Ohio Environmental Protection Agency
Section 401 Water Quality Certificate Application

OHIO PIPELINE ENERGY NETWORK PROJECT

Prepared for:

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1.0 INTRODUCTION

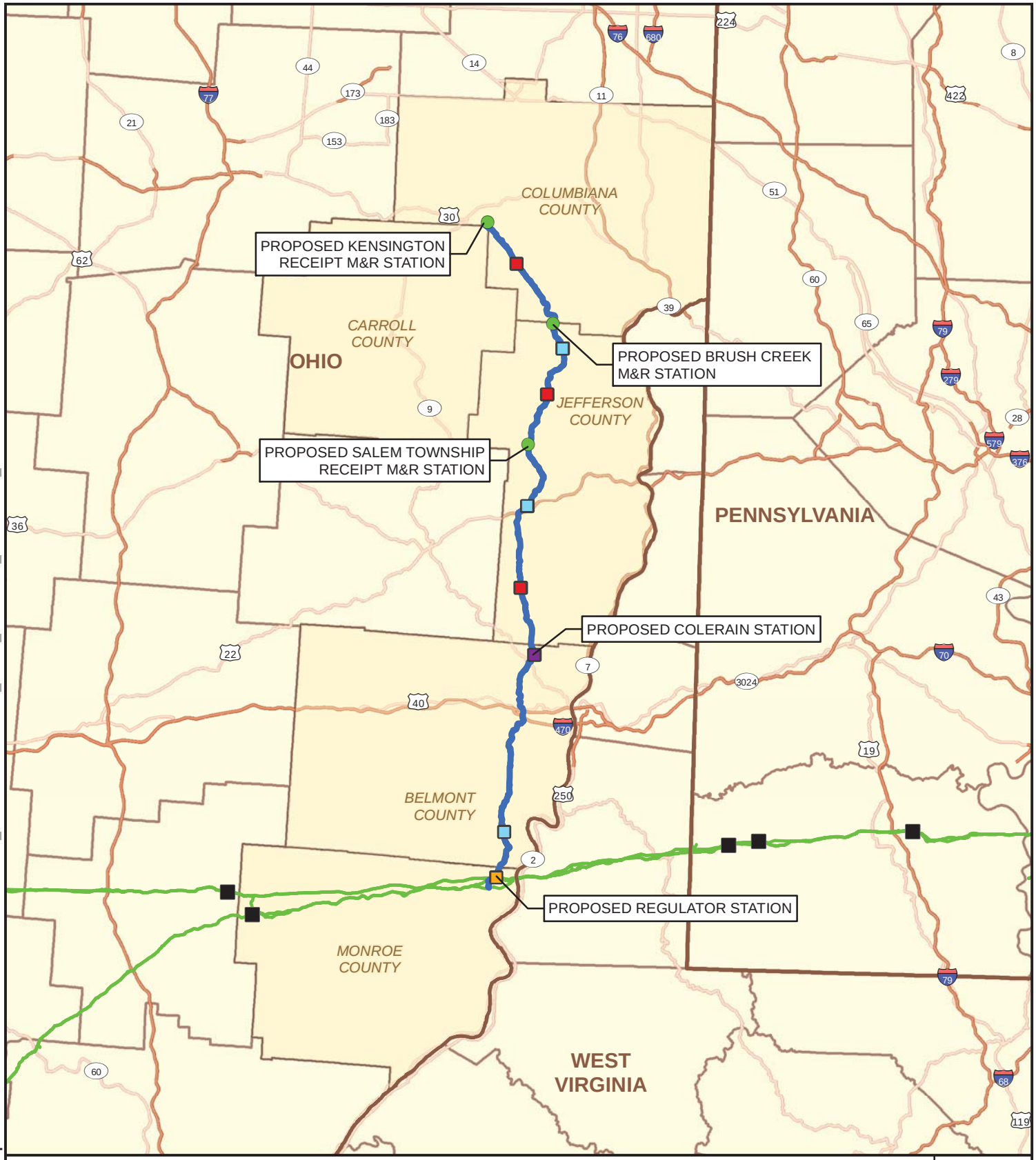
Texas Eastern Transmission, LP ("Texas Eastern"), an indirect wholly owned subsidiary of Spectra Energy Partners, LP is proposing to construct the Ohio Pipeline Energy Network Project ("OPEN Project or "Project"). The Project will include 75.8 miles of new 30-inch diameter mainline pipeline and associated aboveground facilities including a new compressor station in eastern Ohio. The OPEN Project is designed to provide pipeline transportation capacity to transport new incremental production from the emerging Utica Shale and Marcellus Shale plays to growing and diverse markets in the Gulf Coast and facilitate further transportation to the Southeast region. Refer to Figure 1.1-1 for a Project overview map showing the location of all proposed facilities and Section 1.1 for a description of these facilities.

Texas Eastern is currently seeking a certificate of public convenience and necessity ("Certificate") from the Federal Energy Regulatory Commission ("FERC") pursuant to Section 7(c) of the Natural Gas Act authorizing the construction and operation OPEN Project. On January 31, 2014, Texas Eastern filed with the FERC an Abbreviated Application for a Certificate and for Related Authorizations regarding its proposed OPEN Project. FERC has assigned docket number CP14-68-000 to the OPEN Project.

TRC was retained by Texas Eastern to identify and delineate jurisdictional wetlands and waterways along the proposed pipeline route, associated aboveground facilities, additional work areas, staging areas, access roads, pipe yards, and contractor ware yards. Wetland and waterbody delineations were conducted with the objective of identifying and then designing Project facilities to avoid, minimize and mitigate temporary impacts to federal and state jurisdictional wetlands and waterbodies to the extent practicable.

The installation of the OPEN Project pipeline facilities and temporary use of access roads will require temporary crossings of wetland and waterbody areas. As, a result Texas Eastern has filed a Wetland Delineation Preliminary Jurisdictional Determination Report ("PJD") and a Nationwide Permit 12 - Utility Line Activities Application ("NWP-12") to the U.S. Army Corps of Engineers ("USACE") Pittsburgh District in February and March 2014, respectively. On March 7, 2014 the USACE provided correspondence that both the PJD and NWP-12 have been received and the OPEN Project has been assigned the file number 2012-589. Currently the USACE is still in the process of reviewing both reports.

Due to the temporary wetland and waterbody crossings required for the construction of the OPEN Project, Texas Eastern is requesting approval from the Ohio Environmental Protection Agency ("OEPA") under a Section 401 Water Quality Certification ("WQC").



PROPOSED COMPRESSOR STATION
PROPOSED REGULATOR STATION
PROPOSED M&R STATION
PROPOSED TAP VALVE
PROPOSED MAINLINE VALVE
EXISTING COMPRESSOR STATION
PROPOSED PIPELINE
EXISTING TEXAS EASTERN PIPELINE
INTERSTATE
MAJOR HIGHWAY
COUNTY BOUNDARY
STATE BOUNDARY

N W E S

TITLE:

OPEN PROJECT
PROJECT OVERVIEW MAP - FIGURE 1.1-1

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Spectra Energy Partners.

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5400 Westheimer Ct. Houston, TX 77056-5310 713/627-5400

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2.0 PROJECT DESCRIPTION

This section identifies and describes the Project's purpose and need, required permits and approval necessary for the Project, proposed facilities, and pipeline construction procedures.

2.1 Purpose and Need

The OPEN Project is production-driven and designed to provide the necessary new pipeline infrastructure to transport additional natural gas production from Utica Shale and Marcellus Shale production areas in Ohio, West Virginia and Pennsylvania to meet immediate and future supply and load growth requirements in diverse markets in the Gulf Coast. In response to market needs Texas Eastern conducted an open season from April 27, 2012, through May 18, 2012. Given the strong interest expressed by its customers in response to the open season, Texas Eastern is proposing to construct the necessary facilities to provide 550,000 dekatherms per day ("Dth/d") of additional natural gas transportation service on the Texas Eastern system from the Project Shippers to markets along the Texas Eastern system in the Gulf Coast area, as well as to other markets on a secondary basis through Texas Eastern's interconnections with downstream pipelines. The target in-service date for the Project is November 1, 2015, which will meet the timing of the Project Shippers' transportation needs.

2.2 Permits and Approvals

Texas Eastern is seeking approvals or certifications for the construction, operation, and maintenance of the Project from federal and state agencies. U.S. Table 2.1-1 below list all the permit approvals or certificates for other federal, interstate, state or local agencies required for the OPEN Project activities. Refer to Appendix 4 for the Project agency correspondences regarding endangered species as well as cultural and historical resources.

TABLE 2.1-1

Anticipated Environmental Permit, Review and Consultation List

Agency	Permit/Approval	Application/Documentation Proposed or Actual Submittal Date	Approval Status
FEDERAL			
Federal Energy Regulatory Commission	Section 7I Certificate of Public Convenience and Necessity	January 2014	Pending
U.S. Army Corps of Engineers – Pittsburgh District	PJD and Nationwide Permit 12	February and March 2014	Pending
U.S. Fish and Wildlife Service – Ohio Field Office	Section 7 ESA Species Consultation and Clearance	Ongoing	Pending
State Historic Preservation Office	Section 106 Cultural Resources Consultation	February 2014, Consultation Ongoing	Pending
STATE			
Ohio Environmental Protection Agency	Air Permit-to-Install and Operate (Colerain Compressor Station) Section 401 Water Quality Certification NPDES Stormwater General Permit NPDES Hydrostatic Test Discharge General Permit Request for Open Burning Approval	October 2013 April 2014 August 2014 August 2014 As needed during construction	Pending
Ohio Department of Natural Resources	T&E Species Consultation	Ongoing	Pending

2.3 Proposed Facilities

The OPEN Project is located in eastern Ohio; refer to Figure 1.1-1 above for an overview of the Project and U.S. Geological Survey ("USGS") 7.5-minute topographic map excerpts in Appendix 1 which depict OPEN Project facilities locations. The following facilities are proposed to be constructed in Ohio:

New 30-inch Diameter Pipeline

The new 30-inch diameter Pipeline will require a 50-foot permanent right-of-way ("ROW") that will be located within the following counties and associated townships:

- Columbiana County – construct approximately 0.7 mile of pipeline from approximate milepost ("MP") 0.0 to MP 0.7 in Hanover Township, and approximately 12.2 miles of pipeline from approximate MP 0.9 in Franklin Township to approximate MP 13.1 at the Washington Township boundary;
- Carroll County – construct approximately 0.2 mile of pipeline from approximate MP 0.7 to approximate MP 0.9 in East Township;
- Jefferson County – construct approximately 35.5 miles of pipeline from approximate MP 13.1 in Brush Creek Township to approximate MP 48.6 in Mount Pleasant Township;
- Belmont County – construct approximately 24.5 miles of pipeline from approximate MP 48.6 in Colerain Township to approximate MP 73.1 in York Township; and
- Monroe County – construct approximately 2.7 miles of pipeline from approximate MP 73.1 to approximate MP 75.8 in Switzerland Township.

The pipeline facility construction work area will be a minimum of 100-foot wide in upland areas and reduced to 75-foot wide in wetlands, which includes the 50-foot permanent ROW. Other conditions taken into consideration for the construction workspace needed to build the pipeline including proximity to existing residences, roads, railroads, transmission line structures and wires, topography, soils, bedrock and boulders, and wetlands and waterbodies. As a result, in some locations additional temporary workspaces ("ATWS") are required along uplands. In addition, staging areas are required to provide suitable equipment staging, storage of construction materials, room for fabrication, and space for a variety of construction related needs. Staging areas are generally large open spaces along the pipeline route.

New Compressor Station

- Colerain Compressor Station – located at approximate MP 49.9 in Colerain Township, Belmont County.

New Metering and Regulating ("M&R") Stations

- Kensington Receipt M&R Station – A dual 12-inch and single 3-inch ultrasonic receipt M&R station and pig launcher assembly is proposed at MP 0.0 in Hanover Township, Columbiana County at the M3 Midstream LLC Kensington Processing Plant;
- Brush Creek Township M&R Station which includes:
  - The Chesapeake Receipt M&R Facility – A dual 12-inch and single 3-inch ultrasonic receipt metering and regulating station with tee tap for Chesapeake Energy Marketing, Inc. ("Chesapeake") is proposed at approximate MP 13.2 in Jefferson County, and
  - The DTI Delivery M&R Facility and Interconnect – A single 8-inch and single 3-inch ultrasonic delivery metering and regulating station with tee tap is also proposed for Dominion Transmission Inc. ("DTI") at approximate MP 13.2 along with a pig launcher assembly, approximately 1,000 feet of 10-inch diameter pipe and a pig receiver assembly;

- Salem Township Receipt M&R Station – A dual 10-inch and single 3-inch ultrasonic receipt metering and regulator station with tee tap for Chesapeake is proposed at approximate MP 27.0 in Jefferson County; and
- Texas Eastern Delivery Regulator Station – A triple 12-inch-run regulating station is proposed at approximate MP 74.1 in Switzerland Township, Monroe County, upstream of the tie-ins for Texas Eastern's Lines 10, 15, 25 and 30. The tap valves to tie into Texas Eastern's Lines 10 and 15 will also be at this location.

Other New Aboveground Facilities

- Texas Eastern Monroe County Receiver Site – The tap valves to tie into Texas Eastern Lines 25 and 30 and a pig receiver assembly are proposed to be located at approximate MP 75.8 in Switzerland Township, Monroe County;
- Mainline Valve ("MLV") Sites – three 30-inch MLVs are proposed one each at approximate MP 16.0 and approximate MP 34.3 in Brush Creek and Wayne Townships, respectively, in Jefferson County; and at approximate MP 69.0 in York Township, Belmont County; and
- In addition, three 30-inch tee taps will be installed to accommodate potential future receipt tie-ins one each near approximate MPs 5.5 in Franklin Township, Columbiana County; and at approximate MP 21.4 and approximate MP 42.9 in Ross and Smithfield Townships, respectively, in Jefferson County.

Cathodic Protection

A cathodic protection system will be installed along the OPEN Project and will consist of four rectifier groundbed systems. Each groundbed system will protect approximately 18.5 to 20 miles of pipeline.

Access Roads

To the extent feasible, existing public and private road crossings along the proposed pipeline will be used as the primary means of accessing the pipeline construction areas and aboveground facilities. Texas Eastern has identified temporary access road ("TAR") along the Project pipeline facilities and permanent access roads ("PAR") are located at aboveground facilities. The maximum access road width for the Project will be 25 feet. No wetland or waterbodies will be impacted by the construction or use of PARs and therefore are not discussed further in this report.

Pipe Yards and Ware Yards

The four proposed pipe yards/ware yards proposed for the Project have been surveyed for wetlands and waterbodies. These areas are located at previously disturbed and open developed sites. No wetland or waterbodies will be affected by the use of these yards and therefore are not discussed further in this report.

2.4 Construction Procedures

This section summarizes the standard procedures and restoration techniques utilized for the construction for the Project facilities. This section also provides detailed information regarding wetland and waterbody crossing procedures. The Project facilities will be constructed and maintained in accordance with the FERC *Upland Erosion Control, Revegetation, and Maintenance Plan* ("FERC Plan") and *Wetland and Waterbody Construction and Mitigation Procedures* ("FERC Procedures") (Appendix 2). The following sections identify the general construction procedures for routine pipeline construction, as well as the

specific construction techniques that will be utilized in environmentally sensitive areas for the OPEN Project.

2.4.1 Pipeline Facilities

- Clearing operations;
- Right-of-way and temporary construction workspace grading;
- Trench excavation;
- Blasting (where required);
- Stringing;
- Lowering-in;
- Tie-ins;
- Backfilling;
- Cleaning;
- Hydrostatic testing; and
- Restoration and revegetation.

Clearing Operations

The amount of clearing of new ROW will be minimized by co-locating with existing utility corridors where feasible. Initial clearing operations will include the removal of vegetation, as needed, within the construction ROW and ATWS. Clearing will be accomplished by mechanized forest clearing equipment or by hand cutting. The limits of clearing will be identified and flagged in the field prior to any clearing operations. In wetlands, trees and brush will either be cut using rubber-tired and/or tracked equipment, or hand-cut. Unless grading is required for safety reasons, wetland vegetation will be cut off at ground level, leaving existing root systems intact, and the aboveground vegetation removed from the wetlands for chipping or disposal.

In uplands, tree stumps and rootstock will be left in the temporary workspace wherever possible to encourage natural revegetation. Stumps will be removed from the ROW to approved disposal locations or made available to landowners upon request. Timber will be removed from the ROW to approved locations and sold for lumber or chipped, or chipped or burned on the ROW. Brush and tree limbs will be either chipped and removed from the ROW for beneficial reuse or approved disposal, or burned on the ROW in accordance with applicable state and local regulations. Wood chips will be sold as fuel or other marketable products, spread in approved locations on the ROW and used as mulch, or transported off site for proper disposal.

The cleared width within the ROW and temporary construction workspace will be kept to the minimum that will allow for spoil storage, staging and assembly of materials, and all other activities required to safely construct the pipeline. Closely following clearing and before grading activities, erosion controls will be installed at the required locations as outlined in the OPEN Project E&SCP (Appendix 2).

ROW and Temporary Construction Workspace Grading

The entire width of the construction ROW, including the temporary construction workspace, will be rough graded as necessary to allow for safe passage of equipment and to prepare a work surface for pipeline installation activities. However, as stated above, tree stumps and rootstock in upland areas will be left in the temporary workspace wherever possible to encourage natural revegetation and, unless grading is required for safety reasons, wetland vegetation will be cut off at ground level, leaving existing root systems intact. Typically, the grading of the ROW will be completed with bulldozers. Backhoes will be used in conjunction with bulldozers in areas where boulders and tree stumps require removal.

Temporary erosion and sedimentation controls will be established as needed, coincident with excavation or other disruption of soils, and maintained until final stabilization has occurred. Temporary erosion and sedimentation controls typically consist of mulch, silt fence, hay bales or combinations of these measures. In agricultural and residential areas, topsoil will be stripped and stockpiled separately from the subsoil during grading. There may be some areas where the construction ROW is limited and topsoil will need to be stockpiled offsite. Topsoil will be replaced with appropriate imported material as required. The mixing of topsoil with subsoil will be minimized by using topsoil segregation construction methods in wetlands (except when standing water or saturated soils are present). Rock will be removed from all actively cultivated or rotated agricultural land. The size, density and distribution of rock left in construction work areas should be similar to adjacent areas not disturbed by construction, unless otherwise approved in writing by the landowner.

Trench Excavation

A trench will be excavated to the proper depth to allow for the burial of the pipe. In general, the trench will be deep enough (approximately seven feet) to provide a minimum of three feet of cover over the pipeline which exceeds the requirement of 49 CFR Part 192 of the U.S. Department of Transportation ("USDOT") regulations. Additional cover of five feet is required as part of Texas Eastern's specification for road crossings. Cover can also be increased in certain agricultural areas based on consultation with the land owner and type of cropland crossed. During trenching, the excavated material will be placed next to the trench so as to avoid unnecessary movement of machinery across the terrain. Should it become necessary to remove water from the trench, it will be pumped to an off-ROW, stable, vegetated upland area (where practical) and/or filtered through a filter bag or siltation barrier. The trench will be dug by a backhoe or ditching machine. In certain cases where side-slopes are leveled to make a safe work environment before trench excavation, the amount of cover over the pipe will be increased after the slopes are restored.

Blasting

Texas Eastern anticipates that blasting may be required along segments of the pipeline. In the event that unrippable subsurface rock is encountered, blasting for ditch excavation will be necessary. In these areas, care will be taken to prevent damage to underground structures (e.g., cables, conduits, septic systems, and electric transmission tower foundations *etc*.) or to aboveground structures (e.g., homes, electric transmission towers, *etc*.) springs, water wells, or other water sources.

Blasting mats or soil cover will be used as necessary to prevent the scattering of loose rock. All blasting will be conducted during daylight hours and will not begin until occupants of nearby buildings, stores, residences, places of business, and farms have been notified. Texas Eastern will comply with all federal, state, and local regulations applying to blasting and blast vibration limits with regard to structures and underground utilities. The OPEN Project Blasting Plan is provided in Appendix 2.

Stringing and Welding

Once the trench is excavated, the next process in constructing a pipeline is stringing the pipe along the trench. Stringing involves initially hauling the pipe by tractor-trailer, generally in 40-foot lengths from the pipe storage yard, onto the ROW. The pipe will be off-loaded from trucks and placed next to the trench using a sideboom tractor. The pipe joints are lined up end-to-end to allow for welding into continuous lengths known as strings.

The individual joints of pipe are welded together in two steps. The front-end welding crew, or pipe gang, will perform the first step. This crew will clean and align the beveled ends of the pipe in preparation for welding and place at least the first two passes in the welding process. The firing line, or back-end welders, will perform the second step, completing the welds started by the front-end welders. The pipe is welded into long strings to minimize the number of welds that have to be made in the trench (tie-in welds). Gaps in the pipe welding process are often left by the welding crews at water/wetland crossings, road crossings, and other locations where access across the work area is required or when the pipe will be installed later in the construction process.

Lowering-In

After a pipe string has been welded, coated, and inspected, the trench is prepared for the installation of the pipeline. The trench is cleared of loose rock and debris. If water exists in the trench, the water is pumped out into a well-vegetated upland area and/or into an approved filter with the exception of wetland areas where the "push pull" installation may be required, although not likely for the OPEN Project. In sandy soils, the trench is shaped to support the pipe. In areas where the trench contains bedrock, an approved foam or sand bedding is placed on the bottom of the trench, and/or pads made of sandbags are placed at regular intervals along the trench bottom to support the pipe. The lowering-in crew places the pipeline in the trench. Lowering-in is usually done with sideboom tractors.

Tie-Ins

Once the sections of pipe are lowered-in, the tie-in crew makes the final welds in the trench. Additional excavations as needed, lowering in, lining up, welding, weld nondestructive inspection and coating the final welds are accomplished by this crew.

Backfilling

All suitable material excavated during trenching will be replaced in the trench. In areas where excavated material is unsuitable for backfilling, additional select fill may be required.

All backfill operations are conducted in a manner to avoid damage to the protective coating on the pipeline. The area around the pipe, to eight-inches above the pipe in the trench, is backfilled with "padding material". Padding material is small, fine soil material that is either imported (typically from commercial borrow areas in the region) or is mechanically sifted from the native soils excavated from the trench. In either case, the padding material is free of stones larger than 1½-inches in any dimension. Some exceptions area allowed when using rock-jacket coating or other approved rock shield that protect the pipe and pipe coating during backfill operations. In no case will topsoil be used as padding material.

When excavated trench material is used for padding, a "shaker", which is a padding machine, an "Allu bucket", which is specialized excavator bucket, or equivalent device is used to screen native soil material to meet the padding soil particle size requirements. The remaining backfill material (non-padding material) can consist of larger particles, but no rocks greater than approximately 12-inches in any dimension are placed in the trench within 12-inches of the pipeline and no rocks greater than 24-inches in any dimension are placed in the trench within 24-inches of the pipeline.

When backfilling is completed, the top of the trench may be slightly crowned to compensate for settling, except for paved areas where standard compaction methods will be employed. The topsoil is then spread across the graded construction ROW where applicable. The soil surface will be inspected for compaction, and scarified as necessary.

Hydrostatic Testing

The pipeline will be pressure tested in accordance with USDOT Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards" (49 CFR Part 192). Testing will be completed by capping installed pipe segments with test manifolds, filling these segments with water, and pressurizing this water to levels beyond the maximum operating pressure of the pipeline. The water will be maintained at that pressure for a minimum of eight hours.

Restoration and Revegetation

The cleanup crew completes restoration and revegetation of the construction ROW and ATWS. In general, every effort will be made, weather and soil conditions permitting, to complete final cleanup (including final grading) and installation of permanent erosion control measures within 20 days after the trench is backfilled. These restoration activities will be completed in residential areas within 10 days of backfilling. In conjunction with backfilling operations, any woody material and construction debris will be removed from the ROW. The ROW will be final-graded to prepare for restoration. Permanent slope breakers or diversion berms will be constructed and maintained in accordance with the FERC Plan. Fences and stone walls will be restored or repaired as necessary.

Revegetation will be completed in accordance with permit requirements and written recommendations on seeding mixes, rates, and dates obtained from the local soil conservation authority or other duly authorized agency and in accordance with the OPEN Project E&SCP. The ROW will be seeded within six working days following final grading, weather and soil conditions permitting. Alternative seed mixes specifically requested by the landowner or required by agencies may be used. Any soil disturbance that occurs outside the permanent seeding season or any bare soil left unstabilized by vegetation will be mulched in accordance with the FERC Plan and the OPEN Project E&SCP.

2.4.2 Wetland Construction Methods

Construction across wetlands will be performed in accordance with the FERC Procedures and the OPEN Project E&SCP. The Project E&SCP and a typical stream and wetland cross section detail plan are available in Appendix 2. Construction methods will minimize the extent and time that construction equipment operates in wetland areas. Nearly all of the wetlands that would be crossed by the OPEN Project pipeline are small, narrow, and have only seasonally-saturated soils. As a result, normal cross-country construction practices will typically be used in these wetlands. Since these wetlands have firm substrates, are unsaturated and will not be frozen during the time of construction, the top 12 inches of wetland soil over the trenchline will be segregated and stockpiled separate from subsoil. Trench spoils will be temporarily piled in a ridge along the pipeline trench. Gaps in the spoil pile(s) will be left at appropriate intervals to provide for natural circulation or drainage of water. Where practicable the pipeline will be assembled in a staging area located in an upland area while the trench is excavated. If dry conditions exist, as is generally to be expected for the wetland crossings along the OPEN Project route, the pipe fabrication will occur in the wetland.

Should unusually wet weather result in wetland soils that are inundated or saturated to the surface, the pipeline trench will be excavated across the wetland by equipment supported on wooden swamp mats to minimize the disturbance to wetland soils, it may not be possible to stockpile segregated topsoil. In these situations the pipe strings will be fabricated on one bank and either pulled across the excavated trench in the wetland, floated across the wetland, or carried into place and submerged into the trench. This method will minimize the amount of equipment and travel in wetland areas. Based on the wetland crossings along the OPEN route, use of this construction method is not anticipated.

After the pipeline is lowered into the trench, wide track bulldozers or backhoes supported on swamp mats will be used for backfill, grading, and final cleanup. The segregated top 12 inches of excavated wetland soils will be placed on top of backfilled subsoil to serve as a natural seedbed for restoration of wetland vegetation. A complete description of construction methods can be found in the OPEN Project E&SCP, included as Appendix 2.

ATWS will be needed adjacent to specific wetlands to facilitate the pipeline crossing. The ATWS is in addition to the nominal construction ROW and may be used for the assembly and fabrication of the pipe section that will cross the wetland area. These work areas will be located at least 50 feet away from the wetland edge, except where adjacent upland consists of cultivated or rotated agricultural lands and other disturbed areas, topographic and other site specific conditions permitting. If construction limitations, such as topographic conditions (steep slopes) and road crossing requirements do not permit a 50-foot setback, these areas will be located at least 10 feet away from the wetland.

The size of ATWS required at wetland crossings is based on the wetland size, water content of wetland soils (or presence of standing water), and other construction constraints. Under no circumstances will vegetation be cleared between the ATWS and the wetland. The work area will be limited to the minimum size necessary to safely construct the wetland crossing. Restricting the work area in this manner will minimize wetland impacts associated with pipeline construction.

2.4.3 Waterbody Construction Methods

To minimize potential impacts, waterbodies, streams and rivers will be crossed as quickly and as safely as possible. Adherence to the approved construction procedures will ensure stream flow will be maintained throughout construction. Additional information on waterbody crossings and the proposed waterbody crossing methods for each waterbody crossed by the proposed pipeline is provided in Table 3-1 in Appendix 3 and described in more detail in the OPEN Project E&SCP. In addition, see the typical stream and wetland cross section plan in Appendix 2.

<u>Open Cut Crossing Method</u>

The open-cut crossing method (or wet-ditch method) will be utilized for most minor waterbody crossings and for any streams that are dry or display no perceptible flow at the time of crossing. The open-cut crossing method will involve excavation of the pipeline trench across the waterbody, installation of the pipeline, and backfilling of the trench. Excavation and backfilling of the trench will be accomplished using backhoes or other excavation equipment working from the banks of the waterbody. Trench spoil will be stored at least 10 feet from the banks (topographic conditions permitting). A section of pipe long enough to span the entire crossing will be fabricated on one bank and either pulled across the bottom to the opposite bank, floated across the stream, or carried into place and submerged into the trench. The trench will then be backfilled and the bottom of the watercourse and banks restored and stabilized. Sediment barriers, such as silt fencing, staked straw bales, or trench plugs will be installed to prevent spoil and sediment-laden water from entering the waterbody from adjacent upland areas.

Per the FERC Procedures, except for blasting and other rock breaking measures, instream construction activities when using the open cut method for minor waterbodies (including trenching, pipe installation, backfill, and restoration of the streambed contours) must be completed within 24 hours. A minor waterbody is defined as a waterbody that is 10 feet or less in width at the water's edge at the time of the crossing. Stream banks and unconsolidated streambeds may require additional restoration after this period. Texas Eastern may choose to use mainline construction procedures across minor waterbodies where the open cut crossing method is proposed. In these instances, a flume pipe will be installed

immediately after trenching is completed. The flume pipe will remain in place until the lowering-in process. The flume pipe will be removed just prior to lowering in the pipeline. The 24-hour restoration timeframe starts as soon as the flume is removed.

Dry Crossing Method

The dry crossing method will involve installation of a dam and pump and/or flume pipe(s) prior to trenching to divert the stream flow over the construction area and allow trenching of the stream crossing in drier conditions isolated from the stream flow. Spoil removed during the trenching will be stored away from the water's edge and protected by sediment containment structures. Pipe strings will be fabricated on one bank and either pulled across the stream bottom to the opposite bank, floated across the isolated portion of the stream, or carried into place and lowered into the trench. Where these methods are employed, ATWS areas will be required for assembly of the pipe strings and spoil storage areas.

All Crossings

Temporary trench plugs, usually composed of compacted earth or other suitable low-permeable material, will be used to isolate waterbodies and wetland areas, as needed, to minimize channeling of groundwater along the ditch line during construction. Permanent trench breakers consisting of sandbags, gravel, cement, or cement-filled sacks will be installed over and around the pipe in these areas prior to backfilling the trench.

Except where reasonable alternative access is available, temporary construction equipment crossings will be installed across all waterbodies to gain access along the ROW for construction operations. Equipment crossings will be carefully installed after clearing to minimize streambed disturbance and downstream siltation. Where culverts are used, devices will also be placed at the outlet to prevent scouring of the stream bottom. After such equipment crossings are established, construction equipment will not be permitted to drive through the waterbody for access, and the equipment crossings will be removed once access in the area is no longer needed. Only the equipment necessary to construct the crossing and install the pipe will be allowed to work in the waterbody. After clearing activities, construction equipment must cross waterbodies on bridges consisting of one of the following devices:

- Clean rockfill and culverts;
- Equipment pads, wooden mats, and/or culverts; or
- Flexi-float or portable bridge.

To facilitate pipeline construction across waterbodies, ATWS will be needed adjacent to specific waterbody crossings to assemble and fabricate the length of pipe necessary to complete the crossing. This work area is in addition to the standard construction ROW and will be located at least 50 feet away from the stream banks except where adjacent upland consists of cultivated or rotated agricultural lands and other disturbed areas, topographic and other site specific conditions permitting. If construction limitations, such as topographic conditions (steep slopes) and road crossing requirements, do not permit a 50- foot setback, then these areas will be located at least 10 feet away from the water's edge.

Vegetation will not be cleared between the ATWS area and the waterbody. The work area will be limited in size to the minimum area necessary to safely construct the waterbody crossing and accommodate any stockpile of excavated material from the trench and the prefabricated pipeline crossing section.

Typically, for extra workspace on minor and intermediate stream crossings, 50 feet of additional width may be used for a length of 100 feet on either side of the waterbody starting at the edge of the required

setback. However, the size of ATWS areas can vary based on site-specific conditions and length of the pipe section for the crossing.

Blasting will be conducted at stream crossings where areas of dense till or bedrock cannot be avoided. It will be conducted using inserted delays of a fraction of a second per hole, and stemming, in which rock is placed into the top of the borehole to dampen the shock wave reaching the water column. The nature of the material that will require blasting, the limited areas where this will be required, and the short duration of this activity will combine to minimize the amount of fine-grained material that may be released into the water column. Blasting procedures and timing requirements are addressed in detail in the OPEN Project E&SCP and Blasting Plan located in Appendix 2.

Texas Eastern's construction contractor(s) will prepare a project-specific Spill Prevention Control and Countermeasures Plan ("SPCC Plan") to address the handling of construction fuel and other materials for the OPEN Project. Texas Eastern's SPCC Plan for construction activities provides its contractors with a set of minimum requirements for their project-specific SPCC Plans is included in Appendix 2. The final contractor project-specific SPCC Plan(s) will be filed with the FERC prior to construction. Except in circumstances specified in the SPCC Plan, potential impacts to water quality will be avoided while work is being performed in or near waterbodies and wetlands by implementing the following measures:

- Construction materials, fuels, etc. will not be stored within wetlands or within 100 feet of any stream or wetland system, except under limited, highly controlled circumstances;
- Construction equipment will not be refueled within wetlands or within 100 feet of any stream or wetland system, except under limited, highly controlled circumstances and under direct supervision of the Environmental Inspector;
- Construction equipment will not be washed in any wetland or watercourse; and
- Equipment will be well maintained and checked daily for leaks.

2.5 Operation and Maintenance

Texas Eastern will operate and maintain the newly constructed pipeline facilities in the same manner as it currently operates and maintains its existing system. The pipeline will be patrolled on a routine basis and personnel well-qualified to perform both emergency and routine maintenance on interstate pipeline facilities will handle emergencies and maintenance.

The following sections provide specific detail on standard Operations and Maintenance ("O&M") procedures for cleared areas, erosion control and periodic pipeline and ROW patrols.

2.5.1 Erosion Control

Evidence of post-construction soil erosion or sedimentation on the pipeline ROW or at a compressor station will be reported to the local operations supervisor. These reports may originate from landowners or Texas Eastern personnel performing routine patrols. Prompt corrective measures will be performed as needed in accordance with the OPEN Project E&SCP and with Texas Eastern's standard operating procedures.

2.5.2 Pipeline and ROW Patrols

During periodic pipeline and ROW patrols, all permanent erosion control devices installed during construction will be inspected to ensure that they are functioning properly. In addition, attention will be given to:

- Erosion and wash-outs along the ROW;
- Performance of water control devices such as diversions;
- Condition of banks at stream and river crossings;
- Fallen timber or other threats to the pipeline;
- General health of shrubs and other vegetation planted during construction; and
- Any other conditions that could endanger the pipeline or cause erosion.

The local operations supervisor will be notified of any conditions that need attention. Corrective measures will be performed as needed.

3.0 EXISTING CONDITIONS

This Section identifies and describes the existing cover types along the Project, wetland and waterbody survey methodologies, and Project wetlands and waterbodies located along the OPEN Project. The Project wetland and waterbody survey methodology and Project wetland and waterbodies information presented in this Section as well as the wetland and waterbody figures, tables, and data forms in Attachment 1, 3, and 5 were provided USACE Pittsburgh District as part of the OPEN Project Wetland Delineation and Preliminary Jurisdictional Determination Report.

3.1 Existing Cover Types

Based on field surveys in combination with using recent high-resolution aerial photography for analysis, the OPEN Project facilities crosses five basic existing cover type/land use categories.

- Forest/Woodland: central hardwoods, transition hardwoods, and forested wetlands;
- Residential: existing developed residential areas and planned residential developments. This may include large developments, residentially zoned areas that have been developed or short segments of the route at road crossings with homes near the route alignment;
- Industrial/Commercial: roads, railroad beds, electric power or natural gas utility facilities;
- Open land: pasture lands, open fields, active hayfields, cultivated land, existing ROW, herbaceous and scrub-shrub uplands, non-forested lands, emergent wetlands, and scrub-shrub wetlands;
- Open water: visible waterbodies.

The Project area will require approximately 1,416.4 acres during construction, all of which has been surveyed for wetland and waterbody resources. The Project area includes approximately 610.5 acres of forest/woodland, 18.9 acres of residential, 23.8 acres of industrial/commercial roads, 761.8 acres of open land, and 1.4 acres of open water. See Section 3.3.1 below for forested and non-forest wetland vegetation observed during field surveys. In addition, Section 4.0 discusses the total acres of wetland forested and non-forested wetland.

3.2 Project Wetland and Waterbody Survey Methodology

Wetland and waterbody delineation surveys were conducted in 2012 and 2013 for all the Project pipeline facilities, aboveground facilities, staging areas, and access roads. Prior to actual field delineations for wetland and waterbody resources, TRC reviewed USGS 7.5-minute topographic maps, aerial photographs, National Wetland Inventory ("NWI") mapping, FEMA 100-year floodplain map, and Natural Resources Conservation Service ("NRCS") soil mapping, to identify potential wetland and waterbody features present within the Project area.

Wetland and waterbody field surveys were conducted generally within a 200-foot wide study corridor along the pipeline route. In addition, the locations of proposed aboveground facilities, access road, staging areas were also investigated. The wetland delineations were performed in accordance with the USACE wetland delineation criteria and methodology (USACE, 1987) and applicable regional supplements: Eastern Mountains and Piedmont Region (Version 2) (USACE, 2012a) and Northcentral and Northeast Region (Version 2) (USACE, 2012b). Wetlands were also delineated, assessed, and scored in accordance with OEPA's Ohio Rapid Assessment Method for Wetlands V. 5.0 ("ORAM").

USACE Routine Wetland Determination data forms were completed for representative wetland and upland plots along a transect(s) for each wetland crossing. In addition, OPEN Project wetland summary

forms, including sketches, were completed for each wetland. Representative wetland and upland plots and wetland summary forms were completed along wetlands that will be crossed by pipeline and TARs. Wetland data forms are provided in Appendix 5 of this Application.

The waterbodies include lakes, ponds, and streams. The stream features were categorized as ephemeral, intermittent, or perennial, definitions as described in 67 CFR 2020 (Federal Register, 2002). In addition, interstitial streams were identified in accordance with OEPA definition in Methods for Assessing Habitat in Flowing Waters: Using the Qualitative Habitat Evaluation Index ("QHEI") (OEPA, 2006). Representative stream summary forms were completed for each stream crossed by the pipeline and TARs. Stream summary forms area provided in Appendix 5 of this Application.

OEPA scoring forms were completed for each wetland and stream crossed by the Project. ORAM forms were also completed for each wetland. Habitat found in each stream was assessed and scored using either OEPA's Field Evaluation manual for Ohio's Primary Headwater Habitat Streams ("HHEI") or QHEI. The QHEI method was used for streams that had a watershed area greater than one-square mile, or where a stream's natural pools were greater than 40 centimeters in depth. OEPA scoring forms are provided in Appendix 5 of this Application.

3.3 Project Wetlands

The Project will cross a total of 271 wetlands: 258 are located along the pipeline facilities and associated workspace and 13 along temporary access roads. There are no wetlands affected by PARs or aboveground facilities. The wetlands located within the Project area are provided in Table 3-1 in Appendix 3. This table includes Wetland ID, classification, MP, ORAM score and category, crossing area, and temporary wetland impact calculations. As described above wetland forms are available in Appendix 5.

No wetlands were identified along the Project aboveground facilities including the Colerain Compressor Station, PARs, or the Project pipe and wareyards.

3.3.1 Project Wetland Overview

In accordance to USACE wetland delineation criteria, wetland boundaries were based on presence of hydric soils, hydrology, and hydrophytic vegetation.

Typical hydric soil indicators in the Project survey area included ponded or flooded soils, soils with a subsoil matrix depleted of iron near the surface, and soils with dark surface horizons underlain by subsoils with redoximorphic features grading to a depleted matrix near the surface. Upland soils in the Project survey area typically exhibited brown to dark brown surface horizons underlain by brown to olive brown subsoils. Redoximorphic features indicative of periodic short term saturation, such as iron concentrations and pore linings, were sometimes present in upland subsoils but hydric soil morphologies were absent (i.e. depths and amount of redoximorphic features were not appropriate to make the soils key using Field Indicators of Hydric Soils in the United States: A Guide for Identifying and Delineation Hydric Soils, Version 7.0 (USDA, NRCS, 2010).

Site hydrology was examined within each wetland and adjacent upland area. Indicators of wetland hydrology included inundation or evidence of inundation (such as water stained leaves), high water table and/or saturation within the upper portion (12 inches) of the soil during the growing season, drainage patterns, sediment deposition, surface scouring, drift lines within wetlands, geomorphic position, iron deposits, presence of reduced iron, recent iron reduction in tilled soils, and oxidized root channels in the upper 12 inches of soil. Hydrologic factors contributing to the presence of wetland hydrology within

wetlands in the survey area included inundation with river, pond, or stream water, temporarily ponded snowmelt and runoff, and seasonally to permanently shallow groundwater tables.

The wetland cover types were assigned to each delineated wetland according to Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al., 1979). Using this hierarchical wetland classification system three primary cover types were identified for vegetated wetlands in the survey area: palustrine emergent (PEM), palustrine scrub-shrub (PSS), and palustrine forested (PFO) wetlands. Some wetlands contained co-dominant emergent, scrub-shrub, or forested vegetation. Open water areas were identified as palustrine unconsolidated bottom (PUB).

Palustrine Forested Wetlands

Forested wetland cover types are dominated by trees and shrubs that have developed a tolerance to a seasonal high water table. In order to be characterized as forested, a wetland must be dominated by trees and saplings that are greater than 20 feet tall (Cowardin et. al., 1979). Forested wetlands typically have a mature tree canopy, which depending upon the species and density, can have a broad range of understory and groundcover community components.

The forested wetlands along the proposed OPEN Project were classified as palustrine forested broad-leaved deciduous. The forested wetlands along the Project route were typically located in seeps, glades, digressional areas, poorly drained basins (depressions), and in floodplains. These swamps are characterized by seasonal flooding and inorganic, mineral soils. Plants often associated with forested wetland communities were: American elm (*Ulmus americana*), slippery elm (*U. rubra*), American sycamore (*Plantanus occidentalis*), ash-leaf maple (*Acer negundo*), and occasional occurrences of red maple (*A. rubrum),* green ash (*Fraxinus pennsylvanica*), and silver maple (*A. saccharinum*). Shrub species observed in the understory of these wetlands included spice bush (*Lindera benzoin*), multiflora rose (*Rosa multiflora*), red osier dogwood (*Cornus alba)*, black elderberry (*Sambucus nigra*), silky dogwood (*Cornus amomum)*, and American hornbeam (*Carpinus caroliniana*). Depending upon the degree of shading, soil characteristics, and hydrology, groundcover species found within forested wetland areas included skunk-cabbage (*Symplocarpus foetidus*), wingstem (*Verbesina alternifolia*), false mermaidweed (*Floerkea proserpinacoides)*, Quaker bitter cress (*Cardamine pensylvanica*), fowl manna grass (*Glyceria striata*), crooked-stem aster (*Symphyotrichum prenanthoides*), other aster species, blue grass species (*Poa* spp.), sensitive fern (*Onoclea sensibilis*), and spotted-touch-me-not (*Impatiens capensis*).

Palustrine Scrub-Shrub Wetlands

The scrub-shrub wetland cover type includes areas that are dominated by saplings and shrubs that typically form a low and compact structure less than 20 feet tall (Cowardin et. al., 1979). The structure and composition of the vegetation within this cover type may be influenced by the water regime and, where located within existing ROWs, by utility maintenance practices. Typical shrub community wetlands are seasonally flooded and often saturated to the surface. Many of the scrub-shrub wetlands along the pipeline route were often associated with emergent wetlands in a wetland complex. These scrub-shrub wetlands were commonly along existing electric transmission ROWs and adjacent to open land. Due to the steep hill and valley topography, overall wetland size and hydrology characteristics (few areas with seasonal flooding), scrub-shrub wetlands types were the least common cover type along the OPEN Project.

Common vegetation in scrub-shrub wetlands included black willow (*Salix nigra*), other willow species (*Salix* sp.), spice bush, multiflora rose, and red-osier dogwood.

Palustrine Emergent Wetlands

The palustrine emergent wetland cover type is characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens (Cowardin et. al., 1979). The freshwater emergent wetlands along the OPEN Project included areas commonly referred to as marshes and wet meadow communities. These wetlands were often associated with utility ROWs, currently maintained or fallow agricultural areas, abandoned or reclaimed mined areas, slopes, depressions, and the edges of open waterbodies and streams. The PEM wetland cover type existed on its own as well as in conjunction with other wetland types, creating a more heterogeneous wetland system within the Project area.

Freshwater, marsh communities in the Project area were often adjacent to ponds and shallow slow-flowing rivers and streams on mineral soils that are seasonally flooded or permanently or seasonally saturated. Vegetation in these wetland types consisted of a variety of emergent and other rooted herbaceous species. Narrow-leaf and broad-leaf cat-tail (*Typha latifolia* and *angustifolia*) communities were usually located in protected basins along slow moving streams and ponds.

In the Project area, wet meadows generally occurred in seasonally or permanently saturated mineral soils that were associated with high water tables and/or surface water inputs. Most of the wet meadows in the Project area occurred in agricultural or reclaim areas currently used as pasture land. They were also found near flowing water where scouring has prevented the accumulation of peat and organics, such as adjacent to streams, in depressions, on slopes, and adjacent to maintained utility corridors found throughout the Project area. They were often dominated by various grass or sedge species in conjunction with a diverse assemblage of flowing water herbaceous vegetation and were infrequently dominated by a single species.

During field surveys, a diverse array of species were observed in emergent wetlands; dominance and diversity ranged depending on landscape position, hydrologic regime, and degree of anthropogenic influence. Herbaceous species including spotted touch-me-not, Canada goldenrod (*Solidago canadensis*), willowherb species (*Epilobium* spp.), sweetflag species (*Acorus* spp.), Asiatic tearthumb (*Polygonum perfoliatum*), common boneset (*Eupatorium perfoliatum),* sensitive fern, Allegheny monkey-flower (*Mimulus ringens*), white panicled American-aster (*Symphyotrichum lanceolatum*), *s*potted ladysthumb (*Polygonum persicaria*), aster species (*Symphyotrichum* spp; *Erybia* spp.), greater water dock (*Rumex orbiculatus*), Pennsylvania bittercress (*Cardamine pensylvanica*), smartweed species (*Polygonum* spp.), skunk-cabbage, false mermaidweed, swamp dock (*R. verticillatus*), violet species (*Viola* spp.), bedstraw species (*Galium* spp.), wood fern species (*Dryopteris* spp.), bulbous bittercress (*C. bulbosa*), cuckoo flower (*C. pratensis*), wingstem, marsh horsetail (*Equisetum palustre*), sweet-scented joe-pye weed (*Eupatorium purpureum*), and creeping-jenny (*Lysimachia nummularia*) are common in the Project area. Grass, sedge and rush species including reed canary grass, cottongrass bulrush (*Scirpus cyperinus*), sedge species (*Carex* spp.), black bent (*Agrostis*), pointed broom sedge (*C. scoparia*), bulrush species (*Scirpus* spp.), lamp rush, blue grass species, fescue species (*Festuca* spp.), fowl manna grass, fringed sedge (*C. frankii*), shallow sedge (*C. lurida*), and rice cut grass (*Leersia oryzoides*) were often found in these PEM communities.

Palustrine Unconsolidated Bottom Wetland Associations

The palustrine unconsolidated bottom cover type includes wetlands with at least 25 percent cover of particles smaller than stones, and a vegetative cover less than 30 percent (Cowardin et al., 1979). A small number of PUBs were identified along the route and included small, shallow depression areas which were seasonally to permanently flooded. These PUB areas were generally anthropogenic in origin and were the result of mining activity, railroad or road construction excavations, agricultural activities or are ditches. The PUBs were in wetland systems which also contained PEM and/or PSS components.

Substrates within PUB areas were dominated by mineral soils with a small percentage of the soil surface covered by vegetation. Generally the edges of the PUB components were vegetated with either emergent or shrub species. Vegetation observed in these wetlands included willow species, black willow, ash-leaf maple, American sycamore, honeysuckles (*Lonicera* spp.), black cherry (*Prunus serotina*), black raspberry (*Rubus occidentalis*), reed canarygrass, aster species, dark-green bulrush (*S. atrovirens*), field horsetail (*E. arvense*), grass species, narrow-leaf cat-tail, Fuller's teasel (*Dipsacus fullonum*), watercress (*Nasturtium officinale*), spotted touch-me-not, common boneset, and fringed willowherb (*E. ciliatum*).

Forested/Scrub-Shrub/Emergent Wetlands

Some wetlands are best characterized as having co-dominance between vegetation types, such as a mixed forest and scrub-shrub communities. On NWI maps, these can appear as PFO/PSS, PFO/PEM, and PSS/PEM and may occur as adjacent communities within a single wetland, or a single co-dominant community. Communities with mixed dominance are composed of vegetation similar to that described above for separate forested, emergent, and scrub-shrub wetlands.

3.4 Project Waterbodies

The proposed OPEN Project area is located in two major watersheds: Little Beaver Creek drainage basin and the Central Ohio Tributaries drainage basin (OEPA, 2012). The majority of the Project (93 percent) is located within the Central Ohio Tributaries drainage basin. Table 3.4-1 below and Figure 3.4-1 in Appendix 1 indicate the hydrologic unit code ("HUC") 10 and 12 watersheds crossed by the OPEN Project.

Waterbodies within the proposed Project area included streams and one pond. Streams were identified and classified by the presences of defined banks and channel. Delineation flagging of waterbodies were completed along the approximate centerline of stream channels less than six feet wide, along the top of bank for rivers or streams greater than six feet wide, and at the ordinary high water mark ("OHWM") for ponds. Stream summary forms were completed for each stream along the pipeline and TARs.

During field surveys, 228 waterbody crossing were identified within the OPEN Project area. The OPEN Project pipeline facilities will cross 217 waterbodies. Of the 217 crossed waterbodies, one pond and 216 streams were identified. Seventy-three perennial streams were identified and the remaining 143 stream crossings consist of small, interstitial, intermittent or ephemeral stream flow types. Eleven waterbodies will be temporarily crossed by the proposed access roads; nine of these are perennial streams and two are ephemeral streams. The waterbodies located within the Project area are listed in Table 3-2 in Appendix 3. This table includes: waterbody ID, waterbody name, MP, flow type, length of stream, approximate stream width, state water quality classifications, HHEI scores Class or QHEI score, and latitude and longitude of the stream.

No waterbodies were identified along the Project aboveground facilities including the Colerain Compressor Station, PARs, or the Project pipe and wareyards.

TABLE 3.4-1

HUC 10 and 12 Watersheds Crossed by the OPEN Project

Enter MP	Exit MP	Crossing Length (Miles)	HUC 10 Watershed Name and Code	HUC 12 Watershed Name and Code	Public Drinking Water Supply Watershed
Little Beaver Creek Drainage Basin					
0.00	5.51	5.51	West Fork Little Beaver Creek 503010105	Brush Creek 50301010503	No
Central Ohio Tributaries Drainage Basin					
5.51	9.02	3.51	North Fork Yellow Creek-Yellow Creek 503010108	Headwaters North Fork Yellow Creek 50301010802	Yes
9.02	14.38	5.36		Salt Run-North Fork Yellow Creek 50301010803	No
14.38	17.76	3.38		Hollow Rock Run-Yellow Creek 50301010804	No
17.76	22.96	5.20	Headwaters Yellow Creek 503010107	Long Run-Yellow Creek 50301010704	No
22.96	26.16	3.20	North Fork Yellow Creek-Yellow Creek 503010108	Town Fork 50301010801	No
26.16	26.92	0.76	Salem Creek-Cross Creek 503010110	Lower Cross Creek 50301011005	No
26.92	31.56	4.64		Salem Creek 50301011002	No
31.56	35.70	4.14		Middle Cross Creek 50301011003	No
35.70	36.25	0.55		McIntyre Creek 50301011004	No
36.25	41.52	5.27	Piney Fork-Short Creek 503010602	Piney Fork 50301060204	No
41.52	46.99	5.47		Perrin Run-Short Creek 50301060205	No
46.99	51.03	4.05		Little Short Creek 50301060206	No
51.03	56.23	5.19	Crabapple Creek-Wheeling Creek 503010603	Flat Run-Wheeling Creek 50301060304	No
56.23	58.61	2.39	McMahon Creek 503010607	Little McMahon Creek 50301060703	Yes
58.61	62.27	3.66		Lower McMahon Creek 50301060704	No
62.27	64.42	2.15	Short Creek-Ohio River 503010612	Wegee Creek-Ohio River 50301061206	No
64.42	67.67	3.25		Pipe Creek-Ohio River 50301061207	No
67.67	71.34	3.67	Captina Creek 503010609	Pea Vine Creek-Captina Creek 50301060905	No
71.34	73.31	1.97		Cat Run-Captina Creek 50301060906	No
73.31	75.43	2.12	Short Creek-Ohio River 503010612	Big Run-Ohio River 50301061208	No
75.43	75.80	0.37	French Creek-Ohio River 503020110	Stillhouse Run-Ohio River 50302011001	No

3.4.1 Fisheries Habitat

Fisheries resources consist of warmwater fisheries in this part of Ohio and no essential fish habitat occurs in the Project area. The waters crossed by the OPEN Project area include waterbodies classified under the State of Ohio Water Use Quality Designations for Aquatic Life Habitat as WWH (warmwater habitat), EWH (exceptional warmwater habitat), LWH (limited warmwater habitat), and LRW (limited resource waters) (OEPA 2012).

3.4.2 Nationwide River Inventory

None of the waterbodies crossed by the Project are listed under the he National Wild and Scenic Rivers Act (16 United States Code 1271-1287). The National Park Service maintains a Nationwide River Inventory ("NRI") lists river segments that potentially qualify as national wild, scenic or recreational river areas. In addition, the National Wild and Scenic River System recognize certain rivers and outstanding natural, cultural, and recreational areas (NWSRS, 2013). Although the Project is located within the Little Beaver Creek watershed area, Little Beaver Creek is not crossed by the Project.

3.5 Public Drinking Water Watersheds, Intakes, and Protection Areas

This section describes the public drinking water watersheds, reservoirs, surface water intakes, well, and surface water and groundwater protection areas in the vicinity of the proposed OPEN Project. Table 3.4-1 above and Figure 3.4-1 located in Appendix 1, indicate these PWDS watersheds. Figure 3.5-1 also located in Appendix 1, depicts the available OEPA GIS data of surface intakes and groundwater supply wells and their associated protection areas in the vicinity of the Project.

Safe Drinking Water Act ("SDWA") defines public water systems (groundwater and surface water) as having at least 15 service connections or regularly serves at least 25 individuals. There are three types of public water systems in Ohio: 1) community water systems serve at least 15 service connections used by year-round residents or regularly serve at least 25 year-round residents; 2) nontransient noncommunity systems serve at least 25 of the same persons over six months per year; and 3) transient noncommunity systems serve at least 25 different persons over 60 days per year.

Under the Section 1986 amendment to the SDWA, each state is required to develop and implement an aquifer assessment and protection program in order to identify an aquifer's recharge areas contributing to public supply wells, and prevent the contamination of drinking water supplies. The SDWA was updated in 1996 with an amendment requiring the development of a broader-based Source Water Assessment Program. Pursuant to Section 1453 of the SWDA of 1996, OEPA's Division of Drinking and Ground Water ("DDAGW") mandates public groundwater and surface water supply systems to establish a source water assessment and protection program. The assessment and protection program is designed to minimize potential contamination and maintain groundwater quality. These protection areas may vary in size depending upon a particular water supply's recharge areas.

Ohio's public drinking water resources include: public water supply watersheds or aquifers, reservoirs, surface water intakes, groundwater supply wells, and associated surface water groundwater and protection areas. Based on available OEPA GIS and mapping, the Open Project facilities do not cross any designated public aquifers, reservoirs, surface water intakes, wells or associated groundwater protection areas for public supply wells, but does cross two HUC 12 watershed designated as public drinking water supplies ("PDWS"), and one surface water protection area.

The PDWS watersheds crossed by the Project are associated with the Headwaters North Fork Yellow Creek (code 50301010802) and Little McMahon Creek (code 50301060703) watersheds. Respectively

located between mile post ("MP") 5.51-9.02 and MP 56.23-58.61. Based on the OEPA 2012 Integrated Water Quality report and USGS mapping the surface water intakes associated with these PDWS are located up gradient of the OPEN Project and greater than 2 miles away. Table 3.4-1 above and Figure 3.4-1 located in Appendix 1, indicate these PWDS watersheds.

The Project crosses approximately 16.58 miles of segmented portions of the Toronto and Steubenville municipal surface water protection area. This surface water protection area is made up of a complex of surface waterbodies located between MP 9.58 and 26.16. None of the aboveground facilities are located within a surface water protection area. The Brush Creek Township Receipt Meter Station is located between MP 13.13 and 13.24, but outside of the identified Toronto and Steubenville municipal surface water protection area boundary (see Figure 3.5-1 in Appendix 1 for a depiction of this surface water protection area.).

The proposed Project construction activities are temporary in nature, and Texas Eastern will implement its E&SCP to minimize temporary impacts to wetland and waterbodies as well as the associated upland areas during construction. As a result, Texas Eastern does not anticipate any impacts to public groundwater or surface water resources. See section 4.0 for further discussion regarding Project restoration procedures and operation and maintenance procedures.

3.6 Endangered, Threatened, and Special Concern Species and Fisheries of Special Concern

The Endangered Species Act ("ESA") of 1973 (16 United States Code A-1535-1543, P.L. 93-205) states that threatened and endangered ("T&E") plant and animal species are of aesthetic, ecological, educational, historic, and scientific value to the United States and protection of these species and their habitats is required. The ESA protects fish, wildlife, plants, and invertebrates that are federally listed as T&E. A federally listed endangered species is one that is in danger of extinction throughout all or a significant portion of its range. A federally listed threatened species is likely to become endangered in the foreseeable future throughout all or a significant portion of its range. The United States Fish and Wild Service ("USFWS"), which is responsible for terrestrial and freshwater species, administers the law.

Protection is also afforded under the ESA to "critical habitat," which the USFWS defines as specific areas both within and outside the geographic area occupied by a species on which are found those physical and biological features essential to its conservation. In addition to federal law, Ohio has passed laws to protect state endangered and threatened species (Ohio Endangered Species Act, OH ST § 1518.01 - 1518.99; 1531.25, 1531.99).

Texas Eastern consulted with federal and state resource agencies to determine if any federally listed or state listed endangered or threatened species (including federal and state species of special concern) or their designated critical habitats occur within the OPEN Project area. Agencies contacted by Texas Eastern include the Ohio Department of Natural Resources ("ODNR") and the Midwest Region 3, Columbus, Ohio Office of the USFWS. Copies of all relevant agency correspondence, including consultation letters, electronic mail, and meeting notes are included in Appendix 4.

Based on information received as part of the agency consultation process in 2012 and 2013, a number of federally listed endangered, threatened or federal candidate species and state-listed species were identified by the agencies as potentially occurring in the vicinity of the OPEN Project. Table 2.6-1 provides a list of these species and their status relative to the OPEN Project.

TABLE 3.6-1

Federal and State listed Species Potentially Found in Project Area

Common Name	Binomial Nomenclature	Federal Status	State Status	Project Occurrence/Status
Plants				
Carolina catchfly	*Silene caroliniana* ssp. *pensylvanica*	n/a	Threatened	Known occurrences in vicinity of project, Columbiana and Jefferson Counties, but no records at the Project site.
Shale Barren Pussytoes	*Antennaria virginica*	n/a	Threatened	Known occurrences in vicinity of project in Columbiana and Jefferson Counties, but no records at the Project site.
Bowman's Root	*Porteranthus trifoliatus*	n/a	Threatened	Known occurrences in vicinity of project in Columbiana and Jefferson Counties, but no records at the Project site.
Pipsissewa	*Chimaphila umbellata*	n/a	Threatened	Known occurrences in vicinity of project in Columbiana and Jefferson Counties, but no records at the Project site.
Mussels				
Snuffbox	*Epioblasma triqueta*	Endangered	Endangered	The USFWS states impacts are not anticipated to this species.
Sheepnose	*Plethobasus cyphus*	Endangered	Endangered	The USFWS states impacts are not anticipated to this species.
Wavy-rayed Lampmussel	*Lampsilis fasciola*	n/a	Special Concern	ODNR data indicates occurrence in Captina Creek; Surveys will be performed prior to construction and mussels will be relocated if found in accordance with ODNR protocol.
Amphibians				
Eastern Hellbender	*Cryptobranchus a. alleganiensis*	Candidate	Endangered	Known occurrences in Yellow Creek; Cross Creek, Captina Creek; Pre-construction surveys will be conducted; consultation with the USFWS and the ODNR ongoing.
Reptiles				
Eastern Massasauga	*Sistrurus catenatus*	Candidate	Endangered	The ODNR states lack of records and habitat affected indicate no impact to this species.
Birds				
American Bittern	*Botaurus lentiginosus*	n/a	Endangered	The ODNR states that due to project location and type of habitat, project is not likely to impact species.
Loggerhead Shrike	*Lanius ludovicianus*	n/a	Endangered	The ODNR latest comments do not include this species.
Golden Winged Warbler	*Vermivora chrysoptera*	n/a	Extirpated	Formerly state-listed endangered. The ODNR has indicated this species is now formally considered extirpated.
Mammals				
Indiana Bat	*Myotis sodalis*	Endangered	n/a	The USFWS states that surveys demonstrate probable absence of species.
Northern Long-eared Bat	*Myotis septentrionalis*	Proposed Endangered	n/a	Netting surveys indicate that this species is common; seasonal clearing restrictions recommended by the USFWS; consultation with the USFWS ongoing.
Black Bear	*Ursus americanus*	n/a	Endangered	The ODNR states the project is unlikely to affect this species

3.6.1 Protected Plant Species

3.6.1.1 Federally Listed Plant Species

No federally-listed plant species were identified along the OPEN Project route.

3.6.1.2 State-listed Plant Species

Several state-listed plant species were identified in the area of the OPEN Project route in the latest comments from the ODNR, dated October 11, 2013. The species include shale barren pussytoes (*Antennaria virginica*), Carolina catchfly (*Silene caroliniana*), Bowman's root (*Porteranthus trifoliata*), and pipsissewa (*Chimaphila umbellata*). These species are found in Columbiana and Jefferson Counties. However, there are no records of these species being impacted by the Project route or associated facilities.

3.6.2 Protected Wildlife Species

3.6.2.1 Indiana Bat

The Indiana bat (*Myotis sodalis*) was identified by the USFWS and the ODNR as a species that may occur in the vicinity of the OPEN Project route. This species occupies a range that extends from New England to the mid-west and south to the southern Appalachians. Since the species was first listed as endangered under the ESA in 1967, their populations have declined by nearly 60 percent. Habitat loss (hibernacula, forested habitat, and large, mature trees), disturbance during hibernation, white-nose syndrome ("WNS"), and pesticides have been contributing factors to this decline. Their winter habitat includes caves and abandoned mines which are used for hibernation. During the summer the species is found in forested areas where they use dead, dying, or live trees that have peeling or exfoliating bark, split tree trunks, or cavities for roosting. They forage along stream corridors, in riparian areas, and in upland forest (USFWS, 2013a).

3.6.2.2 Northern Long-eared Bat

Northern long-eared bats (*Myotis septentrionalis*) are known to occur in the area of the proposed OPEN Project route due to captures made during Indiana bat surveys, however they were not identified as a species of concern by either the ODNR or the USFWS until October 2013. This species has a range that encompasses much of eastern North America (USFWS, 2014). Historically, the northern long-eared bat was considered common to uncommon throughout much of its range; however, due to WNS, it has experienced significant population declines, particularly in the Northeast. As of January 2014, it has been estimated that this species has declined by 99 percent in the Northeast as a result of WNS (USFWS, 2014). The current degree of mortality in the Midwest and Southeast are yet undetermined. While the speed and degree of future distribution of WNS is yet unknown, WNS is expected to continue to spread throughout this species range (USFWS, 2014).

The northern long-eared bat was not initially identified by the USFWS or the ODNR as rare or a species of concern during consultation in 2012 and 2013; however, due to rapid and profound declines in the Northeast due to WNS, the species was proposed for listing as endangered by the USFWS in October 2013 (Federal Register Vol. 78, No. 191 Wednesday, October 2, 2013 Proposed Rules - http://www.gpo.gov/fdsys/pkg/FR-2013-10-02/pdf/FR-2013-10-02.pdf - page 61046).

Suitable winter hibernacula for this species includes underground caves and cave-like structures (such as mines or railroad tunnels), typically with large passages and significant cracks and crevices for roosting.

Required conditions include generally constant, cool temperatures (0-9 degrees Celsius) with high humidity and minimal air currents (USFWS, 2014).

Summer roosting habitat is associated with both live and dead trees, where bats will roost singularly or in colonies under bark, or within cavities and crevices. Males and non-reproductive females may roost in the cooler refuge of caves and mines during summer. Northern long-eared bats are known to occasionally, but rarely roost in man-made structures such as barns, sheds and bat-boxes (USFWS, 2014).

In Ohio, northern long-eared bats typically occupy their summer habitat from early April through mid-September each year. They typically occupy their spring staging/fall swarming habitat from mid-March to mid-May and mid-August to mid-November, respectively. Northern long-eared bats in Ohio typically hibernate between November 15 and March 15 each year however, these bats may be present in hibernacula during the hibernation season (USFWS, 2014). During surveys for Indiana bats during the summer of 2013, northern long-eared bats were captured in numerous locations along the entirety of the OPEN Project. Several potential portals/hibernacula were also observed in close proximity to the OPEN Project corridor.

3.6.2.3 Eastern Hellbender

The eastern hellbender (*Cryptobranchus a. alleganiensis*), a listed state-endangered and federal candidate species, is found in the vicinity of the OPEN Project route. It is a large aquatic salamander found in perennial streams that have large flat rock substrate for cover.

The eastern hellbender's North American range extends from southwestern and southcentral New York, west to southern Illinois, and south to extreme northeastern Mississippi and the northern parts of Alabama and Georgia. In Ohio, hellbenders are found mostly in unglaciated (south and east) portions of the state (ODNR, 2013d). The eastern hellbender has recently undergone significant population declines in the Ohio River watershed in Ohio. Threats to the hellbender include sedimentation and alteration of stream flow regimes.

Peak breeding for this species in Ohio occurs in late August or September. Females lay eggs in a nest under a large flat rock; sometimes several females use the same nest. Young hellbenders hatch in two to three months (ODNR, 2013d).

In fall 2013, habitat assessments for Eastern hellbenders were completed at three stream crossing, as identified by the USFWS and the ODNR; these are Captina Creek (Belmont County), Cross Creek (Jefferson County), and Yellow Creek (also in Jefferson County). All of these streams are characterized as high quality watersheds in the state of Ohio based on data collected by the OEPA. Eastern hellbender has known occurrence in all three streams. Surveys by Lipps and Pfingsten (2010) described Captina and Cross creeks as the only two streams in Ohio where recent successful reproduction has been documented. During habitat assessments in 2013, suitable hellbender habitat was identified in specific locations within all three creeks.

3.6.2.4 Loggerhead Shrike

The Loggerhead Shrike (*Lanius ludovicianus*) is included in Ohio's endangered species list according to the ODNR. This species is found only in North America in open grasslands, scrub-steppe areas, utility ROWs, riparian areas and old railroad rack corridors. These habitats provide protection (trees and tall shrubs) but also provide vantage points to hunt prey (posts and dead trees). Since the species demands large territories, they are rarely seen in large groups but rather observed individually scanning their territory. The breeding season is between April and August, sometimes with a single female laying two

clutches a breeding season or trying a second time if the initial clutch fails. A few major threats exist to the livelihood of this species including habitat interferences, urbanization and the destruction of migratory stopover sites (Dechant, et al., 1998). In the eastern counties of Ohio the Loggerhead Shrike is almost never seen. This species is seen more often (although, still rarely) in the western and northwestern counties. Though initially identified as potentially occurring in the OPEN Project area, subsequent consultation with the ODNR has not included this species.

3.6.2.5 Golden Winged Warbler

According to the ODNR, the Golden Winged Warbler (*Vermivora chrysoptera*) was a state-listed endangered species during initial consultation. During the spring of 2013, the ODNR changed the status of this species to extirpated in Ohio, and therefore it is not a concern for this Project. This species winters in the southeastern United States as well as Mexico and spends the summer months in southwestern Canada. It was considered rare to see the Golden Winged Warbler in the Ohio region at any time, predominantly due to the lack of supportive habitat. The decline of the Golden Winged Warbler is in association with the maturation of early successional fields and the destruction of wetlands, and this will continue to be the largest threat to the survival of the species. This warbler species can survive in upland or wetland habitats, specifically thriving in areas with sparse trees and shrubs with an understory consisting of grasses and forbs. The breeding season is underway by the third week of May and lasts through July, with males arriving prior to the females in order to claim their territory where the female will choose the nest location (generally along the edge of forest or a field) (Golden-winged Warbler Working Group, 2012; National Audubon Society, 2013).

3.6.2.6 American Bittern

In Ohio, the American Bittern (*Botaurus lentiginosus*) is considered an endangered species due to loss of wetland habitats, according to the ODNR. The American Bittern is not commonly spotted because of excellent camouflage but has been confirmed in the following Ohio counties; Lucas, Ottawa, Sandusky, Summit, Portage, Trumbull, Mahoning, Vinton, and Seneca. These counties are not crossed by the OPEN Project. Though initially identified as potentially occurring in the OPEN Project area, subsequent consultation with the ODNR has not included this species.

Although this species can live in bogs, wet meadows or shrubby swamps, the American Bittern prefers large scale (>20 acres), undisturbed, freshwater wetlands for their habitat that can be used both for feeding and breeding (Gibbs and Melvin, 1992). Ohio is considered a migratory breeding zone for the American Bittern; they are not year-round residents. The months of May and June are peak breeding activity in Ohio for this species. By the end of July, it is common to see fledged young. The largest threat of survival for this species is the loss of wetland habitat depended upon for breeding, followed closely by the threat of invasive species infringing on current wetlands (ODNR, 2013a).

3.6.2.7 Mussels

The OPEN Project is located within the range of two federal and state-listed mussels: the sheepnose (*Plethobasus cyphus*) and the snuffbox (*Epioblasma triquetra*).

The snuffbox is a small, triangular freshwater mussel that is found in Alabama, Arkansas, Illinois, Indiana, Kentucky, Michigan, Minnesota, Missouri, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and Wisconsin. It typically lives in small to medium-sized creeks in areas with a swift current; however, it can also be also found in Lake Erie and some larger rivers. The population of the snuffbox mussel, in terms of range and numbers, appears to have declined by at least 90 percent (USFWS, 2013b).

The sheepnose is a medium-sized freshwater mussel found across the Midwest and Southeast. It is found in larger rivers and streams where it inhabits shallow water with moderate to swift current. Favored substrates are coarse sand and gravel. This species has been eliminated from two-thirds of the total number of streams from which it was historically known. Today, the sheepnose is found in Alabama, Illinois, Indiana, Iowa, Kentucky, Minnesota, Mississippi, Missouri, Ohio, Pennsylvania, Tennessee, Virginia, West Virginia, and Wisconsin (USFWS, 2013b).

In 2013, freshwater mussel habitat assessments were completed at seven identified stream features along the Project route, including North Fork Yellow Creek, Salem Creek, Piney Fork, Wheeling Creek, Little McMahon Creek, McMahon Creek, and Cat Run. These assessments evaluated each water feature's potential to support native freshwater mussels. No live or dead snuffbox or sheepnose mussels were encountered at any of the sites evaluated. Furthermore, all areas assessed were described as containing "moderate" habitat and were determined not to contain suitable mussel habitat. Additional habitat surveys will be conducted in 2014 at Brush Creek and Short Creek, both located in Jefferson County. Occupancy surveys will also be performed at the four Group 1 streams (i.e. streams that are known to contain native unionid mussels, but where federally endangered/listed species are not expected to be present), as designated by the Ohio Mussel Survey Protocol (ODNR, 2013c). Streams included within the 2013 and 2014 survey efforts are listed in Table 3.7-2

TABLE 3.7-2

Potential Mussel Streams Crossed by the OPEN Project

County	Stream Name	Survey Type
Columbiana	Brush Creek	Group 1 Survey / Relocation
Columbiana	North Fork Yellow Creek	Habitat
Jefferson	Brush Creek	Habitat
Jefferson	Yellow Creek	Group 1 Survey / Relocation
Jefferson	Salem Creek	Habitat
Jefferson	Cross Creek	Group 1 Survey / Relocation
Jefferson	Piney Creek	Habitat
Jefferson	Short Creek	Habitat
Belmont	Wheeling Creek	Habitat
Belmont	Little McMahon Creek	Habitat
Belmont	Captina Creek	Group 1 Survey / Relocation
Belmont	Cat Run	Habitat

4.0 CONSTRUCTION IMPACTS AND MITIGATION

Section 4 identifies temporary impacts to those wetlands and waterbodies affected by the OPEN Project. It also describes wetland and waterbody restoration procedures and operation and maintenance procedures for wetland areas traversed by the proposed Project.

4.1 Wetland Impacts

This section identifies the wetlands present and the wetland construction procedures, impacts, and mitigation measures that will be implemented for the OPEN Project. Impact calculations (acres) for the wetlands that will be affected by construction and operation of the proposed facilities are also presented. Construction across wetlands will be performed in accordance with the FERC Procedures and the OPEN Project E&SCP (see OPEN Project E&SCP in Appendix 2).

Construction of the OPEN Project pipeline facilities will result in temporary impacts to 9.95 acres of wetlands. Construction of the proposed pipeline will result in temporary impacts to 8.29 acres of emergent, scrub-shrub, and unconsolidated bottom wetlands and temporary impacts to 1.66 acres of forested wetlands. Approximately 1.07 acres of previously forested wetland will be permanently converted to non-forested cover types and maintained by means of mechanical cutting and mowing as part of pipeline operation. The remaining 0.59 acres of forested wetland will be allowed to revert to a forested state following construction and restoration of the ROW. There are no wetlands impacted by the OPEN Project aboveground facilities.

A total of 11 wetlands will be crossed by the proposed temporary access roads for the OPEN Project. Temporary access road construction and use will result in a total of 0.32 acres of temporary wetland impacts. There are no forested wetland impacts associated with the Project's proposed access roads.

Each wetland crossed by the Project were also delineated, assessed, and scored in accordance with OEPA's ORAM. The Project wetlands were scored as category 1 and 2 wetlands. There were no category 3 wetlands crossed by the Project. See Table 3-1 in Appendix 3 for each Project wetland ORAM score and associated category.

A complete list of wetland crossings, including crossing length and total impact to each wetland, is provided in Table 3-1 in Appendix 3. Table 4.1-1 presents a summary of the Project's total wetland impacts including: total length, total wetland areas affected, total forested wetland areas affect, and wetland area affected by O&M, and forested wetland area affected by O&M.

TABLE 4.1-1 Summary of Wetlands Affected by Construction and Operation of the OPEN Project					
Facility, County	**Total Crossing Length (feet)**	**Total Wetland Area Affected (acres)**	**Total Forested Wetland Area Affected (acres)**	**Wetland Area Affected by Periodic O&M (acres)**	**Forested Wetland Area Affected by Periodic O&M (acres)**
Pipeline Facilities					
Pipeline Subtotal	14,616	9.95	1.66	6.14	1.07
Aboveground Facilities					
Aboveground Facilities Subtotal	0.00	0.00	0.00	0.00	0.00
Temporary Access Road					
Access Road Subtotal	708	0.32	0.00	0.00	0.00
Project Totals	**15,324**	**10.27**	**1.66**	**6.14**	**1.07**

Some temporary wetland impacts associated with construction of the OPEN Project facilities will involve the temporary removal of wetland vegetation, disturbance of wetland soils and substrates, and, in some cases, changes in wetland hydrology. There will be some changes in current wetland functions and values due to the disturbance associated with construction. However, it is important to note that following construction and restoration the affected wetlands will continue to provide numerous ecological functions such as: sediment/toxicant retention; nutrient removal/transformation; flood attenuation; groundwater recharge/discharge; and wildlife habitat. These changes may require additional mitigation to ensure reestablishment and growth of the wetland plant communities.

Construction of the pipeline is not expected to adversely affect the distribution or regional abundance of wildlife species due to the distribution and availability of similar habitat types in the immediate Project area. Construction of the Project within wetland habitats may temporarily affect the wildlife utilizing the immediate impacted area. The alteration and conversion of habitat could displace some species that selectively prefer forested wetland habitats. Although the wetlands along the OPEN Project will be temporarily disturbed, and there will be some conversion of forested wetland to a scrub-shrub and emergent wetland mix, the restoration of topsoil, contours and hydrologic patterns will allow these wetlands to reestablish and continue to provide important food, shelter, migratory or overwintering areas, and breeding areas for wildlife.

4.2 Waterbody Impacts

This section summarizes the temporary waterbody impacts, construction procedures, and mitigation measures that will be implemented for the OPEN Project. All waterbodies crossed by the Project are shown on Table 3-2 of Appendix 3. As described in Section 3.3 none of the waterbodies crossed by the Project have essential fish habitat and none are listed under the National Wild and Scenic Rivers Act.

Waterbody resources including rivers, streams, smaller tributaries, and ponds located were identified during the field surveys along the Project pipeline facilities and access roads. A total of 228 waterbodies were identified along the Project, 217 are located along the pipeline facilities and 11 along temporary access roads. Of the 217 waterbodies crossed by pipeline facilities, one pond and 216 streams were identified. Seventy-three streams were perennial waterbodies and the remaining 143 stream crossings

consist of small, interstitial, intermittent or ephemeral stream flow types. This will result in 19,143 linear feet of temporary impacts to the Project waterbodies.

Of the total 217 waterbodies located in the pipeline workspace 179 waterbodies will be crossed by the pipe and will require excavation. This will result in a total of 1,930 linear feet of stream width excavation for the Project pipeline installation. The remaining 38 waterbodies located within the Project pipeline facilities will not require excavation and will either be avoided during construction or will be crossed using equipment bridges. The 11 streams along the Project TARs will be crossed using equipment bridges resulting in 275 linear feet of temporary impacts. There are no waterbodies affected by PARs, aboveground facilities, staging areas, and pipe and ware yards.

Pipeline construction across streams or adjacent to surface waters can result in temporary and long-term adverse environmental impacts if not properly completed. However, proper construction techniques and timing can ensure that any such impacts are both temporary and minor. The primary impact associated with in-stream trenching is a temporary increase in turbidity and the resulting sedimentation that may occur downstream. Surface runoff and erosion from the cleared ROW can also increase in-stream sedimentation during construction. Other potentially deleterious impacts include accidental hazardous material spills resulting from refueling/maintaining construction equipment, fuel storage, or equipment failure in or near a waterbody, and could have immediate effects on aquatic resources and contaminate the waterbody downstream of the release point.

Long-term impacts on water quality can result from alteration of stream banks and removal of riparian vegetation. If not stabilized and revegetated properly, soil erosion associated with surface runoff and stream bank sloughing can result in the deposition of large quantities of sediment into the waterbody. Prolonged periods of exposure to high levels of suspended solids have been linked to fish egg and fry mortality and degradation of spawning habitat from the infiltration of sediments within the interstitial spaces of streambed gravel. The removal of riparian vegetation tends to increase light penetration into the waterbody, possibly increasing water temperature.

Of the 179 stream crossed by the pipeline, 135 waterbodies (approximately 80 percent) are considered minor streams (10 feet or less in width), 43 being intermediate stream (10 to 100 feet in width), and one is considered major (greater than 100 feet). It is likely that many or most of these minor waterbodies will be dry (depending on season) and will not be supporting aquatic habitats at the time of construction. For sites with flowing water, temporary construction-related impacts include increased levels of turbidity and sedimentation associated with installation and removal of the flume or the dam and pump structures as well as the initial flush of stream water across the restored stream bed.

Minor long-term impacts associated with pipeline operations and maintenance will largely be restricted to periodic clearing of vegetation within the permanent ROW at waterbody crossings. These maintenance activities will be consistent with the FERC Procedures, which have been fully integrated into the OPEN Project E&SCP.

4.3 Proposed Wetland and Waterbody Crossing Avoidance, Minimization and Mitigation Measures

4.3.1 Environmental Training

For all aspects of the OPEN Project construction general procedures, proper environmental training and inspection are important aspects for minimizing and mitigating temporary wetland impacts. Environmental training will be given to both Texas Eastern and contractor personnel whose activities will impact the environment during construction. The level of training will be commensurate with the type of

duties of the personnel. All construction personnel from the Chief Inspector, Environmental Inspector, craft inspectors, contractor job superintendent to loggers, welders, equipment operators, and laborers will be given some form of environmental training.

The training will be given prior to the start of construction and throughout the construction process, as needed when new construction personnel are first on site or if erosion and sedimentation control measures are not being properly installed and maintained. The training program will cover the erosion and sediment control measures included within this Section, FERC's Plan and Procedures, job specific permit conditions, Texas Eastern' policies, cultural resource procedures, threatened and endangered species restrictions, the SPCC Plan, and any other pertinent information related to the job. In addition to the Environmental Inspector, all other construction personnel are expected to play an important role in maintaining strict compliance with all permit conditions to protect the environment during construction.

4.3.2 Supervision and Inspection

To effectively mitigate construction impacts, the erosion control plan must be properly implemented. An Environmental Inspector will be employed by Texas Eastern to supervise the environmental aspects of construction activities and will report directly to Texas Eastern' Chief Inspector. Environmental Inspectors shall have the authority to stop activities that violate the environmental conditions of the FERC certificate, or other permits and authorizations, and to order corrective action. The Environmental Inspector will have construction inspection experience and/or training, be experienced in erosion control techniques and have an understanding of the wetland and waterbody resources required to be protected.

Responsibilities of the Environmental Inspector include working with the contractors and company to ensure project compliance with the erosion control measures described in this Section, measures contained within the FERC certificate, and other applicable environmental permits, conditions, approvals, and any environmental requirements stipulated in landowner easement agreements. Specific duties include: verifying all authorized construction work areas are marked before clearing, supervising the proper installation and maintenance of erosion control devices, ensuring the repair of all ineffective temporary erosion control measures within 24 hours of identification, working with the contractors and Texas Eastern to ensure compliance with environmental permit conditions, supervision of dewatering activities, documentation of temporary and permanent revegetation programs, ensuring restoration of contours and topsoil, coordination with environmental regulatory agencies, ensuring the contractor's appropriate implementation of the SPCC Plan, inspecting contractor activities to ensure implementation and function of stormwater control measures, determining corrective action and implementation of additional measures deemed necessary based on field or weather conditions and identifying areas that should be given special attention to ensure stabilization and restoration following construction. Field decisions may often be required regarding timing of the placement of erosion controls, dewatering, revegetation and other construction related items.

The Environmental Inspector will meet with the Chief Inspector and the contractor to review the sequence of construction and the placement of erosion control measures to be employed. The Environmental Inspector will conduct detailed inspections of erosion controls at least once a week during active construction and restoration, and following major storm events generating greater than 0.5 inch of rainfall within a 24-hour period. Following completion of final restoration, inspections will occur once per month until the site is considered to be stabilized and any remaining temporary erosion controls are removed. The Environmental Inspector will keep records of any non-compliance with environmental permit conditions and the mitigation measures proposed by Texas Eastern in its applications submitted to the FERC and other federal and state environmental permitting agencies. The Environmental Inspector will also participate in periodic coordination meetings with the Chief Inspector and contractor personnel

during construction and will advise the Chief Inspector when conditions make it advisable to restrict construction activities to avoid and minimize excessive soil rutting.

Texas Eastern will require the on-site contractor(s) to identify a qualified individual to perform the daily inspections of erosion control measures and site conditions during active construction. The contractor's environmental inspector will immediately report any areas of non-compliance or other concerns to the Texas Eastern Chief Inspector and Environmental Inspector.

4.3.3 Avoidance, Minimization and Mitigation Procedures

Wetland and waterbody mitigation and restoration procedures include a number of construction measures that minimize the overall impact area, contain sediment to the construction site, limit potential erosion problems and facilitate the effective restoration of wetland areas temporarily impacted. Texas Eastern will implement these measures along the OPEN Project Facilities.

Construction and mitigation activities in wetlands and waterbodies will be conducted in accordance with the procedures and Best Management Practices ("BMPs") in the OPEN Project E&SCP and the conditions of related permits. The OPEN Project E&SCP was developed using the FERC Plan and the FERC Procedures and Texas Eastern's significant experience and practical knowledge of pipeline construction and effective environmental protection measures. Recommended practices include, wherever practical:

- A 50-foot setback for ATWS for wetlands and waterbodies not located in active agricultural land or other disturbed land;
- Minimization of riparian clearing to the extent practicable while ensuring safe construction conditions;
- Implementation of erosion and sedimentation control and restoration measures as outlined in the OPEN Project E&SCP;
- Expedited construction in and around wetlands and waterbodies;
- Confinement of stump removal to the trench-line to minimize soil disturbance (unless safety or access considerations require stump removal elsewhere);
- Return of wetland substrates and drainage patterns to their original configurations and contours to the extent practicable;
- Permanent stabilization of upland areas near wetlands and waterbodies as soon as practicable after trench backfilling to reduce sediment run off;
- Segregation of topsoil in unsaturated wetlands to preserve the native seed source (which will facilitate re-growth of herbaceous vegetation once pipeline installation is complete);
- Utilization of appropriate seed mixes for revegetation and stabilization;
- Periodic inspection of the construction corridor during and after construction;
- Post construction wetland and waterbody monitoring to evaluate the progress of revegetation; and
- Documentation of invasive species prior to construction and post-construction monitoring to compare pre- and post-construction occurrences.

In wetlands and on stream banks, vegetation will be cut just above ground level, leaving existing root systems intact. Stumps or root systems will be removed only over the trench line (minimum 10 feet) and where the Chief Inspector or Environmental Inspector determines that existing conditions present a safety hazard for construction. Treating stumps and root systems in this manner will help stabilize the soil and promote re-sprouting by some species.

Extra Temporary Workspace Requirements

To facilitate pipeline construction across waterbodies, ATWS, also commonly referred to as staging areas, will be needed adjacent to wetlands and waterbodies to assemble and fabricate the length of pipe necessary to complete the crossing and to stockpile excavated ditch spoil. These work areas are in addition to the normal construction ROW. ATWS which is outside the construction ROW (except actively cultivated or rotated cropland or other disturbed land) will be 50 feet from the edge of streams (and wetlands) as required by the FERC, unless a variance is obtained from the FERC. If site specific conditions such as slope, road crossing requirements, or other construction limitations do not permit the standard setbacks, these areas will be located at least 10 feet away from wetland boundaries or the top of stream banks.

Post-Construction Restoration Monitoring

As outlined in the OPEN Project E&SCP, Texas Eastern will monitor the general condition of the construction ROW and revegetation success in upland areas for a minimum of two growing seasons following construction, with monitoring of wetland revegetation success for a minimum of at least three years following construction. Annual monitoring and associated remedial maintenance of the ROW includes, but is not limited to:

- inspection and maintenance of permanent erosion controls;
- inspection and maintenance of temporary erosion and sedimentation controls that need to remain in place in areas that have not been stabilized;
- removal of those temporary measures once the vegetative cover requirements are achieved;
- removal of construction debris left behind during construction clean-up; and
- documentation of and continued efforts to control ATV damage.

In accordance with the OPEN Project E&SCP, Texas Eastern will conduct post-construction maintenance and monitoring of the ROW in affected wetlands to assess the success of restoration and revegetation. Monitoring efforts will include documenting occurrences of exotic invasive species to compare to pre-construction conditions. During field surveys, Texas Eastern documented the presences of purple loosestrife (*Lythrum sallicaria*), European milfoil (*Myriophyllum spicatum*), lesser naiad (*Najas minor*), reed canary grass (*Phalaris arundinacea*), phragmites (*Phargmites australis*), curly pondweed (*Potamogeton crispus*), lesser celandine (*Ramunculus ficaria*), European buckthorn (*Rhamnus frangula*), narrow-leaved cattail (*Typha angustifolia*), narrow-leaved cattail hybrid (*Typha xglauca*) during the 2012 and 2013 wetland surveys. These ten species are identified in OEPA ORAM as invasive or exotic and have the potential to degrade wetlands. As described above, Texas Eastern will monitor these documented occurrences during the post-construction wetland monitoring.

4.3.4 Mitigation Preservation Plan

In addition to restoring the Project wetlands and waterbodies to pre-existing conditions during construction, off-site mitigation is required to offset the wetland and waterbody temporary impacts. Texas Eastern has retained Ohio Wetland Foundation ("OWF") to identify a mitigation site and develop a plan for the preservation of 965 linear feet of stream and wetland mitigation through the restoration of 4.15 acres of forested wetlands and 4.305 acres of non-forested wetlands. See Table 4.3-1 and 4.3-2 for the proposed wetland and streams mitigation summary based on the OPEN Project temporary impacts.

TABLE 4.3-1 Wetland Mitigation for the OPEN Project Temporary Wetland Impacts		
Wetland Type	**Project Temporary Impact Areas (acres)**	**Off-site Wetland Mitigation Area** a/
Non forested (PEM/PSS)	8.61	4.305
Forested (PFO)	1.66	4.15
Subtotal	10.27	8.455
a/ For non-forested wetlands, mitigation is calculated as 0.5 x acre of impact. 1:1 mitigation will be accomplished on site by restoring the wetland, and 0.5 must be accomplished offsite. For forested wetlands, mitigation is calculated as 2.5 x acre of impact. The Forested wetland mitigation will be accomplished offsite.		

TABLE 4.3-2 Stream Mitigation for the OPEN Project Temporary Wetland Impacts	
Stream Impacts	**Off-site Stream Mitigation (linear feet)**a/
1,930	965
a/ Mitigation is calculated as 0.5 x linear feet of impact. 1:1 mitigation will be accomplished on site by restoring the stream, and 0.5 must be accomplished offsite.	

The OWF has developed the OPEN Project Wetland Mitigation and Monitoring Plan and Stream Preservation Plan ("OPEN Mitigation Plan") utilizing the Yankee Creek 3 site located in Hartford Township, Trumbull Country, Ohio. The Yankee Creek 3 is a pooled mitigation site and is located within an extensive system of high-quality wetland and uplands associated with the Yankee Creek riparian corridor and directly adjacent to other conservation easements forming a contiguous area of over 450 acres of permanently protected wetlands, streams, and endangered and threatened species habitat. The OPEN Project mitigation area will total 11.4 acres; 8.5 acres being previously restored wetland and 965 linear feet of stream preservation including 3.3 acres of associated riparian areas. The OPEN Mitigation Plan is located in Appendix 6 which includes site mapping.

4.4 Endangered Species Impacts and Mitigation

4.4.1 Federally Listed Plant Species

There are no known Federal-listed plant species in the proposed Project area.

4.4.2 State-listed Plant Species

State-listed plant species in the Project area were identified by the ODNR in the latest consultation letter, dated October 11, 2013. The species include shale barren pussytoes (*Antennaria virginica*), Carolina catchfly (*Silene caroliniana*), Bowman's root (*Porteranthus trifoliata*), and pipsissewa (*Chimaphila umbellata*). These species are found in Columbiana and Jefferson Counties. Additional consultation with the ODNR will be performed prior to construction to identify specific areas of concern.

4.4.3 Indiana Bat

As a result of consultation with the USFWS and the ODNR, Texas Eastern performed netting surveys for bats along the proposed pipeline corridor to determine the presence or likely absence of Indiana bat during the summer. These surveys followed the recommendations in the 2013 Indiana Bat Summer Survey Guidance Overview, which was issued by the USFWS on April 29, 2013. The ODNR requested that only netting survey be performed and the survey window be limited to between June 15 and July 31. The ODNR extended the survey window to August 15 due to unusually poor sampling conditions experienced state-wide during July. Surveys were conducted for a total of four net nights for every kilometer of proposed pipeline route within one kilometer of the proposed pipeline centerline. No Indiana bats were captured during these surveys. The Project therefore is not likely to adversely impact the Indiana bat summer habitat.

Texas Eastern also conducted portal searches for potential Indiana bat hibernacula along the majority of the pipeline route during the late fall of 2013. The first step was performing a desk-top review of aerial photography and mapping to identify mine entrances, air vents or other structures. This effort helped to target field survey. In the field, the surveys searched for signs of past mining efforts such as slope and unnatural topography, spoil, old roads, cuts, benches, exposed rock, and other physical or chemical alterations to the environment. All potential portals located were assessed for suitability as a hibernaculum, utilizing the USFWS "Draft Protocol for Assessing Abandoned Mines/Caves for Bat Use". Two areas with potentially suitable portals were identified during field surveys. Additional survey to gather data on bat use are proposed for March or April of 2014.

4.4.4 Northern Long-eared Bat

Netting surveys for Indiana bats have been performed relevant to the OPEN Project. During this effort to capture Indiana bats, northern long-eared bats were captured in numerous locations along the OPEN Project corridor. In addition, two potential hibernacula portal areas have been identified in the vicinity of the Project corridor. Additional surveys will be performed during April 2014 to assess bat use at these potential portals. These findings, coupled with the October 2013 proposal to list the northern long-eared bat as endangered under the ESA suggests that measures will need to be implemented to avoid adverse impacts to northern long-eared bat. Additional consultation with the USFWS under Section 7 of the ESA has confirmed this necessity.

On January 6, 2014, the USFWS released "Northern Long-Eared Bat Interim Conference and Planning Guidance" (USFWS 2014; "interim guidance"). This document provides potential conservation measures and current survey guidance protocols for the northern long-eared bat. According to guidance for delineating "known habitat", the following (as relevant to known information regarding this species within the OPEN Project area) is considered to be included in "known habitat" for the northern long-eared bat:

- Hibernacula: all suitable habitat located within 5 miles of a hibernaculum; and
- Mist-net capture(s): all suitable habitat within 3 miles of the location where a northern long-eared bat was captured within the standard summer survey window (May 15 to August 15) but no other information (e.g., radio telemetry) is available for the area.

Based on this guidance, most, if not all of the proposed Project area is encompassed within the suggested buffer areas associated with known capture locations and potential hibernacula sites. As such, suitable habitat within the entire Project area may be considered "known habitat" for northern long-eared bats. "Suitable habitat", as described in the interim guidance, consists of a variety of habitats where northern

long-eared bats roost, forage, travel, swarm and hibernate. Suitable habitat includes, but is not limited to the areas listed below (as described in USFWS, 2014).

Suitable Roost Trees

Suitable roosts for northern long-eared bats are defined as live, dying, dead, or snag trees with a diameter at breast height of three inches or greater that exhibits any of the following characteristics: exfoliating bark, crevices, cavity, or cracks. Isolated trees are considered suitable habitat when they exhibit the characteristics of a suitable roost tree and are less than 1,000 feet from the next nearest suitable roost tree within a woodlot, or wooded fencerow.

Summer Habitat

In Ohio, northern long-eared bats typically occupy their summer habitat from early April through mid-September each year, but exact dates may vary by location and the species may arrive or leave some time before or after this period.

Suitable summer habitat includes a wide variety of forested/wooded habitats where members of this species roost, forage, and travel. Specific areas include, or may include:

- forests and woodlots containing potential roosts;
- linear features such as fencerows, riparian forests, and other wooded corridors;
- some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures;
- wooded areas comprised of dense or loose aggregates of trees with variable amounts of canopy closure;
- individual trees that exhibit characteristics of suitable roost trees and are within 1,000 feet of other forested/wooded habitat; and
- human-made structures, such as buildings, barns, bridges, and bat houses.

Maternity Habitat

Maternity habitat for this species is defined as suitable summer habitat used by juveniles and reproductive (pregnant, lactating, or post-lactating) females. According to the interim guidance, northern long-eared bat home ranges (consisting of maternity, foraging, roosting, and commuting habitat) typically occur within three miles of a documented capture record, or within 1.5 miles of a known suitable roost tree.

Spring staging/Fall swarming Habitat

In Ohio, northern long-eared bats typically occupy their spring staging/fall swarming habitat from mid-March to mid-May and mid- August to mid-November, respectively. Suitable spring staging/fall swarming habitat for the northern long-eared bat consists of a variety of forested/wooded habitats where they roost, forage, and travel, which is most typically within five miles of a hibernaculum. This includes:

- forested patches as well as linear features such as fencerows, riparian forests and other wooded corridors;
- wooded areas comprised of dense or loose aggregates of trees with variable amounts of canopy closure; and
- isolated trees when they exhibit the characteristics of a suitable roost tree and are less than 1,000 feet from the next nearest suitable roost tree, woodlot, or wooded fencerow.

Winter Habitat

In Ohio, Northern long-eared bats typically hibernate between November 15 and March 15 each year (USFWS, 2014). These bats may be present in hibernacula during the hibernation season; they may also be present in larger numbers within a 5-mile radius of hibernacula during spring staging and fall swarming. Males and non-reproductive females may be close to hibernacula year-round.

Suitable winter habitat (hibernacula) for the northern long-eared bat includes underground caves and cave-like structures (e.g. abandoned or active mines, railroad tunnels). These hibernacula typically possess the following features: large passages; significant cracks and crevices for roosting; constant, cool temperatures (0-9 degrees Celsius); high humidity; and minimal air currents. The interim guidance notes, however, that there may be other landscape features being used by this species during the winter that have yet to be documented.

Due to the fact that suitable habitat exists within the Project area, some impacts to this species habitat may be expected. Short term impacts could include construction disturbance near areas of suitable habitat. These impacts will most likely affect summer habitat; however, winter and swarming habitat could be affected if hibernacula are identified within five miles of the Project area. Long-term impacts could include permanent loss of suitable habitat to the extent that it occurs in areas of the Project that will be permanently cleared.

USFWS's 2014 interim guidance for northern long-eared bats provides a list of recommended conservation measures for the northern long-eared bat. These conservation measures include, but are not limited to, avoidance, minimization, mitigation, and proactive measures. Specific conservation measures are presented for: hibernacula and 5-mile buffer; known or potential summer habitat; and migration periods.

4.4.5 Eastern Hellbender

Pursuant to requests by the USFWS and the ODNR, Texas Eastern performed surveys in 2013 to assess habitat availability for Eastern hellbenders in the vicinity of the proposed pipeline route. The agencies requested that surveys be performed by qualified herpetologists at three specific streams: Yellow Creek, Cross Creek, and Captina Creek. Suitable habitat for hellbenders was sought within specific areas of each stream where pipeline crossings are proposed to occur. The following paragraphs summarize findings and potential impacts for proposed primary and (where identified) alternative crossing locations for each creek. A discussion on avoidance, minimization and mitigation methods follows.

Yellow Creek

The substrate at the proposed crossing at Yellow Creek consists of moderate to heavily silt laden gravel and cobble with very few rocks present. This substrate does not constitute probable hellbender habitat. Just downstream of this location, however, there is a rock field containing suitable hellbender habitat.

In Yellow Creek, direct impacts to the hellbender are not anticipated. A rock field that may provide suitable habitat has been identified downstream of the crossing location, but it is outside of the construction workspace limits.

Cross Creek

The area of the proposed crossing at Cross Creek contains numerous large rocks that are suitable for use by hellbenders. The greatest density of large rocks (and suitable hellbender habitat) is located just downstream of the proposed crossing. The crossing at this location has the potential

to impact adult hellbenders living under the large rocks and/or larval and juvenile hellbenders in the cobble substrate.

Captina Creek
The substrate located at the proposed crossing of Captina Creek is predominantly gravel and cobble and does constitute potential hellbender habitat. A dam and pump dry crossing technique is proposed for this crossing. Depending on the exact location of the crossing, this technique has potential to impact adult hellbenders living under the large rocks and/or larval and juvenile hellbenders in the cobble substrate.

A dam and pump crossing will directly affect substrates at the crossing location. In locations where these crossings occur in areas of potential hellbender habitat, temporary direct impacts to the habitat can be expected. Any impacts to hellbender habitat as a result of these crossings will be temporary and short-term, as they will be limited to physical disturbance of substrates surrounding the period of construction. No long-term impacts are anticipated. At any crossing location where dam and pump methods are applied and where hellbender habitat exists, efforts to avoid, minimize and mitigate impacts will be executed.

Surveys for hellbenders will be conducted, as needed, in each relevant area prior to construction. Survey areas will be delineated based on clearly staked dam locations and all rocks with a length >20 inches will be removed and placed outside of the area to be disturbed. Removing individual rocks is not a standard practice, however, this method is recommended based on the site-specific habitat conditions and should be considered as a viable clearing technique upon gaining approval from the ODNR. It is expected that removing these rocks, which are synonymous with hellbender habitat requirements, will discourage hellbenders from occupying the area to be disturbed. Likewise, making these rocks available outside of the disturbance area is expected to encourage any hellbenders that may be present to gravitate to these available structures and out of the area of disturbance. Cobble areas will be seined to determine the presence or absence of larval and juvenile hellbenders. Any hellbenders captured will be moved outside of the construction area. Surveys will occur in May through September, during periods of low rainfall when water depth and clarity necessary for in-water work are optimal. Ideally, the surveys will occur within one month of pipeline construction. If surveys occur earlier than this, then a short follow-up survey will occur within one month of the construction to remove any new large rocks that may have washed into the construction area.

4.4.6 Loggerhead Shrike

Initial consultation with the ODNR indicated the potential for loggerhead shrike to be found in the vicinity of the OPEN Project. The latest consultation from the ODNR did not include the loggerhead shrike as occurring in the vicinity of the OPEN Project.

4.4.7 Golden Winged Warbler

Due to the status change to the golden winged warbler from endangered to extirpated in Ohio, no impacts are anticipated to this species.

4.4.8 American Bittern

Initial consultation with the ODNR indicated that American bittern may be found within the Project area. Subsequent consultation with the ODNR indicated that due to project location and type of habitat, the Project is not likely to impact species.

4.4.9 Mussels

Through consultation, the USFWS stated that though the Project is within the range of the snuffbox and sheepnose, "due to the project type, location, and onsite habitat, these species would not be expected to be within the Project area, and no impacts to these species are expected."

The ODNR comments differed slightly, as all native mussels are protected in Ohio, and stated that the OPEN Project cannot have any impact to either listed or non-listed freshwater mussel species. Further, the ODNR stated that "(i)f there is a history of mussels near the proposed Project area, it may be necessary for a professional malacologist approved by the ODNR Division of Wildlife to conduct mussel survey in the Project area." Additional consultation with the ODNR resulted in a recommendation from the ODNR that all streams that are crossed by the Project that have a watershed area 10 square miles in size or larger be assessed for mussel habitat and mussel occurrence.

Pursuant to these discussions, initial surveys to identify streams with mussel populations were conducted during the fall of 2013; further work will be performed in 2014. As described in Section 3.6.2.7, above, freshwater mussel habitat assessments have been completed at seven identified stream features along the Project route. No live or dead snuffbox or sheepnose mussels were encountered at any of the sites evaluated, and each site was determined not to contain suitable mussel habitat. Additional surveys to be conducted in 2014 will include habitat assessments at two additional streams, and occupancy surveys at four "Group 1" (as designated by the Ohio Mussel Survey Protocol [ODNR 2013d]) streams that are known to contain native unionid mussels, but where federally endangered/listed species are not expected to be present.

5.0 PART 10 ANTIDEGRADATION RULE

This Section addresses Ohio State's Section 401 WQC Part 10(a)-(k) Antidegradation Rule. Texas Eastern will address Part 10 by comparing the OPEN Project construction impacts and avoidance, minimization and mitigation techniques used for three installation alternatives. These three alternatives include pipeline and associated facilities to meet the Project purpose and need as described in Section 2.1. The construction of the OPEN Project aboveground facilities, including a new compressor station, will have no impacts to wetland or waterbody resources and are therefore the alternatives focus specifically on the 75.8 mile pipeline component of the Project.

The three alternatives to the OPEN Project are identified below:

- Preferred Alternative – The preferred alternative includes the construction of 75.8 miles of new 30-inch diameter mainline pipeline and associated aboveground facilities including a new compressor station in eastern Ohio utilizing basic trenching and mainline construction wherever feasible.

- Minimal Degradation Alternative – The minimal degradation alternative includes the construction of 75.8 miles of new 30-inch diameter mainline pipeline and associated aboveground facilities including a new compressor station in eastern Ohio. Construction will be conducted as described in Section 2.0 of this report. Texas Eastern will implement wetland and waterbody impact avoidance, minimization and mitigation procedures as described in detail in Section 4.3.3. Construction and mitigation activities in wetlands and waterbodies will be conducted in accordance with the procedures and Best Management Practices BMPs in the OPEN Project E&SCP and the conditions of related permits. The OPEN Project E&SCP was developed using the FERC Plan and the FERC Procedures and Texas Eastern's significant experience and practical knowledge of pipeline construction and effective environmental protection measures.

  Non-Degradation Alternatives – The non-degredation alternative would include a systems alternative that would utilize an existing pipeline system to meet the Project purpose and need, or the construction of 75.8 miles of new 30-inch diameter mainline pipeline using the horizontal directional drill ("HDD") crossing method to avoid direct contact with all wetland and waterbody crossings.

10a) Provide detailed description of any construction work, fill, or other structures to occur or to be placed in or near the surface water. Identify all substances to be discharged, including the cubic yardage of dredged or fill material to be discharged to the surface water.

The Project requires installation of 75.8 miles of 30-inch diameter natural gas pipeline with a minimum of three feet of cover from the top of the pipeline to the ground surface. The OPEN Project pipeline facility workspace will cross 258 wetlands and 217 waterbodies. One hundred and seventy-nine streams are crossed by the pipeline itself, and will require the installation of the pipeline beneath the stream bed and banks.

5.1.1 Preferred Alternative

The preferred alternative would utilize standard cross-country mainline installation techniques and a minimum 100-foot wide construction ROW along the entire length of the OPEN Project pipeline, including across wetlands. The size of the equipment necessary to safely install a 30-inch diameter pipeline, with concrete coating where required, the trench width required and room needed for temporary

trench spoil storage, and associated pipeline support facilities are factors used to determine the minimum 100-foot-wide construction ROW width. As a preferred alternative, Texas Eastern would not reduce the ROW width in wetlands, thus eliminating the need to located ATWS in upland areas at least 50-feet from the wetland boundary.

As part of the preferred alternative, Texas Eastern would conduct standard clearing procedures just prior to grading across the entire pipeline ROW, including wetlands and streams. Clearing would occur in the spring of 2015. During the clearing operation, stumps and rootstock would be removed as part of the grading process to create a level work surface in all construction areas. Timber matting would only be used if necessary to create a level platform to support equipment in saturated conditions, otherwise temporary matting will not be installed. Grading would not be limited to upland areas only, and the ground surface would be prepared as most suitable to allow construction equipment access along the ROW. Chipping of clearing debris would occur along the entire length of the pipeline ROW and not limited to upland areas only, eliminating the need to haul clearing debris from certain areas of the ROW.

After clearing is completed, Texas Eastern would only use the minimal erosion and sediment control measures necessary to comply with stormwater construction standards. The E&SCP proposed for the project, which is included as part of the minimal degradation alternative, includes a number of construction and restoration procedures that go well beyond the minimum standards.

As part of the preferred alternative, subsequent steps in the construction process would move along the construction ROW without changing procedures between upland or wetland and waterbody crossings. Trenching would occur along the entire length of the corridor in preparation for the pipeline installation. This will allow one trenching operation to move down the construction line, without separate crews coming behind to conduct specific wetland and waterbody installations.

After stringing is completed, the pipe gang would weld together long stings of pipe with the front-end welding crew and firing line. This method minimizes the number of welds performed in the trench, and is much more efficient, both from a time and cost perspective, than performing separate tie-in welds later in the construction process. These welds are coated outside of the trench as part of the assembly line process that occurs as separate crews move along the pipeline corridor. Strings will be assembled across uplands, wetlands and streams in one process, working down the corridor.

By welding long strings of pipeline, side-booms can leap-frog along the travel lane and lower-in the pipeline in a relatively quick and efficient manner. Once the sections of pipe are lowered-in, the tie-in crew makes the final welds in the trench. Additional trench excavations as needed, lowering in, lining up, welding, weld nondestructive inspection and coating the final welds are accomplished by this crew. Minimizing the number of tie-ins is a preferred method of construction as it reduces the amount of time it takes to install the pipeline, as well as reduces cost.

Construction across wetlands will be conducted in conjunction with upland construction activities. Also, all 179 streams crossed by the pipeline installation activities will be open cut, and similar to wetlands, the trenchline across waterbodies would remain open until the standard lowering process would occur. Backfilling would follow along behind the lowering-in process, and would work from one end of the Project towards the other similar to other stages of construction.

After the pipeline installation and backfill is completed for the entire Project, standard contour restoration through re-grading would occur across the ROW. Then a standard seed mix and mulch would be applied across all disturbed areas, including uplands and wetlands, as the overall ROW as part of one effort at the end of the Project.

5.1.2 Minimal Degradation Alternative

The minimal degradation alternative will utilize specialized construction techniques for wetland and waterbody crossings and an array of specific BMPs to minimize the potential for soil erosion and sedimentation impacts to water quality. Wetland crossing methods utilized for this alternative are described above in Section 2.4.2. As described in Section 2.4.3, waterbodies will be crossed using an open cut or dry crossing method (dam and pump), with specific construction requirements to minimize disturbance to these resource areas.

Texas Eastern will implement the measures described in the OPEN Project E&SCP. The measures identified in the E&SCP will minimize erosion of disturbed soils and transportation of sediments off the ROW and into sensitive resources such as wetlands and streams during construction. The E&SCP provides specifications for the installation and implementation of soil erosion and sediment control measures while permitting adequate flexibility to use the most appropriate measures based on site-specific conditions while preserving the integrity of environmentally sensitive areas and maintaining existing water quality by implementing the following objectives:

- Minimize the extent and duration of disturbance;
- Protect exposed soil by diverting runoff to stabilized areas;
- Install temporary and permanent erosion control measures; and
- Establish an effective inspection and maintenance program.

Also reflected in the OPEN Project E&SCP is Texas Eastern's significant experience and practical knowledge of pipeline construction and effective environmental protection measures. Construction methodology that will be implemented includes:

- A 50-foot setback for ATWS for wetlands not located in active agricultural land or other disturbed land;
- Minimization of riparian clearing to the extent practicable while ensuring safe construction conditions;
- Expedited construction in and around wetlands;
- Confinement of stump removal to the trench-line to minimize soil disturbance (unless safety or access considerations require stump removal elsewhere);
- Return of wetland bottoms and drainage patterns to their original configurations and contours to the extent practicable;
- Permanent stabilization of upland areas near wetlands as soon as practicable after trench backfilling to reduce sediment run off;
- Segregation of topsoil in unsaturated wetlands to preserve the native seed source (which will facilitate re-growth of herbaceous vegetation once pipeline installation is complete);
- Utilization of recommended seed mixes as specified by the USACE, the NRCS, or other relevant land management agencies;
- Periodic inspection of the construction corridor during and after construction;
- Post construction wetland monitoring to evaluate the progress of wetland revegetation; and
- Documentation of invasive species prior to construction and post construction monitoring to compare pre- and post-construction occurrences.

5.1.3 Non-Degradation Alternative

The non-degradation alternative would require the use of a non-impacting systems alternative to meet the Project purpose and need, or HDD technology for crossing all wetlands and waterbodies along the OPEN Project pipeline corridor.

Existing system alternatives are alternatives to the proposed action that would make use of other existing, modified, or proposed pipeline systems to meet the stated objectives of the proposed project. System options would involve the transportation of the equivalent amount of Utica and Marcellus Shale gas. System alternatives may make it unnecessary to construct greenfield portions of the proposed OPEN Project, although comparable or more extensive modifications or additions to the other existing pipeline system(s) may be required to increase capacity or provide for bi-directional flow, or another entirely new system may be required. Therefore, these modifications or additions could result in environmental impacts, and although the impacts may be less, similar to, or greater than that associated with construction of the proposed OPEN Project, they nevertheless would not be considered a non-degradation alternative.

The purpose of and need for the OPEN Project is to provide the necessary infrastructure to transport 550,000 Dth/d of natural gas from the Kensington Processing Plant in Hanover Township, Ohio and other receipt points in Brush Creek and Salem Townships into Texas Eastern's existing system in Switzerland Township, Ohio and beyond to the Gulf Coast markets utilizing Texas Eastern's existing system. Any viable system alternative composed of modifications to existing pipeline systems would need to provide the same transportation service while avoiding environmental impact.

There are three pipeline systems within the broad area around the OPEN Project area that were evaluated to consider rendering the same service as proposed by Texas Eastern. They are:

- Dominion East Ohio Gas Company ("Dominion East Ohio");
- Dominion Transmission, Inc. ("DTI"); and
- Tennessee Gas Pipeline Company, L.L.C. ("TGP").

Each pipeline system was evaluated for suitability to render the same service as that proposed by Texas Eastern in the OPEN Project without impacts to wetland or waterbody resources. Based on the evaluation, the other existing pipeline systems operating in the Ohio area would require substantially greater expansions and in excess of the facilities proposed for the OPEN Project in order to fulfill the need of the OPEN Project. Therefore, a systems alternative that meets the requirements of a non-degradation alternative is not feasible, as crossings of wetlands and waterbodies with new facilities would be required. Since a non-impacting systems alternative has not been identified that meets the Project purpose and need, it is not discussed further in this Section.

Texas Eastern has evaluated the HDD crossing method to install the pipeline beneath wetlands and waterbodies without trench excavation which may avoid any direct impacts. The HDD crossing method involves establishing staging areas along both sides of the proposed crossing. The process commences with the boring of a pilot hole beneath the resource to the opposite side and then enlarging the hole with one or more passes of a reamer until the hole is the necessary diameter to facilitate the pull-back (installation) of the pipeline.

Once the reaming passes are completed, a prefabricated pipe segment is then pulled through the hole to complete the crossing. While the HDD method is a proven technology, there are certain impacts that could occur as a result of the drilling, such as the inadvertent release of drilling fluid (frac-out), which is a slurry of bentonite clay and water. Drilling fluid is classified as non-toxic to the aquatic environment and is a non-hazardous substance.

This alternative would require use of the HDD crossing method for 475 combined wetlands and waterbodies spread out across the length of the Project. In order to install the pipeline using the HDD method, the hole must be drilled so that the pipe bend is not forced, but rather "free-stressed" as it needs to accommodate the curvature as defined by pipe wall thickness and pipe diameter. This curvature is factored into the HDD design to establish the entry and exit points of the drill, allowing enough length to

reach the depth required to pass under the lowest point, typically the wetland or waterbody, and then back to the surface.

For discussion purposes, without factoring the topography encountered along the OPEN Project route, a HDD crossing would require at least a 1,500 foot minimum length to install the pipeline underneath a wetland or waterbody. With 475 resource crossings located along the OPEN Project route, the pipeline would have to be installed by using the HDD installation method for the entire 75.8 mile Project length. Technically this is not feasible due to a variety of factors. Each HDD crossing requires a significant amount ATWS that would require clearing and grading in order to provide adequate room for the HDD pullbacks and HDD entry and exit sites. Suitable locations for every ATWS needed at HDD entry and exit points would not be available. Also, locating every ATWS to avoid all wetland or waterbody resources along the OPEN Project pipeline corridor would not be possible.

Based on the geology of the area, and the difficult topography, the chances of a frac-out into a resource area are highly probable. This would result in an impact to a resource area, and possibly the failure of the HDD process itself. Texas Eastern has evaluated using the HDD method for Captina Creek. The geotechnical boring data revealed that the bedrock contains poor rock quality and zones of lost circulation. The elevation difference combined with the observed geotechnical conditions (poor rock quality) creates a situation where drilling fluid management will be compromised. The result is hydraulic fracturing would likely occur through the poor quality rock. This would create a lack of hydraulic pressure of the drilling fluid which would create problems returning cuttings to the entry point, bore instability issues and significantly increase the chance of hole collapse and drill failure.

10b) Describe the magnitude of the proposed lowering of water quality. Include the anticipated impact of the proposed lowering of water quality on aquatic life and wildlife, including threatened and endangered species (include written comments from Ohio Department of Natural Resources and U.S. Fish and Wildlife Service), important commercial or recreational sport fish species, other individual species, and the overall aquatic community structure and function. Include a Corps of Engineers approved wetland delineation.

The discussion below provides a description of each alternative with regard to anticipated impacts to water quality and biological and physical impacts. Texas Eastern has consulted closely with the ODNR and USFWS, and conducted rare species surveys along the Project route. Results of the consultation and surveys are provided in Section 4 and Appendix 4.

As stated in Section 1.0, Texas Eastern has submitted a Wetland Delineation and Preliminary Jurisdictional Determination Report to the USACE Pittsburgh District for review regarding the wetlands and waterbodies delineated along the Project corridor.

None of the streams crossed by the Project are considered wild or scenic. Table 3-2 in Appendix 3 indicates the OEPA recreation designations for each waterbody crossed by the Project. Only Captina Creek is designated as having potential frequent recreation activities. In addition, there are no known commercial fisheries along the Project.

<u>Preferred Alternative</u>

The preferred alternative would utilize standard cross country mainline installation techniques and a minimum 100-foot wide ROW across all wetland and waterbody crossings to minimize the amount of tie-ins required along the route and to allow sufficient workspace to assemble, lower-in, and backfill the pipeline. This process would involve trenching across all resource areas as the ditch crew moves from one end of the Project towards the other, and then subsequent stages of construction would follow.

Clearing activities across the 100-foot wide ROW in wetlands and along stream banks would have the potential for increased short-term and long-term impacts. Clearing would occur just prior to grading in the spring of 2015. Disposal of wood chips in wetland areas may delay or hinder revegetation after construction is complete. Removal of root stock and stumps in wetlands will delay the re-establishment of woody vegetation in these areas after construction. This could potentially lead to increased soil instability, particularly along stream banks, which in turn could lead to increased erosion and sedimentation into resource areas. In addition, clearing in the spring has the potential to increase impacts to neotropical migrant and other bird species as well as potentially disrupting the northern long-eared bat, recently proposed for listing under the Endangered Species Act.

The construction methodology that would be used for the preferred alternative would require that the trenchline across waterbodies remains open for the duration of the pipeline installation process along the pipeline route. This will lead to increased downstream sedimentation when compared to the minimal alternative, thus increasing negative impacts to water quality and downstream fisheries and aquatic resources.

Potential long-term impacts on water quality can result from alteration of stream bed and banks associated with the removal of riparian vegetation, including stumps and root stock. If not stabilized and revegetated properly, soil erosion associated with surface runoff and stream bank sloughing can result in the deposition of large quantities of sediment into the waterbody. Prolonged periods of exposure to high levels of suspended solids have been linked to fish egg and fry mortality and degradation of spawning habitat from the infiltration of sediments within the interstitial spaces of streambed gravel. This may increase the potential to impact the eastern hellbender and associated habitat in Cross Creek, Yellow Creek and Captina Creek.

Surface runoff and erosion from the cleared and graded ROW can also increase sedimentation during construction. A reduction of the amount of BMPs implemented (when compared to the full OPEN E&SCP and SPCC plan included in the minimal degradation alternative) on adjacent upland slopes and at upland/wetland boundaries during construction and restoration will increase the potential of upland soils being deposited in wetlands and streams. This could alter their physical and ecological functions and values as well as a net loss of wetland. The natural revegetation of wetland areas may be inhibited due to potential mixing of soils from adjacent upland soils not contained by BMPs, and the mixing of wetland topsoil from equipment rutting along unmatted travel lanes. In addition, not segregating topsoil over the trenchline across wetlands will result in the mixing of subsoil and wetland topsoil, also potentially inhibiting the natural regeneration of native wetland plants.

Construction activities within wetland habitats will temporarily affect wildlife utilizing the area. Disturbance to wetland dependent wildlife will be similar to those described for terrestrial wildlife species. The preferred alternative would increase the wildlife displacement duration by inhibiting the revegetation potential and alternation of wetlands and especially within the forested wetlands. Post construction maintenance activities, as part of the preferred alternative, would include mowing the entire 50-foot wide permanent ROW on a routine basis. This would include upland and wetlands. Mowing the full ROW width in wetlands would result in some conversion of scrub-shrub wetland habitat used by wildlife.

Minimal Degradation Alternative

Compared to the preferred alternative, the minimal degradation alternative will reduce wetland and waterbody impacts that lower water quality, biological and physical impacts. The minimal degradation alternative will achieve lesser wetland and waterbody impacts by reducing the construction workspace in

wetlands, prioritizing wetland and waterbody construction activities, and utilizing the dry crossing method for the larger stream crossings.

The minimal degradation alternative will utilize a narrowed 75-foot wide construction workspace in wetlands, therefore reducing temporary impacts to wetlands vegetation and soil compaction. ATWS necessary to install the pipeline across wetlands and waterbodies will be located in upland areas, and at least 50 feet away from the wetland edge, except where adjacent upland consists of cultivated or rotated agricultural lands and other disturbed areas, topographic and other site specific conditions permitting. If construction limitations, such as topographic conditions (steep slopes) and road crossing requirements do not permit a 50-foot setback, these areas will be located at least 10 feet away from the wetland. The work area will be limited to the minimum size necessary to safely construct the wetland or waterbody crossing. Restricting the work area in this manner will minimize resource impacts associated with pipeline construction and the potential disturbance to wetland dependent wildlife.

The clearing operation in wetlands and on stream banks will be conducted to minimize impacts to existing woody vegetation root stock in order to promote revegetation after construction is completed. This process will reduce the potential negative impacts to water quality or wildlife habitat. Clearing will be conducted in the winter season, which will avoid impacts to neotropical migrant bird and other breeding bird species. Winter clearing will also avoid potential clearing impacts to the northern long-eared bat.

Prior to initiating clearing activities, all wetland boundaries and streams will be clearly marked in the field. Vegetation will be cut just above ground level, and stumps will be ground and not removed (except over the trenchline or where determined to be a potential safety hazard). Treating stumps and root systems in this manner will help stabilize the soil and promote re-sprouting by some species. Cleared debris (brush, slash, wood chips) will be disposed of in upland areas, hauled off or burned (in accordance with applicable permit conditions).

After clearing is completed and prior to grading, erosion and sediment controls will be installed along the ROW minimize the potential for upland soils to enter resource areas. These erosion and sediment control measures will be installed in accordance with the OPEN E&SCP and maintained throughout construction and until restoration is determined to be successful. The OPEN SPCC Plan will be utilized during both the clearing and construction phases of the project.

The construction methods that will be used for wetland crossings will minimize the extent and time that construction equipment operates in these areas. The top 12 inches of wetland soil over the trenchline will be segregated and stockpiled separate from subsoil. Trench spoils will be temporarily piled in a ridge along the pipeline trench. Gaps in the spoil pile(s) will be left at appropriate intervals to provide for natural circulation or drainage of water. The construction equipment required in wetland will be limited as much as practicable to install the pipeline, and will reduce soil compaction from equipment travel by utilizing matting to avoid excess rutting in wetland areas. The reduction of construction timing and workspace area will increase revegetation potential of adjacent naturally occurring wetland plants, in-turn increasing restoration of wetland function and ecological functions such as: sediment/toxicant retention; nutrient removal/transformation; flood attenuation; groundwater recharge/discharge; and wildlife habitat.

Temporary trench plugs will be installed in the trench at the edges of the wetland if the possibility exists for sediment-laden water to flow from uplands down the trench and into the resource. Silt fences and/or straw bales will be installed if the possibility exists for spoil to flow into undisturbed areas of wetlands. Original topographic conditions and contours will be restored as close to pre-construction as possible after completion of construction.

As part of the minimal degradation alternative, Texas Eastern will use specialized waterbody crossing techniques to minimize potential impacts to water quality. The open-cut crossing method (or wet-ditch method) proposed for the minimal degradation alternative will require that specific procedures be followed that will reduce potential impacts to water quality. Except for blasting and other rock breaking measures, instream construction activities when using the open cut method for minor waterbodies (including trenching, pipe installation, backfill, and restoration of the streambed contours) must be completed within 24 hours. A minor waterbody is defined as a waterbody that is 10 feet or less in width at the water's edge at the time of the crossing. Stream banks and unconsolidated streambeds may require additional restoration after this period. Limiting the installation process to the 24 hour window will minimize the duration of disturbance and potential degradation to water quality.

Texas Eastern may choose to use mainline construction procedures across minor waterbodies where the open cut crossing method is proposed. However, different from the preferred alternative, in these instances a flume pipe will be installed immediately after trenching is completed. The flume pipe will remain in place until the lowering-in process. The flume pipe will be removed just prior to lowering in the pipeline. The 24-hour restoration timeframe starts as soon as the flume is removed. These procedures, although more labor intensive, reduce the potential for water quality impacts and downstream sedimentation.

The minimal degradation alternative will also reduce impacts to waterbodies by utilizing the dry crossing method for streams crossed which have average widths greater than 10 feet. This crossing method requires the installation of a dam and pump and/or a flume pipe(s) prior to trenching to divert the stream flow over the construction area and allow trenching of the stream crossing in drier conditions isolated from the stream flow. By using the dry crossing method for streams with more significant flow, it will reduce sediment transport downstream and therefore reduce temporary and potential impacts to water quality and aquatic life.

If trench dewatering is necessary in or near a waterbody, the removed trench water will be discharged into an energy dissipation/sediment filtration device, such as a geotextile filter bag or straw bale structure located away from the water's edge to prevent heavily silt-laden water from flowing into the waterbody in accordance with the OPEN E&SCP and all applicable permits.

Following construction, stabilization, and establishment of vegetative cover, temporarily disturbed areas will be left to revegetate via natural succession. Texas Eastern will monitor the ROW to ensure revegetation is successful and address any areas where it is determined not to be successful. Permanent loss of trees will occur within the ROW that will be maintained in an early successional stage by mowing and periodic tree removal. The temporary workspaces will be allowed to naturally revegetate via natural succession. This natural revegetation process will gradually develop a stratified vegetative cover between the ROW and adjacent habitats. Construction and operation of the pipeline facilities is not expected to adversely affect the distribution or regional abundance of wildlife species given the amount and distribution of similar habitat types available in the immediate Project area.

As part of the minimal degradation alternative, in wetlands, vegetation maintenance over the full width of the permanent ROW is prohibited. However, to facilitate periodic pipeline corrosion/leak surveys, a corridor centered on the pipeline up to 10 feet wide may be maintained annually in an herbaceous state. In addition, trees that are located within 15 feet on either side of the pipeline that are greater than 15 feet in height may be selectively cut and removed from the ROW. Trees and shrubs that become reestablished beyond 15 feet on either side of the pipeline will not be disturbed. Vegetation maintenance practices on the construction ROW adjacent to waterbodies will consist of maintaining a riparian strip within 25 feet of the stream as measured from the mean high water mark. This riparian area will be allowed to permanently revegetate with native woody plant species across the entire ROW. However, similar to

wetland areas, a corridor centered on the pipeline up to 10 feet wide may be maintained in an herbaceous state and trees and shrubs greater than 15 feet in height may be selectively cut within 15 feet on either side of the pipeline.

To offset temporary impacts to wetland and waterbody resources, the minimal degradation alternative includes an OPEN Mitigation Plan. The OPEN Mitigation Plan compensates for the temporary loss of aquatic resource functions and values by providing stream mitigation through the preservation of 965 linear feet of stream and additional wetlands mitigation through the restoration of 4.15 acres of forested wetlands and 4.305 acres of non-forested wetlands. Detailed information regarding the benefits to water quality on aquatic life and wildlife are included in the OPEN Mitigation Plan located in Appendix 6.

Non-Degradation Alternative

To avoid any direct impacts to wetlands or waterbodies along the Project, each resource would have to be crossed using the HDD method. Although a successful HDD crossings would avoid direct impacts to wetlands and waterbodies, there are potential indirect impacts to wetlands and waterbodies in the form of additional clearing and grading required to establish the HDD workspace in adjacent uplands. In addition, due to the geology and topographic constraints along the Project route, there is a significant likelihood of the inadvertent release of drilling fluids during a frac-out and probable drill failure.

Geotechnical boring data collected along portions of the Project route revealed that the bedrock contains poor rock quality and zones of lost circulation. While the HDD method is a proven technology under the right conditions, there are certain impacts that could occur as a result of the drilling such as the inadvertent release of drilling fluid indirectly or directly into wetlands or waterbodies and potentially outside of construction workspace. The drilling fluid is a slurry of bentonite clay and water which is classified as non-toxic to the aquatic environment and is a non-hazardous substance. Fluid released into wetland could temporarily reduce wetland and biological functions. This fluid release into waterbodies would increase turbidity and result in sedimentation of the stream channel.

In most areas the HDD pipeline installation method install the pipeline to a depth below natural roots systems and routine repairs would not be able to be completed, therefore post construction mowing would not be required along the permanent ROW.

10c) Include a discussion of the technical feasibility, cost effectiveness, and availability. In addition, the reliability of each alternative shall be addressed (including potential recurring operational and maintenance difficulties that could lead to increased surface water degradation.).

Preferred Alternative

The preferred alternative would utilize standard cross country mainline installation techniques and a minimum 100-foot wide ROW across all wetland and waterbody crossings to minimize the amount of tie-ins required along the route and to allow sufficient workspace to assemble, lower-in, and backfill the pipeline. Standard cross-country mainline construction is the most cost-effective way to install pipeline in most circumstances. In certain situations where there are slope constraints, road crossings, or other potential obstructions, this method of construction may not be technically feasible. However, in most instances it is the most cost effective and a technically feasible approach used routinely by the industry.

There are potential issues that may arise by not implementing many of the construction and restoration procedures provided in the minimal degradation alternative. This includes possible erosion problems that can result in a lack of sufficient ground cover over the pipeline and sediment deposition in wetlands and waterbodies. The removal of root stock and stumps in wetland areas and stream banks, and lack of

permanent erosion and sediment controls on adjacent upland slopes as part of the restoration effort could result in additional maintenance requirement to restore shallow cover over the pipeline and stabilizing potential land slips. This may require additional crossings of wetlands and waterbodies by heavy equipment needed to conduct the work. It could also result in sediment deposits in wetland and waterbodies, which can negatively impact water quality.

During operation of the pipeline, the most cost effective method of maintaining the vegetation along the corridor is through conventional mowing. As part of the preferred alternative, the mowing would be conducted of the full 50-foot width of the permanent ROW in both uplands and wetlands. This process is easier to comply with and more cost effective to complete than the wetland specific vegetation maintenance procedures incorporated into the minimal degradation alternative.

Minimal Degradation Alternative

The minimal degradation alternative will utilize specialized construction procedures for wetlands and waterbodies crossed by the pipeline. The pipeline will be installed across waterbodies using the open cut or the dry crossing method. The open cut crossing method would be used for 135 minor streams and the dry crossings method (dam and pump and/or flume) would be used for the 44 larger streams. Both crossing procedures are considered relatively rapid and technically feasible. The open cut method is more cost effective and the duration of the temporary disturbance is short. Separate installations at stream crossings do require separate tie-ins, which does increase cost over the standard mainline construction process.

The dry crossing technique isolates the trenchline, which will reduce potential turbidity and sediment transport downstream from construction activities. This process is more costly as it requires the installation of temporary dams upstream and downstream, pump set-up, and separate installation crew and associated tie-in.

There are no additional operational difficulties through the use of the minimal degradation alternative. The pipeline will be installed at the minimum depth of three feet that are required by USDOT regulations. At this depth the pipeline will easily be accessed for any future maintenance that may be required for the pipeline.

Texas Eastern will conduct full ROW post-construction monitoring to determine the success of revegetation, which ensures that any potential circumstances that could lead to erosion are address quickly before problems occur.

As part of the routine vegetation maintenance along the ROW, in wetlands as well as waterbody riparian areas (25 feet in width from mean high water mark), a corridor centered on the pipeline up to 10 feet wide may be maintained annually in an herbaceous state. Trees and shrubs that are located within 15 feet on either side of the pipeline that are greater than 15 feet in height may be selectively cut and removed from the ROW. This method of vegetation maintenance is more costly, as crews need to identify the boundaries of resource areas during each maintenance cycle and restrict mechanical mowing across the entire ROW width. In wetlands and riparian areas, hand cutting of trees 15 feet or taller is required, which is more labor intensive with associated additional cost.

Non-Degradation Alternative

The HDD crossing of all wetland and streams that would be proposed for non-degradation alternative is not technically feasible. Due to the geologic and topographic conditions identified along the Project route, the loss of drilling fluid through fractured rock and elevation differences would cause drill failure.

If the HDD process was technically feasible for crossing all wetland and waterbodies along the Project route, it would be significantly more time consuming and Texas Eastern could not complete the Project by the in-service date and therefore would not meet the Project's purpose and need. Also, the pipeline would be installed at depths not accessible by conventional equipment. Therefore the pipeline cannot be maintained or repaired if necessary. Needed repairs would require installing another pipeline replacement segment using an HDD. This is not cost effective or practical as part of the operation of the facility.

Lastly, the magnitude of the expense of using the HDD method for all wetland and waterbody crossings along the pipeline route is cost prohibitive to the Project. On average, the rough estimated cost for the HDD process needed for the 30-inch diameter pipeline to be installed on the OPEN Project is $1,200 per linear foot. The non-degradation alternative would require over 75 miles of HDD to avoid wetlands and waterbodies, which puts the HDD installation cost alone at over $475 million, which is cost prohibitive to construct the Project.

10d) For regional sewage collection and treatment facilities, include a discussion of the technical feasibility, cost effectiveness and availability, and long-range plans outlined in state or local water quality management planning documents and applicable facility planning documents.

The OPEN Project is a natural gas transmission project and not related sewage and treatment facilities.

10e) To the extent that information is available, list and describe any government and/or privately sponsored conservation projects that exist or may have been formed to specifically target improvement of water quality or enhancement of recreational opportunities on the affected water resource.

Texas Eastern is not aware of any government and/or privately sponsored conservation projects that exist or may have been formed to specifically target improvement of water quality or enhancement of recreational opportunities on any of the affected water recourses areas crossed by the OPEN Project.

10f) Provide an outline of the costs of water pollution controls associated with the proposed activity. This may include the cost of best management practices to be used during construction and operation of the project.

<u>Preferred Alternative</u>

The preferred alternative would require implementation of basic BMPs and not the full suite of requirements identified in the OPEN Project E&SCP and SPCC Plan. It is estimated that the cost of such BMPs is approximately one-quarter, to one-half of what would be required as part of the minimal degradation alternative. Also, one-quarter of the cost would be required for environmental inspection. In addition, there would be no cost required for pre-construction flagging and signing to mark all resource areas along the Project, or for post-construction upland and wetland revegetation monitoring. Lastly, as part of the preferred alternative, a mitigation plan for temporary wetland and waterbody impacts would not be proposed.

<u>Minimal Degradation Alternative</u>

The estimated costs associated with the larger task items associated with water pollution control and impact minimization are broken out as follows;

- The minimal degradation alternative includes the BMP's identified in the OPEN Project E&SCP. Texas Eastern estimates that implementation of BMP's on the OPEN Project to be approximately $14,371,200.
- Environmental Inspection Services required during construction is estimated to cost $1,650,000.
- The Project will use Resource Specialists during construction to assist Environmental Inspectors by marking out all wetland and waterbody resource areas prior to, and through construction and restoration as needed. This cost is estimated to be approximately $120,000.
- Post-construction wetland revegetation monitoring is estimated to cost $131,260.
- The OPEN Project Mitigation Plan is projected to cost $531,750.

The total cost estimated for the OPEN Project BMP implementation and impact minimization is $16,804,210.

Non-Degradation Alternative

The non-degradation alternative would require over 75 miles of HDD to avoid wetlands and waterbodies, which puts the HDD installation cost alone at over $475 million, which is cost prohibitive to the Project. This does not include the additional cost of ATWS at entry and exit points, clean-up from inadvertent release of drilling fluids or multiple drill attempts and drill failures likely to occur do to geophysical constraints found in the Project area. This cost also does not include BMPs necessary to stabilize and contain soils disturbed at the HDD entry and exit point.

10g) Describe any impacts on human health and the overall quality and value of the water resource.

As described in Section 3.5 above, OPEN Project facilities does not cross any designated aquifers, reservoirs, surface intakes, or groundwater wells and associated groundwater protection areas for public supply wells. The project does cross two HUC 12 watershed designated as PDWS, and one surface water protection area.

The PDWS watersheds crossed by the Project are associated with the Headwaters North Fork Yellow Creek (code 50301010802) and Little McMahon Creek (code 50301060703) watersheds. Respectively located between mile post ("MP") 5.51-9.02 and MP 56.23-58.61. Based on the OEPA 2012 Integrated Water Quality report and USGS mapping the surface water intakes associated with these PDWS are located up gradient of the OPEN Project and greater than 2 miles away. The Project crosses segmented portions of the Toronto and Steubenville municipal surface water protection area, but these municipalities' water works/departments are located approximately 10 miles away from the Project. In additional, seven private domestic wells are located within 150 feet of the OPEN Project pipeline facilities construction workspace. Due to the temporary impact relating to the pipeline facilities the Project will not likely have any effect on water supplies or human health.

Short-term and highly localized impacts to groundwater could potentially occur during various construction stages, particularly during clearing and grading, trench excavation, and blasting. Soil compaction during clearing and grading could temporarily result in localized decreases in groundwater recharge rates, as well as changes to overland water flow for wells and groundwater protection areas that are in the vicinity of the Project. During construction, local water table elevations could be affected by trenching and backfilling, thereby temporarily impacting springs and wells in close proximity. In locations where groundwater is near the surface, trench excavation may intersect the water table. Each of these possible impacts is short-term and temporary; a long-term impact on groundwater resources is not anticipated as a result of this Project.

Dewatering of the pipeline trench may be required in areas with a high water table or after a heavy rain. Removal of the water from the trench may result in a temporary fluctuation in local groundwater levels. Trench dewatering activities are usually completed in a few days within a particular location; therefore, impacts are expected to be temporary. All trench water will be discharged into well-vegetated upland areas or properly constructed dewatering structures to allow the water to infiltrate back into the ground, thereby minimizing any long-term impacts on the water table. Texas Eastern will conduct pre- and post-construction monitoring of well yield and water quality for the 6 private well, with the landowner's permission.

The Preferred Alternative

The OPEN Project is not anticipated to result in any human health impacts result of constructing the preferred alternative.

The Minimal Degradation Alternative

Comparatively, the minimal degradation alternative would further reduction any potential human health impacts.

Non-Degradation Alternative

Successful HDD crossings of all wetland and waterbodies would likely result in the non-degradation alternative having no effect to human health. In the case where an HDD fails there could be temporary impacts as with the preferred and minimal degradation alternatives.

10h) Describe and provide an estimate of the important social and economic benefits to be realized through this project. Include the number and types of jobs created and tax revenues generated and a brief discussion on the condition of the local economy.

The OPEN Project will require temporary and permanent jobs that would be beneficial impact to the both The State of Ohio and local communities. It is anticipated that the three alternatives would be relatively similar in terms of social and economic benefits.

Socioeconomic impacts during construction are generally related to the size and composition of the labor force and its potential need for public services (including transportation) and temporary housing. Other impacts are directly related to the construction and operation activities themselves, including the need to transport materials to and from the OPEN Project area, commerce generated by local materials purchases, and tax revenues generated by Project activities.

The Project socioeconomic impact area includes Columbiana, Carroll, Jefferson, Belmont and Monroe Counties in Ohio. The townships crossed by the proposed OPEN pipeline include:

- Hanover, Franklin, Wayne and Washington Townships in Columbiana County;
- East Township in Carroll County;
- Brush Creek, Ross, Salem, Wayne, Smithfield and Mount Pleasant Townships in Jefferson County;
- Colerain, Richland, Pease, Pultney, Mead and York Townships in Belmont County; and
- Switzerland Township in Monroe County.

Table 10-1 provides summary data for selected demographic and socioeconomic conditions of the Project socioeconomic impact area, as well as the State of Ohio.

TABLE 10-1

Existing Economic Conditions for the OPEN Project Facilities in Ohio

County, Township	2010 Population a/	2010 Population Density (people/square mile) a/	2010 Per Capita Income (dollars) a/	2010 Poverty Rate (percent) b/	July, 2013 Unemployment Rate (percent) c/ f/	2011 Civilian Labor Force d/	2011 Top Three Occupations d/,e/
Columbiana	**107,841**	**202.7**	**19,635**	**12.1**	**8.2**	**51,470**	**E, M, R**
Hanover	3,704	101.4	19,493	6.6	-	1,741	E, M, R
Franklin	835	36.3	15,932	9.5	-	638	R, M, E
Wayne	814	32.7	21,938	4.0	-	284	M, E, R
Washington	2,264	102.1	14,791	28.3	-	1,009	E, M, P
Carroll	**28,836**	**73.1**	**21,575**	**9.0**	**7.2**	**13,738**	**M, E, R**
East	843	36.8	17,911	5.2	-	396	M, E, P
Jefferson	**69,709**	**170.2**	**20,470**	**12.4**	**10.3**	**31,571**	**E, R, M**
Brush Creek	438	18.5	44,305	16.2	-	166	A, P, T/E
Ross	721	23.3	20,185	0.0	-	422	C, E, O
Salem	3,148	86.3	21,755	6.0	-	1,504	E, M, C
Wayne	2,232	57.6	22,462	16.9	-	805	E, T, R
Smithfield	3,473	92.0	17,534	10.0	-	1,408	E, R, C
Mount Pleasant	2,368	123.5	22,451	6.4	-	1,129	E, A, AR
Belmont	**70,400**	**132.3**	**20,266**	**12.1**	**7.2**	**32,362**	**E, R, AR**
Colerain	4,276	171.4	23,367	10.1	-	2,054	E, R, M
Richland	14,973	257.4	21,605	6.3	-	6,156	E, R, AR
Pease	14,309	501.0	18,093	17.2	-	6,935	E, R, AR
Pultney	8,795	331.3	17,929	17.3	-	4,166	E, R, AR
Mead	5,967	186.5	21,612	9.3	-	2,680	E, R, M
York	2,538	98.0	19,308	14.2	-	1,160	E, A, T
Monroe	**14,642**	**32.1**	**18,738**	**12.3**	**10.3**	**6,212**	**E, M, C**
Switzerland	462	17.0	18,380	14.6	-	281	C, M, R/T
State of Ohio	11,536,504	282.3	25,113	10.3	7.3	5,872,293	E, M, R

a/ U.S. Census Bureau, 2010b
b/ U.S. Census Bureau, 2006-2010
c/ U.S. Department of Labor, Bureau of Labor Statistics. 2013
d/ U.S. Census Bureau, 2007-2011
e/ A: Agriculture, forestry, fishing, hunting and mining
AR: Arts, entertainment, recreation, accommodation and food services
E: Educational, health and social services
C: Construction
M: Manufacturing
O: Other services, except public administration
P: Professional, scientific, management, administrative and waste management services
R: Retail trade
T: Transportation, warehousing and utilities
f/ Unemployment data for each township is not available.

Texas Eastern anticipates hiring a substantial number of local construction workers with the requisite experience for the installation of the natural gas facilities in Ohio. These local hires will include surveyors, welders, equipment operators, and general laborers. It is estimated, based on historical percentages for this type of project, that approximately 40 to 60 percent of the construction workers (about 600 to 900 workers at peak) will be local hires. The local supply of construction workers needed for the Project is expected to be derived from workers employed in the construction industry in Ohio,

including those employed in Columbiana, Carroll, Jefferson, Belmont, and Monroe counties. Construction personnel that may be hired from outside Ohio include supervisory personnel and inspectors. These individuals will temporarily relocate to the Project vicinity.

Most socioeconomic impacts will be short-term and localized, due primarily to the relatively short construction period when substantial numbers of workers will be active and the limited geographic scope of the Project. Potential impacts associated with construction may include minor, short term traffic disruption and congestion in the general vicinity of the Project. Pipeline construction will also result in minor short-term disturbance of agricultural activities. Some long-term disturbance to site-specific agricultural areas will occur with the construction of certain aboveground facilities. The Project will not involve the displacement of any residences or businesses, and any disruptions of local residential use will be of short duration and fully mitigated.

Revenues from construction employment, as well as local expenditures by both the construction companies (for construction materials) and non-local construction workers (for temporary housing, food, and entertainment) will benefit the local economy. The increased property tax base and (minimally) enhanced employment opportunities during Project operation will be beneficial in the long-term.

10i) Describe and provide an estimate of the important social and economic benefits that may be lost as a result of this project. Include the effect on commercial and recreational use of the water resource, including effects of lower water quality on recreation, tourism, aesthetics, or other use and enjoyment by humans.

The Preferred Alternative

The OPEN Project would not result in any important social or economic benefits loss as a result of constructing the preferred alternative. Due to the temporary nature of the anticipated Project, potential short term impacts to water quality impacts during construction are not anticipated to effect recreation, tourism, aesthetics or other use and enjoyment by humans. During construction there will be a short-term impediment to use of the area within the construction workspace limits, but because of the linear nature of the Project, that area is limited to a relatively narrow crossing of waterbodies and wetlands.

The Minimal Degradation Alternative

Comparatively, the minimal degradation alternative would not result in any important social or economic benefits loss as a result of constructing the preferred alternative.

Non-Degradation Alternative

Successful HDD crossings of all wetland and waterbodies would likely result in the non-degradation alternative having no effects to social or economic benefits. In the case where an HDD conditions are problematic there could be temporary impacts associated with the inadvertent release of drilling fluid and eventual drill failure. A significant release of drilling fluid into a waterbody used for recreation or other use by humans could have a negative effect.

***10j) Describe environmental benefits, including water quality, lost and gained as a result of this project. Include the effects on the aquatic life, wildlife, threatened or endangered* species.**

As Sections 10a and 10b indicate, the difference in the duration and quantity of these temporary environmental impacts are a direct result to clearing, construction, post-construction phases of the Project as well as the utilization of erosion control BMPs. Refer to Section 10b above, which describes and

compares the preferred, minimal degradation, and non-degradation alternatives temporary impacts to water quality, aquatic, wildlife, threatened or endangered species ("T&E").

Similar to the preferred and non-degradation alternatives the minimal degradation alternative temporary impacts will not result in any net loss of wetland or waterbodies, but the Proposed OPEN Mitigation Plan proposed for the minimal degradation alternative will have a positive environmental benefit to water quality in Eastern Ohio. The OPEN Mitigation Plan will permanently preserve approximately 8.455 acres restored wetland (4.15 acres of which will be forested wetland) and 965 linear feet of a perennial stream and 3.3 acres of its surrounding riparian area. In addition the OPEN Mitigation site is located adjacent to approximately 450 acres of persevered wetland and streams resources that are known to be inhabited by numerous T&E species. This additional preservation of wetland, stream, and riparian areas proposed in the OPEN Mitigation Plan coupled with the avoidance, minimization, and mitigation procedures will result net gain of aquatic resources and will increase water quality and environmental benefit to the region.

Currently Texas Eastern consulting with the USFWS and the ODNR regarding threatened and endangered species. If any potential of impacts threaten or endangered species are expected within the Project area, additional mitigation measures will be implemented as required to avoid any potential effect to those species.

10k) Describe mitigation techniques proposed:

- ***Describe proposed Wetland Mitigation***
- ***Describe proposed Stream, Lake, Pond Mitigation***

Preferred Alternative

Information provided in Sections 10a and 10b includes the mitigation techniques for wetlands, stream and ponds. Natural revegetation of the ROW and no net loss of wetlands or waterbodies are anticipated Resources will be restored to preconstruction conditions, however, there will be some conversion forested wetlands to non-forested wetlands.

Minimal Degradation Alternative

The minimal degradation alternative impact mitigation measures for wetland and waterbody crossing for the Project include a number of specialized construction and restoration techniques designed to minimize temporary disturbance and mitigate potential impacts. Information provided in Sections 10a and 10b includes the mitigation techniques for wetlands, stream and ponds. There will be no net loss of wetland or waterbodies as a result of the Project. Wetlands, ponds, and streams will be restored to preconstruction conditions, however, there will be some conversion of forested wetlands to non-forested wetlands.

Construction will be conducted as described in Section 2.0 of this report. Texas Eastern will implement wetland and waterbody impact avoidance, minimization and mitigation procedures as described in detail in Section 4.3.3. To mitigate temporary impacts at wetland and waterbody crossings during construction, operation and maintenance, Texas Eastern will construct the Project in accordance with its E&SCP and with all federal and state regulations and permit requirements. Stream banks and riparian areas will then be revegetated in accordance with the OPEN Project E&SCP and any applicable agency requirements.

During construction, the open trench may, on occasion, accumulate water from either groundwater intrusion or precipitation. In such cases, the trench will be dewatered periodically to allow for proper and safe construction. Any hazardous materials, chemicals, lubricating oils, solvents, or fuels used during construction will be stored in upland areas at least 100 feet from wetlands and waterbodies as required by

the OPEN Project E&SCP. All such materials and spills (if any) will be handled in accordance with Texas Eastern's SPCC Plan. Except where absolutely necessary, or to otherwise minimize overall impacts to the environment, there will be no refueling or lubricating of vehicles or equipment within 100 feet of a waterbody. Under no circumstances will refuse be discarded in waterbodies, trenches, or along the construction corridor.

Construction and mitigation activities in wetlands will be conducted in accordance with the procedures and BMPs in the OPEN Project E&SCP and the conditions of related permits. The OPEN Project E&SCP was developed using the FERC, Plan FERC Procedures, as well as Texas Eastern's significant experience and practical knowledge of pipeline construction and effective environmental protection measures.

In scrub-shrub wetlands, vegetation will be cut just above ground level, leaving existing root systems intact. Stumps or root systems will be removed only over the trench line (minimum 10 feet) and where the Chief Inspector or Environmental Inspector determines that existing conditions present a safety hazard for construction. Treating stumps and root systems in this manner will help stabilize the soil and promote re-sprouting by some species.

Texas Eastern has evaluated each of the proposed ATWS locations for wetland and waterbody (resource) crossings, and has identified certain areas where site-specific conditions do not allow for a 50-foot setback for the ATWS. ATWS areas located less than 50 feet from the edge of a resource, but within pre-disturbed areas (which do not require a variance in accordance with the FERC Procedures) are identified in Table 2D-1 in Appendix 2D. ATWS areas located within 50 feet of a resource which require a variance from the FERC Procedures are identified in Table 2D-2.

In accordance with the OPEN Project E&SCP, Texas Eastern will conduct post-construction maintenance and monitoring of the ROW in affected wetlands to assess the success of restoration and revegetation. Monitoring efforts will include documenting occurrences of exotic invasive species to compare to pre-construction conditions. During field surveys, Texas Eastern documented the presences of purple loosestrife (*Lythrum sallicaria*), European milfoil (*Myriophyllum spicatum*), lesser naiad (*Najas minor*), reed canary grass (*Phalaris arundinacea*), Phragmites (*Phargmites australis*), curly pondweed (*Potamogeton crispus*), Lesser celandine (*Ramunculus ficaria*), European buckthorn (*Rhamnus frangula*), narrow-leaved cattail (*Typha angustifolia*), narrow-leaved cattail hybrid (*Typha xglauca*) during the 2012 and 2013 wetland surveys. These ten species identified in OEPA's ORAM for Wetlands as invasive or exotic and have the potential to degrade wetlands. As described above, Texas Eastern will monitor these documented occurrences during the post construction wetland monitoring. Currently, Texas Eastern is consulting with the OEPA as part of the 401 Water Quality Application process and will work with the OEPA as needed regarding invasive exotic species.

To assist with these periodic monitoring and surveillance efforts, and to comply with the USDOT Safety Standards (49 CFR Part 192), a 30-foot corridor centered on the pipeline will routinely be cleared of woody growth greater than 15 feet in height, with a 10-foot strip centered over the pipeline being maintained in an herbaceous state. Because of this vegetation maintenance restriction within wetland areas, 20 feet of Texas Eastern's 50-foot wide permanent ROW easement within wetlands will be allowed to revert to scrub-shrub and forested cover types.

As described in Section 4.3.4, to offset unavoidable temporary impacts to wetland and waterbody resources, the minimal degradation alternative includes the Open Project Mitigation Plan. The OPEN Mitigation Plan compensates for the temporary loss of aquatic resource functions and values by providing stream mitigation through the preservation of 965 linear feet of perennial stream and 3.3 acres of its surrounding riparian area as well as additional wetland mitigation through the restoration of 4.15 acres of

forested wetlands and 4.305 acres of non-forested wetlands. Detailed information regarding the benefits to water quality on aquatic life and wildlife are included in the OPEN Mitigation Plan located in Appendix 6.

Non-Degradation Alternative

In theory the non-degradation alternative would avoid any direct impact to wetlands, ponds, and or streams. Although due to the significant workspace requirements for the HDD entry and exits sites, temporary impacts to wetland and waterbodies would likely be unavoidable, and the avoidance, minimization, and mitigation measures proposed for the minimal degradation alternative would be utilized.

In the event of an inadvertent drilling fluid release, Texas Eastern would implement the following measures:

1. Monitor mud pressures down hole to ensure they do not get too high for the materials and depth of cover being penetrated.
2. Conduct frequent visual inspections of the drill path on the surface so that timely detection of a release can be achieved.
3. Stop the mud pumps once an inadvertent release has been detected so that the release does not spread and secure the perimeter with straw bales, silt fence, sand bags, or other means as appropriate.
4. Notify Texas Eastern's environmental inspectors to ensure efforts are being undertaken to protect the waterbody and any associated wetlands.

6.0 REFERENCES

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APPENDIX 1

Figures

USGS Mapping Including Project Wetlands and Waterbodies
Natural Resource Mapping
Public Water Supply
HUC 10 and 12 Watersheds

APPENDIX 2

OPEN Project Construction Plans

Erosion and Sediment Control Plan
Blasting Plan
FERC Plan
FERC Procedures
Spill Prevention Control and Countermeasure Plan
Stream and Wetland Cross Section Detail

APPENDIX 3

OPEN Wetland and Waterbody Tables

Table 3-1 OPEN Project Wetlands
Table 3-2 OPEN Project Waterbodies

APPENDIX 4

Agency Consultation Correspondence

APPENDIX 5

Data Forms, Photographs, and Mapping

Wetland and Waterbody Summary Forms
Wetland Determination Forms
OEPA Forms (ORAM, HHEI, QHEI)
Photographs
Natural Resource Maps
USGS Wetland and Waterbody Maps

APPENDIX 6

OPEN Project Wetland Mitigation and Monitoring Plan and Stream Preservation Plan