to waterbodies from construction activities. This will prevent significant degradation issues within the project area and the surrounding environs.

Chapter 93 established the water quality standards for surface waters of the Commonwealth, including wetlands in specific instances. Section 93.4a(b) describe existing use protection for surface waters and Section 93.6 protects General Water Quality. National Fuel will be utilizing its stormwater management policy, the ESCAMP, and its SPRP to minimize any adverse effects on surface waters. Application of these standards will minimize direct alteration of the physical, chemical or biological character and resources of surface waters. There are no proposed new or point source discharges to surface waters. Additionally, degradation resulting from non-point source discharges are not anticipated as best management practices will be implemented during construction.

Section 93.4c(a)(2) is applicable as there is critical habitat or critically dependent endangered or threatened State or Federal species associated in or near surface waters. However, as identified in this EA, National Fuel has consulted with PAFBC, PADCNR, and USFWS regarding these species, and no impacts are anticipated with the application of conservation measures outlined herein.

Chapter 95 applies to wastewater treatment requirements. This Project does not involve the treatment or discharge of wastewater and is therefore not applicable to this Project.

Chapter 102 is focused on earth disturbance activities that must “develop, implement and maintain BMPs to minimize the potential of accelerated erosion and sedimentation and to manage post construction stormwater. BMPs shall be implemented during construction to protect, maintain, reclaim and restore water quality and the existing and designated use of waters of this Commonwealth” (25 Pa. Code 102).

3.2 Floodplain/Floodway Assessment

The linear pipeline project crosses several FEMA classified floodplains as identified in Table 2.3-4. Where 100-year floodplains were not identified for waterbodies, National Fuel adhered to PADEP's guidelines and identified a 150-foot area along the feature as the floodway area.

As the pipeline will be constructed under the bed of the waterbody at a minimum depth and will not impede, retard or change flood flows during construction. There will be no impacts or alteration to flows and no fills occurring in floodplains or floodways.

3.3 Alternative Analysis

An alternative analysis has been completed and is detailed herein. Route alternatives were considered and were largely driven by available workspace, landowner constraints, existing utility infrastructure, avoiding environmental or cultural resources, and avoiding existing structures. The alternatives evaluated are described below.

3.3.1 No-Action Alternative

Under the No-Action Alternative no new facilities or modifications to the existing facilities would occur; however, this would not achieve the purpose and need of the Project. For the reasons discussed below, the No-Action Alternative was not considered acceptable. The related work at the aboveground facility interconnect sites is contingent upon the pipeline design for the Project; therefore, aboveground facility sites, other than compressor stations, are not discussed in this section.

The No-Action Alternative would require the existing Line FM100 to remain in service. This line is of 1950's vintage and is reaching the end of its useful lifespan. For long-term reliability and safety reasons, it is advisable to replace it. The replacement pipeline would utilize modern pipe materials, coating and construction installation techniques, thereby reducing risks for many decades to come.

This alternative would eliminate environmental impacts associated with the Project; however, the No-Action Alternative would prevent National Fuel from abandoning approximately 44.9 miles of an older pipeline (and one mile of new pipeline) and implementing needed system upgrades; thus, impacting the integrity, reliability and functionality of the pipe. In addition, Transco would be denied the ability to utilize incremental natural gas capacity created by the modification of National Fuel's YM53 system.

The No-Action Alternative would require Transco to construct additional pipeline, compression and metering facilities, all of which would create their own environmental impacts. The No-Action Alternative was not found to be a feasible alternative for the Project since this alternative would not satisfy the purpose and need of the Project.

3.3.2 Energy Alternatives

Market forces, weather, natural resource limitations, government policy, etc. may affect utilization of available energy supply and other fuel alternatives. Use of alternative fuels to supply the needs of the customers will potentially result in adverse environmental impacts due to increased air pollutant emissions that will be otherwise minimized through the use of natural gas. In general, alternative energy sources for natural gas consumers include traditional energy sources such as coal, fuel oil, and nuclear fuels and renewable energy sources such as wind, solar, geothermal and hydroelectric. State and federal air pollution control regulations indirectly promote the use of clean fuels to minimize adverse air quality impacts. Use of alternative hydrocarbon energy sources will unnecessarily increase adverse air quality impacts, and these increased impacts will

conflict with federal and state long-term energy and environmental policies aimed toward attaining ambient air quality standards. While renewable alternative energy sources contribute to a diverse energy portfolio for users, they ultimately cannot provide the energy needs that the proposed Project will supply to the end user.

3.3.2.1 Energy Conservation

Reduction in the need for additional energy is the preferred alternative wherever possible. Conservation of energy reduces demand for limited fossil fuel reserves and is strongly advocated by both federal and state authorities in the United States. Energy efficiency and conservation programs that are encouraged at the state and federal levels and may serve to slow the growth of natural gas use and demand may decrease because of these programs. However, there remains a demonstrated need for the natural gas by the end user served by the Project that would be provided for through the construction and operation of this Project. Energy conservation alone is not a viable alternative to the Project; however, such conservation and efficiency programs will continue to exist in concert with the Project.

3.3.2.2 Traditional Energy Sources

The proposed Project will provide the necessary incremental capacity to provide firm service to the end user. The use of natural gas is the most efficient fuel for the end user, because the use of another energy source would cause them to incur additional operational costs due to the need to convert facilities and equipment to accommodate an alternative energy source. The proposed Project will provide a reliable source of energy to the end user with minimal additional costs to the customer.

Coal

Coal is used for energy generation and functions as an alternative to natural gas. However, relative to natural gas, the burning of coal results in greater emissions of pollutants such as nitrogen oxides, sulfur dioxide, GHG, and mercury (USEPA 2014). Reducing reliance on coal burning generators is driven by lower-cost natural gas, renewable energy, and stricter emissions standards. In the United States coal consumption has been falling since its peak in 2007. The Energy Information Administration forecasts that 2018 coal consumption will decline 4% from 2017 levels with continued decline in future years (2018). Due to the greater environmental impacts associated with emissions from coal-burning power generation as well as its transportation and declining demand, coal does not represent a preferred alternative for replacing the natural gas to be supplied by the proposed Project.

Fuel Oil

Fuel oil is commonly transported by pipeline which may require construction of other pipeline systems to transport the fuel oil, which will likely have similar impacts as the proposed Project. Reliance on fuel oil as an alternative to natural gas will increase the potential for environmental impacts such as oil spills and pollution from air emissions. Natural gas burns cleaner than other fossil fuels, is relatively inexpensive compared to other fossil fuels, and is domestically produced. A primary object of the Project is to provide Transco with the firm transportation capacity for the end user. As such, fuel oil will not achieve the purpose and need for the project. Fuel oil has no advantage over natural gas, and fuel oil necessitates increased environmental impacts in transportation and at the burner. For these reasons, fuel oil will not be a preferable alternative to the natural gas to be supplied by the proposed Project.

Nuclear

In the United States, energy from nuclear power accounted for approximately 20 percent of annual energy generation nation-wide reported in 2017 (DOE/EIA 2018). Although use of nuclear power may avoid GHG emissions that will otherwise occur with burning fossil fuels, nuclear power remains problematic given the environmental and regulatory challenges concerning safety and security, the disposal and long-term storage of toxic and radioactive materials (i.e., spent fuel), and potential alterations to hydrological/biological systems.

The use of nuclear energy is not considered to be an option for meeting the existing and projected demand for the Project. The construction of nuclear power plants would not meet the purpose and need of this Project due to the timing constraints and barriers associated with the permitting and construction of nuclear power plants; the disposal of spent fuel; and long regulatory review time and uncertainty of construction costs. A nuclear facility is beyond the scope of servicing the end consumers this Project proposes to serve.

3.3.2.3 Renewable Energy Sources

In the United States, energy from renewable energy sources accounted for approximately 17 percent of annual energy generation nation-wide reported in 2017 (DOE/EIA 2018). Wind power, geothermal, hydropower and solar energy sources have been expanding in recent years. Use of renewable energy sources is expected to increase in the future as renewable energy portfolio standards are implemented and traditional energy sources become more expensive to produce due to more stringent emissions standards.

Energy supplied by renewable energy sources is generally not supplied to the market on a continuous basis, and viable storage technologies are not yet available. Renewable energy sources are an important segment of energy generation; however, due to variable generation profiles, they are insufficient to meet the current demand for natural gas required by the Project's end user. In addition, the use of renewable sources of energy does not eliminate all construction impacts and presents a different set of operational impacts, including those that may be associated with new electric transmission lines and associated facilities. Further, the construction involved with renewables at an equivalent scale of power that can be generated from the amount of gas to be delivered by the Project would be significant. Finally, the lead times to complete the design, permitting, and construction of these facilities would extend well beyond National Fuel's scheduled in-service date of December 2021.

3.3.2.4 Fuel Cells

Fuel cells are a developing alternative for generating electricity more directly and cleanly from fossil fuels or hydrogen. Small-scale fuel cell research and development are ongoing, but reliable fuel cell systems representing a magnitude of energy equivalent to the Project are not expected to be available or cost-effective in the near future.

3.3.2.5 Energy Alternatives Conclusion

While energy alternatives to the Project could address some of the energy demand required by the end user, none of the alternatives meet the needs of the Project, which will provide the necessary incremental capacity to provide firm service to the end user. Accordingly, energy conservation, other traditional energy sources and renewable energy resources will not be an alternative to meet the purpose and needs of the Project. These and other alternative energy sources are increasingly important to the overall energy portfolio of the United States; however, they are not considered viable due to factors such as siting constraints, increased environmental impacts, and the time required to develop these alternatives. Therefore, the use of natural gas is the preferred alternative for the proposed Project.

3.3.3 System Alternatives

System alternatives are alternatives to the proposed action that would make use of existing, modified, or proposed project(s) systems to meet the stated objective of the proposed Project. System alternatives involve the transportation of the equivalent amount of natural gas by the modification or expansion of existing pipeline systems or by other new pipeline systems. National Fuel explored several different system alternatives, including alternative routes and facility locations. The system alternatives identified and reviewed by National Fuel are discussed in greater detail below.

3.3.3.1 System Alternative

The System Alternative to the proposed Project would include replacing 44.9 miles of pipe on Line FM100 with like diameter pipe; however, it would omit the other proposed Project components.

At 44.9 miles, the System Alternative is the longest of the routes reviewed. It has the advantage of being routed almost entirely parallel to existing National Fuel ROW, with short deviations where terrain or other features may dictate. The topography of this alternative is severe in numerous places, including seven miles exceeding 26 percent slope. There are 35 streams crossed (USGS 2017, PADEP 2019f); of which 27 (77%) are designated as CWF and two (6%) are WWF. PADEP has designated 20 (57%) of these streams as HQ and three (9%) as EV waters (PADEP 2019). The majority of this route (80.5%) is on no-federal, publicly-owned lands. It crosses Pennsylvania State Game Land 34 for 0.25-mile; the Bucktail State Park Natural Area for 0.5-mile; and three state forests, the Elk, Moshannon, and Susquehannock, totaling 35.4 miles. The entire system alternative impacts 328.0 acres of state-owned lands. This alternative bisects Pennsylvania's designated wild elk herd range.

Construction considerations and customer commitments were also significant determining factors regarding the viability of this alternative. As stated above, the proposed route is constrained due to difficult terrain and the adjacent active Line FM100. Additionally, National Fuel must complete the Project with minimal disruptions to existing firm customer delivery commitments. As such, construction options were generally limited to take-up and relay or new parallel construction. Although, take-up and relay construction would minimize additional environmental disturbance, it would involve a very lengthy and total pipeline shutdown lasting for the duration of the construction period. Taking the pipeline out of service for the duration of construction would interrupt firm delivery service for the same period. Alternatively, offset construction would require greater environmental disturbance than take-up and relay, in that working alongside active pipelines would require significant ATWS. To maintain a safe working environment and to protect the existing active pipelines, 25 to 50 feet of ATWS would be required along most of the route. Given the terrain, proximity to the existing Line FM100, areas of side slope and the relative inability to obtain ATWS at critical locations along the route, National Fuel determined offset construction presented an unacceptable safety risk for construction workers and the operating pipelines. For these reasons, National Fuel removed this alternative from further consideration. A map of this alternative is included in Appendix N.

3.3.3.2 Existing National Fuel System Alternatives

National Fuel and its affiliates have no other existing gas transmission systems in the area that would achieve the purpose and need of Project. Therefore, no other "system alternative" on the National Fuel pipeline network is possible.

3.3.3.3 Third-Party System Alternatives

Third-Party System Alternatives are pipelines not owned by National Fuel that could potentially serve the same need as the Project with less environmental impacts than the proposed Project. There are several other pipelines in the area; however, National Fuel's understanding is that they could not deliver the volume of gas required by National Fuel without replacing the facilities with larger pipe or looping portions of their pipeline systems with similar facilities. Additionally, National Fuel is not aware of any proposed Third-Party System Alternatives that could serve the required delivery volumes.

Third-Party System Alternatives were ultimately dismissed because the other pipelines would need to build similar facilities with equal or potentially greater impacts than the proposed Project. Ultimately, the Project as proposed will disturb less resources because the majority of the Project will be co-located, minimizing additional environmental and landowner impacts. Specifically, proposed facilities parallel existing pipelines and will make use of existing cleared areas to further minimize disturbance.

3.3.4 Pipeline Route Alternatives

3.3.4.1 Proposed Pipeline

The proposed pipeline route achieves the stated purpose and need of the Project while minimizing impacts to the environment, accommodating engineering/construction demands and optimizing the Project's economics. To accomplish this, National Fuel examined aerial photography, USFWS, NWI maps, USGS quadrangle maps, pipeline and oil and gas well data, and county parcel data. In addition, field surveys and public input were used during routing. The intent of this effort was to identify the most environmentally sound, technically efficient, and cost-effective route for the Project.

The routing criteria used in creating the various proposed routes included:

- Potential impact to sensitive resources
- Land use issues
- Potential impacts to landowners
- Proximity to residential areas
- Proximity to industrial development areas
- Engineering/construction issues
- Operation and maintenance considerations
- Supporting infrastructure
- Overall cost effectiveness
- Public input

The use of existing corridors was prioritized in the routing evaluation. Existing corridors generally provide the best opportunity to minimize environmental impacts and construction costs. Parallel construction reduces the need for establishing new corridors and thus the involvement of additional landowners; minimizes clearing of new ROW; and lessens potential environmental impacts. Similarly, operation and maintenance costs incurred during the life of the pipeline can be reduced when corridors are shared.

The Line YM58 route includes 29.5 miles of new 20-inch-diameter steel pipeline, of which approximately 24.0 miles will parallel existing pipeline corridors, with some minor reroutes

possible. The topography for the preferred route is less severe than other routes analyzed, with less than 3.75 miles exceeding 26 percent slope. There are 33 streams crossed (USGS 2017); of which 27 are CWF and 2 are TSF. Pennsylvania Department of Environmental Protection identifies 4 streams as EV and 11 streams as HQ-CWF (PADEP 2019f). The proposed route crosses Pennsylvania State game lands 59 and 61, totaling 2.8 miles and 27.6 acres of impact; but does not cross any Pennsylvania state forests, state parks or federal lands.

To achieve the required flow conditions and deliver existing contracted capacity commitments, National Fuel is proposing to construct 1.41-miles of 24-inch-diameter pipeline loop located adjacent to National Fuel's Line YM224. The Line YM224 Loop is bounded by Dwight Road and Nelson Run Road and has been sited to minimize resource impacts and optimize construction efficiencies. This loop is discussed in detail in Section 3.3.4.3 below.

Alternatives to the proposed pipeline route that were considered and dismissed are described below, and a comparative analysis of the proposed route versus dismissed alternatives is shown on Table 3.3-1. Maps of the alternatives/deviations are included in Appendix N. To facilitate a comparative analysis between the proposed Project and the alternatives, certain generalizations were made in Table 3.3-1. For example, publicly available data and aerial photography interpretation were used rather than field reconnaissance survey data, a standard 75-foot wide construction corridor was used for the alternatives; also, alternative routes assumed the same starting and ending location as the proposed alignment for a consistent and comparable analysis.

3.3.4.2 Alternative Alignment

The alternative alignment includes replacement of 5.8 miles of existing Line FM120, 24.0 miles of new greenfield pipeline construction in an easterly direction to the existing FM100 corridor (Line LF3), and replacement of 3.7 miles of the existing Line FM100 to the Costello Compressor Station.

The topography of this alternative is severe, including 6.5 miles exceeding 26 percent slope. There are 35 delineated streams crossed; 29 of which are CWF. Twenty-seven (27) of these streams are identified as HQ/EV waters by the Pennsylvania Department of Environmental Protection (2017). Many of the delineated streams presented challenges with protection due to steep narrow banks. This alternative route crosses two Pennsylvania State Forests, Elk and Susquehannock, totaling 22 miles and 200 acres of impact. A map of this alternative is included in Appendix N.

3.3.4.3 Line YM224 Loop Alternatives

In conjunction with Line YM58 and previously considered alternatives, and to achieve the correct hydraulic flow conditions for the Project, National Fuel evaluated a 6.4-mile section of Line YM224 for potential looping and determined that 1.41 miles of 24-inch-diameter pipeline looping the existing Line YM224 would meet Project needs. National Fuel evaluated three alternatives to looping Line YM224 that provided certain construction advantages. These alternatives are discussed in detail below.

3.3.4.4 Loop Alternatives

For comparative purposes Loop Alternatives are additive to the calculations presented for the proposed Line YM58 and Line LK Extension.

Loop Alternative 1 – Northern Alignment

Loop Alternative 1 – Northern Alignment starts at MP 29.1, or at the proposed interconnect of the proposed Line YM58 and existing Line YM224. From this point the pipeline parallels an existing

Dominion pipeline for approximately 5.4 miles in a gradual northeasterly direction to a tie-in point on National Fuel's existing Line YM52.

The topography of this alternative is severe, including 1.09 miles exceeding 26 percent slope. In conjunction with the proposed Line YM58, there are 38 streams crossed (USGS 2017); 30 of which are CWF. Eighteen (18) of these streams are identified as EV waters by the PADEP (2019f). State forests and game lands crossed are limited to the proposed Line YM58, totaling 2.8 miles and 27.6 acres. Loop Alternative 1 – Northern Alignment does not cross state forests or game lands.

While this loop alternative would eliminate the need for an interconnect station at the eastern terminus of the proposed Line YM58, a similar interconnect station would be required at the eastern end of Loop Alternative 1 – Northern Alignment. Therefore, no reduction in Project scope or footprint could be gained from this alternative. In fact, this loop alternative involves significantly newer pipeline lay and earth disturbance than the proposed Line YM224 Loop. As such, National Fuel removed this alternative from further consideration. A map of this alternative is included in Appendix N.

Loop Alternative 2 – Southern Alignment

Loop Alternative 2 – Southern Alignment starts at MP 27.7, or approximately 1.24 miles west of the proposed interconnect of the proposed Line YM58 and Line YM224. From this point, the pipeline parallels an existing TGP pipeline for approximately 5.88 miles in an easterly direction to a tie-in point on National Fuel's existing Line YM52.

The topography of this alternative is severe, including 0.79-mile exceeding 26 percent slope. In conjunction with the proposed Line YM58, there are 36 streams crossed (USGS 2017); 30 of which are CWF. Seventeen (17) of these streams are identified as EV waters by the PADEP (2019f). State forests and game lands crossed are limited to the proposed Line YM58, totaling 2.8 miles and 27.6 acres. Loop Alternative 2 – Southern Alignment does not cross state forests or game lands. For similar reasons as Loop Alternative 1 – Northern Alignment, National Fuel removed this alternative from further consideration. A map of this alternative is included in Appendix N.

Loop Alternative 3 – Increase MAOP on Line YM224

A third alternative to looping Line YM224 was considered, which involved pressure testing and operating Line YM224 at a higher maximum allowable operating pressure (MAOP). This approach would minimize additional environmental impacts in that only limited dig-out locations and potentially new access roads would be required to facilitate hydrotesting. However, the increased MAOP on Line YM224 would require additional filtration and pressure regulation equipment at the proposed eastern interconnect station because YM50 would be operating at a lower pressure than Line YM224.

This alternative was ultimately dismissed because the multiple elevation changes along Line YM224 would require breaking up the hydrostatic test into multiple test sections to control hydraulic pressure head buildup. This would require construction of new access roads through sensitive areas, including wetlands and waterbodies. Additionally, this alternative was less cost effective than building the proposed loop and would be extremely disruptive to system supply extending customer outages while the line is being hydrotested. No figure was prepared for this alternative as it would only increase the MAOP on an existing pipeline.

Table 3.3-1: Alternative Route Characteristics

Factor	Proposed Project	System Alternative	Alternative Alignment	Loop Alternative 1 – Northern Alignment	Loop Alternative 2 – Southern Alignment	Loop Alternative 3 – Increase MAOP on Line 224[10]
Length of Route (to be constructed)	Line YM58 – 29.5 miles Line KL Ext. – 0.4-mile Line YM224 Loop – 1.4 miles **Total: 31.3 miles**	Line FM100 Replacement – 44.9 miles **Total: 44.9 miles**	Line FM120 Replacement – 5.8 miles Line FM100 Replacement – 3.7 miles Line LF3 – 24.0 miles **Total: 33.5 miles**	Parallel Dominion ROW – 5.4 miles Line YM58 – 29.5 miles **Total: 34.9 miles**	Parallel TGP ROW – 5.9 miles Line YM58 – 29.5 miles **Total: 35.4 miles**	0 miles
ROW Type						
New ROW (miles)[1]	7.3	--	24.0	6.9	5.5	--
Length of co-location (miles)[1]	24.0	44.9	9.5	28.0	29.9	--
ROW Land Requirements						
Pipeline operation requirements (acres)[2]	188.1	267.8	203.0	210.4	204.9	--
Pipeline construction requirements (acres)[3]	282.5	401.8	305.1	315.7	307.4	--
Wetlands						
Total wetlands crossed (feet)[4]	2,611.9	2,635.2	1,116.8	2,817.3	2,654.1	--
Total wetlands crossed (number)[4]	32	20	34	35	34	--
Total wetlands crossed (acres)[4]	4.7	4.6	2.1	5.0	4.8	--
PFO wetland area in operational and construction limits (acres)[4,5]	2.4	2.2	0.6	2.4	2.4	--
PEM wetland area in operational and construction limits (acres)[4,5]	1.0	--	0.2	1.0	1.0	--
PUB wetland area in operational and construction limits (acres)[4,5]	--	--	--	0.2	--	--
Riverine area in operational and construction limits (acres)[4,5] (includes R3, R4 and R5 NWI mapped subsystems)	1.3	2.4	1.3	1.4	1.4	--
Waterbodies						
Waterbodies Crossed (number)[6]	33	35	35	38	36	--
Land Use[7]						

Factor	Proposed Project	System Alternative	Alternative Alignment	Loop Alternative 1 – Northern Alignment	Loop Alternative 2 – Southern Alignment	Loop Alternative 3 – Increase MAOP on Line 224[10]
Agricultural Land (miles/acres)	3.6/32.6	<0.1/0.1	0.1/0.6	4.2/38.5	4.8/41.5	--
Industrial/Commercial Land (miles/acres)	0.5/5.1	1.0/9.2	2.1/16.5	0.4/5.8	0.8/7.3	--
Forest & Woodland (miles/acres)	9.8/100.3	40.7/268.7	24.9/235.4	12.9/130.6	10.7/107.3	--
Open Land (miles/acres)	17.1/142.0	3.6/119.7	6.3/51.4	17.1/138.3	18.7/148.3	--
Open Water (miles/acres)	0.2/1.7	<0.1/0.1	<0.1/0.3	0.2/1.7	0.2/1.7	--
Residential Land (miles/acres)	0.1/0.8	0.5/4.0	0.1/0.9	0.1/0.8	0.2/1.3	--
Residences and Structures						
Residences or structures located within 50 ft of the construction workspace (number)[8]	16	2	4	16	21	--
Cultural Resources[9]						
National Historic Landmarks within 0.50 mile (number)	--	--	--	--	--	--
NRHP eligible or potentially eligible cultural resources sites within 0.50 mile (number)	17	14	9	19	21	--
Other Environmental Factors						
Landfills, quarries (count within 0.50 mile)	4	4	--	2	2	--
Active oil and gas wells (count within 0.50 mile)	240	43	187	281	254	--
Foreign pipeline crossings (number)	49	12	14	53	54	--
Public roads crossed (number)	18	43	25	23	24	--
Miles exceeding 26% slope	7.1	9.3	5.8	11.1	10.6	--
Cold Water Fisheries Crossed	27	27	29	30	30	--
State Lands Crossed (acres)[5]	27.6	328.0	200.0	27.6	27.6	--

[1] Co-location was based on the centerline of an alternative being within 100 feet of existing pipeline centerlines or powerline facilities.
[2] Operational ROW for the Project is based on a 50-foot-wide permanent ROW; and includes proposed Line YM58, Line KL, and YM224 Loop. The operational ROW for alternatives considered is based on a 50-foot-wide permanent ROW .
[3] Construction ROW for the proposed project is a 75-foot-wide typical ROW that includes a 50-foot-wide permanent easement and 25-foot-wide temporary workspace (TWS) abutting the permanent easement. For comparative purposes, it does not account for access roads or additional temporary workspace (ATWS). The typical construction ROW for alternatives considered is based on a 75-foot-wide typical construction ROW.
[4] Based on centerline crossing of USFWS NWI data.

[5] Based on a 50-foot-wide Permanent ROW and 25-foot-wide temporary workspace (does not account for construction crossing technique, such as conventional trench or HDD; therefore, area reported may not equal actual wetland impact).
[6] Based on PADEP Chapter 93 Designated Use Streams data.
[7] Land Use classes determined through 2017 aerial photography interpretation and USFWS NWI data; reported in miles crossed by pipeline and acres of construction ROW.
[8] Based on a 75-foot-wide construction ROW.
[9] Sources used for cultural assessment include (1) Pennsylvania Historical & Museum Commission Cultural Resources Geographic Information System [07/09/2019]; (2) National Register of Historic Places public database (accessed [07/09/2019]); and (3) National Parks Services National Historic Landmark database (accessed [07/09/2019]).
[10] As mentioned in Section 10.6.4.3, this alternative appears to have less impacts as presented in this table; however, when construction logistics such as access and dig-out staging are considered impacts may be considerable.

3.3.5 Compressor Stations Alternatives

National Fuel is proposing to abandon the existing 1,440 hp Costello Compressor Station, immediately south of Costello, PA, which requires capital improvements to ensure continued reliability. As part of this Project the new 15,165 hp Marvindale Compressor Station would be constructed approximately one-mile northwest of Clermont, PA. Additionally the new 22,220 hp Tamarack Compressor Station will be constructed in Clinton County, PA. Measurement and regulation facilities will be installed at Marvindale Compressor Station. A 4,055 hp portion of the Marvindale Compressor Station will provide the necessary compression to deliver contracted volumes from National Fuel's K system to National Fuel's YM system, with newer, cleaner burning units. An 11,110 hp portion of the Marvindale Compressor Station and the Tamarack Compressor Station will provide the necessary compression on National Fuel's YM53 system to deliver contracted volumes into Transco. The Marvindale Compressor Station will be located on property owned by National Fuel's affiliate Seneca Resources Corporation (Seneca Resources), near existing TGP and NFG Midstream Clermont, LLC, and Seneca Resources facilities. The Tamarack Compressor Station will be located on property owned by National Fuel. These sites are shown in Appendix N.

3.3.5.1 Electric Motor-Driven Compression Alternative

National Fuel considered the use of electric compressors at both the proposed Marvindale and Tamarack Compressor Stations instead of the typical natural gas fired engines or turbines used at other existing compressor stations and proposed for the Project stations. The analysis is based on readily available public information in addition to communications with Tri-County Rural Electric and West Penn Power. National Fuel considered environmental impacts, cost, and reliability in its assessment of an electric compressor option.

The use of electric motor-driven compressor units for the compressor stations would require National Fuel to purchase electricity from an outside supplier and the construction of additional non-jurisdictional electric transmission infrastructure. Necessary infrastructure would include new electric transmission and service lines, a new National Fuel dedicated substation, and new electric utility substation(s) or upgrades to existing substation(s). Due to the high energy demands of a typical electric compressor required to meet the necessary hydraulic flow capacity needs for the Project, electric supply upgrades (e.g., substation and transmission line) would be required.

Specific to the Marvindale Compressor Station, West Penn Power provided estimated construction requirements and costs associated with the extension of transmission lines to the site. In order to service a proposed load of 12 MW of power for three electric motors with a combined 16,000 horsepower, National Fuel would need to receive at least 34.5kV service at the Marvindale Compressor Station. West Penn Power would need to construct over two miles of transmission line from an existing 115kV line and complete modifications to an existing substation to provide service. It is expected a 100 ft wide ROW will need to be obtained to construct and operate the line. Anticipated timing to complete the required engineering, permitting and construction of these supporting facilities is estimated at three to four years; this will not support National Fuel's desired in-service schedule. An addition substation facility would be required to support the new electric transmission system increasing the permanent impacts of the project.

Specific to the Tamarack Compressor Station site, Tri-County Rural Electric provided estimated construction requirements and costs associated with the extension of transmission lines to the site. In order to service a proposed load of 18 MW of power for two electric motors with a combined 22,800 horsepower, National Fuel would need to receive 115kV service at the Tamarack Compressor Station. The location of this compressor station is close to an existing electrical

distribution line that operates at 12.5 kV. There would be significant impact to existing feeds to support the required load and therefore additional infrastructure modifications. Anticipated timing to complete the required engineering, permitting and construction of these supporting facilities is estimated at two to five years; this will not support National Fuel's desired in-service schedule. An addition substation facility would be required to support the new electric transmission system increasing the permanent impacts of the project.

Non-jurisdictional facilities, including new substations with access roads at a location along the existing electric transmission line and new transmission corridor with utility poles and overhead lines, would need to be constructed. Poles for overhead transmission lines are typically spaced every 200 feet at a height of 80 to 100 feet. A new 2.5-mile transmission line route would require approximately 80 new poles. This new ROW will increase the overall environmental impacts to waterbodies and wetlands, soils, landowners, visual resources and various land uses.

In order to service the proposed compressor stations with sufficient power for electric-driven compressors, a new substation located adjacent to the compressor stations sites would be required to reduce the electric transmission to required levels (approximately 13.2 kV for the facility electrical needs). The compressor station substations would encompass approximately 1 acre (assumed to be 200 feet by 200 feet). It is desirable to have the substation located close to the compressor station site. To ensure the facilities remain operational and can meet customer obligations, two transformers, one for each transmission feed from the utility substation, would be proposed at the new substations.

These non-jurisdictional facilities would greatly increase the overall disturbance and impacts for construction and operation of the Marvindale and Tamarack Compressor Stations. Increased overall environmental or human resources impacts to waterbodies and wetlands, soils, landowners, visual and land use would be anticipated. Construction and operation of these non-jurisdictional facilities would be cost prohibitive relative to the selected alternative.

In addition, a single power source greatly decreases the reliability of the compressor station maintaining power. A second substation facility drawing from a separate transmission line and/or an emergency back-up generator would be necessary for adequate protection from power grid failures, creating additional environmental impacts and a higher cost of construction and operation.

Air emissions and noise impacts of the compression units were also considered. Although electric compressors themselves do not produce air emissions, the carbon footprint of an electric compressor is anticipated to be similar to gas fired engines and turbines. Regionally, the electric grid is powered by a combination of renewable and traditional sources, including wind farms, nuclear plants, natural gas plants, and coal fired plants. Although it is difficult to assess the draw of power at any one time, a significant portion of power regionally is still provided by coal fired plants, which have significantly higher air emissions than the clean burning natural gas used to power the proposed low emission gas fired compressor units typically used by National Fuel., Electric compressors would be expected to have similar noise impacts as gas fired units and would require similar minimization and mitigation measures to control noise at the nearest noise sensitive receptors.

For these reasons, the electric compressor options were eliminated as a viable option for the Marvindale Compressor Station and Tamarack Compressor Station.

3.3.5.2 Proposed Site

Marvindale Compressor Station

The proposed Marvindale Compressor Station site is located on a 173-acre tract at the interconnection of National Fuel Lines KL and FM120, McKean County, PA, at approximate MP 0.0 of the proposed Line YM58. The site is generally forested with existing above and below grade National Fuel, Seneca Resources Corporation, NFG Midstream Clermont, LLC, and TGP facilities adjacent to, and southwest of the proposed compressor station site. As planned, the Marvindale compressor station will include one Caterpillar G3608A4 Engine / Ariel JGC/4 Compressor package (2,675 hp), one Caterpillar G3516 Engine / Ariel JGT/4 Compressor package (1,380 hp), and one Solar Taurus 70 Turbine/Compressor package (11,110 hp), with a station total of 15,165 hp, and associated appurtenances such as taps, valves, station piping, inlet filter/separators, HP gas coolers, backup power generation, utilities, a control building, and office building that will include communication, storage, office, and a break room area, water and septic. The station is being designed to be fully automated and hiring of new employees will be limited. An electrical power source is available from West Penn Power and will be extended to the station.

The permanent footprint of the proposed compressor station will be 3.7 acres. The slopes of the site average zero percent to four percent. The soils are mapped as Hartleton channery silt loams (HaD) and Cookport loams (CoB); of which 2.6 acres are considered prime farmland soils. There are no wetlands on the site. A biological survey of the site performed in October 2017 did not identify any sensitive species. In addition, an intensive cultural resources inventory was performed on the site and no cultural resources were found (RGA, Inc., 2017).

The National Ambient Air Quality Standards (NAAQS) for all pollutants at the proposed site is in attainment (USEPAe 2019). Three noise-sensitive areas (NSA) were identified within a one-mile radius of the site, the nearest being 0.4-mile to the southwest.

This site was screened based on several factors including hydraulic compatibility, favorable topography, surrounding land use, proximity to existing access roads, proximity to an electrical power source, presence of NSAs, land ownership, NAAQS status, and minimizing conflicts with other pipeline systems in the vicinity.

Tamarack Compressor Station

The proposed Tamarack compressor station site is located on an 8.8-acre tract on the existing Line YM53 near the interconnect with Transco at the Leidy M&R Station in Clinton County, PA., at approximately MP 28.6. The current land use at the proposed compressor station site includes open land and areas that are partially forested due to the timber having been historically cleared. As planned, the Tamarack compressor station will include two Solar T-70 gas turbines (11,110 hp each, with a station total of 22,220 hp), and associated appurtenances such as taps, valves, station piping, inlet filter/separators, HP gas coolers, meter station, backup power generation, utilities and a control building. The compressor station is being designed to be fully automated and hiring of new employees will be limited. An electrical power source is available from Tri-County Rural Electric Cooperative, Inc and will be extended to the station.

The permanent footprint of the proposed compressor station will be 4.6 acres. The slopes of the site average zero percent to four percent. The soils are mapped as Hustontown channery silt loams 3 to 8 percent slopes (HuB); which are considered prime farmland soils. There are no wetlands on the site. A biological survey of the site performed in October 2017 did not identify any sensitive species. In addition, an intensive cultural resources inventory was performed on the site and no cultural resources were found (RGA, Inc. 2017).

National Fuel is evaluating NAAQS for all pollutants at the proposed site and will submit this information in subsequent filings of this report. Seven NSAs were identified within a one-mile radius of the site, the nearest being 0.19-mile to the north.

This site was screened based on the same factors utilized for the Marvindale Compressor Station.

3.3.5.3 Alternate Compressor Station Sites

Marvindale Compressor Station

Three alternative compressor stations sites to the proposed Marvindale Compressor Station site were evaluated and compared to the proposed site. Alternative Site 1 is at the proposed Line YM58 MP 2.4, near the existing Tennessee Gas compressor station. Alternative Site 2 is approximately five miles south of Ellisburg, Potter County, PA at the intersection of National Fuel's Lines YM52 and YM53. This alternate location is approximately 2.3 miles northeast of Colesburg, Potter County, PA, and at the terminus site of Loop Alternative 1 – Northern Alignment. Alternative Site 3 is approximately five miles south of Ellisburg, Potter County, PA near the intersection of TGP's pipeline and National Fuel's Line YM52. This alternate location is approximately one-mile northeast of Colesburg, Potter County, PA, and at the terminus site of Loop Alternative 2 – Southern Alignment. Alternative Site 1 can be accessed from proposed Permanent Access Road 3. Alternative Sites 2 and 3 can be accessed from an unimproved spur road off Cowburn Road. The equipment and supporting systems at all three alternative sites would be the same as described above for Marvindale. Alternative Site 1 could have power serviced by the existing source located at the Tennessee Gas compressor station site, approximately 800 feet to the southeast. Alternative Sites 2 and 3 may be serviced by the existing West Penn Power distribution line, located about 1,200-feet to the west. However, it is unknown whether the existing distribution line has sufficient power capacity to operate the proposed compressor station. National Fuel is working with West Penn Power to determine additional upgrades are necessary to deliver sufficient power to the site. If insufficient power is available on that distribution circuit, National Fuel will work with West Penn Power to make the necessary upgrades to the circuit to satisfy the needs of the compressor station. These modifications are not anticipated to change the environmental impacts evaluated in this application and reflected in Table 3.3-2.

Tamarack Compressor Station

Three alternative compressor stations sites to the proposed Tamarack Compressor Station site were evaluated and compared to the proposed site. Tamarack Alternative Site 1 (Site 1T) is at MP 38.1 of Line YM53, near the proposed Leidy Interconnect LDC2245 with Transco. This alternate location is approximately 1.8 miles southeast of Cross Fork, Potter County, PA, and 3.1 miles northeast of the Leidy Interconnect LDC2245. Tamarack Alternative Site 2 (Site 2T) is approximately 2.2 miles southwest of Cross Fork, Potter County, PA, and 2.59 miles northeast of the Leidy Interconnect LDC2245. Tamarack Alternative Site 3 (Site 3T) is approximately 3.6 miles south of Cross Fork, Potter County, PA, and 2.6 miles northeast of the Leidy Interconnect LDC2245.

Alternative Site 1T would be accessed from new 0.3-mile permanent access road or by improving the nearby Shephard Road and constructing a new 0.1-mile permanent access road which crosses Susquehannock State Forest, which is managed by the PADCNR. Alternative Site 2T can be accessed from Bailey Lane, a public road. Alternative Site 3T would be accessed from new 0.6-mile permanent access road.

The equipment and supporting systems at all three alternative sites would be the same as described above for Tamarack Compressor Station. Site 1T can be serviced by Tri-County Rural Electric Cooperative, Inc. To support the compressor station loads Tri-County will convert

approximately 2 miles of single-phase service to three phase service. Similarly, Site 2T and 3T would potentially be served by the same Tri-County Rural Electric Cooperative, Inc. but the distances traveled would be adjusted respectively.

3.3.6 Compressor Station Alternatives Evaluation

The alternative compressor station sites were compared to the proposed sites based on the factors summarized above for the proposed compressor station sites.

3.3.6.1 Marvindale Compressor Station

The alternative sites to the Marvindale Compressor Station are owned by different private landowners and are primarily forested with existing pipeline ROWs bisecting the sites. Slopes average fourteen, five and three percent for Alternative Sites 1, 2, and 3, respectively. Soils for Alternative Site 1 are mapped as Cookport loams (CoB), Hartleton and Buchanan loams (HeF), and Hazleton channery loams (HdD), of which 11.70 acres are designated as prime farmland soils. Alternative Site 2 soils are mapped as Cookport channery loams (CoB and CoD), of which 11.8 acres are designated as prime farmland soils. Alternative Compressor Station 3 soils are mapped as Cavode channery loams (CdC) and Cookport channery loams (CpB), of which 7.5 acres are designated as prime farmland soils. There are no wetlands, waterbodies or intermittent drainages mapped on the alternative sites. A desktop analysis did not identify any sensitive habitats on the alternative sites, and no cultural resource sites were identified from the Pennsylvania State Historic Preservation Office (PA SHPO), the Pennsylvania Heritage Museum Commission (PHMC) Cultural Resources Geographic Information System (CRGIS) database, or the National Register of Historic Places (NRHP). The National Ambient Air Quality Standards (NAAQS) for all pollutants at Sites 1, 2 and 3 are in attainment (USEPA 2019e). No NSA's were identified within 0.5-mile of Alternative Sites 1 and 2. Three NSA's were identified within 0.5-mile of the Alternative Site 3, which may not meet the FERC sound level requirement of 55 dBA (L_{dn}). None of the sites are considered visually sensitive.

3.3.6.2 Tamarack Compressor Station

The alternative sites to the Tamarack Compressor Station are owned by different private landowners, except for Site 2T which is 2/3 owned by Seneca Resources Corporation. Alternative Sites 1T and 3T are open land, whereas Alternative Site 2T is forested. Slopes average 3, 3 and 4 percent for Alternative Sites 1T, 2T, and 3T, respectively. Soils for Alternative Site 1T are mapped as Cambridge silt loams, 3 to 8 percent slopes (CaB), none of which are designated as prime farmland soils. Alternative Sites 2T and Site 3T are mapped as Hustontown channery silt loams, 3 to 8 percent slopes (HuB), which is designated as prime farmland soils. There are no wetlands, waterbodies or intermittent drainages mapped on the alternative sites. A desktop analysis did not identify any sensitive habitats on the alternative sites, and no cultural resource sites were identified from the Pennsylvania State Historic Preservation Office (PA SHPO), the Pennsylvania Heritage Museum Commission (PHMC) Cultural Resources Geographic Information System (CRGIS) database, or the National Register of Historic Places (NRHP). The National Ambient Air Quality Standards (NAAQS) for all pollutants at Sites 1T, 2T and 3T are in attainment (USEPA 2019e). No NSA's were identified within 0.5-mile of Alternative Site 1T. Three NSA's were identified within 0.5-mile of Alternative Site 2T, and 1 NSA was identified within 0.5-mile of Alternative Site 3T. The NSA's near these alternatives may not meet the FERC sound level requirement of 55 dBA (L_{dn}). None of the sites are considered visually sensitive.

3.3.7 Compressor Station Alternative Sites Conclusion

Based on these environmental comparisons, the primary difference between the proposed Marvindale Compressor Station site and Alternative Sites 1, 2, and 3 is the presence of existing natural gas facilities at the site which maximizes the ability to collocate facilities and minimizes potential environmental impacts. The alternative sites have less direct access from existing roads and would require the construction of new permanent access road(s). The alternative sites would also require the acquisition of land from a private landowner, whereas National Fuel currently owns the proposed compressor station site. Additionally, these sites would require the construction of Loop Alternative 1 – Northern Alignment or Loop Alternative 2 – Southern Alignment and would incur their respective impacts as described in Section 3.3.4.4. For these reasons, the proposed site was selected over the alternate sites for the new Marvindale Compressor Station, and the alternative compressor station sites were dismissed from further consideration.

The proposed Tamarack Compressor Station site was selected over the alternative sites based on multiple factors including a landowner that was willing to sell their property, the lack of cultural and environmental concerns, the relative isolation of the site (e.g., limited nearby residences), and the close proximity to both existing power and Line YM53. Although the Tamarack Compressor Station will require the construction of a new permanent access road, the road will be co-located with existing pipeline ROW whereas new and/or improved permanent access roads to the alternatives sites would generally require additional environmental impacts through greenfield areas. The alternative sites would also require the acquisition of land from private landowners, whereas National Fuel has an Option Agreement to purchase the proposed compressor station site. For these reasons, the proposed site was selected over the alternate sites for the new Tamarack compressor station, and the alternative compressor station sites were dismissed from further consideration.

Table 3.3-2 compares the Alternative Sites to the proposed Marvindale and Tamarack Compressor Station Sites.

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Table 3.3-2: Proposed and Alternative Compressor Station Site Characteristics

Factor	Proposed Project	Electric Driven	Alternatives Considered		
Marvindale Compressor Station			**Site 1**	**Site 2**	**Site 3**
Construction impacts (acres)	20.5	20.5	15.1	21.1	29.7
Permanent impacts[1] (acres)	6.8	6.8	9.6	9.7	9.1
Prime farmland[2] (acres)	2.6	2.6	11.7	11.8	7.5
NSAs within 1 mile (number)/closest NSA (miles)	3/0.4	3/0.4	0/0	0/0	3/<0.5
Attainment Status for All Criteria Pollutants[3] (Y/N)	Y	Y	Y	Y	Y
Land availability	Available	Available	Unknown	Unknown	Unknown
Land uses (acres)	Forest and Woodland – 12.7 Industrial/Commercial Land – 2.2 Open Land - 5.6 Wetlands <0.1 Open Water <0.1	Forest and Woodland – 12.7 Industrial/Commercial Land – 2.2 Open Land - 5.6 Wetlands <0.1 Open Water <0.1	Forest and Woodland – 3.8 Industrial/Commercial Land – 11.4	Forest and Woodland – 7.5 Industrial/Commercial Land – 3.9 Open Land -2.2	Forest and Woodland – 23.7 Industrial/Commercial Land – 6.1
Access (miles/use)	0.5/Existing Permanent	0.5/Existing Permanent	1.3/Existing Permanent	1.2/Existing Permanent	1.3/Existing Permanent
Tamarack Compressor Station			**Site 1T**	**Site 2T**	**Site 3T**
Construction impacts (acres)	15.6	15.6	10.1	7.2	9.6
Permanent impacts[1] (acres)	5.2	5.2	4.7	4.0	5.4
Prime farmland[2] (acres)	5.2	5.2	0.0	4.0	5.4
NSAs within 1 mile (number)/closest NSA (miles)	7/0.2	7/0.2	0/0	3/<0.5	1/<0.5
Attainment Status for All Criteria Pollutants[3] (Y/N)	Y	Y	Y	Y	Y
Land availability	8.75-acre parcel under Option Agreement	8.75-acre parcel under Option Agreement	Landowner Not receptive to Selling Property	Unknown	Unknown
Land uses (acres)	Forest and Woodland – 13.2 Open Land – 2.4	Forest and Woodland – 6.6 Open Land – 2.4	Open Land -10.1	Forest and Woodland – 7.2	Open Land -9.1 Forest and Woodland – 0.5
Access (miles/use)	0.3/New Private Road	0.3/New Private Road	0.2/ New Private Road	0.0/Existing Public Road	0.6/ New Private Road

[1] Includes operational footprint of compressor station and permanent access road.
[2] Determined using NRCS SSURGO soils data for the operational footprint of the compressor station.
[3] County attainment status data (USEPA 2019e).

3.3.8 Other Aboveground Facility Alternative Locations

Other additional aboveground facilities are proposed for the Project including:

- The Marvindale Interconnect to be installed near the new Marvindale Compressor Station site;
- The Carpenter Hollow OPP Station HEP0 4639 at the interconnect between the proposed pipeline and existing Line YM224; and
- Modification of the existing Leidy Interconnect LDC2245 with Transco at the Leidy M&R Station.

The location of these facilities is entirely dependent upon the location and configuration of the proposed new Line YM58 and the location of the receipt point with Transco at Leidy; therefore, no alternative sites were evaluated. In addition, pig launcher/receiver sites are fixed at the beginning and end of the proposed Line YM58 pipeline.

In addition to these facilities, three mainline valve facilities are proposed along the new pipeline at locations to be determined. The location of these facilities was selected based on an evaluation of the valve spacing per USDOT regulations (49 CFR 192), and the need to locate the valves near access roads for accessibility; therefore, no alternative sites were evaluated.

3.4 Potential Secondary Impact Evaluation

There will be no permanent effects on downstream or upstream properties as a result of this Project. The Project will not impact stream hydraulics or water quality to the extent that upstream or downstream property owners will be affected. The flood capacity of those waterways traversed by the proposed route will not be altered by the installation of the pipeline. In addition, a sufficient depth of cover will be maintained to prevent scouring or erosion of the installed pipeline during flood events.

The existing plans, ESCAMP and SPRP, are designed to provide sufficient Best Management Practices to protect the staff, the project area, and the area surrounding the Project. The Project is committed to adhering to these plans as well as requirements of the PAFBC to protect state-listed species.

3.5 Cumulative Impact Analysis

To support an informed decision by the Commission, National Fuel assessed other actions near the Project and evaluated the potential for a cumulative impact on the environment. The following is a summary of the cumulative impacts anticipated for the Project.

Cumulative impacts may result when the environmental effects associated with a proposed project are added to construction-related (temporary) or operations-related (permanent) impacts associated with other past, present, or reasonably foreseeable future projects in the area of the proposed Project. As defined by the Council on Environmental Quality (CEQ), a cumulative effect is defined as "…the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR § 1508.7). Further, CEQ guidance states that an adequate cumulative effects analysis may be conducted "…by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions" (CEQ 2005). For this Project, National Fuel considered the impacts of past projects and ongoing operational projects in the geographic vicinity as part of the existing environment (e.g., the environmental baseline

condition). However, present effects of past actions that are relevant and useful are also considered.

Cumulative impacts may occur when the environmental effects associated with a Project are added to either temporary (construction-related) or permanent (operation-related) impacts associated with past, present, or reasonably foreseeable future actions. Reasonably foreseeable future actions are those projects within the geographic scope and timeframe of the Project that are beyond mere speculation (i.e., projects with an existing proposal, commitment of resources or funding, or the permitting process has begun).

The geographic scope of the past, present, or reasonably foreseeable future actions that may contribute to cumulative impacts varies depending on the resource being considered. For each resource, a geographic area, or Region of Influence (ROI) has been defined. Actions outside of the ROIs were not evaluated because “their potential to contribute to a cumulative impact diminishes with increasing distance from the Project” (FERC 2016).

In addition to evaluating the geographic relationship between the ROI and other projects, temporal relationships were also considered. National Fuel evaluated projects within the ROI that had been completed within the past two years or were reasonably foreseeable and could be constructed about the same timeframe as the proposed Project, including the time anticipated to achieve Commission standards for revegetation of the ROW (FERC Plan VII.A). Construction and restoration of the Project is anticipated to take approximately twelve months, with full revegetation by Q3 2022. Therefore, National Fuel considered reasonably foreseeable future projects that may be constructed within the defined ROIs through CY 2022.

For the purposes of this analysis, cumulative impacts on a given resource will result from the combined effect of construction and operational impacts of the Project and the impacts of other projects when those impacts overlap temporally and spatially as defined above.

3.5.1 Project Impacts

This Project will affect approximately 538.1 acres (inclusive of permanent and temporary impacts). The pipeline has been routed to generally follow the existing TGP Corridor and to avoid as many environmental and cultural resource conflicts as possible.

The project will result in total disturbance of 41.170 acres of water resources: 14.796 acres of wetlands, 2.654 acres of waterbodies, and 23.720 acres of floodplains. Temporary wetland disturbance is approximately 14.053 acres of wetlands with approximately 0.743 acres of permanent indirect wetland impacts. Permanent impacts resulting in the permanent conversion of PFO/PSS wetlands to PEM wetlands account for 0.277 acres. Indirect permanent impacts also account for the length and width of the pipe crossing within wetlands for both the proposed pipeline and the abandoned-in-place existing pipeline accounting for 0.466 acres.

Of the 14.796 acres of wetland impacts, a total of 0.968 acres are EV PFO impacts and 1.854 acres of EV PSS wetland impacts. There are 0.143 acres of non - EV PFO impacts.

The Project will result in a temporary disturbance of 2.654 acres of waterbodies/streams, with 1.055 acres attributable to temporary direct impacts and 1.542 acres attributable to temporary indirect impacts. The Project will result in an indirect permanent impact to 0.057 acres of waterbodies/streams resulting from the linear pipeline construction. There are no proposed direct permanent impacts, fills or alterations proposed during construction or during operation and maintenance of the pipeline.

Overall, the Project will result in a total of 14.043 acres of temporary impacts to wetlands, with 10.300 acres attributable to temporary direct wetland impacts and 3.753 acres attributable to

temporary indirect impacts. Refer to Table 3.5-1 which is a summary of potential Project impacts. This table identifies project impacts, both temporary and permanent, for each resource type, and identifies the impact as either direct or indirect, for all project activities proposed. All wetland and stream crossings are depicted on the site-specific drawings provided in Appendix P.

Table 3.5-1: Potential Project Impacts Summary Table

County	Resource Type	Permanent Direct	Temporary Direct[1]	Permanent Indirect[2]	Temporary Indirect[3]	TOTAL:
CAMERON	Palustrine	-	0.075	0.036	0.113	**0.224**
	Floodway	-	0.618	0.090	1.395	**2.103**
	Riverine	-	0.087	0.013	0.071	**0.171**
CLEARFIELD	Palustrine	-	0.196	0.017	0.001	**0.214**
	Floodway	-	-	0.055	1.695	**1.750**
	Riverine	-	0.004	0.004	0.076	**0.084**
ELK	Palustrine	-	0.115	0.122	<0.001	**0.237**
	Floodway	-	-	0.019	0.055	**0.074**
	Riverine	-	-	0.002	0.006	**0.008**
MCKEAN	Palustrine	-	8.996	0.486	3.550	**13.032**
	Floodway	-	2.000	6.732	7.630	**16.362**
	Riverine	-	0.594	0.026	1.372	**1.992**
POTTER	Palustrine	-	0.918	0.082	0.089	**1.089**
	Floodway	-	1.098	1.865	0.468	**3.431**
	Riverine	-	0.370	0.012	0.017	**0.399**
TOTALS	**Palustrine**	**-**	**10.300**	**0.743**	**3.753**	**14.796**
	Floodway		**3.716**	**8.761**	**11.243**	**23.720**
	Riverine	**-**	**1.055**	**0.057**	**1.542**	**2.654**
	ALL	**-**	**15.070**	**9.562**	**16.538**	**41.170**

[1] Temporary Direct Impacts represent an impact in an area not undergoing permanent maintenance after construction, but will have a structure placed in the resource, such as timber matting, during construction
[2] Temporary Indirect Impacts represent an impact in an area not undergoing permanent maintenance after construction and will not have any structures placed in the resources during construction.
[3] Permanent Indirect Impacts represent both PFO/PSS Wetlands converted to PEM, and resources permanently impacted by the pipeline centerline.
[4] Riverine Impacts represent all waterbody and Floodplain Impacts
[5] Palustrine Impacts represent all wetland impacts.

National Fuel evaluated all riparian areas using a 100-foot buffer from the top of bank of non-HQ/EV waters, and a 150-foot buffer from the top of bank for HQ/EV waters.

The proposed Project riparian disturbance is 50.1 acres of riparian areas within McKean County; 17.2 acres of riparian areas within Potter County; 1.2 acres of riparian areas within Clearfield County; 0.2 acres of riparian areas within Elk County; 0.1 acres of riparian areas within Cameron County; and no riparian acres are crossed within Clinton County, for a total of 68.8 acres of riparian area disturbance.

Below is the total forested riparian disturbance by County:

- McKean County - 9.2 acres

- Potter County - 4.2 acres
- Elk County - 0.1 acres
- Clinton County - 0.0 acres
- Clearfield County - 0.2 acres
- Cameron County - 0.03 acres

Approximately 13.7 acres of riparian forest is proposed to be permanently converted from forest to herbaceous cover.

National Fuel requested a Riparian Forest Buffer Request for this Project per 025 Pa. Code Oil and Gas Regulations Chapter 102.14(d)(2)(ii). As described in our application materials, the Project consists of a replacing natural gas pipeline, and wherever possible the pipeline replacement occurs in close proximity to existing pipeline ROWs. Areas that deviated from a parallel alignment were due to environmental avoidances, constructability concerns, or landowner preference.

Other than occasional additional temporary workspaces, the construction ROW being used has been limited to the minimum limit of disturbance necessary for construction, thereby minimizing the amount of disturbed area. The extent and duration of the disturbance will be limited through the recommended pipeline construction schedule as required by the Erosion and Sediment Control Manual schedule and by backfilling and revegetating disturbed area as soon as possible following pipeline installation. As such, National Fuel requested a riparian forest buffer waiver for this Project.

No adverse effects or changes to water quality or aesthetics are anticipated for property or riparian rights of owners upstream, downstream, or adjacent to the project as a result of the riparian impacts.

No aboveground facilities will be constructed in the 100-year floodplains associated with the project.

Project construction is expected to have minor short-term impacts on wetland/waterbody dependent wildlife habitat, causing localized effects on resident fauna. Clearing and grading of the ROW will result in loss of vegetative cover and may result in the loss of less mobile fauna, such as small rodents, and invertebrates that may be unable to escape the construction area. The Project will be following a host of mitigation measures to reduce impacts as much as possible, as previously mentioned.

It is anticipated that most wildlife can relocate to suitable adjacent habitat during construction. After construction, wildlife is expected to return and colonize post-construction habitats. Species diversity is expected to remain at or near pre-construction conditions following restoration of the ROW.

However, PAFBC provided comments (dated 8/8/2020) to this JPA-105 application requesting National Fuel prepare a riparian restoration plan. These plans have been developed for both the Abandonment and Modernization portions of the project and are provided as Appendix Q.

3.5.2 Cumulative Impact Regions of Influence

The CEQ Guidance on Consideration of Past Actions in Cumulative Effects Analysis, states that cumulative impact analysis should be proportional to the magnitude of the environmental impacts of a proposed action (2005). To this end, ROIs differ for each resource (e.g., for waterbody and wetland impacts, the area of impact may be a particular watershed; for air emissions, the area of

impact may be a particular air-shed region or attainment/non-attainment area; for threatened and endangered wildlife species, the area of impact may be approximate to their home range, suitable habitats, or migration corridors).

For the proposed Project, CEQ and USEPA guidance and research of other projects under review at federal, state, and local agencies were used to determine the spatial extent of the Project's impacts (e.g., ROI) for each resource, as presented in Table 3.5-3. The ROIs presented in Table 3.5-3 were used to identify past, present, and reasonable foreseeable future projects that are within the geographic scope of the proposed Project and that may potentially contribute to indirect or direct cumulative impacts.

Table 3.5-3: Resource-Specific Cumulative Impact Regions of Influence

Resource	Boundary	Region of Influence Rationale
General Project Description	N/A	
Water Use and Quality	Hydrologic Unit Code [HUC] 12 Watershed Boundary	Impacts on surface waters can result in downstream contamination or increased turbidity. Impacts on surface water and wetlands would occur as a result of temporary ground disturbance and vegetation clearing, dewatering, and hydrostatic testing activities during construction. Impacts to surface waters and wetland resources are traditionally assessed on a watershed level. Watersheds are well-defined, published natural boundaries for surface water flow. Cumulative effects have been most extensively studied at the watershed level. Published papers and agency guidance to support the proposed ROI include: > Watershed Analysis as a Framework for Implementing Ecosystem Management (Montgomery, Grant and Sullivan 1995); > Evaluating and Managing Cumulative Effects: Process and Constraints (MacDonald 2000); and > Considering Cumulative Effects Under the National Environmental Policy Act (CEQ 1997).
Fish, Wildlife, and Vegetation	HUC12 Watershed Boundary	Impacts on biological resources would occur as a result of temporary ground disturbance, temporary dewatering, and vegetation clearing. Impacts on biological resources may be considered on the watershed scale as it provides a natural boundary and geographic proxy to accommodate wildlife habitat, seed dispersal, and ecosystem characteristics in the Project area. Wildlife areas of influence are published and well-defined. A watershed boundary encompasses a reasonable distance for plant seed dispersion areas and migration corridors for individual home ranges for species with potential to occur in the Project area. Published papers and agency guidance to support the ROI include: > Guidance on Preparing Cumulative Impact Analysis (Washington State Department of Transportation 2008); and > Guidance for Preparers of Cumulative Impact Analysis, Approach and Guidance (Caltrans 2005). The references above identified a 5-mile ROI, however, the HUC12 watershed boundary ROI in most instances is larger than a 5-mile buffer from the project and will be used to assess potential cumulative impacts to wildlife and vegetation resources.
Cultural Resources	Area of Potential Effect (APE)	The FERC *Guidance Manual for Environmental Report Preparation (2017)* requires analysis of cultural resources within the APE, which is defined by the State Historic Preservation Office (SHPO) and accounts for both direct and indirect impacts (e.g., visual impacts) to cultural resources. Published papers and agency guidance to support the proposed ROI include: > Guidance on Preparing Cumulative Impact Analysis (Washington State Department of Transportation 2008); > Guidance for Preparers of Cumulative Impact Analysis, Approach and Guidance (Caltrans 2005); and > Corpus Christi LNG Project Final Environmental Impact Statement (FERC 2014a).
Socioeconomics	Cameron, Clearfield, Elk, McKean and Potter Counties	County boundaries are published and well-defined. The FERC *Guidance Manual for Environmental Report Preparation (2017)* specifies that the socioeconomic impact area generally comprises the municipalities or counties in which Project facilities will be located or may be affected by Project activities. Socioeconomic data is collected and published at the county level by the United States Census Bureau and the United

		States Department of Labor. Published papers and agency guidance to support the proposed ROI include: > Corpus Christi LNG Project Final Environmental Impact Statement (FERC 2014a). > Pomelo Connector Project Environmental Assessment (FERC 2017a).
Geological Resources	0.25 mile	Geologic conditions and potential resources occur within site-specific locales and are generally not affected by activities occurring outside the designated work area. Project-related impacts are typically limited to impacts associated with current and future mineral and non-mineral mining activities rather than geologic formations and geologic hazards. The FERC *Guidance Manual for Environmental Report Preparation (2017)* suggests that impacts to mines and oil or gas fields be evaluated out to 0.25 mile. Published papers and agency guidance to support the proposed ROI include: > Corpus Christi LNG Project Final Environmental Impact Statement (FERC 2014a). > Pomelo Connector Project Environmental Assessment (FERC 2017a). Due to the extensive history of oil and gas development in the area, a 0.25-mile ROI was used to assess geological resources cumulative impacts.
Soils	Construction workspaces	Soil resources occur within site-specific locales and are generally not affected by activities occurring outside the designated work area, particularly when appropriate erosion controls and BMPs are implemented. Published materials and agency guidance to support the ROI include: > National Environmental Policy Act Handbook: Chapter 10 Environmental Analysis (U.S. Forest Service 2012); > Consideration of Cumulative Impacts in USEPA Review of NEPA Documents (U.S. EPA 1999); and > Corpus Christi LNG Project Final Environmental Impact Statement (FERC 2014a). > Pomelo Connector Project Environmental Assessment (FERC 2017a). A construction workspaces ROI be used to assess potential cumulative impacts to soil resources.
Land Use, Recreation, and Aesthetics	1 mile	Impacts to land uses, recreation, and aesthetics generally occur within and adjacent to Project areas. The FERC *Guidance Manual for Environmental Report Preparation (2017)* specifies that public lands, recreation areas, special land uses, and planned developments within 1 mile of Project activities be evaluated. In addition, this area has a long history of oil and gas development with numerous existing facilities in the vicinity. The addition of the proposed compressor station is in character with the surrounding baseline environmental conditions. Published papers and agency guidance to support the ROI include: > Guidance on Preparing Cumulative Impact Analysis (Washington State Department of Transportation 2008); > Guidance for Preparers of Cumulative Impact Analysis, Approach and Guidance (Caltrans 2005); > Corpus Christi LNG Project Final Environmental Impact Statement (FERC 2014a); and > Cameron Liquefaction Project Final Environmental Impact Statement (FERC 2014b).
Air and Noise Quality	50 km (operations) 0.25-mile (construction) 1.0 mile (noise)	The U.S. EPA considers 50 km to be adequate for assessing cumulative impacts to air quality for project operational phases and is consistent with recommendations from EPA for assessing cumulative impacts of proposed project air emissions with other sources to assess combined impacts. As such, the effects of air emissions from the operation of the Project are expected to be limited to a 50-km radius around the compressor station. Therefore, assessment of cumulative impacts for operations is limited to projects within the 50-km potential impact radius. National Fuel also used a 0.25-mile buffer from active construction workspace along the pipeline ROW to evaluate temporary and short-term impacts to air quality during construction. Published papers and agency guidance to support the proposed air quality ROI include: > Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO2 National Ambient Air Quality Standard (USEPA memorandum found at: https://www3.epa.gov/scram001/guidance/clarification/Additional_Clarifications_AppendixW_Hourly-NO2-NAAQS_FINAL_03-01-2011.pdf); and > Considering Cumulative Effects Under the National Environmental Policy Act (CEQ 1997). > Abandonment and Capacity Restoration Project Environmental Assessment (FERC 2016).

	Noise impacts are highly localized and attenuate quickly as the distance from the noise source increases. Published papers and agency guidance to support the proposed noise ROI include: > Cameron Liquefaction Project Final Environmental Impact Statement (FERC 2014b). > Pomelo Connector Project Environmental Assessment (FERC 2017a).

3.5.3 Cumulative Actions

The related non-jurisdictional facilities discussed in Section 1.4.7 were included in National Fuel's assessment for Project impacts and, therefore, are not included as a cumulative action in this analysis.

Past and present impacts generally combine to determine existing environmental baseline conditions in the vicinity of a project (CEQ 2005). To identify past and present projects that were relevant to the cumulative impacts analysis, National Fuel evaluated the relationship of those projects to the extent that they were necessary to inform agency decision making, and if they contributed to the understanding of the aggregate effects of past actions when combined with the proposed Project. In general, National Fuel evaluated projects either under construction at the time of this filing or were identified as permitted but were pending construction. Projects permitted prior to 2018, and that are not under construction at the time of this filing, were considered completed projects and were considered as part of the existing environmental baseline conditions.

Reasonably foreseeable future actions are defined in 40 CFR § 1508.7. National Fuel focused the analysis of future actions to those that provide information which is 1) relevant to determine significant adverse impacts, and 2) essential to a reasoned choice among alternatives. Future impacts were excluded from the cumulative impact analysis if they fell outside the defined ROIs, would not affect resources that are the subject of the cumulative impact analysis, or if it was determined that including the action would be arbitrary. To identify future actions, National Fuel evaluated proposed projects identified either by a project's published Environmental Assessment (EA) or by permit locations (e.g., PADEP Chapter 105 Wetland Encroachment Permits). A project was considered a proposed future action if review of recent aerial imagery suggests that project construction has not commenced.

A preliminary determination of potential projects (e.g., cumulative actions) to include in the cumulative impacts analysis, were identified through federal, state, and local agency/municipality websites; direct communications; permit applications; paid and free database searches; third-party communications; and field review. Data were collected for existing and planned developments, transportation improvement projects, utility, and energy projects.

Table 3.5-4 identifies the past, present and reasonably foreseeable future actions that fall within the defined ROIs and temporal status to comprise the cumulative actions analyzed for this project. National Fuel also reviewed its own non-jurisdictional and jurisdictional projects that may be completed under 18 CFR § 2.55; no projects were identified that would overlap with the ROIs.

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Table 3.5-4: Cumulative Actions Occurring in Proximity to the Proposed Project

Project Name	Development Category/ Description	Anticipated Date of Construction/Status	Approximate Distance from Proposed Project (miles)	Source/Date Contacted
Transco Leidy South Project	Replace 6.1-miles of natural gas pipeline, 6 miles of new natural gas pipeline, additional compression, and ancillary facilities.	Proposed Q4 2020/In Pre-filing	Varies, closest project component (Hensel Replacement) is approximately 2.9 miles southeast of Tamarack Compressor Station	Transco/June 2019 (FERC Docket PF19-1-000)
Dominion Modification to Leidy Interconnect LDC 2245	Natural gas/piping modifications to accommodate additional capacity	Proposed 2021/certificated under existing blanket authority	0	Coordination between National Fuel and Dominion
Brockway Modernization Project	Proposed 10-mile natural gas pipeline replacement	Proposed 2018/In Prior Notice filing review period	7	National Fuel/June 2018 (FERC Docket CP19-220-000)
National Fuel YM28 and FM120 Modernization Project	Proposed 14-mile natural gas pipeline replacement	Proposed 2019	Directly adjacent to, and west of proposed Project	National Fuel/October 2017 (FERC Docket CP17-74-000)
National Fuel Northern Access 2016 Project	Proposed 96-mile natural gas pipeline, additional compression, and one (1) meter station, of which approximately 16.7 miles occurs within the USGS HUC12 ROIs for this project.	Proposed Q4 2021	Adjacent to Line KL and Marvindale interconnect in McKean County	National Fuel/October 2017 (FERC Docket CP15-115-000)
Renovo Energy Center	Proposed 950 MW natural gas power plant and associated 6.5-mile pipeline	Proposed Q4 2019 – 2021 / currently in pre-construction planning phase	Approximately 8.6 miles southeast of Tamarack Compressor Station	Power Engineers, Inc. (Plan Approval Application[1])
NFG Midstream Clermont Phase 2 North Central Project	Natural gas pipeline project	Proposed 2019	Approximately 5 miles south of Marvindale Compressor Station	PADEP Open Data Portal – Chapter 105 Encroachment Locations Pipeline or Conduit at http://data-padep-1.opendata.arcgis.com/datasets (accessed January 2019)
Dominion Energy LN16 & LN20 Pipeline Project	Natural gas pipeline project	Proposed Q2 2019	Adjacent to YM58 Carpenter Hollow OPP Station	PADEP Open Data Portal – Chapter 105 Encroachment Locations Pipeline or Conduit at http://data-padep-1.opendata.arcgis.com/datasets (accessed January 2019)
Maxson Gas Plants and Goodwin Gathering Pipeline Project	Natural gas gathering pipeline	Proposed 2019	Approximately 4 miles north of YM224 Loop milepost 0.0	PADEP Open Data Portal – Chapter 105 Encroachment Locations Pipeline or Conduit at http://data-padep-1.opendata.arcgis.com/datasets (accessed January 2019)

Various oil and gas wells (17 abandoned wells, 204 active wells, and 42 inactive wells within 0.25 of Project construction activities)	Active and proposed oil and gas wells identified by spud dates 2015 to present	Ongoing and proposed operations	Various locations in Elk, McKean, and Potter Counties	PADEP Open Data Portal – Oil and Gas Locations – Conventional and Unconventional Wells at http://data-padep-1.opendata.arcgis.com/datasets (accessed January 2019)
Various Bridge Replacement and Improvement Projects (3 projects identified within HUC12 ROI)	Active and proposed PennDOT bridge replacement and improvement projects	Completed, ongoing and proposed construction	Various locations in Elk, McKean, and Potter Counties	PennDOT Transportation Improvement Program Four Year Plans at **Error! Hyperlink reference not valid.** (accessed January 2019)
Various Road Resurfacing, Restoration, and Reconstruction Projects (5 projects identified within HUC12 ROI)	Active and proposed PennDOT road resurfacing, restoration, and reconstruction projects	Completed, ongoing and proposed construction	Various locations in Elk, McKean, and Potter Counties	PennDOT Transportation Improvement Program Four Year Plans at **Error! Hyperlink reference not valid.** (accessed January 2019)
Various Existing Parallel Linear Facilities and ROWs ***Line YM58*** > TGP 300 Lines (30-inch and 24-inch diameters), > Overhead electrical transmission line (unknown owner), > Dominion Line LN16 ***Line YM224*** > National Fuel Line YM224	Historical natural gas pipeline projects	Completed, ongoing operations	Directly parallel to/from (MP): ***Line YM58*** > TGP 300 Lines: o 0.4 - 4.5 (4.1 miles), o 4.9 – 18.9 (14 miles) o 19.6 – 19.8 (0.2 miles) o 20.2 – 23.6 (3.4 miles) o 25.6 – 28.3 (2.7 miles) > Electrical Transmission Line o 25.0 – 25.1 (0.1 miles) > Dominion Line LN16 o 28.3 – 29.5 (0.1 miles) ***Line YM224*** > National Fuel Line YM224 o 0.0 – 0.4 (0.4 miles)	N/A

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3.5.4 Cumulative Impact Assessment

To evaluate potential cumulative impacts, National Fuel assessed past, present, and reasonably foreseeable future actions or human-related activities near the Project facilities within the resource-specific ROIs and timeframes mentioned above. A basic assumption of the cumulative impacts analysis was that, if the Project activities were determined to have no impact or only a negligible impact, the cumulative impacts resulting from the Project would also be negligible. Impacts on those resources for which no Project-related impacts are anticipated to contribute to cumulative impacts are not discussed. The following factors identified in *Fritiofson v. Alexander*, 772 F.2d 1225 (5th Circuit 1985), were applied to this analysis:

- What is the geographic area affected by the project?
- What are the resources affected by the project?
- What are the other past, present, and reasonably foreseeable actions that have impact on these resources?
- What are those impacts?
- What is the overall impact on these various resources from the accumulation of the actions?

Using these criteria and the criteria previously discussed in this section, National Fuel determined that for an action to be included in this cumulative impact assessment, it must:

- Impact a resource potentially affected by the Project;
- Cause some or all of this impact within the ROIs defined for the Project; and
- Cause some or all of this impact within the timeframe in which the Project will have an impact.

The ROI for cumulative impacts includes the areas directly impacted by Project activities and the anticipated area of effect those actions may have for each resource. As discussed, the study area varies for each resource, based on the potential for impacts to extend beyond the area of disturbance. The cumulative impacts discussion describes the ROIs and the cumulative actions included as part of the assessment. Only the projects identified in Table 3.5-4 were identified as projects that could potentially contribute cumulative impacts when combined with the impacts of the proposed Project. Table 3.5-5 provides a summary of the cumulative impacts associated with the Project and contributing Cumulative Actions. Table 3.5-5 provides the total construction footprint for each project. The resource-specific impacts in Table 3.5-5 are calculated based on the ROI for each resource; for example, the land use impacts in Table 3.5-5 are based on the one-mile ROI defined for land use impacts.

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Table 3.5-5: Summary of Cumulative Impacts

Cumulative Action Name	Approximate Construction Footprint[1] (acres)	Habitats Affected[2] (acres)	Wetlands Affected[3] (acres)	Waterbodies Crossed[4] (number)
Transco Leidy South Project (Docket PF19-10-000)	--	--	--	--
Dominion Modification to Leidy Interconnect LDC 2245	<1.0	Industrial/Comm. – <1.0	--	--
Brockway Modernization Project (Docket CP19-220-000)	116.36	Agricultural – 8.3 Forest/Woodland – 31.4 Industrial/Comm. – 34.7 Open Land – 37.15 Open Water – 0.6 Residential – 3.0	2.6	38
YM28 and FM120 Modernization Project (Docket CP17-74-000)	96.0	Forest/Woodland – 96.0	5.4	12
National Fuel Northern Access 2016 Project (Docket CP15-115-000)	151. 6	Agriculture – 150.9 Forest/Woodland – 482.4 Industrial/Comm. – 0.6 Open Land – 240.0 Open Water – 0.0 Residential – 17.5	3.2	15
Renovo Energy Center	68	Industrial/Comm. – 68	--	--
National Fuel Gas Midstream Clermont Phase 2 North Central Project	2.0	Forest/Woodland – 1.0 Industrial/Comm. – 0.1 Open Land – 1.0	--	--
Dominion Energy LN16 & LN20 Pipeline Project	372.1	Agriculture – 105.0 Forest/Woodland – 201.2 Industrial/Comm. – 4.8 Open Land – 56.0 Open Water – 3.6 Residential – 1.6	7.2	63
Maxson Gas Plants and Goodwin Gathering Pipeline Project	18.36	Agriculture – 2.4 Forest/Woodland – 14.3 Industrial/Comm. – 1.0 Open Land – 0.1 Open Water – 0.5	0.1	3
Various oil and gas wells (2 active or proposed well pad locations identified within HUC12 ROI)	10.5	Forest/Woodland – 10.5	--	--
Various Bridge Replacement and Improvement Projects (10 projects identified within HUC12 ROI)	2.0	Industrial/Comm. – 2.0	--	10
Various Road Resurfacing, Restoration, and Reconstruction Projects (45 projects identified within HUC12 ROI)	210.1	Industrial/Comm. – 210.1	--	55

Various Existing Parallel Linear Facilities and ROWs	--	--	--	--

Notes: Acreage and information presented are estimates based on publicly available information or interpretation thereof; including FERC Certificate applications and permit databases. Information available may not include ongoing project modifications.
-- Indicates that information is not available at the time of this filing.
[1] Approximated construction footprint within the USGS HUC 12 watershed ROI.
[2] Land uses determined through aerial photography interpretation for projects identified within the USGS HUC12 watershed ROI; actual an/or published land use impacts may differ. Land use numbers considered construction impacts rather than operational impacts. Land uses not represented in each category did not apply to that project. Land use categories were standardized if presented differently in publicly available information.
[3] Wetlands affected determined using USFWS NWI data and PADEP Encroachment Permitted locations for projects identified within the USGS HUC12 watershed ROI.
[4] Waterbodies crossed determined using PADEP Chapter 93 Designated Use Stream data for projects identified within the USGS HUC 12 watershed ROI.
[5] Prime farmland and farmlands of statewide importance determined using NRCS SSURGO data for projects identified within the USGS HUC12 watershed ROI.
[6] Relating to construction emissions.
[7] Relating to operational emissions.
[8] Relating to noise.
[9] The Brockway Modernization Project was noted as a potential Cumulative Action because it is sponsored by National Fuel on the existing Line FM100; however, it's ROI does not overlap with the proposed Project and therefore will not contribute to the cumulative impacts related to this Project.

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4 Mitigation Plan

Cumulative impacts are the impacts on the environment which result from the incremental impact of this project when added to other past, present, and reasonably foreseeable future actions. This is regardless of who or what agency or party undertakes such other actions.

In accordance with Section 5a and 5b of PADEP's technical guidance companies are to consider other existing and potential project permanently impacting each wetland resource.

As indicated in the technical guidance, where a temporary wetland impact is proposed to be properly restored, the applicant does not need to identify the temporary impact as an adverse cumulative impact on the wetland resource. Therefore, temporary impacts and their restoration measures have been discussed as provided in this document, however those impacts are not considered an adverse cumulative impact and are not discussed in this section. Only the impacts associated with permanent conversion of PFO and PSS wetlands to PEM wetlands are detailed below, as the Project does not propose any permanent wetland loss.

The primary impacts from this project include 0.278 acres of permanent wetland (0.257 PSS and 0.021 PFO) conversion to PEM wetlands. There are no permanent waterbody impacts.

The mitigation sequence includes (1) avoidance, (2) minimization and (3) replacement and is required by the PADEP and the USACE for compensatory mitigation for wetland losses. Regulations found at Pennsylvania Code Title 25, Chapter 105 provide the permitting criteria and wetland mitigation and replacement requirements. Mitigation avoidance and minimization is required for all applications proposing to impact wetlands.

National Fuel will implement the following measures to avoid resource impacts:

- National Fuel will implement FERC's Wetland and Waterbody Construction and Mitigation Procedures to minimize unavoidable resource impacts as captured in National Fuel's ESCAMP.
- National Fuel will minimize the maintained footprint of the pipeline to a 10-foot-wide area in wetland areas.

Specific descriptions regarding how National Fuel will repair, rehabilitate, and restorative wetlands impacted by the Project are detailed in the ESCAMP. As mentioned, this document incorporated FERC's Plan and Procedures and incorporates decades of practical experience National Fuel acquired from constructing similar pipeline facilities in Pennsylvania.

National Fuel is coordinating with PADEP and USACE to gain approval for an identified permittee responsible mitigation site. PADEP recommended the following ratios in table 4.1-1 to mitigate for PSS/PFO wetlands that will be permanently converted into PEM wetlands.

For additional information regarding this effort, refer to the Mitigation Plan (Appendix Q). Other wetlands temporarily impacted by the project will be restored immediately following construction and allowed to recruit naturally over time.

Compensatory mitigation is required as a result of unavoidable palustrine scrub-shrub (PSS) and palustrine forested (PFO) wetland conversion impacts associated with the Project. Resource Impacts requiring mitigation are outlined in Tables 4.1-1.

Table 4.1-1 Compensatory Mitigation Summary

Resource	Impact Type	Impact Area (acres)	Mitigation Ratio	Mitigation Need (acres)
PSS	Perm	0.0000	1.5:1	0.0000
	Temp	0.0000		0.0000
EV PSS	Perm	0.2565	1.75:1	0.4489
	Temp	1.5977		2.7959
PFO	Perm	0.0000	2:1	0.0000
	Temp	0.1431		0.2861
EV PFO	Perm	0.0211	2.5:1	0.0528
	Temp	0.9467		2.3668
TOTALS:		**2.9651**	**-**	**5.9506**

Regulated aquatic resource impacts associated with the proposed Project will occur within the Upper Allegheny Watershed (8-Digit Hydrologic Unit Code (HUC) #05010001) of the Upper Allegheny River Subbasin (Watershed 16). Compensatory mitigation required for the Project within this watershed is due to permanent conversion of PSS and PFO wetlands to PEM wetlands within the Project footprint. No fill impacts, or loss of wetlands or streams is proposed. Consistent with the Compensatory Mitigation Final Rule ("Final Rule"), which establishes mitigation credits as the preferred method of compensatory mitigation for impacts to aquatic resources of the U.S. (332.3(b)(2)), National Fuel first sought to purchase approved mitigation credits from a mitigation bank within Upper Allegheny River Subbasin (Watershed 16) to compensate for the anticipated resource impacts resulting from the Project. Although the Conneauttee Creek Mitigation Bank has been proposed in Watershed 16, and existing and prospective banks exist in the secondary service areas, bank credits are not anticipated to be available in the amounts or time frame needed for the Project. As the required approved mitigation credits will be not be available within the Upper Allegheny River Subbasin, and because no ILF programs are active within the Watershed, the PRM approach will be utilized to offset the wetland conversion impacts occurring as a result of the proposed Project.

An appropriate off-site Permittee-Responsible Mitigation (PRM) has been located within McKean County and within the Upper Allegheny River Subbasin. Appropriate landowner approvals have been secured to ensure the applicability of the proposed PRM site(s). The selected site has been anthropomorphically degraded (as a result of grazing/agriculture) emergent wetlands, and ideally hydrologically connected to a Designated Chapter 93 Special Protection Water (Pennsylvania Department of Environmental Protection). At the identified PRM site, the wetland enhancement process will involve diligent invasive species management and native seeding and planting efforts. The proposed PRM Plan details the alternatives considered for completing compensatory mitigation, how the affected resources functions and values will be offset from the proposed compensation approach and provide detailed discussions regarding maintenance and monitoring of the PRM Site to ensure that performance standards are to be achieved.

National Fuel has selected RES, a third-party firm who is under contract to facilitate mitigation through a turnkey PRM project.

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Appendices

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B – Report Figures

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C – Erosion and Sediment Control & Agricultural Mitigation Plan (ESCAMP)

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D – Agency Correspondence and PNDI Reports

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E – Wetland and Waterbody Delineation Report

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F – Unanticipated Discovery of Contaminated Materials Plan

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I –Spill Prevention and Response Procedures Plan

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J – HDD Plan

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P – Chapter 105 Site-Specific Wetland and Stream Crossing Plans

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Q – Mitigation Plan

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