APPENDIX L -1

COMPREHENSIVE ENVIRONMENTAL EVALUATION FOR CENTRAL PENN LINE

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On August 28, 2015, Transcontinental Gas Pipe Line Company (Transco) submitted Joint Permit Applications (JPA) to the Pennsylvania Department of Environmental Protection (PADEP) for the Atlantic Sunrise Project (Project). Separate applications were submitted for each of the eight (8) counties crossed by the Central Penn Line (CPL) portion of the Project. This Comprehensive Environmental Evaluation (CEE) presents information in summary form for the Project as a whole rather than by county as presented in each of the JPAs.

1.0 OVERALL PROJECT ALTERNATIVES ANALYSIS

1.1 ALTERNATIVES

This alternatives analysis summary describes the alternatives that Transco considered for the new, greenfield natural gas pipeline (i.e., the CPL North and CPL South pipelines). In addition to the No Action Alternative, which does not meet the Project's purpose and need, Transco considered system alternatives, major and minor route alternatives, route deviations, and construction alternatives.

The objective of Transco's alternatives analysis is to develop proposed pipeline routes that will be constructible, accomplish the Project's purpose and need, and will avoid or minimize potential adverse environmental impacts. In addition, the alternatives analyses were developed to be consistent with the Federal Energy Regulatory Commission's regulatory requirements as set forth in 18 Code of Federal Regulations 380.15 and 25 PA. Code § 105.13(e)(viii).

The following is a summary of the alternatives analysis for the Project as whole. A detailed analysis of the alternatives Transco considered for each county is provided in Attachment P-1 of each JPA.

1.1.1 No Action Alternative

Under a no-action alternative, the proposed facilities would not be constructed, short- and long-term environmental impacts from the Project would not occur, and the Project purpose and need would not be met. By not constructing the Project, Transco would not be able to provide the natural gas transportation service requested by the customers that have executed binding agreements for Transco to provide 1.7 million dekatherms per day of incremental firm transportation of natural gas from the Marcellus Shale production areas in northern Pennsylvania to its existing market areas, extending to as far south as Choctaw County, Alabama. The no-action alternative would not result in increased access to reliable, domestic natural gas supplies from the Marcellus Shale production areas. Transco's review of existing and available energy sources indicates that natural gas is the best fuel source to provide clean, reliable energy necessary to meet existing and future demand while minimizing environmental impacts.

The existing Transco facilities in or near the Project area are not currently designed to transport natural gas from north to south and do not provide adequate pipeline takeaway capacity for transportation of natural gas to meet current transportation demand. If the no-action alternative is selected, Transco's customers will need to:

- Seek other transportation services;
- Forgo meeting their natural gas demand until energy conservation measures stabilize or decrease demand, possibly limiting their growth and the growth of the local economies they serve; and

- Depend on other future development projects with unpredictable schedules and undetermined environmental impacts.

For the reasons described above, the no-action alternative does not meet the Project objectives of providing the additional transportation capacity of natural gas requested by its customers within the time frame required and was eliminated from further consideration.

1.1.2 Transco Existing System Alternatives

The Transco Existing System Alternative would utilize the existing rights-of-way (ROWs) of the Transco's Leidy Line and Mainline systems to the extent practicable by installing noncontiguous pipeline loop[1] and other facilities along these systems. The Transco Existing System Alternative incorporates a segment of the current proposed CPL North route, from the Zick Meter Station at approximate milepost (MP) 57.33, to the proposed North Diamond Regulator Station near MP L92.7 in Luzerne County, Pennsylvania. From this point, the alternative route runs east along the Leidy Line System to existing Compressor Station 515 in Luzerne County, Pennsylvania. An additional Leidy Line loop would be required between existing Compressor Stations 517 and 515 to accommodate volumes of natural gas moving eastward. East of Compressor Station 515, several sections of pipeline loop would be required to transport the incremental volumes along the Leidy Line and Transco Mainline systems. A figure of the Transco Existing System Alternative is provided in Section 3.0 of Attachment P-1 of each JPA.

Transco's currently proposed Unity Loop, Chapman Loop, and horsepower (hp) additions at Compressor Stations 517, 520 and 190 would still be required as part of this system alternative. Similarly, facilities located south of Compressor Station 195 (i.e., replacement of 2.5 miles of pipeline in Virginia and aboveground facility modifications in Maryland, Virginia, North Carolina, and South Carolina) would also be required for the Transco Existing System Alternative to meet the Project's purpose and need. In addition, the Transco Existing System Alternative would require adding additional compression and construction of 10 additional pipeline loops along Transco's existing Leidy Line and Mainline systems in Pennsylvania and New Jersey.

Transco eliminated the Transco Existing System Alternative from further consideration because it would be approximately 51.1 miles longer than the proposed Project route and affect approximately 619 acres additional acres of land during construction. A pipeline loop along Transco's existing Mainline System would located in proximity to high population density areas including Wilkes-Barre, Pennsylvania and Trenton and Princeton, New Jersey. Therefore, collocating a pipeline loop with the existing pipeline system may not be possible in all instances due to the development that has occurred since construction of the original pipelines. A pipeline loop along this system alternative would result in greater impacts on residential, commercial and industrial properties with a 15 times greater occurrence of residential structures located within 50 feet of construction workspace. In addition, to being in proximity to areas of high population density and residences, this system alternative would require installing an additional 51,000 hp of compression compared to the Project. In addition, the Transco Existing System Alternative are that it would affect forestland, waterbodies, and wetlands than the Project.

[1] A pipeline loop is a segment of pipe that is typically constructed parallel and slightly offset to an existing pipeline to increase capacity.

1.1.3 Major Route Alternatives Considered for the Project

Major route alternatives include those that deviate from the proposed route for a significant distance and which provide a substantially different pathway from the source area to the delivery area.

Transco analyzed three major route alternatives for the Project as a whole: (1) Diamond CPL North Alternative, (2) Williams Midstream CPL North Alternative, and (3) Western CPL South Alternative.

Diamond CPL North Alternative

Transco evaluated the Diamond CPL North Alternative as an alternative to the CPL North pipeline alignment. This alternative starts at the proposed Zick Meter Station in Susquehanna County and continues south for approximately 80 miles, bisecting Transco's existing Leidy Line A to the north and Leidy Lines B and C to the south, and terminates near MP 93.2 of the CPL South pipeline in Columbia County. A figure of the Diamond CPL North Alternative and comparison table is provided in Section 6.1 of Attachment P-1 of each JPA. Approximately 48 miles of the alternative route is co-located with other ROWs and the remaining 32 miles is primarily new, greenfield ROW. The Diamond CPL North Alternative is approximately 23 miles longer than the corresponding sections of the proposed CPL North route and would likely require an additional compressor station along CPL North pipeline because it would bypass existing Compressor Station 517 along Transco's Leidy Line System.

Transco eliminated the Diamond CPL North Alternative from further consideration because it would be considerably longer and affect more land than the corresponding segment of the CPL North pipeline route. In addition, it would likely require a second new compressor station along the CPL North pipeline. This alternative would affect more forestland, agricultural land and cross more waterbodies and wetlands than the corresponding segment of the CPL North pipeline route and it would be in proximity to high population density areas including to Scranton, Wilkes-Barre, and Nanticoke, Pennsylvania, resulting in greater impacts on residential and other developed areas.

Williams Midstream CPL North Alternative

Transco evaluated the Williams Midstream CPL North Alternative to maximize collocation with existing rights-of-way. This alternative starts at the proposed Zick Meter Station in Susquehanna County and continues west along the Williams Field Services (midstream) Appalachian Basin Area. It is co-located with 10-inch- and 12-inch- diameter pipelines for approximately 11 miles and then is adjacent to the existing Williams Field Services Springville 24-inch-diameter midstream pipeline until it intersects with the Transco's Leidy Line System, where the route is co-located for an additional 4 miles. The Williams Midstream CPL North Alternative terminates at its connection point, near MP 21.3 on the proposed CPL North pipeline route in Luzerne County. A figure of the Williams Midstream CPL North Alternative and comparison table is provided in is provided in Section 6.2 of Attachment P-1 of each JPA.

Transco eliminated the Williams Midstream CPL North Alternative from further consideration because it would be approximately 11 miles longer than the proposed CPL North pipeline route. In addition, the midstream pipeline routes have several tight turns that would be impractical to site the 30-inch-diameter CPL North pipeline thereby making co-location through certain areas of the alternative route infeasible. In addition, ***this*** ~~**the**~~ alternative route crosses more densely populated areas than the CPL North pipeline route, particularly on the south end where the alternative route is not co-located with the Williams Field

Services Springville 24-inch-diameter midstream pipeline. This would result in significant impacts on residential and other developed areas.

Western CPL South Alternatives

Transco evaluated the three (3) Western CPL South Alternative alignments as alternatives to the proposed CPL South alignment. Alternative alignment 1 (Alternative 1) is located approximately 6 to 12 miles west of the proposed route. It begins in Lycoming County and proceeds south across Lycoming, Columbia, Montour, Northumberland, Schuylkill, Dauphin, Lancaster, and York counties. Alternative 1 terminates at Transco's existing Compressor Station 195 in York County.

Alternative alignments 1 and 2 incorporate segments of the proposed route from existing Compressor Station 517 in Columbia County, south to approximate MP 38.1. From this point, the alternative alignments proceed southwest across the to the Susquehanna River and follow a portion of the Alternative 1 alignment in a south-southeasterly direction to their respective terminus points in York County at Transco's existing Compressor Station 195 (Alternative 2) and at an interconnect with the existing Transco Mainline System (Alternative 3). A figure of the Western CPL South Alternative alignments and comparison table is provided in Section 3.2.3 of the Federal Energy Regulatory Commission (FERC) ***Final*** ~~**Draft**~~ Environmental Impact Statement (***December*** 2016).

Of the three alternative alignments evaluated, the proposed route is the shortest in length. Because the proposed route is the shortest in length, it would reduce the amount of land disturbed during construction. The advantages of the alternative alignments are that they follow existing ROWs for a greater percentage of their lengths when compared to the proposed route. Some of the benefits of collocating with existing ROWs are that it reduces impacts on interior forest and can often be used to overlap construction workspaces in previously disturbed areas, reducing the overall impact. However, the alternative alignments cross more developed land than the proposed route. The proposed route crosses the least amount of forestland when compared to the three alternative alignments in addition to fewer waterbody and wetland crossings. Each of the three alternative alignments would cross the Susquehanna River, which the proposed route does not.

While the alternative routes would have the benefit of increasing collocation with existing ROWs, the environmental disadvantages far outweigh any benefit the increased collocation would provide. In addition, crossing the Susquehanna River, which would be required by Alternatives 1, 2, and 3, would be technically challenging given the extensive area that would have to be crossed using the horizontal directional drill (HDD) method, limited workspace along the river banks, and differences in elevation along the river. Therefore, Transco eliminated the three Western CPL South Alternative alignments from further consideration.

1.1.4 Minor Route Alternatives Considered for the Project

Minor route alternatives are typically shorter in length than major route alternatives and are often identified to avoid large environmental resources, engineering constraints, and/or developed areas. Minor route alternatives typically remain within the same general area as the proposed route.

Transco analyzed a total of ***41*** ~~**40**~~ minor route alternatives for the Project as a whole. Of this amount, four were analyzed in Columbia County, 10 were analyzed in Lancaster County, six were analyzed in Lebanon County, seven were analyzed in Luzerne County, two were analyzed in Northumberland County, six were

analyzed in Schuylkill County, one was analyzed in Susquehanna County, and ***five*** ~~**four**~~ were analyzed in Wyoming County. A figure of the minor route alternatives and comparison table is provided in Section 7.0 of Attachment P-1 of each JPA.

Of the minor route alternatives that were analyzed, Transco incorporated three in Columbia County, six in Lancaster County, four in Lebanon County, two in Luzerne County, one in in Northumberland County, four in Schuylkill County, and ~~**one**~~ ***two*** in Wyoming County. The incorporation of these minor route alternatives into Transco's Project pipeline route avoids or reduce effects on environmental or other resources, resolve engineering or constructability issues, or address stakeholder concerns.

1.1.5 Route Deviations Considered for the Project

Route deviations are typically site-specific and may allow for avoidance of certain localized features such as a residence, wetland, or cultural resource site.

Transco accepted a total of ~~**143**~~ ***167*** route deviations for the Project as a whole. Of this amount, ~~**23**~~ ***31*** were accepted in Columbia County, ~~**35**~~ ***41*** were accepted in Lancaster County, ~~**26**~~ ***27*** were accepted in Lebanon County,~~**10**~~ ***15*** were accepted in Luzerne County, ~~**8**~~ ***9*** were accepted in Northumberland County, ~~**13**~~ ***15*** were accepted in Schuylkill County, 10 were accepted in Susquehanna County, and~~**18**~~ ***19*** were accepted in Wyoming County. A table of the route deviations accepted into Transco's pipeline route is provided in Section 8.0 of Attachment P-1 of each JPA. The incorporation of these route deviations into Transco's Project pipeline route avoids or reduce effects on environmental or other resources, resolve engineering or constructability issues, or address stakeholder concerns.

1.1.6 Waterbody and Wetland Construction Method Alternatives

During design of the Project, Transco attempted to avoid and minimize waterbody and wetland impacts that could result from construction and installation of the Project pipeline by reducing the construction ROW to 75 feet, where practicable, and by proposing to maintain the ROW in accordance with the FERC Wetland and Waterbody Construction and Mitigation Procedures.

Based on comments received from PADEP, Transco conducted a comprehensive trenchless crossing analysis for both waterbodies and wetlands within each of the affected counties (see Attachment P-1, Appendix P-2, of each JPA). Some of the critical factors taken into consideration to determine if trenchless construction methods would be successful include surface conditions, workspace requirements, subsurface conditions, ground surface elevation, water allocations, inadvertent returns, drilling fluid disposal, risks, constructability, schedule and post-construction accessibility. Trenchless construction methods that were assessed ***and approved*** include the ***five (5) installations via the*** HDD method and ***six (6) installations via the*** conventional bore method.

While a successful HDD or conventional bore may have certain environmental benefits the overall environmental impact can be greater, particularly if the waterbody is small and can be crossed using dry crossing methods in a short period of time (i.e., 24 to 48 hours). Also, trenchless construction methods may not be feasible at all locations because of suboptimal substrate or geologic conditions. Therefore, Transco proposed to use conventional construction methods to cross the majority of waterbodies along the Project route using open-cut crossings and dry crossings (e.g., flume pipe or dam-and-pump).

1.1.7 Routing Process/Impact Avoidance and Minimization Measures

Based on the commercial aspects of the Project, Transco evaluated start and endpoints for the proposed Project pipeline routes and identified potential route alternatives within this area. Factors that were considered to define the route start and endpoints of the proposed CPL North and CPL South pipelines included the selection of new receipt points, tie-in locations between the CPL North and CPL South pipelines and the existing Leidy Line System, and tie-in locations between the CPL South and the existing Mainline Line System. Transco then identified routing engineering and environmental constraints that required detailed analyses and an attempt***ed*** to avoid or minimize potential impacts along its proposed pipeline route and alternative routes.

Due to the linear nature of the Project, it is not possible to completely avoid impacts on waterbodies, wetlands, or other sensitive resources. However, Transco used a comprehensive field routing process to identify a constructible alignment for CPL North and CPL South pipeline routes that will avoid or minimize impacts on waterbodies, wetlands, and other sensitive resources to the extent practicable. Impact avoidance and minimization has been accomplished for the Project with field routing teams comprised of engineering, construction, and environmental specialists. These teams assessed pipeline route alignment options with regard to an array of engineering and environmental factors, land requirements, and potential effects on cultural resources before selecting a preferred pipeline route. Factors that were considered include:

Engineering

- Avoiding general engineering and constructability constraints;
- Minimizing route distance along steep slopes and side slopes;
- Reducing the number of severe pipeline bends and turning angles;
- Identifying and avoiding, where practicable, areas of karst topography;
- Identifying and evaluating opportunities for utilizing trenchless technology such as HDD and boring; and
- Identifying and avoiding, where practicable, locations with a potential need for blasting.

Environmental

- Minimizing impacts at any single wetland crossing to 1 acre or less wherever practicable;
- Avoiding or minimizing impacts on forested wetlands and other wetlands;
- Avoiding or minimizing impacts on known threatened and endangered species habitat, such as:
    - Rocky talus slopes potentially used as habitat by the timber rattlesnake (*Crotalus horridus*), Allegheny woodrat (*Neotoma magister*), and small-footed bat (*Myotis leibii*);
    - Wetland complexes with features suggesting potential suitability as bog turtle habitat;~~ and~~
    - Palustrine emergent wetlands surrounded by woodlands, which may be suitable habitat for the northeastern bulrush (*Scirpus ancistrochaetus*)***; and,***
    - Forest stands containing trees greater than 5 inches diameter at breast height with exfoliating bark, cracks, crevices, and/or hollows. Prime examples would include live shagbark hickory trees (*Carya ovata*) and shellbark hickory trees (*C. laciniosa*), dead elms (*Ulmus* spp.), dead poplars (*Populus spp*.), or any tree with a rotted-out cavity, which may be potential roosting

trees or suitable habitat for the Indiana bat (*Myotis sodalis*) and northern long-eared bat (*Myotis septentrionalis*).

- Crossing waterbodies at 90 degree angles to minimize in-stream disturbance wherever practicable;
- Avoiding or minimizing crossings of major waterbodies;
- Minimizing impacts on contiguous upland forest by routing the centerline along tree lines or through existing cleared areas to the greatest extent practicable; and
- Identifying and avoiding, where practicable, groundwater springs/seeps.

Land

- Minimizing impacts on private property and structures;
- Minimizing conflicts with land use; and
- Minimizing impacts on residential water wells and septic systems.

Cultural

- Avoiding or minimizing impacts on sites listed on or potentially eligible for listing on the National Register of Historic Places; and
- Identifying and avoiding, where practicable, aboveground structures that appeared to be over 50 years old.

1.2 COMPENSATORY MITIGATION

Transco submitted a Permittee-Responsible Mitigation (PRM) Plan as part of its application for a Clean Water Act (CWA) Section 404 permit, CWA Section 401 Certification, and PADEP Application. Transco is proposing off-site mitigation for palustrine forested (PFO) and palustrine scrub-shrub (PSS) wetlands disturbed by construction and operation of the Project. No wetlands will be permanently lost (e.g., no fill will be placed in wetlands) as a result of construction; however, permanent impacts on wetlands will include those wetlands located within the new permanent ROW, to be maintained regularly during operation of the pipeline, and will result in the conversion of forested vegetation to ~~**palustrine scrub-shrub (**~~PSS~~**)**~~ and palustrine emergent (PEM) as well as PSS to PEM vegetation types within the maintained ROW. According to the U.S. Army Corps of Engineers (USACE), a mitigation strategy involving the purchase of mitigation bank credits or participation in an in-lieu fee program are currently not available. A detailed analysis of compensatory mitigation is provided in Attachments L-5, Q-1, and Q-2 of each JPA. ***The following sections summarize the watercourse and wetland impacts and proposed mitigation.***

1.2.1 Wetland Impacts and Mitigation

No permanent fill will be placed in wetlands as a result of the Project; however, there will be permanent conversion of PFO wetlands to PEM or PSS vegetation types and/or PSS to PEM vegetation types within the permanent ROW. Transco is providing off-site compensatory mitigation for temporal conversion of PFO and PSS wetlands to ~~**palustrine emergent**~~***PEM*** wetlands within a 10-foot wide operation and maintenance corridor centered over the pipeline within the permanent easement. The Mitigation Master Plan and Permittee Responsible Mitigation Plan are provided as Attachments Q-1 and Q-2, respectively, of each JPA.

While Transco will implement its compensatory mitigation plans as described ***in the above-referenced attachments*** ~~**above**~~, the majority of the impacts on wetlands from pipeline construction will be temporary and short term because Transco will restore all wetlands to preconstruction contours and hydrology. Transco will mitigate for unavoidable wetland impacts by implementing the procedures specified in its Project-specific Erosion and Sediment Control Plan (see Attachment M of each JPA) and by complying with the conditions of its section 404 and 401 permits. Specific measures Transco will implement in addition to limiting vegetation maintenance practices in wetlands include:

- limiting the construction ROW width to 75 feet, except in areas where site-specific conditions require additional space;
- locating extra workspaces at least 50 feet from wetland boundaries, except where site-specific conditions warrant otherwise;
- cutting vegetation just above ground level, leaving existing root systems in place, and limiting the pulling of stumps and grading activities to directly over the trenchline except where the Chief Inspector and Environmental Inspector determine that these activities are required for safety reasons;
- using low ground weight equipment or operating equipment on timber mats in saturated soils to prevent rutting;
- installing sediment barriers immediately after initial ground disturbance at the edge of the boundary between wetlands and uplands, immediately upslope of the wetland boundary, and along the edge of the ROW as necessary to contain spoil and to protect adjacent wetland areas;
- segregating the top 12 inches of topsoil from the trenchline, except in areas where standing water is present or soils are saturated or frozen;
- decompacting compacted wetland soils by plowing or similar methods;
- prohibiting the use of rock, soil imported from outside the wetland, tree stumps, or brush riprap to stabilize the ROW;
- installing trench plugs as necessary to maintain the original wetland hydrology;
- restoring preconstruction contours to maintain the original wetland hydrology;
- prohibiting the use of lime or fertilizer within wetlands;
- seeding restored wetlands with annual ryegrass or an agency approved wetland seed mix, unless standing water is present; and
- prohibiting the use of herbicides or pesticides within 100 feet of wetlands or waterbodies except as specified by the appropriate land management or state agency.

Following construction, Transco will ensure that all disturbed wetland areas are successfully revegetated. Transco's mitigation measures to control invasive species during construction are described in its Project-specific Erosion and Sediment Control Plan (see Attachment M of each JPA).

1.2.2 Waterbody Impacts and Mitigation

For the Project as whole, no fill or water obstructions will be added to streams; therefore, no loss of stream functions and values is expected to occur. Transco will cross the majority of waterbodies using an open-cut, dry crossing method involving either the flume or dam-and-pump technique. Upon completion of in-stream construction, Transco will stabilize the stream bed and surface water banks and bed to preconstruction contours such that they are similar to banks at the limits of disturbance. Transco will also

utilize pre-construction photographs. Stream banks will be stabilized using geotextile fabric. Attachment L-5, Appendix L-3, Table 1 of each JPA, identifies each watercourse and the stream restoration detail to be utilized on either bank. Typical details for streambed restoration are included in the Best Management Practices (BMPs) and Quantities Plan Set in Attachment M of each JPA. Transco will restore the streambed to grade using native streambed material. To further stabilize the surface water banks, Transco will re-vegetate the banks and riparian areas using approved seed mixes as identified within the BMPs Quantities and Plan Set in Attachment M of each JPA. If inclement weather limits the effectiveness of reseeding efforts, temporary erosion control measures will be implemented to minimize erosion until conditions are suitable for reseeding. The temporary erosion control measures will be monitored and maintained until conditions are suitable for completion of restoration. No fertilizers, lime, or mulch will be utilized in riparian areas unless required in writing by PADEP.

Following construction, disturbed areas adjacent to waterbodies will be reseeded with approved seed mixes. Trees and other woody vegetation will be allowed to reestablish naturally within the temporary ROWs and other temporary workspaces that were cleared for construction of the pipeline. The use of soil conservation techniques will avoid and/or minimize erosion and runoff that could potentially affect surface water quality.

No permanent fill will be placed in any waterbody as a result of this Project, and no stream relocation is expected. Therefore, no stream mitigation is proposed for the Project as a whole.

~~**In addition,**~~ Transco prepared a Riparian Area Impact Assessment and Restoration Plan for each county (see Attachment L-5, Appendix L-2, of each JPA). Transco assessed the condition of existing riparian areas (i.e., land bordering a waterbody) located in Project workspace; evaluated riparian area functions; quantified riparian area impacts from construction and operation of the Project; and presented BMPs proposed to avoid and minimize impacts on riparian areas. The PADEP requested that Transco evaluate riparian areas from the top of bank landward for a minimum of 100 feet, which is consistent with PADEP's Riparian Buffer Guidance. The PADEP guidance also states that the average width should be extended to a minimum of 150 feet along waters designated as High Quality or Exceptional Value, consistent with the riparian buffer protection width in Chapter 102.14 of the Pennsylvania Code. Based on this guidance, Transco evaluated riparian areas using a 100-foot buffer from the top of bank of non-HQ/EV waters, and a 150-foot buffer from the top of bank for HQ/EV waters.

Impacts on riparian buffers have been avoided to the extent practicable through early routing efforts, which focused on siting the proposed pipeline to avoid paralleling streams and crossing streams at 90-degree angles. In addition, the following minimization practices were incorporated into the Project design: reduce the construction workspace ROW width by up to 15 feet (from originally proposed 90 feet), depending on site-specific conditions; ***l***~~L~~ocate additional temporary workspace 50 feet from stream boundaries, except where specific conditions warrant otherwise; and cut vegetation just above ground level, leaving existing root systems in place and limit the pulling of stumps and grading activities to directly over the trench line where practicable. ***Finally, Transco is also proposing to replant riparian forest buffers crossed by the Project. Replanting will occur within the regulated floodplain (FEMA-mapped 100-year floodplain or 50-foot wide floodway, whichever is greater). Transco is also proposing to replant riparian forest buffers where such buffers overlap with locations where a riparian buffer waiver is being requested.*** After the completion of construction and restoration activities, and in accordance with Transco's Upland Erosion Control, Revegetation, and Maintenance Plan, Transco will conduct follow-up inspections of all disturbed upland areas after the first and second growing seasons to determine the success of restoration.

2.0 CONSISTENCY WITH ANTIDEGRADATION POLICY

The proposed Project extends through 46 special protection watersheds (e.g., High Quality or Exceptional Value) and watersheds that are considered siltation impaired. As a result, an anti-degradation analysis was prepared for the Project and a detailed listing of each watershed, cause of siltation, and location it will be crossed is provided for each county within Attachment M of each JPA.

2.1 STRUCTURES AND ACTIVITIES IN EXCEPTIONAL VALUE WETLANDS

Transco has submitted an applications to ~~the~~ PA DEP for a Joint Permit under the Chapter 105 Pennsylvania Water Obstruction and Encroachment guidelines. The permit applications address the portions of the Project that are subject to Chapter 105 and are within the jurisdiction of the Northeast, North Central and South Central Regions of ~~the~~ PA DEP.

Pursuant to Chapter 105, Transco has demonstrated that:

- the Project will not have an adverse impact on wetlands (see Attachments L and Q of each JPA);
- the Project is water-dependent (see Attachments L, N, and O of each JPA);
- there is no practicable alternative to the proposed Project that would not involve a wetland or that would have less effect on the wetland, and not have other significant adverse effects on the environment (see Attachments L and P of each JPA);
- the Project will not cause or contribute to a violation of an applicable State water quality standard (see Attachments L and M of each JPA);
- the Project will not cause or contribute to pollution of groundwater or surface water resources or diminution of resources sufficient to interfere with their uses (see Attachments L and M of each JPA);
- the cumulative effect of the Project and other projects will not result in the impairment of exceptional value wetland resources (see Attachment L ***of*** each JPA); and,
- affected wetlands will be replace in accordance with Section 105.20a (see Attachments L and Q of each JPA)

2.2 ANTIDEGRADATION REQUIREMENTS

The proposed Project extends through special protection watersheds as well as watersheds that are considered siltation impaired. While the Project pipeline corridor will cross multiple special protection watersheds, the design approach and proposed BMPs are consistent for the Project as a whole. The following non-discharge alternatives for the Project were considered to minimize accelerated erosion and sedimentation during earth disturbance activities and to maintain pre-development stormwater runoff rate, volume and concentration of pollutants.

2.2.1 Alternative Siting

As discussed in Section 1.0 above, Transco's alternative siting/routing analysis developed a pipeline alignment that will be constructible, accomplish the Project's purpose and need, while avoiding or minimizing potential adverse environmental impacts to the greatest extent practicable in accordance with the FERC's guidelines as set forth in 18 Code of Federal Regulations 380.15. A detailed analysis of the alternatives Transco considered is provided in Attachment P-1 of each JPA. One of Transco's primary

siting strategies was to collocate the proposed pipeline route with existing utility corridors to minimize forest removal and disturbance of established vegetation. Forty- two (42) of the CPL North and twelve (12) percent of the CPL South pipeline are collocated within existing utility corridors.

2.2.2 Limited Disturbed Area

The limit of disturbance along the Project pipeline construction ROW was minimized to avoid Project-related land impacts. Typical ROW widths were reduced in areas where impacts to environmentally sensitive areas were unavoidable. Transco conducted a comprehensive trenchless crossing analysis for both waterbodies and wetlands within each of the affected counties (see Attachment P-1, Appendix P-2, of each JPA). Based on the results of these analyses, trenchless crossing methods were incorporated into the Project design at a number of wetlands and waterbodies within special protection watersheds.

In areas of disturbance within riparian buffers, the proposed permanent conversion of forested riparian buffer to herbaceous riparian buffer affects a relatively small fraction of the overall riparian buffer for each affected watercourse and the larger watershed. In addition, the remaining herbaceous riparian vegetation will continue to provide beneficial functions related to water quality. Therefore, any potential changes in riparian area thermal functions will be minor and isolated to the 10-foot area centered over the pipeline within the permanent easement and are not expected to result in the degradation of the existing stream uses or associated water quality.

2.2.3 Limit Extent and Duration of Disturbance

Disturbed areas will be final graded and permanently stabilized as construction progresses in a linear manner along the pipeline ROW. The expected maximum length of time that any section of trench will be open is 30 days. Additionally, temporary stabilization will occur within 4 days of the completion of any earth disturbance activities in non-wetland and stream areas and 48 hours within areas of wetland and stream disturbance. At wetland and stream crossings, all pipe installation and temporary restoration is proposed to be completed within a 48-hour period.

2.2.4 Site Restoration

Restoration of the pipeline ROW will be conducted in accordance with the restoration requirements discussed in the Attachment 14 of Transco's Project-specific Erosion and Sediment Control Plan. Restoration (see Attachment M of each JPA) will primarily include, but is not limited to, surface decompaction and replanting.

To supplement the use of non-discharge BMPs within the Project workspace areas, Antidegradation Best Available Combination of Technologies (ABACT) Erosion and Sediment Control BMPs are also proposed in the special protection and siltation impaired watersheds and include the following:

- Compost filter socks
- Rock construction entrances with wash racks
- Compost filter sock and sump at waterbar discharges
- Erosion control blankets
- Horizontal Directional Drilling
- Rock filter outlets with compost layer
- Bored waterbody crossings

Based on the above non-discharge alternatives and protective BMPs, it is anticipated that the Project will not have a significant impact, thermal or otherwise, to the functions of special protection watersheds.

In addition, as an additional protection measure ***and as discussed above***, Transco is proposing ~~**voluntary replanting of**~~***to replant*** riparian forest buffers crossed by the Project ~~**that are associated with an Exceptional Value or High Quality watercourse.**~~ Replanting will occur within the regulated floodplain ~~**(Federal Emergency Management Agency [**~~FEMA~~**]**~~-mapped 100-year floodplain or 50-foot-wide floodway ~~**if no FEMA mapped floodplain is present**~~, whichever is greater). Transco also proposes to replant in areas where Chapter 102 riparian buffer waivers are being requested. Riparian Buffer Impact Assessment and Restoration Plans are provided in Attachment L-5, Appendix L-2, of each JPA.

3.0 OVERALL IMPACT TABLES FOR AQUATIC RESOURCES

The following tables summarize the overall impacts on waterbodies and wetlands for the Project as a whole. Detailed tables are provided in Attachment L-5 of each JPA.

3.1 WATERBODIES

TABLE 3-1
Summary of Waterbodies Crossed by the CPL North and CPL South Pipelines

Commonwealth/ Facility	Perennial Waterbody Crossings	Intermittent Waterbody Crossings	Ephemeral Waterbody Crossings	Total
CPL North	***89*** ~~**116**~~	***30*** ~~**52**~~	***20*** ~~**23**~~	***139*** ~~**191**~~
CPL South	***132*** ~~**101**~~	***59*** ~~**35**~~	***20*** ~~**17**~~	***211*** ~~**153**~~
Total	***221*** a/ ~~**217** a/~~	***89*** ~~**87**~~	**40**	***350*** ~~**344**~~

a/ Total includes ~~**211**~~ ***213*** perennial waterbodies and 6 ponds.

3.2 WETLANDS

TABLE 3-2
Summary of Wetland Acreages Affected by the Construction and Operation of the CPL North and CPL South Pipelines

State/Facility	Wetland Impacts a/, b/ (acres)							
	PEM		PSS		PFO		Total	
	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.	Temp.	Perm.
CPL North	***15.59*** ~~**16.6633**~~	***1.88*** ~~**1.9183**~~	***2.95*** ~~**2.9839**~~	***0.35*** ~~**0.3557**~~	***4.07*** ~~**5.1706**~~	***2.17*** ~~**2.6792**~~	***22.61*** ~~**24.8178**~~	***4.40*** ~~**4.9532**~~
CPL South	***6.18*** ~~**4.6663**~~	***0.86*** ~~**0.6428**~~	***0.70*** ~~**0.5106**~~	***0.07*** ~~**0.0475**~~	***1.25*** ~~**0.9873**~~	***1.41*** ~~**1.0709**~~	***8.13*** ~~**6.1642**~~	***2.34*** ~~**1.7612**~~
TOTAL	***21.77*** ~~**21.3296**~~	***2.74*** ~~**2.5611**~~	***3.65*** ~~**3.4945**~~	***0.42*** ~~**0.4032**~~	***5.32*** ~~**6.1579**~~	***3.58*** ~~**3.7501**~~	***30.74*** ~~**30.9820**~~	***6.74*** ~~**6.7144**~~

a/ Temporary impacts include the ~~**construction right-of-way**~~***temporary workspace***, additional temporary workspace, and access roads.
b/ Permanent impacts reflect a 30-foot-wide corridor centered over the pipeline in forested wetlands and a 10-foot-wide corridor centered over the pipeline in scrub-shrub wetlands. The remaining areas within the permanent easement would be allowed to revegetate to preconstruction condition. Emergent wetlands would not be affected during operation as they would be allowed to revegetate to preconstruction condition.

4.0 ASSESSMENT OF CUMULATIVE IMPACTS

Cumulative effects may result when the environmental effects associated with construction and operation of a proposed Project are added to the environmental effects of other known Projects or activities occurring in the same area. The United States Environmental Protection Agency 1999 guidelines state:

> *"Cumulative impacts result when the effects of an action are added to or interact with other effects in a particular place and within a particular time. It is the combination of these effects, and any resulting environmental degradation, that should be the focus of cumulative impact analysis. While impacts can be differentiated by direct, indirect, and cumulative, the concept of cumulative impacts takes into account all disturbances since cumulative impacts result in the compounding of the effects of all actions over time."*

To identify and assess potential cumulative effects of the Project, Transco considered other past, present, and reasonably foreseeable Projects and other human-related activities near the Project.

4.1 PROJECT WIDE CUMULATIVE IMPACT ANALYSIS

The existing conditions in the Project area reflect changes from past and present activities. Although much of the area is rural and relatively undeveloped, substantial alterations to the natural environment have occurred due to agriculture, mining, transportation Projects, and other development. The potential for cumulative effects from the Project exists for resources including ***water quality (i.e.,*** groundwater, surface water, and wetlands***);*** ~~***;***~~***and ecology (***fish, vegetation, and wildlife including federally and state-protected species***)***.

The following is a summary of cumulative impacts for the Project as whole. Additional information on ***the potential for*** cumulative impact is provided in Attachment L-5 of each JPA.

4.1.1 Geographic Area for Cumulative Impact Analysis

Transco identified past, present, and reasonably foreseeable Projects and other human-related activities occurring in the vicinity (within 10 miles) of the Project that may result in cumulative effects when combined with the effects of the Project. Transco consulted with the affected municipal and county planning agencies to identify Projects in the vicinity of the Project and also identified other activities, such as residential Projects located within a 0.5-mile radius of the Project, as well as transportation and energy development Projects located within a 10-mile radius of the Project. In general, the closer another project is to the Project, the greater the potential for cumulative impacts and the more resources that could be cumulatively affected.

The assessment area for potential cumulative effects includes the area directly affected by construction of the Project in addition to the anticipated area of effect the Project may have on each resource. This assessment area varies for each resource, based on the potential for effects to extend beyond the area of direct effect. For example, effects on air quality have the potential to extend beyond the Project boundaries, but effects on geologic and soil resources would likely not extend beyond the construction boundaries. Cumulative effects are considered in the context of the appropriate geographic area of potential effect (e.g., watershed boundaries for water quality and use and county boundaries for socioeconomics).

4.1.2 Other Known Projects

CPL North Pipeline

The potential for cumulative impacts would be greatest where the CPL North pipeline begins, especially in Susquehanna County. The area to the west of the Project has been affected by past and ongoing development of natural gas wells and gathering pipelines and the construction and operation of associated meter stations and compressor stations. Other planned developments that would contribute to the cumulative resource impacts of the Project in Susquehanna County include Williams' (midstream) 5.9-mile-long Owego pipeline and Zick Compressor Station Discharge pipeline, which are scheduled to be constructed in 2016 and 2017.

In Wyoming County, additional cumulative impacts would result from construction of the new electric transmission line to supply power to the electric motor-driven compressor at Compressor Station 605. Construction of this transmission line would result in mostly temporary, but also some long-term, soil, land use, vegetation, wildlife, air quality, noise, and visual impacts.

In Luzerne County, the recently completed UGI Auburn Pipeline Expansion Project, the planned Central New York Oil & Gas Company's (CNYOG) MARC II Pipeline Project, and the proposed PennEast Pipeline Project (located further from the CPL North pipeline) would also contribute to the cumulative impacts of the Project. The Auburn Pipeline Expansion Project was completed in early 2014 and crosses the CPL North pipeline route. The MARC II Pipeline Project, which is tentatively scheduled to be constructed in 2017, but has not yet been proposed, would be 3.6 miles southeast of CPL North pipeline at its closest point. These pipelines have or would have similar resource impacts as the proposed CPL North pipeline; however, the majority of impacts were or would be temporary including impacts on soils, groundwater, surface water, wetlands, vegetation, wildlife, land uses, construction emissions, and noise. Other effects would contribute to permanent or long-term cumulative impacts, including the loss of forest cover, visual impacts, and forest fragmentation effects associated with the maintenance of a new ROW.

The Leidy Southeast Expansion Project, which was placed into full service on January 5, 2016, includes Compressor Station 517 in Columbia County (one new 30,000 hp compressor and replacement of an existing 12,500 hp compressor with a new 16,000 hp compressor) and Compressor Station 515 in Luzerne County (one new 16,000 hp compressor). The Leidy Southeast Expansion Project also includes 29.8 miles of new pipeline loop including the 5.3-mile-long Dorrance Loop in Luzerne County and the 11.5-mile-long Franklin Loop also in Luzerne County, and Monroe County to the east.

CPL South Pipeline

A new electric transmission line that would supply power to the electric motor-driven compressor at Compressor Station 610 is one action that would contribute to the cumulative impacts of the Project in Columbia County. Construction of this transmission line would primarily result in temporary but some long-term soil, land use, vegetation, wildlife, air quality, noise, and visual impacts would also occur.

Other known projects that could contribute regionally to cumulative impacts near the northern 70 miles of the CPL South pipeline route in Columbia and Northumberland counties include the Leidy Southeast Expansion Project, which was placed into full service on January 5, 2016, and active or planned Pennsylvania Department of Transportation (PennDOT) projects. The majority of impacts associated

with the Leidy Southeast Expansion Project were or would be temporary including impacts on soils, groundwater, surface water, wetlands, vegetation, wildlife, and land uses. The transportation projects generally involve bridge replacements or rehabilitations. The closest of these is the ongoing replacement of the State Road 2019 bridge over German Run, which is 3.6 miles from the Project pipeline route. These PennDOT projects would or could contribute to cumulative impacts on soil, surface waters, traffic, and visual effects during their construction. However, most of these effects would be temporary, highly localized, and for the most part confined to previously disturbed areas.

In Lebanon County, two actions could contribute to the cumulative impacts of the Project, the recently constructed Texas Eastern Appalachia to Market 2014 Grantville West Discharge, which crosses the CPL South route near MP 51, and the proposed Sunoco Logistics Mariner East 2 Pipeline Project, which would cross the CPL South route near MP 41. The Texas Eastern line was completed in late 2014 and the Mariner East 2 Pipeline Project is scheduled to be ***completed by the third quarter of*** ~~**operational in early**~~ 2017 ***and the second line to be located within the same easement is expected to be completed by mid- to late-2018***. The majority of potential impacts associated with these pipelines would be similar to the impacts associated with the Project, including impacts on soils, groundwater, surface water, wetlands, vegetation, wildlife, land uses, construction emissions, and noise. Most of these impacts would be temporary, but some impacts would be permanent or long term including the loss of forest cover, visual impacts, and forest fragmentation effects associated with the maintenance of a new ROW.

Other actions that would or could contribute regionally to cumulative impacts in Schuylkill and Lebanon Counties (primarily between MPs 45 and 55 in Lebanon County) include two PennDOT projects and seven residential, commercial, or mixed use developments. Three of the seven residential, commercial, or mixed use developments would be crossed; all of the others would be within 0.5 mile of the CPL South route in Lebanon County. The two PennDOT projects involve bridge replacements in Lebanon County and the closest of these is the Colebrook Road bridge replacement, which is currently under construction, approximately 0.4 mile from the CPL South route. The other bridge replacement is 3.3 miles away and is scheduled to be constructed in 201**6**. These projects could contribute to the cumulative impacts of the Project on surface water, land uses, soil, residences, groundwater, vegetation, wildlife, traffic, visual effects, air quality, and noise. However, the majority of these impacts would be temporary, highly localized, and, in the case of the PennDOT projects, confined to previously disturbed areas.

In Lancaster County, one action that would contribute to cumulative impacts is the Transco Rock Springs Expansion Project, which would connect to the southern end of CPL South near MP 0.0. This project includes approximately 10.1 miles of new pipeline that ~~**is scheduled to be constructed in 2015 and 2016**~~***was completed and placed in-service on August 1, 2016***. The effects of this action would be similar to the Project, only on a smaller scale and would include temporary impacts on soils, groundwater, surface water, wetlands, vegetation, wildlife, land uses, construction emissions, and noise. However, some of the impacts of the Rock Springs Expansion Project will be permanent or long term, including the loss of forest cover, visual impacts, and forest fragmentation effects associated with the maintenance of a new ROW.

Also in Lancaster County, the Transco proposed Northeast Supply Enhancement (NESE) Project includes 10.2 miles of pipeline looping in Pennsylvania with additional facilities in New York and New Jersey. Transco anticipates construction of the NESE Project will begin in the third quarter of 2018. The effects of this action would be similar to the Project, but on a smaller scale and would include temporary impacts on soils, groundwater, surface water, wetlands, vegetation, wildlife, land uses, construction emissions, and noise. However, some of the impacts of the NESE Project will be

permanent or long term, including the loss of forest cover, visual impacts, and forest fragmentation effects associated with the maintenance of a new ROW.

Other actions that would or could contribute to the cumulative impacts of the Project in Lancaster County include 11 planned or potential residential developments that are within 0.5 mile of the CPL South route between MPs 0.0 and 8.0 and two PennDOT road projects (one bridge replacement and one bridge rehabilitation). Only one of the PennDOT projects is within 2.0 miles of the Project. The impacts of the nearby residential and road projects would or could include effects on land uses, soils, traffic, and visual resources and the more distant actions would or could contribute mostly to cumulative air and, in some cases, traffic impacts during their construction. Most of these effects would be temporary and highly localized and, in the case of the PennDOT projects, confined to previously disturbed areas; therefore, they would not contribute to long-term cumulative impacts.

In addition to the above projects, five recently constructed or planned gathering system pipelines in Susquehanna, Luzerne, and Wyoming counties would intersect or cross the Project pipeline corridor and may contribute to the infrastructure providing natural gas volumes to the Project. Five other recently constructed gathering pipelines or aboveground facilities are within 0.25 mile of the Project pipeline route, of which four are in Susquehanna County and one is in Wyoming County, which was completed in 2012. Construction of these gathering system facilities would have involved activities similar to construction of interstate natural gas transmission facilities, although land requirements for construction are typically less for gathering systems due to the installation of smaller-diameter pipe.

There are 10 planned, proposed, or existing natural gas transmission projects within 10 miles of the Project. Based on various combinations of their distance from the proposed and planned projects, scope, and schedule, construction and operation, some of these projects could contribute to cumulative impacts in the areas where they cross or are close to the Project. These cumulative effects, however, are not expected to be significant as all of these projects would be constructed and maintained in accordance with FERC guidelines and other construction, operation, and mitigation measures that may be required by federal, state, or local permitting authorities, further reducing the potential for cumulative impacts.

4.1.3 Potential Cumulative Impact on Specific Resources within the Project Area

The following sections describe the potential cumulative impacts associated with the general development of other known projects and Transco's Project.

4.1.3.1 Water Use and Quality

Potentially affected water resources include groundwater, surface waters, and wetlands. Construction and operation of the Project will likely result in only short-term impacts on water resources and include impacts such as increased turbidity, which will return to baseline levels over a period of days or weeks following construction.

Groundwater

Cumulative effects on groundwater resources are expected to be limited to areas that are affected by other known projects near the Project. The potential groundwater impacts of these actions could include increased turbidity, reduced water levels, and contamination. Nearby water wells could also be damaged by construction.

The impact of the Project on groundwater resources is expected to be short term and minor. Transco will minimize groundwater impacts through the use of both standard and specialized construction techniques, including the measures specified in its Project-specific Erosion and Sediment Control Plan, Upland Erosion Control, Revegetation, and Maintenance Plan**, ~~and~~** Wetland and Waterbody Construction and Mitigation Procedures, Spill Plan for Oil and Hazardous Materials, and Blasting Plan. If a water supply well is damaged as a result of project construction, Transco will ensure that a temporary source of water is provided until the damaged water well is restored to its preconstruction capacity and quality, a replacement water source will be provided, or the landowner will be fairly compensated for damages. All of the other known projects that are near the Project would also be required to obtain water use and discharge permits, implement erosion and sediment controls, and as appropriate adhere to various spill plans as required by federal and state agencies.

Surface Waters and Wetlands

Cumulative effects on waterbodies and wetlands affected by the Project would be limited primarily to the wetlands and waterbodies that are affected by other known projects within the same major watershed that are constructed at approximately the same time. In Pennsylvania, the Project pipeline will cross three major watershed basins (i.e., 6-digit hydrologic unit codes): the Upper Susquehanna, the Lower Susquehanna, and the West Branch Susquehanna and seven watershed subbasins: the Upper Susquehanna-Lackawanna, the Upper Susquehanna-Tunkhannock, the Lower Susquehanna, the Lower Susquehanna-Swatara, the Lower Susquehanna-Penns, the Middle West Branch Susquehanna, and the Lower West Branch Susquehanna.

The primary impacts on surface waters would be temporary and mostly associated with active construction activities, ceasing upon settling of turbidity and proper restoration and stream bank revegetation. The greatest of these potential impacts would be an increase in sediment loading to surface waters and an increase in internal sediment loading due to channel/floodplain instability as a result of a change in erosion/deposition patterns. These impacts would be avoided or minimized by Transco's implementation of its Project-specific Erosion and Sediment Control Plan, Upland Erosion Control, Revegetation, and Maintenance Plan and Wetland and Waterbody Construction and Mitigation Procedures,~~ and~~ Spill Plan for Oil and Hazardous Materials and Transco's use of the HDD and other dry crossing methods. These measures will reduce the cumulative impacts on the watersheds encompassing the waterbodies that would be affected by the Project.

~~**See Section 4.1.3.3 below, for an assessment of cumulative impacts on wetlands permanently impacted along the Project.**~~

4.1.3.2 Permanently Affected Wetlands along the Project Pipeline

As indicated in Section 1.2 above, no wetlands will be permanently lost (e.g., no fill will be placed in wetlands) as a result of construction; however, permanent impacts on wetlands will include those wetlands located within the new permanent ROW, to be maintained during operation of the pipeline, and will result in the conversion of forested and PSS vegetation within the maintained ROW to PEM and PSS vegetation types.

While there would be a loss of some wetland functions as a result of the construction and operation of the Project and other reasonably foreseeable projects, Transco will **~~further~~** mitigate unavoidable

construction-related impacts on wetlands associated with the Project by implementing the wetland protection and restoration measures contained in its Wetland and Waterbody Construction and Mitigation Procedures and by complying with the conditions of wetland permits issued by the USACE and state agencies, as well as the Section 404 compensatory mitigation requirements. Similar mitigation would be required for any unavoidable wetland impacts associated with other known projects. Although construction of the Project along with other known projects in the Project area would result in the conversion or reduction in the amount of forested and woody wetlands in the vicinity, the creation of new wetlands and restoration or enhancement of existing wetlands as may be required by the USACE would appropriately mitigate for these impacts.

There will be no permanent loss of wetland area from construction of the Project. Transco is proposing compensatory off-site mitigation for Project-related impacts to PFO and PSS wetlands for temporal conversion within the temporary construction easement and permanent conversion of PFO and PSS.

4.1.3.3 Vegetation, Fish, and Wildlife

Clearing and grading and other construction activities associated with the Project and some of the other known projects would result in the removal of vegetation; alteration of fish and wildlife habitat; the temporary displacement of wildlife; and other potential secondary effects such as increased population stress, predation, and the establishment of invasive plant species. The effect of clearing would be greatest during and immediately following construction and would diminish when the disturbed areas are restored and revegetated and the wildlife that were displaced during construction return. Some long-term impacts would result from the ongoing maintenance of vegetation. However, these effects would be smaller in scale than the disturbance associated with construction. The effect of vegetation clearing would be greatest on forest-dwelling wildlife species because it would fragment the forest habitat, and it could be decades before the forests return to preconstruction conditions. In addition, the removal of forest and the resulting forest fragmentation would be permanent within the areas that are maintained to operate the facilities (e.g., the permanent ROW).

Cumulative vegetation, fish, and wildlife impacts would be most likely to occur where the other known projects are constructed within the same timeframe and areas as the Project and in forested areas where it would take longer for the preconstruction habitat to recover. The more distant projects, and linear actions constructed before the Project that have been restored and revegetated would contribute less to the cumulative impacts on vegetation and wildlife. However, the cleared rights-of-way associated with these actions would contribute to the long-term cumulative loss and fragmentation of forestland and associated wildlife habitat.

Transco has reduced the potential for cumulative impacts associated with the Project by collocating the pipeline and aboveground facilities where possible with existing ROWs. Following construction, Transco will revegetate disturbed areas and monitor these areas to ensure revegetation is successful. Previously forested areas occupying the temporary ROW and other temporary workspaces will be allowed to regrow, and vegetation maintenance on the permanent ROW will be restricted. For example, routine vegetation maintenance of the permanent ROW will be limited to annual mowing of a 10-foot-wide strip centered over the pipeline, and mowing of the full width of the ROW in uplands will be performed no more frequently than once every 3 years.

In wetlands, regular vegetation maintenance will be further restricted by limiting it to annual maintenance of a 10-foot-wide strip and the selective clearing of woody vegetation exceeding 15 feet in height that is

within 15 feet of the pipeline centerline. Other natural gas projects would be required to implement similar measures and restrictions and/or would likely be required by state agencies and other federal agencies to implement similar revegetation and monitoring measures designed to minimize the potential for long-term resource losses.

In addition, Transco and the proponents for the other known projects are required to consult with the appropriate federal, state, and local agencies to identify special status species; evaluate the potential impacts of their proposed projects on any identified species; and implement measures to avoid, minimize, or mitigate impacts on special status species and their habitat. Because protection of threatened, endangered, and other special status species is part of the federal and state permitting processes, cumulative impacts on such species would be reduced or eliminated through conservation and mitigation measures identified during those relevant permitting processes.