

West Virginia has several systems of designating waterbodies for the protection of water quality and fisheries. Section 47-2-4 of the West Virginia Code of State Regulations ([WVCSR], 2014) outlines an anti-degradation policy that establishes three “tiers” for protecting waters of the state; levels used to maintain quality or existing uses by protecting from activities that have the potential to lower water quality (WVDEP, 2015d). The three tiers are:

- **Tier 1 Protection:** existing water uses and the level of water quality necessary to protect the existing uses shall be maintained and protected.
- **Tier 2 Protection:** existing high-quality waters (HQW) must be maintained at their existing high quality unless it is determined necessary to accommodate important economic or social development. HQWs are defined as those waters whose quality is equal to or better than the minimum levels necessary to achieve the national water quality goal uses.
- **Tier 3 Protection:** waters which constitute an outstanding national resource shall be maintained and protected and improved where necessary. Outstanding national resource waters include, but are not limited to, all streams and rivers within the boundaries of Wilderness Areas, all federally designated rivers under the Wild and Scenic Rivers Act, all streams and other bodies of water in state parks which are HQWs or naturally reproducing trout streams; waters in national parks and forests which are HQWs or naturally reproducing trout streams; waters designated under the National Parks and Recreation Act of 1978 as amended, and those waters whose unique character, ecological or recreational value; or pristine nature constitutes a valuable national or state resource.

West Virginia also identifies some streams as HQWs based on their ability to support certain fisheries (WVCSR, 2014; WVDNR, 2001). Streams can also be classified into one of four groups based on their ability and status to support federally and state protected species. These groups and special designations for fisheries in West Virginia are discussed in section 4.6.4.1.

Waterbodies that may be considered sensitive to pipeline construction include, but are not limited to:

- waters that do not meet the water quality standards associated with the state’s designated beneficial uses (i.e., 303(d) impaired waters);
- waters that have been designated for intensified water quality management and improvement;
- waterbodies that contain threatened or endangered species or critical habitat (see sections 4.7.4 and 4.7.5);
- waters that support fisheries of special concern (e.g., HQWs, trout streams; see section 4.6.4.1);
- waterbodies that are designated as an outstanding resource water (i.e., Tier 3 waters); and
- waterbodies on or designated to be added to the Nationwide Rivers Inventory (NRI) or a state river inventory.

The MXP does not appear to cross any Tier 3 streams (WVDEP, 2015d). However, the WVDNR has identified four waterbodies in Marshall and Wetzel Counties that have significant

importance as baseline monitoring sites. Based on information provided by the WVDEP, five sites are located near the MXP-100 route; on the Lower Bowman Run (one site), Middle Bowman Run (one site), Upper Bowman Run (two sites), and Lynn Camp Run (one site). The two monitoring sites on Upper Bowman Run are upstream of the pipeline crossing location (approximate MP 6.3), the nearest of which is approximately 0.3 mile upstream. These two locations would not be affected by construction of the project. Of the three remaining monitoring sites, the closest downstream location is approximately 0.5 mile from the Lower Bowman Run crossing (approximate MP 3.5). Columbia would cross these four waterbodies using a dry-ditch crossing technique (see section 2.4.4.2.1), which would reduce the potential for significant downstream sediment transport into the monitoring sites. Columbia Gas would continue to work with the WVDEP regarding crossing methods for these waterbodies and measures to limit the potential impacts on these downstream monitoring sites.

Two rivers listed on the NRI would be crossed by the MXP-100: Little Kanawha River, MP 94.8; and Mud River, MP 163.4. Both crossings are in segments recognized by the NRI as having historic value (National Park Service [NPS], 2011). (See section 4.8.2.4.1.)

Overall, the MXP pipelines and aboveground facilities would cross or disturb 42 sensitive waterbodies. Access roads associated with the MXP would result in an additional 16 sensitive waterbody crossings. Most are considered sensitive because they are designated HQWs and potential freshwater mussel habitat. In addition to these designations, one is also a public water supply and listed on the NRI (Little Kanawha River) and another is designated for recreation and listed on the NRI (Mud River). Five are designated solely as potential habitat for freshwater mussels and three are designated solely as HQWs. Additionally, construction of the Ripley Regulator Station would disturb Grasslick Run, an intermittent stream identified as potential freshwater mussel habitat, where a culvert would be installed for the permanent access road.

4.3.2.2.2 Gulf XPress Project

The GXP would have no impact on waterbodies with special designations or impaired streams.

4.3.2.3 Flood Hazard Zones

According to FEMA, Zones A and AE2 areas have a 1 percent annual chance of a flood event. These areas are known as the base flood or 100-year-flood. Zone X areas, also known as the 500-year-flood, have a 0.2 percent annual chance of a flood event (FEMA, 2016).

4.3.2.3.1 Mountaineer XPress Project

As would be expected for a linear project, MXP pipelines would cross FEMA identified flood hazard zones at multiple locations along the 170-mile corridor. However, none of the aboveground facilities would be within a FEMA flood hazard zone.

4.3.2.3.2 Gulf XPress Project

Temporary workspaces at the Grayson, New Albany, and Holcomb Compressor Stations would be present within 100-year floodplains. Carter and Holcomb Counties require that

applications for construction within floodplains certify that no permanent structures would be sited within the floodplain. No floodplain permit is required in Union County. Columbia Gas' ECS (appendix D-2) provides appropriate measures that would be implemented to protect from flooding during construction.

4.3.2.4 Impacts and Mitigation

4.3.2.4.1 Mountaineer XPress Project

Project construction could impact surface waters in several ways. Clearing and grading of streambanks, instream trenching, trench dewatering, and backfilling could result in modification of aquatic habitat, increased sedimentation, turbidity, decreased dissolved oxygen concentrations, releases of chemical and nutrient pollutants from sediments disturbed by trenching, and introduction of chemical contaminants such as fuel and lubricants.

The clearing and grading of streambanks could expose soil to erosional forces and would reduce riparian vegetation along the cleared section of the waterbody. The use of heavy equipment for construction could cause compaction of near-surface soils, an effect that could result in increased runoff entering surface waters in the immediate vicinity of the construction right-of-way. Increased surface runoff could transport sediment into surface waters, resulting in increased turbidity levels and increased sedimentation rates in the receiving waterbody. Disturbances to stream channels and streambanks could also increase the likelihood of scour after construction.

Long-term impacts associated with pipeline operations and maintenance would be relatively minor. Columbia Gas would stabilize streambanks within 24 hours of completion of construction and revegetate following installation of the pipeline. Post-construction vegetation maintenance would be limited to the permanent rights-of-way pursuant to the Columbia Gas' ECS.

Dry-Ditch Stream Crossings

As shown in table 4.3-7, the MXP would make 78 crossings of streams listed as impaired on the West Virginia 303(d) list (WVDEP, 2014). No impaired waterbodies were identified in association with the SM80 Line or SM80 Loop Line Replacements, or the proposed compressor station sites. All the impaired streams to be crossed (except for the Kanawha and Mud Rivers) have been degraded by contaminants that typically may be found in areas where wastewater treatment facilities are absent or inadequate (fecal coliform, bacteria, biological) and where mining is common (iron). Dioxin and polychlorinated biphenols (in the Kanawha River) are "legacy" contaminants, resulting from the improper disposal of manufacturing wastes at some time in the past. (Legacy contaminants show little degradation even decades after their release to the environment.) Fecal coliform and bacteria typically predominate the water column while dioxin and biphenols bind strongly to sediments.

Columbia Gas would mitigate impacts on water quality by conducting most crossings of perennial streams greater than 10 feet wide (intermediate and major streams) as dry-ditch crossings, i.e., by dam-and-pumping to move the stream around the work area or using flumes to carry waterbody flow across the workspace. Columbia Gas intends to work with its contractors to determine which dry-ditch crossing technique is most efficient, constructible, and protective based on the site conditions at the time of construction. The exception would be at the Kanawha River,

where the HDD method would be used. See section 2.4.4.2 for a description of wet, dry, and HDD crossing methods. Thus, water quality impacts would be largely limited.

Because a dry-ditch crossing allows for trenching and backfill activities to occur under relatively dry conditions, it minimizes the re-suspension of polluted sediments, limits downstream sedimentation, and avoids disruption to water flow (which minimize impacts on downstream fish). Temporary construction-related impacts would be limited primarily to short periods of increased turbidity (during the assembly of the upstream and downstream dams before trenching begins, and following installation of the pipe when the dams are removed and flow across the restored work area is re-established).

During construction, the open trench may accumulate water, either from the seepage of groundwater or from precipitation. Where dewatering is necessary, Columbia Gas would pump the trench water into well-vegetated uplands and/or filter bags, as described in its ECS. This would prevent heavily silt-laden water from flowing into any adjacent waterbodies or wetlands.

Following construction, waterbody beds and banks would be restored to pre-construction contours and spoil excavated from the stream bottom used as trench backfill. This would also minimize changes to the instream habitat at the crossing site.

Columbia Gas would minimize impacts on waterbodies during construction by implementing the construction and mitigation procedures contained in its ECS, which include:

- limiting clearing of vegetation between ATWS and the edge of the waterbody to preserve riparian vegetation;
- constructing the crossing as close to perpendicular to the waterbody as site conditions allow;
- maintaining adequate flow rates throughout construction to protect aquatic life and prevent the interruption of existing downstream uses;
- locating equipment parking areas, equipment refueling areas, concrete coating activities, and hazardous material storage areas at least 100 feet from surface waters;
- requiring construction across waterbodies to be completed as quickly as possible;
- requiring temporary erosion and sediment control measures to be installed across the entire width of the construction right-of-way after clearing and before ground disturbance;
- requiring maintenance of temporary erosion and sediment control measures throughout construction until streambanks and adjacent upland areas are stabilized;
- requiring bank stabilization and reestablishment of bed and bank contours and riparian vegetation after construction;
- limiting post-construction maintenance of vegetated buffer strips adjacent to streams; and
- implementing the SPCC Plan if a spill or leak occurs during construction.

Once the pipeline is installed across a waterbody, measures to stabilize and restore streambanks and the crossing approach disturbed by construction are important to rehabilitating

the integrity of the crossing site. Based on WVDEP's recommendations, proper measures should be planned beforehand and implemented as part of the crossing completion. Columbia Gas' proposed stream crossing restoration techniques, which are provided in its ECS and are consistent with the FERC Procedures, have also been reviewed and approved by the WVDEP. Confirmation of WVDEP's approval was filed with the Secretary by Columbia Gas on April 21, 2017.

Finally, we note that in a letter dated September 21, 2016, the USFWS expressed concern with Columbia Gas' proposal to cross McElroy Creek (MP 38.5), the South Fork Hughes River (five crossings; MP 59.6 to 76.9), Spring Creek (three crossings; MP 96.6 to 97.4), the Little Kanawha River (MP 94.9), and Meathouse Fork (five crossings: MXP-100 at MPs 50.3 and 51.6; and MXP-200 at MPs 1.1, 5.8, and 5.9), all of which contain suitable habitat for the federally endangered snuffbox and/or clubshell mussel. Although Columbia Gas proposes to cross these streams using a dry-ditch method, the USFWS' West Virginia Field Office determined that the combined effects of the project "could result in adverse effects to federally listed mussels and their habitat" and recommended "avoiding or drastically minimizing the number of crossings to these streams by seeking an alternative route..." (USFWS, 2016c). This issue is addressed in section 4.7.

HDD Crossing

Columbia Gas proposes to use the HDD crossing method to install the MXP-100 beneath the Kanawha River. Where subsurface conditions are appropriate, an HDD is used to avoid impacts on the waterbody by eliminating any disturbance to the streambed or banks. Although the HDD method is typically effective at protecting the resource, an inadvertent return of drilling fluid (a mixture of nontoxic bentonite clay and water) could occur if the fluid seeps from the drill hole to the ground surface or into the waterbody. In general, the potential for inadvertent surface returns is highest near the HDD entry and exit locations when the drill bit is working nearest the surface. However, an inadvertent return is dependent on numerous factors including substrate characteristics, head pressure of the drilling fluid, topography, elevation, and subsurface hydrology.

To minimize the potential for an inadvertent return of drilling fluid, Columbia Gas would implement measures identified in its HDD Inadvertent Return Contingency Plan (appendix G), which describes procedures to monitor, avoid, contain, and clean up any inadvertent drilling fluid return. Measures used to control the seepage of drilling fluid from the hole may include adding thickening agents to the fluid (e.g., additional bentonite, cottonseed hulls, or other non-hazardous materials) or reducing the fluid circulation pressure. If fluid seepage could not be controlled, drilling would be suspended until the cause could be determined. If needed, the hole may be abandoned and a new drill location established.

Borings conducted as part of the HDD geotechnical evaluation at the Kanawha River found sandy/silty soils to a depth of 45 to 60 feet overlying a shale/sandstone layer to about 100 feet. While under the riverbed, the bore hole would average about 80 feet deep. This would place the bore well within the shale/sandstone layer, which was found to have a compressive strength ranging from 4,000 to 9,000 pounds per square inch. Such conditions appear highly favorable for a successful HDD. However, if drilling fluid found a path to migrate from the hole to the waterbody (an underwater release), Columbia Gas' general HDD Inadvertent Return Contingency

Plan states only that the fluid circulation pumps would be stopped temporarily or the pressure would be decreased (essentially the same steps to be taken for an inadvertent return in an upland area). However, Columbia Gas filed with the Secretary a revised HDD Inadvertent Return Contingency Plan tailored specifically for the Kanawha River Crossing (appendix G). This plan outlines the immediate corrective actions that would be implemented if an inadvertent release occurs within the Kanawha River. The revised plan was found to be sufficient and consistent with the requirements of the section 401 water quality certification by the WVDEP. This plan may undergo minor revisions as Columbia Gas completes its section 401 review process.

Open-Cut Crossings

As previously noted, Columbia Gas plans to cross most intermediate and major perennial waterbodies as dry-ditch crossings. However, the majority of the waterbodies crossed by the pipeline routes are “minor,” i.e., less than 10 feet wide. These streams would be crossed by open-cutting. This technique is used because the potential impacts on water quality of open-cutting minor streams is typically not significant. Where streams are substantial (carry significant flow) and contain sensitive resources or have other valued attributes, alternative dry-crossing or HDD methods are considered to avoid or mitigate potential impacts.

Overall, the MXP-100 and MXP-200 pipelines would cross about 411 waterbodies by open-cutting. These streams are almost exclusively ephemeral or intermittent, “minor” (less than 10 feet wide), and classified as warmwater fishery habitat. Assuming they contain flowing water at the time of construction, the primary impacts would be limited to turbidity and sedimentation. Given the flow regimes of minor waterbodies, these impacts would be limited in duration and extent, and not be considered significant. Nevertheless, Columbia Gas would conduct all minor stream crossing activities (trenching, pipeline installation, backfill, and streambed contour restoration) within 24 hours, thereby limiting the duration of active stream disturbance. Any intermediate waterbodies (10 to 100 feet wide) to be open-cut would be crossed in 48 hours unless site-specific conditions make completion infeasible.²⁴

Blasting

Blasting may be required along the pipeline route and within streams. Instream blasting has the potential to injure or kill aquatic organisms, displace organisms during blast-hole drilling operations, and temporarily increase stream turbidity. Chemical by-products from the blasting materials could also be released into the water column. Columbia Gas developed a Blasting Plan to minimize potential adverse impacts on the environment, nearby water sources, structures, and utilities. Licensed blasting contractors would conduct blasting activities in accordance with all applicable federal, state, and local regulations. Columbia Gas would obtain all necessary permits and agency approvals if blasting were required within streams.

²⁴ Columbia Gas plans to open cut only one intermediate perennial waterbody, an unnamed tributary of Peppermint Creek, at MP 130.8.

Flooding

Seasonal and flash flooding hazards are a potential concern where the pipeline would cross or be near major streams and small watersheds. (See discussion of flash-flooding in section 4.1.4.8.) Although flooding itself does not generally present a risk to pipeline facilities, bank erosion and/or scour could expose the pipeline or cause sections of pipe to become unsupported. All pipeline facilities would be designed and constructed in accordance with the USDOT regulations at 49 CFR 192. These regulations include specifications for installing the pipeline in a navigable river, stream, or harbor with a minimum cover of 48 inches in soil or 24 inches in consolidated rock between the top of the pipe and the underwater natural bottom (as determined by recognized and generally accepted practices) (49 CFR 192.327(a)). Burial at these depths is considered sufficient to minimize potential impacts from scour during flood events.

In addition, Columbia Gas would implement several mitigation measures within floodplains to minimize potential impacts from flood events. These measures include:

- clearing only the vegetation needed for safe construction of the pipeline;
- installing and maintaining erosion and sediment control structures;
- installing a concrete coating or concrete weights on the pipeline within waterbodies and/or floodplains to control buoyancy;
- restoring floodplain contours and waterbody banks to their pre-construction condition; and
- conducting post-construction monitoring to ensure successful revegetation.

Compressor and Regulator Stations, Tie-ins

Construction of the new compressor stations (and, to a limited degree, activities at the existing and pending stations), regulators, and tie-ins would have similar potential impacts as overland pipeline construction although on a more limited scale because the activities would be confined to relatively small, discrete locations.

No perennial waterbodies are present on any of the station or tie-in sites; however, permanent access would require one ephemeral and one intermittent feature to be crossed at the Sherwood Compressor and Ripley Regulator Stations, respectively. Columbia Gas would install a culvert or bridge at each location.

In addition, several ephemeral and one intermittent waterbody would be disturbed during construction of the White Oak and Mt. Olive Compressor Stations, and the tie-in with Line X59M1 (at the Ripley Regulator Station) and Line 1983 (at the terminus of the MXP-200). Waterbodies within permanent station work spaces (or areas to be recontoured) would not be restored. This would include 4 of the 5 ephemeral drainages at White Oak, 10 of the 13 ephemerals at Mt. Olive, and all 3 of the ephemeral drainages at the Ripley Regulator Station. For waterbodies temporarily affected by construction (including one intermittent channel at Mt. Olive), Columbia Gas would restore the channels to their original contours and revegetate the banks in accordance with its ECS.

During construction, sediment from earth-disturbing activities would be contained within the facility site. Disturbed areas would be surrounded by temporary erosion controls; while runoff is expected, implementation of measures in Columbia Gas' ECS would prevent heavily silt-laden water from leaving the site. No impaired or otherwise designated waterbodies would be affected by construction or operation of these MXP facilities.

Access Roads and Construction Staging Areas

Access roads associated with pipeline construction would require 38 intermediate and 339 minor waterbody crossings. Of these, 53 waterbodies are perennial, 76 are intermittent, and 248 are ephemeral. Fifteen of the perennial crossings would involve waters considered sensitive, based on designations of HQW and/or potential freshwater mussel habitat. Access roads crossing sensitive waters would require the placement of new culverts (12 crossings) or use of existing culverts (4 crossings). Only culverts and crushed stone would be used at waterbody crossings. All pipeline/staging area access roads would be temporary. Following MXP construction, access roads would be graded and left intact for the landowners' benefit or removed and the area restored as specified in Columbia Gas' ECS.

Surveys of the pipeyards and staging areas identified potential disturbances to one intermittent and seven ephemeral streams, and one pond. Columbia Gas would avoid these features where practicable. At locations where impacts are unavoidable (e.g., where bridges or culverts are required to access or use the sites), Columbia Gas would implement procedures from its ECS and conditions from applicable permits. Following construction, all pipeyards and staging areas would be restored in accordance with the ECS, agency requirements, and landowner stipulations.

Hazardous Material Spills

Accidental spills and leaks of hazardous materials associated with vehicle refueling or maintenance, and the storage of fuel, oil, and other fluids could contaminate a waterbody downstream of the release point and have an immediate effect to aquatic resources. To avoid or minimize potential impacts associated with spills or leaks of hazardous liquids, Columbia Gas would implement procedures from its ECS and SPCC Plan including:

- restricting the location of refueling (at least 100 feet from a wetland or waterbody) and bulk petroleum storage facilities;
- the use of secondary containment structures for stored petroleum products;
- inspecting equipment daily for leaks;
- restricting the transport of potentially hazardous materials to the construction work area; and
- specifying measures to immediately contain and clean up spills.

Implementation of Columbia Gas' ECS and SPCC Plan would adequately address the storage and transfer of hazardous materials and petroleum products, and the appropriate response in the event of a spill.

Hydrostatic Testing and Dust Control

Columbia Gas would verify the integrity of its pipelines before placing them into service by conducting hydrostatic testing. About 50 million gallons of water would be required to hydrostatically test all pipeline segments (see table 4.3-8).

As practicable, hydrostatic test water would be transferred between test segments to minimize the total volume of test water needed. Following testing, the test water would be discharged into well-vegetated upland locations adjacent to the construction work area, in accordance with permit conditions and Columbia Gas' ECS.

**Table 4.3-8
Mountaineer XPress Project Water Requirements for Hydrostatic Testing**

Spread	MP	Approximate Fill Volume (gallons)	Source Water <u>a</u>	Receiving Water <u>b</u>	Waterbody	Flow Regime	Water Quality Classification/Use Categories <u>c</u>
Primary Water Sources & Receiving Waters							
1	7.05	5,644,654	yes	primary	Fish Creek	Perennial	B1, HQW
2	26.40	6,129,885	yes	primary	Piney Fork	Perennial	B1
3	51.63	4,006,116	yes	primary	Meathouse Fork	Perennial	B1, HQW
4	59.62	6,845,448	yes	primary	South Fork Hughes River	Perennial	B1, HQW
5	77.02	6,246,586	yes	primary	South Fork Hughes River	Perennial	B1, HQW
6a & 6b	94.83	9,314,600	yes	primary (split)	Little Kanawha River	Perennial	A, B1, HQW
6a & 6b	113.40	N/A	no	primary (split)	Little Mill Creek	Perennial	B1, HQW
7, 8, & HDD	147.15	12,272,054	yes	primary	Kanawha River	Perennial	HQW
Alternate Water Sources and/or Receiving Waters							
1	0.0	N/A	no	alternate	Big Tribble Creek	Perennial	B1
1 & 2	18.39	N/A	no	alternate	Little Fishing Creek	Perennial	B1, HQW
2 & 3	38.50	alternate	alternate	alternate	McElroy Creek	Perennial	B1, HQW
4	51.63	N/A	no	alternate	Meathouse Fork	Perennial	B1, HQW
4	61.71	N/A	no	alternate	Upland area	N/A	N/A
4	71.54	alternate	alternate	alternate	Slab Creek	Perennial	B1, HQW
4 & 5	73.35	N/A	no	alternate	Jesse Cain Run	Perennial	B1
5	94.83	N/A	no	alternate	Little Kanawha River	Perennial	A, B1, HQW
6a & 6b	115.31	alternate	alternate	alternate	Frozencamp Creek	Perennial	B1
6a, 6b & 7	124.63	N/A	no	alternate	Grasslick Run	Intermittent	B1
8	164.50	N/A	no	alternate	Upland area	N/A	N/A
<p>a All source water withdrawals would be completed in accordance with the applicable permit conditions.</p> <p>b Receiving water indicates the closest waterbody to a proposed discharge location. Hydrostatic test water discharges would be directed into dewatering structures located in upland areas and in accordance with applicable permit conditions.</p> <p>c West Virginia State Water Quality Classifications: Category A - Public Water; Category B1 - Warmwater Fishery; Category C - Water Contact Recreation (WVCSR, 2014). State Water Quality Classifications were determined using West Virginia Code of State Regulations, Title 47, Series 2. High Quality Water (HQW) - Streams listed as HQW by the WVDNR (<i>West Virginia High Quality Streams 6th edition</i>), or receive annual stockings of trout but do not support year-round trout populations.</p>							

Columbia Gas also would use municipal sources, local wells, and/or surface water sources for dust control. During extremely dry conditions, the construction work area would be sprayed with water to reduce fugitive dust in residential areas. All appropriate permits and authorizations required would be obtained prior to conducting any dust control activities.

Withdrawal of the volumes of water needed for hydrostatic testing could temporarily affect the recreational and biological uses of the source waters if the diversions constituted a substantial percentage of the source's total flow or volume. Columbia Gas would minimize the potential effects of water withdrawals from surface water and groundwater sources by adhering to the measures in its ECS, and to any additional state and federal conditions. For instance, the ECS stipulates:

- water would be drawn from local sources (streams, ponds, public water supplies) in a manner that would minimize impacts on the environment and other existing users, while maintaining adequate stream flow;
- withdrawals would maintain adequate flow rates to protect aquatic life and provide water for downstream withdrawals by existing users;
- water from exceptional value waters or streams utilized as public water supplies would not be used unless other water sources are not readily available and the appropriate federal, state, or local agency permits its use;
- all required federal, state, and local approvals for the withdrawal and/or discharge of hydrostatic test water would be obtained prior to such activities; and
- all approval/permit conditions must be complied with, which may include notifying the appropriate state agency of withdraw/discharge, collection of samples in accordance with permit conditions where required, and discharging in a manner to meet all discharge parameters where required.

Additionally, we recommended in our draft EIS that Columbia Gas should provide the time-of-year flow regime for each waterbody from which it proposes to withdrawal hydrostatic test water. The flow regime information for streams in West Virginia is limited; however, in its April 21, 2017 response filed with the Secretary, Columbia Gas proposed the following measures to minimize impacts during hydrostatic testing:

- If, at the time of withdrawals, stream flow is not sufficient to protect aquatic life, alternate sources would be appropriated;
- Hydrostatic test water would only be obtained from alternate sources after applicable authorizations are acquired by Columbia Gas;
- Columbia Gas would screen intake hoses to minimize fish entrainment during withdrawals; and
- Energy dissipation devices would be used during discharge activities to minimize the potential for erosion.

Because flow regime data are not publicly available for all streams where Columbia Gas proposes to withdrawal water for hydrostatic testing, **we recommend that:**

- **Prior to withdrawing water for hydrostatic testing from Fish Creek, Piney Fork, Meathouse Fork, McElroy Creek, Slab Creek, or Frozencamp Creek, Columbia Gas should consult with the WVDNR to assess whether stream flow is sufficient to protect aquatic life, and to assess whether any specific measures to protect in-stream habitat and downstream uses are warranted at these waterbodies. The results of these consultations should be filed with the Secretary.**

4.3.2.4.2 Gulf XPress Project

There are no waterbodies at the Paint Lick and Cane Ridge Compressor Station sites. As noted, no perennial waterbodies would be crossed at any of the GXP facilities. Columbia Gulf would implement the measures included in its ECS, which incorporates FERC's Procedures, to minimize impacts on the ephemeral waterbodies and ponds present on several of the sites.

Construction at the existing Leach C Meter Station could affect one ephemeral stream and one impoundment/stocked pond. The pond and the ephemeral stream are in areas proposed as temporary workspace. Columbia Gulf would install erosion controls around the pond and maintain a 25-foot-wide buffer during construction. Additionally, Columbia Gulf would maintain flow of the ephemeral stream across the work area during construction and would restore the waterbody to preconstruction contours following construction.

Construction of the Morehead Compressor Station could affect one impoundment/stock pond as well as two ephemeral waterbodies. The pond and the two ephemeral waterbodies are within areas proposed as temporary and permanent workspace. The portions of these features within permanent workspace would not be restored.

Construction of the Goodluck Compressor Station could potentially affect an ephemeral waterbody located within the TWS; however, Columbia Gulf would establish a 25-foot buffer around this feature to avoid impacts during construction.

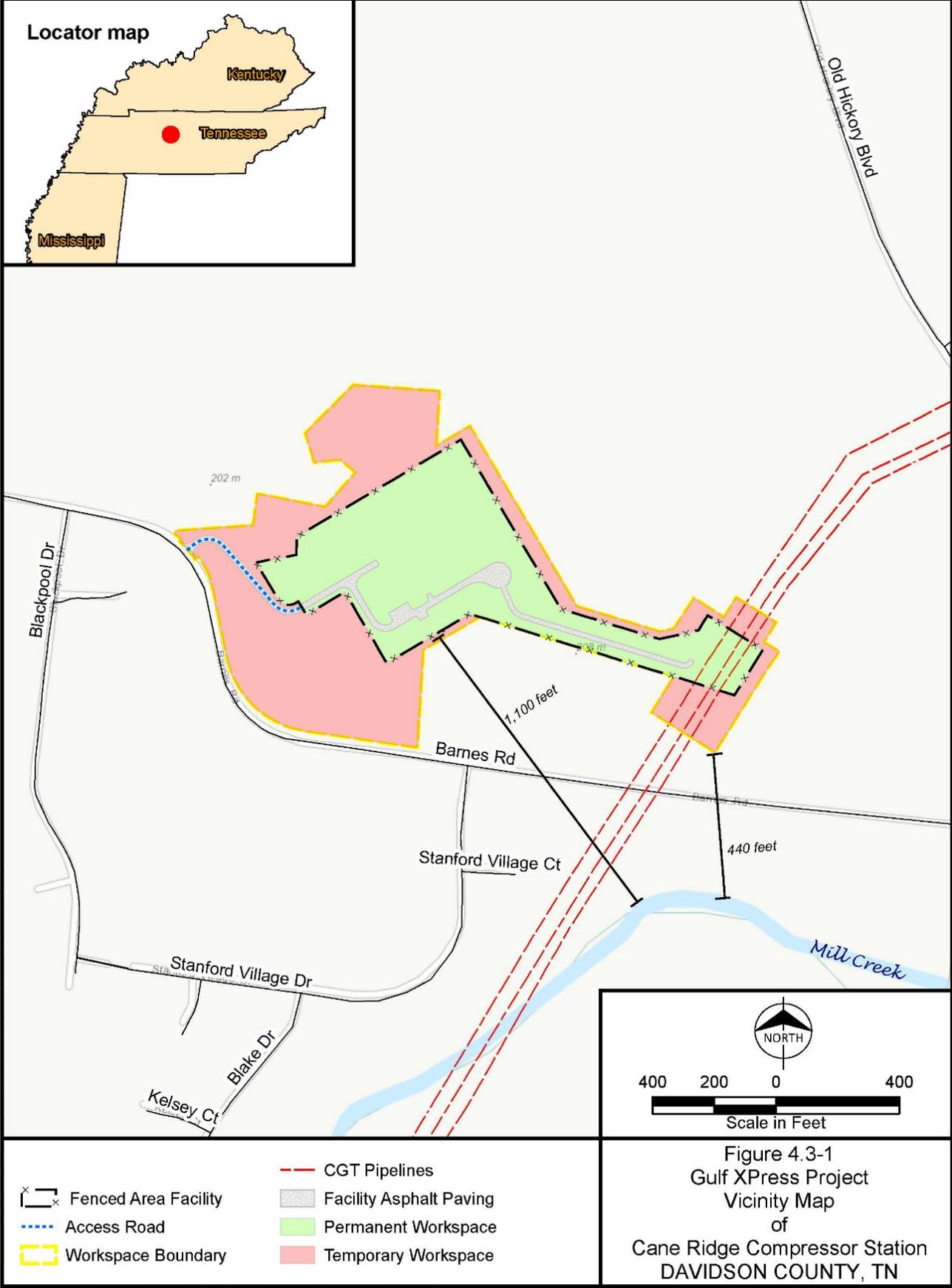
Construction of the Clifton Junction Compressor Station would potentially affect two impoundment/stock ponds and five ephemeral waterbodies. Both ponds are within areas proposed as temporary and permanent workspace. A 25-foot buffer would be maintained around one of the ponds to avoid impacts during construction. The other pond is within the access road workspace; it would be graded and not restored following construction. (Routing the access road in this location would limit tree clearing at the site.) Of the five ephemeral waterbodies impacted during construction, three are within an area proposed as permanent workspace. The fourth would be crossed by a permanent access road and directed through a culvert upon restoration, and the fifth would be restored to preconstruction contours following construction.

Construction of the New Albany Compressor Station would potentially affect three ephemeral waterbodies. The three drainages are within areas proposed as temporary and permanent workspace. The portion of one stream crossed by the permanent access road would be directed through a culvert upon restoration. The portions of the other two drainages within the permanent workspace would not be restored.

We received a comment during public scoping regarding concerns with the potential for upstream impacts due to construction within proximity of the ephemeral drainage that crosses the Holcomb Compressor Station site. The Holcomb Compressor Station site is bisected by an ephemeral drainage that would be crossed to provide access to TWS north of the feature. Columbia Gulf would mitigate impact on this drainage by installing erosion controls and a temporary bridge or culvert during construction. The temporary crossing would be removed during site restoration. One commenter expressed concern that construction activities might impede flow in this ephemeral drainage, causing it to back-up onto the commenter's property. Columbia Gas would install a bridge (or culvert) across the feature and implement its ECS, therefore, we conclude that impact on the flow capacity of this drainage would be avoided.

We received a number of comments about potential impacts from the proposed Cane Ridge Compressor Station on the nearby Mill Creek, which lies southeast of the site and is separated from the site by Barnes Road and either undeveloped forest or a residential subdivision and Columbia Gulf's existing right-of-way. At its nearest point, the construction footprint is about 450 feet from Mill Creek. This distance extends from a point east of Columbia Gulf's existing right-of-way directly to the creek (and across undeveloped forest and Barnes Road). Another measurement from the compressor station proper to the creek extends almost 1,100 feet and crosses undeveloped forest, Barnes Road, a large residential parcel, and Columbia Gulf's right-of-way before encountering Mill Creek (see figure 4.3-1). Given the distance between the site and Mill Creek, there is little to no potential for construction or operation of the compressor station to impact Mill Creek. This includes impacts from spills or equipment leaks, which, due to the nature of the equipment involved, would be minor and addressed by use of Columbia Gulf's SPCC Plan (discussed further, below).

During construction, sediment from earth-disturbing activities would be contained within the site. Disturbed areas would be surrounded by temporary erosion controls. While runoff is expected, implementation of measures in Columbia Gulf's ECS would prevent heavily silt-laden water from leaving the site. Runoff leaving the site would also be naturally filtered by the lands between the site and Mill Creek. Once site restoration is complete, runoff would be directed to an on-site pond for infiltration into the ground.



Access Roads and Construction Staging Areas

The access roads associated with the GXP are all related to construction of the new compressor stations; no new access would be needed at the existing Leach C Meter and approved Grayson Compressor Station. Permanent access roads to the new compressor stations would be 20 feet wide and paved, and would vary in length. Construction staging at the new compressor stations would be integral to each site and would occupy the temporary work areas until final grading and site cleanup; no separate “yards” would be required.

Access roads to most of the compressor station sites would be of limited length; from about 300 feet at the Goodluck site to 1,200 feet at the Paint Lick site. Most cross former agricultural/cultivated land or pasture. The exception is the Clifton Junction site, where the access road would extend about 1,800 feet along a circuitous route to limit impact on the heavily forested land that surrounds the site.

Our review of Columbia Gulf’s proposal regarding access roads and the treatment of ephemeral drainages and stock ponds found that with implementation of its ECS, appropriate consideration for limiting or avoiding impact on surface waters would be exercised and that no significant impact would result.

Hazardous Material Spills

A potential impact during construction and operation of GXP facilities would be a leak or spill of a hazardous liquid (e.g., fuels, lubricant, and oil associated with internal combustion machinery). Because no perennial streams cross any of the new station sites, direct impact on surface waters from construction and operation of the new facilities would be remote. More likely, a spill or leak would only contaminate a small patch of exposed soil. During facility construction and operation, Columbia Gulf would implement procedures from its ECS and SPCC Plan to avoid or minimize impacts associated with spills or leaks of hazardous liquids, such as:

- requiring that hazardous liquid materials are appropriately contained with dikes and impervious linings;
- routinely inspecting machinery for leaks;
- refueling equipment at least 100 feet from streams, ponds, or wetlands;
- outfitting vehicles with appropriate-sized spill kits and sufficient tools and material to take immediate measure to stop leaks and contain/clean up spills; and
- collecting contaminated soils and absorbent materials used during cleanup in impervious bags or drums, isolating these materials, and sending them off-site to a licensed disposal facility.

Once construction is complete, the volume of hazardous liquids stored on site would be limited. Nevertheless, Columbia Gulf’s SPCC Plan contains measures for isolating fuel storage from the environment, fueling and servicing vehicles, and procedures to guide employees in the proper storage, handling, and disposal of hazardous liquids. Implementation of Columbia Gulf’s

ECS and SPCC Plan would adequately address the storage and transfer of hazardous materials and petroleum products, and provide an appropriate response in the event of a spill.

Hydrostatic Testing and Dust Control

Hydrostatic testing would be required to verify the integrity of the GXP facilities including the associated suction and discharge pipelines connecting the new compressors with Columbia Gulf's system. Columbia Gulf would follow guidelines set forth in its ECS during any hydrostatic testing and comply with any relevant state permit requirements including the NPDES – One-Time Hydrostatic Test Water Discharge Authorization in Kentucky and a Hydrostatic Test Water Discharge General Permit in Tennessee and Mississippi.

Municipal water would be trucked to each facility from a commercial source or an on-site well would supply water for hydrostatic testing. The amount of water needed for hydrostatic testing at each facility is identified in table 4.3-9. Overall, about 1.4 million gallons of water would be required. Columbia Gulf would attempt to re-use hydrostatic test water at multiple facilities to minimize the volume of water used and may re-use the water for fugitive dust mitigation, as needed. Any remaining water would be discharged on site in accordance with Columbia Gulf's ECS and applicable permits.

Columbia Gulf would implement fugitive dust control measures proactively, as needed to protect both construction workers and the public. Its primary tool for dust control would be water sprays (or suitable biodegradable, water-soluble chemicals) to control dust from earth-moving, material stockpiles, use of unpaved roads or work areas, demolition activities, etc. Measures would be implemented based on a visual determination of need and to prevent fugitive dust from being carried off the construction site.

On site discharges would only be made into a well-vegetated upland area; into storage tanks for disposal elsewhere; into a body of water or drainage; or through a sediment filter device to filter out particulate matter before allowing the water to infiltrate through the soil. These practices are typical, and are effective for avoid or limiting impact on nearby surface waters. Because water for dust control would be obtained from the same source(s) as hydrostatic test water (i.e., trucked in from commercial sources or on-site wells), there would be no impact on nearby surface waters.

Table 4.3-9 Gulf XPress Project Water Requirements for Hydrostatic Testing		
State/Facility	Approximate Water Requirement (gallons)	Locations of Water Withdrawals/Discharges
Kentucky		
Pending Grayson Compressor Station <u>a</u> /	5,000	Commercial Source/On site
Existing Leach C Meter Station	2,500	Commercial Source/On site
Morehead Compressor Station	165,000	Commercial Source/On site
Paint Lick Compressor Station	150,000	Commercial Source/On site
Goodluck Compressor Station	175,000	Commercial Source/On site
Tennessee		
Cane Ridge Compressor Station	275,000	Commercial Source/On site
Clifton Junction Compressor Station	250,000	Commercial Source/On site
Mississippi		
New Albany Compressor Station	155,000	Commercial Source/On site
Holcomb Compressor Station	178,000	Commercial Source/On site
a Pending compressor station proposed by Columbia Gulf under the Rayne XPress Project (Docket No. CP15-539-000).		

4.3.2.5 Conclusion

4.3.2.5.1 Mountaineer XPress Project

No long-term impacts on surface water quality or quantity are anticipated to result from construction of the proposed project. Columbia Gas would not significantly or permanently affect any designated water uses; it would bury the pipeline beneath the bed of all waterbodies, implement erosion controls, and restore the streambanks and streambed contours as close as practical to pre-construction conditions. Virtually all flowing streams (including those containing sensitive mussel species) would be crossed using a dry-ditch method. This would largely avoid or limit impacts on water quality and aquatic species, even when crossing waterbodies identified as impaired. Columbia Gas would implement the measures contained in its ECS for the project during construction to minimize instream impacts including erosion controls and revegetation of disturbed areas. We have also recommended several measures to reduce impacts on surface water resources. Additionally, Columbia Gas would implement measures contained in its ESC and SPCC Plan to avoid contamination from spills of fuels and other hazardous materials.

Operation of the project would not impact surface waters, unless maintenance activities involving pipe excavation and repair in or near streams are required in the future. If maintenance activities are required, Columbia Gas would employ protective measures like those proposed for use during construction. Thus, we conclude that any impacts derived from maintenance would be short-term and similar to those discussed above for the initial pipeline construction.

4.3.2.5.2 Gulf XPress Project

No impacts on surface waters are anticipated to result from construction and operation of the seven new compressor stations. Through consultation with the USACE, Columbia Gulf would

determine the jurisdictional status of water features at its compressor station sites, and would avoid or mitigate impacts as required by permit conditions. Columbia Gulf would implement BMPs, as specified in its ECS, and would revegetate temporary work areas not encumbered by permanent facilities after construction.

During station operations, very limited volumes of fuels, lubricants, and other hazardous materials would be present. Preventive measures outlined in Columbia Gulf's ECS and SPCC Plan would be implemented and would be adequate to reduce this concern to less-than-significant levels. During maintenance activities, Columbia Gulf would employ protective measures similar to those proposed for use during construction. Therefore, we conclude that any impacts derived from operation and maintenance activities would be limited and similar to those discussed above for the initial project construction.

4.4 WETLANDS

Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas (USACE, 1987). Wetlands serve important biological, physical, and chemical functions, including providing wildlife habitat, food, recreation opportunities, flood control, and water quality improvement.

The Cowardin classification system (Cowardin et al., 1979) was utilized to classify wetland types. Wetlands crossed by the projects are classified as palustrine (freshwater wetland) and are further defined by their dominant vegetation layer (emergent, scrub-shrub, or forested), as follows:

- **Palustrine Forested Wetlands:** Palustrine forested wetlands (PFO) in the project areas are dominated by trees and shrubs at least 20 feet tall with a tolerance to a seasonally high water table. PFO wetlands typically have a mature tree canopy with a diverse range of understory and herbaceous community structure and species. Wetland tree species identified in project work areas are dominated by hardwoods such as yellow poplar, sycamore, maple, and ash.
- **Palustrine Scrub-Shrub Wetlands:** Palustrine scrub-shrub wetlands (PSS) are dominated by shrubs and saplings less than 20 feet tall. Shrub species identified in project work areas include willows, dogwoods, maples, and pawpaws.
- **Palustrine Emergent Wetlands:** Palustrine emergent wetlands (PEM) are characterized by erect, rooted, herbaceous plants suited to growing in wet conditions. Vegetation may also include mosses and lichens. In the project areas, these wetlands include wet meadows (including hay fields). Emergent wetland species identified in project work areas include common rush, grasses, smartweeds, sedges, cattails, and Japanese stiltgrass (an invasive species).

In the project areas, wetlands are regulated at both the federal (USACE) and state (WVDEP for MXP; KDEP, TDEC, and MDEQ for GXP) levels. Under section 404 of the CWA, the USACE is authorized to issue permits for activities that would result in the discharge of dredge or fill material to, or the dredging of, waters of the United States, such as wetlands. Under section 401

of the CWA, states are required to certify that proposed dredging or filling of waters of the United States meets state water quality standards.

4.4.1 Existing Wetlands

4.4.1.1 Mountaineer XPress Project

MXP facilities are within the USACE Pittsburgh District in northern West Virginia (15.3 miles) and the USACE Huntington District in central and southern West Virginia (149.2 miles for MXP-100, 6 miles for MXP-200, and 0.4 mile for the SM80 Loop and SM80 Loop Replacements).

Columbia Gas identified and delineated wetlands along an approximately 300-foot-wide corridor centered over the proposed pipeline centerlines from June through October 2015, and completed surveys for remaining areas not surveyed in 2015 and route modifications in 2016. The wetland delineation encompassed all areas required for installation of the pipelines (i.e., construction rights-of-way, TWS, ATWS, staging areas, and access roads) as well as the compressor stations and other aboveground facilities. The survey included 164.5 miles of the MXP-100 corridor between Columbia Gas' LEX tie-in point in Marshall County, West Virginia, and the interconnect site with the Columbia Gas SM System in Cabell County, West Virginia. The survey also included the 6-mile-long Sherwood Lateral (MXP-200) corridor from the Sherwood Compressor Station in Doddridge County to the existing Columbia Gas T-System Line 1983; the 0.4-mile-long SM80 corridors (SM80 Loop and SM80 Loop Replacements) in Cabell County; three new compressor station sites in Doddridge, Calhoun, and Jackson Counties; and some ATWS, all in West Virginia. The existing Ceredo Compressor Station in Wayne County and the pending Elk River and approved Lone Oak station sites in Kanawha and Marshall Counties, respectively, were previously surveyed as part of separate Columbia Gas projects.

The wetland boundaries were identified and delineated in accordance with the *1987 Corps of Engineers Wetlands Delineation Manual* and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0)* (USACE, 1987; 2012) accompanied by the *National Plant List: 2014* (Lichvar et al., 2014), and the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al., 1979).

In support of its application for a CWA section 404 permit, Columbia Gas submitted a Wetland and Waterbody Delineation Report (July 2016) to the USACE that detailed its survey methodologies and initial assessments of wetlands and waterbodies in the MXP footprint. Wetland impacts were identified in both the Pittsburgh and Huntington Districts. An updated Wetland and Waterbody Delineation Report (February 2017) was submitted to describe additional areas that were surveyed subsequent to the July 2016 report.

4.4.1.2 Gulf XPress Project

The GXP facilities are within the USACE Louisville, Nashville, and Vicksburg Districts.

All wetlands that may be affected by construction of the GXP compressor stations were delineated in accordance with the current federal methodology, and characteristics of each wetland identified in the project areas were documented in accordance with the *Corps of Engineers*

Wetlands Delineation Manual and the *Regional Supplements to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0)* and *Eastern Mountains and Piedmont Region (Version 2.0)* (USACE, 1987, 2010, and 2012). Surveys were conducted during July – November 2015, and March 2016, at eight locations involving multiple sites in three states. Most of the survey emphasis was on the delineation of wetland and waterbody features, and included both preferred and alternative sites for the GXP facilities. Prior to conducting the field review, project biologists evaluated existing data including National Wetlands Inventory (NWI) maps, the National Hydrography Dataset, and various digital county soil surveys. All field-collected spatial data, including wetland and waterbody boundaries, sampling points, and invasive species locations, were collected using global positioning system (GPS) technology.

The approved Grayson Compressor Station site in Carter County, Kentucky was surveyed as part of the Rayne XPress survey area, and no wetlands or waterbodies were found to exist at the site. All modifications to the Grayson station would be within previously disturbed areas owned by Columbia Gulf and used for the existing station construction.

Ten wetlands within the survey footprint at five project sites were identified. Environmental surveys identified one PEM wetland at the Leach C Meter Station site (W-BOA-001), three PEM wetlands at the Morehead Compressor Station (W-ROA-001, W-ROA-007, and W-ROA-008), one PEM wetland at the Paint Lick Compressor Station site (W-GAA-001), four PEM wetlands at the New Albany Compressor Station site (W-UNA-001, W-UNA-002, W-UNA-003, and W-UNA-008), and one PEM/PFO wetland at the Holcomb Compressor Station site (W-GRA-003). Columbia Gulf would avoid impacts on wetlands at the Paint Lick Compressor Station and the Holcomb Compressor Station. Construction impacts at the Leach C, Morehead, and New Albany sites are discussed in section 4.4.2.2.

4.4.2 Wetland Impacts and Mitigation Measures

4.4.2.1 Mountaineer XPress Project

Construction of MXP facilities would have temporary and permanent impacts on wetlands within project workspaces. We received comment during scoping regarding the minimization of wetland impacts from the MXP. Columbia Gas would minimize wetland impacts through implementation of wetland construction and restoration guidelines described in its ECS, which integrates FERC's Procedures, and are intended to avoid wetland impacts to the extent practicable, minimize the area and duration of disturbance, and enhance wetland revegetation after construction. After construction, Columbia Gas would restore wetlands to pre-construction contours to the extent practicable, and return excavated soil from the trench to its original horizon within the wetland to maintain hydrologic characteristics. PEM wetlands would be fully restored onsite, with no long-term impacts anticipated. Long-term temporary and permanent impacts would occur within PFO wetlands, as trees would be permanently removed from the permanent rights-of-way, which would be mowed or otherwise cleared periodically to maintain them in an herbaceous state. These impacts on PFO wetlands would be minimized by allowing the portions of the right-of-way used for construction and not maintained as part of the permanent pipeline corridor to revegetate to pre-construction conditions; however, regrowth of PFO wetlands could take several decades.

Within its permanent 50-foot-wide easement, Columbia Gas would further reduce its impact on PFO wetlands by maintaining only a 10-foot-wide corridor, with selective removal of trees within 15 feet of the pipeline. Limiting right-of-way maintenance to a 10-foot-wide herbaceous strip centered over the pipeline through wetlands would allow for growth of PSS wetland habitats in the remainder of the easement. Compensatory mitigation would be provided by Columbia Gas for unavoidable impacts to PSS and PFO wetlands as a part of its permitting through the USACE (see section 4.4.3). A summary of wetland impacts is provided table 4.4-1.

Table 4.4-1 Summary of Wetlands Affected by the Mountaineer XPress Project				
Pipeline Facility	Classification	Crossing Length (feet)	Construction Impacts (acres)	Operational Impacts (acres) <u>a/</u>
MXP-100	PEM	3,093	5.0	0.0
	PSS	133	0.5	<0.1
	PFO	348	0.5	0.2
MXP-200	PEM	90	0.1	0.0
	PSS	3	<0.1	<0.1
	PFO	22	<0.1	<0.1
White Oak Compressor Station	PEM	--	<0.1	<0.1 <u>b/</u>
Contractor / Pipe Yards	PEM	156	1.4	0.0
Access Roads	PEM	0	1.1	0.0
Project Total		3,689	7.5	0.2
<p>Note: The totals shown in this table may not equal the sum of addends due to rounding.</p> <p>a Operational impacts are associated with PSS and PFO wetlands. Operational requirements allow a 10-foot-wide corridor centered over the pipeline to be maintained in an herbaceous state, and for the removal of trees within 15 feet on either side of the pipeline. To determine conversion impacts on PSS wetlands, a 10-foot-wide corridor centered over the pipeline was assessed. A 30-foot-wide corridor centered over the pipeline was assessed for PFO wetlands. Because the easement would be maintained in an herbaceous (emergent) state, there would be no operational impacts on PEM wetlands.</p> <p>b Wetland would be permanently altered by grading.</p>				

Overall, the MXP would impact 7.5 acres of wetlands through construction activities associated with the pipeline rights-of-way, TWS, ATWS, access roads, staging areas, and the aboveground facilities. Most of impacts would be within PEM wetlands and would be temporary and short-term. Construction of the pipeline facilities would temporarily impact 5.1 acres of PEM and 0.5 acre of PSS wetlands within the construction rights-of-way. Another 2.5 acres of PEM would be temporarily impacted by use of the project contractor/pipe yards and access roads. Less than 0.1 acre of PSS wetlands would be permanently converted to and maintained as PEM due to pipeline operations and maintenance activities. In addition, 0.5 acre of PFO wetlands would be impacted by construction activities, of which less than 0.2 acre would be within the permanent easement and permanently converted to and maintained as PEM wetlands (i.e., in an herbaceous state). As shown in the table above, the total “operational” impact on wetlands would be 0.2 acre, which represents the 10-foot-wide strip centered over the pipeline, where PFO wetlands would be permanently maintained in an herbaceous or shrubby state. The total acreage of wetlands that would actually fall within Columbia Gas’ permanent easement is 4.1 acres; however, as previously stated, most of it would be able to return to pre-construction conditions (i.e., no loss in function or wetland type).

A PEM wetland was identified within the construction footprint of the proposed White Oak Compressor Station. Construction and operation of the compressor station would result in less than 0.1 acre of permanent impacts on this wetland.

Six PEM wetlands totaling 0.6 acres were identified within the MXP contractor/pipe storage yards. These wetlands would be temporarily disturbed, but the wetlands would be restored to pre-construction conditions following construction. Based on a review of aerial imagery, all the wetlands associated with contractor/pipe storage yards appear to be within areas that undergo routine mowing or are in areas where soils are previously disturbed from other industrial operations.

The MXP would require 276 temporary and 30 permanent access roads for the construction and operation of the project. Columbia Gas would construct 56 new access roads, including new facility access roads, and has identified 250 existing private roads that it would use during construction. Project surveys identified PEM wetlands on access roads in 6 counties that would be affected by construction, totaling about 0.2 acre of temporary wetland impacts.

To minimize the overall area and duration of wetland disturbance, reduce the amount of wetland soil disturbance, and enhance wetland restoration following construction, Columbia Gas would determine the method of pipeline construction within each wetland based on soil stability and saturation at the time of construction, as discussed in section 2.4.4.1. Construction activities would also be conducted in accordance with Columbia Gas' ECS and as described in section 2.4.4.1. Columbia Gas would mitigate for unavoidable wetland impacts by implementing the procedures specified in its ECS, and by complying with the conditions of its pending section 404 and 401 permits. Compensatory mitigation may be required by the USACE and would be mitigated per the 2008 Mitigation Rule (33 CFR 332). This rule uses a hierarchy as such: 1) mitigation banking, 2) in lieu fee, and 3) permittee responsible mitigation (onsite or offsite). Any offsite mitigation would need to comply with the ESA and section 106 of the NHPA. Specific measures Columbia Gas would implement from its ECS to mitigate impacts on wetlands include:

- limiting the construction rights-of-way width to 75 feet through wetlands (unless alternative, site-specific measures are requested by Columbia Gas and approved by FERC and other applicable agencies);
- locating ATWS at least 50 feet away from wetland boundaries (unless alternative, site-specific measures are requested by Columbia Gas and approved by FERC and other applicable agencies);
- limiting the operation of construction equipment within wetlands to only equipment essential for clearing, excavation, pipe installation, backfilling, and restoration;
- operating equipment on timber mats in wetlands to prevent the compaction and rutting of wetland soils that are not excessively saturated (deeply inundated);
- removing woody stumps only from areas directly above the trenchline, or where they would create a safety hazard, to facilitate the re-establishment of woody species by existing root structures;

- restricting grading in wetlands to the area directly over the trenchline, except where necessary for safety;
- segregating topsoil from the trench in non-saturated wetlands and returning topsoil to its surface location during backfilling to avoid changes in subsurface hydrology and to promote re-establishment of the original plant community by replacing the seed bank found in the topsoil;
- installing temporary and permanent erosion and sediment control devices, and re-establishing vegetation on adjacent upland areas, to avoid erosion and sedimentation into wetlands;
- installing trench breakers or trench plugs at boundaries of wetlands, or sealing the trench bottom, as necessary, to prevent draining of wetlands;
- returning graded areas to their preconstruction contours to the extent practicable, and returning excavated soil from the trench within the wetlands back to its original soil horizon to maintain hydrologic characteristics;
- prohibiting the storage of chemicals, fuels, hazardous materials, or lubricating oils within 100 feet of a wetland;
- prohibiting parking and/or fueling of equipment within 100 feet of a wetland unless the EI determines there is no reasonable alternative, and appropriate steps (such as a secondary containment structure) are taken; and
- dewatering the trench into a sediment filtration device, such as geotextile filter bag, to minimize the potential for erosion and sedimentation.

If bedrock is encountered in wetland trenches, the type of bedrock would determine the method of excavation. Blasting could affect wetlands by causing a fissure in the confining layer that would drain the wetland. Blasting could also result in a wetland conversion through the introduction of a new water source. Columbia Gas has prepared and would implement a Blasting Plan that identifies procedures for the use, storage, and transportation of explosives consistent with safety requirements defined by federal, state, and local agency regulations. Impacts on wetlands due to blasting would be addressed as part of the compensatory mitigation for the project.

In addition, Columbia Gas would develop a project-specific wetland restoration plan, as needed, in consultation with the appropriate federal and state agencies. Following construction, Columbia Gas would verify that all disturbed areas successfully revegetated. Revegetation would not be considered successful until:

- vegetation is at least 80 percent of either the cover documented for the wetland prior to construction, or at least 80 percent of the cover in adjacent wetland areas that were not disturbed by construction;
- the plant species composition is consistent with early successional wetland plant communities in the affected ecoregion; and
- invasive species and noxious weeds are absent, unless they are abundant in adjacent areas that were not disturbed by construction.

In accordance with its ECS (and FERC’s Procedures), Columbia Gas would conduct routine wetland monitoring for a minimum of 3 years (or until revegetation is successful) and submit annual reports to the Commission on the status of wetland restoration and vegetation growth. Where revegetation is not successful at the end of 3 years, Columbia Gas would develop and implement remedial revegetation plans, in consultation with a professional wetland ecologist, to actively revegetate any wetland, continue revegetation efforts, and file annual reports until wetland revegetation is successful.

4.4.2.2 Gulf XPress Project

Construction of the GXP facilities would temporarily impact 0.12 acre of PEM wetlands. Impacts on these wetlands would be temporary and short-term (a nominal amount of PEM would be permanently affected at the Morehead and New Albany compressor stations), and the wetlands would be restored to pre-construction contours and conditions. To further reduce impacts, construction activities would be conducted in accordance with Columbia Gas’ ECS, including interceptor diversions and/or sediment barriers along a slope or the edge of a wetland, as necessary, to prevent sediment flow into the wetland. Additionally, the placement of equipment mats to allow construction vehicles to cross wetlands with minimal impact would be employed during construction, as needed. Table 4-4.2 provides a summary of wetland impacts at each GXP facility.

Table 4.4-2 Wetland Impacts Resulting from the Gulf XPress Project			
State/Facility/Wetland Identification Number	Classification	Construction Impacts (acre)	Operation Impacts (acre)
Kentucky			
Leach C Meter Station			
W-BOA-001	N/A	0.02	0.00
Grayson Compressor Station			
None	N/A	N/A	N/A
Morehead Compressor Station			
W-ROA-001	PEM	<0.01 <u>a/</u>	<0.01 <u>b/</u>
Paint Lick Compressor Station			
None	N/A	N/A	N/A
Goodluck Compressor Station			
None	N/A	N/A	N/A
Tennessee			
Clifton Junction Compressor Station			
None	N/A	N/A	N/A
Cane Ridge Compressor Station			
None	N/A	N/A	N/A
Mississippi			
New Albany Compressor Station			
W-UNA-001	PEM	N/A <u>c/</u>	N/A <u>c/</u>
W-UNA-002	PEM	0.03 <u>a/</u>	N/A
W-UNA-003	PEM	0.03 <u>a/</u>	<0.01 <u>d/</u>
W-UNA-008	PEM	0.03 <u>a/</u>	N/A
Holcomb Compressor Station			
W-GRA-003	PEM	N/A <u>c/</u>	N/A <u>c/</u>
Project Total		0.12	<0.02
a	Temporary workspace	b	Access Road
c	Identified wetland but avoided	d	Permanent workspace

4.4.3 Compensatory Mitigation

Mitigation is the process of restoring, creating, enhancing, or preserving resources to offset unavoidable impacts on streams or wetlands that result from a specific permit authorization issued by a regulatory agency, such as the USACE. Columbia Gas and Columbia Gulf planned the projects so that they would avoid impacts on aquatic resources where possible; however, when impacts on streams and wetlands cannot be avoided, mitigation will generally be required. According to the USACE, and based on the objectives of the CWA, there are three main methods for achieving satisfactory compensatory mitigation:

- in-lieu fee program,
- onsite mitigation, and
- mitigation banking.

An in-lieu fee program may be used as a form of compensatory mitigation when determined acceptable by participating agencies. In general, the project proponent pays a fee to the USACE or state agency, and the fee is ultimately used towards state or regional programs designed to enhance or protect aquatic/wetland resources. The fee is determined by the agencies and is typically based on the amount and type of project impact.

Onsite mitigation is when an applicant implements compensatory measures at the site of the impact or at a different location within the same watershed. The applicant is responsible for the implementation, monitoring, and success of the mitigation project.

Finally, mitigation banking is the purchase of mitigation credits from an agency-approved mitigation bank. The credits required are determined by calculations based on the quantity and type of unavoidable impacts on wetlands, streams, or other aquatic resources. A mitigation bank is a wetland, stream, or other aquatic resource area that has been or is in the process of being restored, created, enhanced, or in some circumstances, preserved.

4.4.3.1 Mountaineer XPress Project

Columbia Gas states that it would prepare a compensatory wetland mitigation plan for project impacts from crossing Waters of the United States, with assistance from the USACE District offices and WVDEP, as necessary. Mitigation ratios for unavoidable impacts on Waters of the United States would be determined by the USACE and applied towards calculating the amount of compensatory mitigation credits needed to compensate for both PFO and PSS wetland conversions. Where available, purchase of mitigation bank credits to mitigate impacts would be the preferred option. If mitigation bank credits are unavailable for purchase, or to make up the balance of credits needed, participation in an In-lieu Fee Program would be used to satisfy remaining compensatory mitigation requirements.

4.4.3.2 Gulf XPress Project

Wetland impacts at the Morehead and New Albany Compressor Station sites would be approved under the USACE Nationwide Permit Program and would not require compensatory mitigation.

4.4.4 Conclusion

4.4.4.1 Mountaineer XPress Project

By implementing construction and mitigation measures outlined in Columbia Gas' ECS, completing compensatory mitigation as determined by the USACE and other appropriate agencies, and complying with federal and state permit conditions, we conclude that the MXP would not result in any significant impacts on wetlands.

4.4.4.2 Gulf XPress Project

Wetland impacts from construction and operation of the GXP would likely be authorized under the USACE Nationwide Permit Program. A very small amount of wetland impacts at the Morehead and New Albany Compressor Station sites would be unavoidable, but with implementation of the BMPs in Columbia Gulf's ECS, would not be significant.

4.5 VEGETATION

4.5.1 Existing Vegetation Resources

The locations of the MXP and GXP project areas can be defined using multiple methodologies, including watersheds (and subwatersheds), geographic areas, physiographic provinces, Major Land Resource Areas, and ecoregions. Vegetation resources in the United States can be described by ecoregions, which are distinct natural communities based on regional geology, landforms, soils, vegetation, climate, land use, wildlife, and hydrology characteristics (EPA, 2016d). The degree of impact on vegetation from the projects would depend on the type of vegetation affected, whether impacts would be temporary or permanent, the rate at which the vegetation would regenerate after construction, and the area and frequency of vegetation maintenance conducted during project operation.²⁵

4.5.1.1 Mountaineer XPress Project

The MXP would be constructed entirely within the Western Allegheny Plateau ecoregion (EPA, 2016d), which is characterized by a mosaic of forests, developed land, farms, coal mines, and oil and gas fields. The soils in this ecoregion support Appalachian Oak Forest, dominated by white and red oak, and Mixed Mesophytic Forest, which supports sugar maple, beech, basswood, and oak. It has rounded hills and is relatively rugged; most farms and agricultural activities are concentrated in the valleys.

²⁵ The focus of this section is on upland vegetation resources. Wetland vegetation, wildlife, protected species, and developed land are not discussed in this section. Wetland vegetation cover types are described in section 4.4. Discussion of the wildlife common to these vegetation cover types is provided in section 4.6. Threatened, endangered, and special status plant species are discussed in section 4.7. Developed land includes residential, commercial, and industrial lands; roadways; and mining operations. Developed land, discussed in section 4.8, is generally devoid of native vegetation and provides little habitat value.

The MXP would cross through three major natural upland vegetation cover types: forested land, agricultural land, and open land. Various classes of vegetation exist within each upland vegetation cover type, as shown in table 4.5-1 (LANDFIRE, 2016).

**Table 4.5-1
Upland Vegetation Cover Types Affected by the Mountaineer XPress Project**

Class Name <u>a/</u>	System Location and Description <u>a/</u>	Acres <u>b/</u>		Miles Crossed <u>b/</u>
		Total Construction	Permanent (Operation)	
Forests				
Allegheny-Cumberland Dry Oak Forest and Woodland	Dry hardwood forests mainly on nutrient-poor or acidic soils. Dominant species include white oak (<i>Quercus alba</i>), southern red oak (<i>Q. falcata</i>), chestnut oak (<i>Q. montana</i>), and scarlet oak (<i>Q. coccinea</i>), with some red maple (<i>Acer rubrum</i>), pignut hickory (<i>Carya glabra</i>), and mockernut hickory (<i>C. tomentosa</i>). Small stands of shortleaf pine (<i>Pinus echinata</i>) and/or Virginia pine (<i>P. virginiana</i>) may occur near escarpments or following fire. Eastern white pine (<i>P. strobus</i>) may be prominent in some stands where fire has not occurred.	498.3	183.9	28.9
Appalachian Hemlock - Northern Hardwood Forest	Conifer or hardwood forests dominated by northern hardwoods including sugar maple (<i>Acer saccharum</i>), yellow birch (<i>Betula alleghaniensis</i>), and American beech (<i>Fagus grandifolia</i>). These trees either form a canopy or mix with eastern hemlock (<i>Tsuga canadensis</i>) or eastern white pine. Other common and sometimes dominant trees include oaks (<i>Quercus spp.</i>), most commonly northern red oak (<i>Q. rubra</i>), tulip tree (<i>Liriodendron tulipifera</i>), black cherry (<i>Prunus serotina</i>), and sweet birch (<i>Betula lenta</i>).	164.8	56.9	9.2
Central Appalachian Alkaline Glade and Woodland	Woodlands and open glades on thin soils over limestone, dolostone or similar calcareous rock. Red cedar (<i>Juniperus virginiana</i>) is a common tree. Chinquapin oak (<i>Quercus muehlenbergii</i>) is indicative of the limestone substrate. Fragrant sumac (<i>Rhus aromatica</i>), Eastern redbud (<i>Cercis canadensis</i>), and hophornbeam (<i>Ostrya virginiana</i>) may occur. Prairie grasses are dominant in the herbaceous layer and include big bluestem (<i>Andropogon gerardii</i>), little bluestem (<i>Schizachyrium scoparium</i>), and grama grasses (<i>Bouteloua spp.</i>). Forb richness is often present in the herbaceous layer. Characteristic forbs include whorled milkweed (<i>Asclepias verticillata</i>), wild bergamot (<i>Monarda fistulosa</i>), lyreleaf sage (<i>Salvia lyrata</i>), aromatic aster (<i>Symphotrichum oblongifolium</i>), and false bonset (<i>Brickellia eupatorioides</i>).	0.2	0.0	<0.01

**Table 4.5-1
Upland Vegetation Cover Types Affected by the Mountaineer XPress Project**

Class Name <u>a/</u>	System Location and Description <u>a/</u>	Acres <u>b/</u>		Miles Crossed <u>b/</u>
		Total Construction	Permanent (Operation)	
Central Appalachian Rocky Oak and Pine Woodland	Open or patchy dry wooded hilltops and outcrops or rocky slopes that are mostly nutrient poor with a history of fire. Bedrock is generally granitic or has acidic lithology. Pitch pine (<i>Pinus rigida</i>) and Virginia pine are characteristic and often mixed with xerophytic oaks and American chestnut sprouts. Some areas have a fairly well- developed heath shrub layer or a grass layer.	1.0	0.2	<0.1
Central Interior and Appalachian Floodplain Forest	Floodplain forests dominated by silver maple (<i>Acer saccharinum</i>), eastern cottonwood (<i>Populus deltoides</i>), river birch (<i>Betula nigra</i>), sugarberry (<i>Celtis laevigata</i>), sweet gum (<i>Liquidambar styraciflua</i>), and willows (<i>Salix</i> spp.), especially black willow (<i>S. nigra</i>) in the wettest areas, and American sycamore (<i>Platanus occidentalis</i>), with green ash (<i>Fraxinus pennsylvanica</i>), American elm (<i>Ulmus americana</i>), tulip tree, swamp chestnut oak (<i>Quercus michauxii</i>), and bur oak (<i>Q. macrocarpa</i>) in more well- drained areas. Understory species are mixed and include shrubs, such as buttonbush (<i>Cephalanthus occidentalis</i>), roughleaf dogwood (<i>Cornus drummondii</i>), and pawpaw (<i>Asimina triloba</i>), sedges (<i>Carex</i> spp.) and grasses such as eastern bottlebrush grass (<i>Elymus hystrix</i>), Canada wildrye (<i>E. canadensis</i>), and Indian woodoats (<i>Chasmanthium latifolium</i>) which sometimes form savanna- like vegetation. Gravel bars may be dominated by young black willow, American sycamore, or river birch.	65.1	18.9	2.8
Central Interior and Appalachian Riparian Forest	Small floodplains and shores along moderate to very high gradient river channels that lack a broad, flat floodplain. Flooding, substrate deposition, and rapidly draining conditions affects vegetation composition. Vegetation is often a mosaic of forest, woodland, shrubland, and herbaceous communities. Common trees include river birch, American sycamore, and box elder (<i>Acer negundo</i>), tulip tree, sweet gum, red maple, sugarberry, green ash, swamp chestnut oak, and cherrybark oak (<i>Quercus pagoda</i>). Common shrubs include hazel alder (<i>Alnus serrulata</i>), buttonbush, silky dogwood (<i>Cornus amomum</i>), northern spicebush (<i>Lindera benzoin</i>), coastal plain willow (<i>Salix caroliniana</i>), other willows, and eastern poison ivy (<i>Toxicodendron radicans</i>).	0.9	0.2	<0.1
Central Interior Highlands Calcareous Glade and Barrens Woodland	Moderate to steep slopes and steep valleys on primarily southerly to westerly facing slopes. Limestone and/or dolomite bedrock typify this system with shallow, moderately to well- drained soils interspersed with rocks. These soils often dry out during the summer and fall, and then become saturated during the winter and spring. Fire is the primary natural dynamic. Stunted woodlands primarily dominated by chinquapin oak interspersed with eastern redcedar occur on variable- depth- to- bedrock soils.	0.2	0.1	<0.1

**Table 4.5-1
Upland Vegetation Cover Types Affected by the Mountaineer XPress Project**

Class Name <u>a/</u>	System Location and Description <u>a/</u>	Acres <u>b/</u>		Miles Crossed <u>b/</u>
		Total Construction	Permanent (Operation)	
Eastern Cool Temperate Urban Deciduous, Evergreen, and Mixed Forest	Forests in low to moderately urbanized settings with unnatural combinations of primarily native species with substantial amounts of species alien to the area.	18.0	4.9	0.8
Managed Tree Plantation – Northern and Central Hardwood and Conifer Plantation Group – Introduced Upland Vegetation - Treed	Plantations - Areas where establishment of forests or reforestation is occurring. Even-aged, regularly spaced forest stands from planting and/or seeding within a plantation. Individual trees are generally greater than 15 feet tall and are dominated by evergreen species. Introduced Upland Vegetation – Treed areas that are spontaneous, self-perpetuating and dominated by introduced species that are not the result of planting, cultivation, or human maintenance.	68.5	27.5	4.6
Northeastern Interior Dry-Mesic Oak Forest	Oak-dominated forest system that occurs in dry-mesic flat to gently rolling, occasionally steep slopes. Located midslope to toeslope, transitioning to very dry systems on upper slopes and ridges. This forest type typically has a closed canopy although there may be areas of patchy canopy. Dominant species include northern red oak, white oak, eastern black oak (<i>Quercus velutina</i>), and scarlet oak. Other less important trees include hickories (<i>Carya</i> spp.) and chestnut oak. Frequent associates include red maple and sweet birch. Sprouts of American chestnut may occur where formerly a common tree. Local areas of calcareous bedrock may support forests typical of richer soils that support sugar maple and/or chinquapin oak.	331.9	117.2	18.8
Ruderal Forest-Northern and Central Hardwood and Conifer	Forests resulting from man-made disturbance. Includes unnatural combinations of native and non-native species.	28.9	10.4	1.5
South-Central Interior Mesophytic Forest	Highly diverse, predominantly deciduous forests on deep and enriched soils in non-montane settings. Located in somewhat protected landscape positions such as coves or lower slopes. Dominant species include sugar maple, American beech, tulip tree, American linden, northern red oak, cucumber tree (<i>Magnolia acuminata</i>), and eastern black walnut (<i>Juglans nigra</i>). Eastern hemlock may also be present. The herbaceous layer may have abundant spring ephemerals.	1,221.5	447.6	72.1
Agriculture				
Eastern Cool Temperate Pasture and Hayland	Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops. Pasture and hay vegetation accounts for greater than 20 percent of the total vegetation.	455.3	107.4	16.6

**Table 4.5-1
Upland Vegetation Cover Types Affected by the Mountaineer XPress Project**

Class Name <u>a/</u>	System Location and Description <u>a/</u>	Acres <u>b/</u>		Miles Crossed <u>b/</u>
		Total Construction	Permanent (Operation)	
Eastern Cool Temperate Row Crop – Close Grown Crop	Cropland with greater than 20 percent vegetation that is generally drill-seeded or broadcast with wheat, oats, rice, barley, flax, corn, soybeans, vegetables, tobacco, and cotton. Cropland may also include orchards and vineyards or areas that are tilled.	0.4	0.0	0.3
Open Lands				
Barren	Areas with generally less than 15 percent vegetation cover located on bedrock, desert pavement, scarps, talus, slides, volcanic material, glacial debris, sand dunes, strip mines, gravel pits, and other accumulations of earthen material.	3.3	0.1	<0.1
Eastern Cool Temperate Urban Herbaceous and Shrubland	Areas of lawn grasses and shrubs commonly within single-family housing units, parks, and golf courses. Vegetation is planted in developed settings for recreation, erosion control, or aesthetics.	89.5	14.9	2.4
Recently Burned Herbaceous and Grass Cover	Recently burned areas that were previously dominated by grasses or forbs that are in the process of regenerating. Species composition may be different than pre-fire conditions.	0.1	0.0	<0.1
Recently Logged – Herbaceous and Grass Cover	Areas dominated by herbaceous ground cover following tree harvesting.	4.5	1.6	0.3
Ruderal Upland Herbaceous	Areas with unnatural combinations of non-native and native herbaceous vegetation resulting from man-made disturbance.	7.2	2.8	0.3
<p>a Class name, location, and description were obtained from LANDFIRE (LANDFIRE, 2016). LANDFIRE data are different from the data used to calculate total vegetation and land use impacts for the project (as reported in table 4.8-1). Thus, the totals for different vegetation cover types in this table may not reflect the totals in table 4.8-1.</p> <p>b Acreages and miles in this table have been rounded for presentation purposes. Thus, the totals may not reflect the exact sum of the addends in all cases.</p>				

As shown in table 4.8-1 (section 4.8), the largest natural upland cover type that would be affected by the MXP is forest (2,400.7 acres). Below, we provide a detailed breakdown of the MXP impacts on specific forest systems. LANDFIRE data (2016) were analyzed to characterize the MXP construction and operation impacts on each of these different forest systems (table 4.5-1). Forested land systems that provide greater than 5 percent cover include South-Central Interior Mesophytic Forest (1,221.5 acres, 72.1 miles), Allegheny-Cumberland Dry Oak Forest and Woodland (498.3 acres, 28.9 miles), Northern Interior Dry-Mesic Oak Forest (331.9 acres, 18.8 miles), and Appalachian Hemlock – Northern Hardwood Forest (164.8 acres, 9.2 miles). The next largest natural upland cover type that the MXP would cross is agricultural land (674.2 acres), primarily comprised of Eastern Cool Temperate Pasture and Hayland (455.3 acres, 16.6 miles). The smallest natural upland cover type that the MXP would cross is open land (314.1 acres), primarily composed of Eastern Cool Temperate Urban Herbaceous and Shrubland (89.5 acres, 2.4 miles). In total, about 3,647.2 acres would be affected by the MXP (about 2,570.8 acres temporarily impacted and about 1,076.4 acres permanently impacted).²⁶

4.5.1.1.1 Pipeline Facilities

The primary impact of pipeline construction would be the cutting, clearing, and/or removal of about 2,645 acres (sum of pipeline and ATWS construction impacts on forested, agricultural, and open land from table 4.8-1 in section 4.8) of existing vegetation, of which about 2,103 acres is forest.

Construction in forested lands would remove the tree canopy over the entire width of the construction right-of-way, which would change the structure and environment of the underlying area. In areas where the MXP corridor is adjacent to existing rights-of-way, clearing would result in moving an existing edge outward, rather than creating newly fragmented forested habitat. Forested lands within the maintained right-of-way would be permanently converted to an herbaceous cover type. The regrowth of shrubs and trees within the TWS would reduce the edge effect and provide connectivity between adjacent forested tracts to some extent (Tewksbury et al., 2002), but it may take decades before the TWS areas resemble the forest vegetation that was present before construction.

In addition, soils that were previously shaded by the tree canopy would receive increased amounts of light, which could lead to drier soils and higher soil temperatures. Trees on the edge of the right-of-way might be subject to mechanical damage to trunks and branches, and root impacts from soil disturbance and compaction, all of which could result in the decreased health and viability of some trees and root systems. Some edge trees that were previously within dense forested stands may also lack stability following removal of adjacent supporting trees, which could result in increased susceptibility to wind damage.

Most impacts on agricultural lands would be temporary to short-term, as these areas are disturbed annually to produce crops and would typically return to their previous condition shortly following construction, cleanup, and restoration. Columbia Gas would maintain topsoil

²⁶ These impact acreages are referring to areas that support vegetation. Developed land is not included in the vegetation impact numbers. Developed land within the project areas includes residential, commercial, and industrial lands; roadways; and mining operations.

segregation throughout all construction activities in agricultural lands to mitigate impacts on subsequent crop production and maintain a minimum cover depth of 48 inches between the soil surface and the top of the pipeline. Lands currently dominated by herbaceous growth would revegetate quickly, often within one or two growing seasons after seeding and otherwise typically within 3 years, depending on several factors. Cleared scrub-shrub vegetation would likely require 3 to 5 years to regain its woody composition. This process would involve transitioning through several successional stages.

Impacts associated with disturbances to vegetation could also include increased soil compaction and erosion, increased potential for the introduction and establishment of non-native and invasive and noxious species, and a local reduction in available wildlife habitat (see section 4.6.1). Columbia Gas would implement erosion control measures as described in its ECS. Erosion control measures may include sediment barriers (silt fence, staked hay or straw bales, compacted earth, sand bags, or other appropriate materials), interceptor diversions (temporary slope breakers), and sediment filter devices. During clearing activities, Columbia Gas would mow non-woody vegetation to ground level and cut and remove woody vegetation and stumps, as necessary. Columbia Gas would fell trees and other woody material into the right-of-way, then chip and remove the debris. At the request of individual landowners, Columbia would stack the tree-length cut timber on the landowner's property for landowner use. Following construction, Columbia Gas would seed all previously vegetated workspaces disturbed by construction in accordance with its ECS and landowner agreements, and would include any additional recommendations from the NRCS and the WVDEP, as applicable.

During operations, Columbia would mow up to a 50-foot-wide permanent right-of-way no more than once every 3 years; however, a 10-foot-wide strip may be mowed more frequently to facilitate routine inspections and emergency access. Maintenance activities (permanent operational impacts) would result in impacts on about 1,076.4 acres (sum of permanent operational impacts on forested, agricultural, and open land from table 4.8-1 in section 4.8) of vegetated lands, including almost 814 acres of forest, 163 acres of agricultural land, and 66 acres of open land. Given that the permanently maintained facilities would be considered "developed land" and maintained in an herbaceous state, the 1,076 acres of vegetated land would be converted to developed land for the life of the project. Due to the predominantly rural nature of the project area, construction would cross many forested lands. However, Columbia Gas routed the pipeline to minimize vegetation impacts where feasible, and would further minimize impacts on vegetation by adherence to its ECS.

4.5.1.1.2 Aboveground Facilities

Construction of the aboveground facilities would disturb about 116 acres (sum of construction impacts on forested, agricultural, and open land from table 4.8-1 in section 4.8) of overall vegetation, including about 63 acres of forest land, 39 acres of agricultural land, and 14 acres of open land. Columbia Gas would construct the MLVs, pig launcher/receivers, and two tie-ins within the permanent pipeline easement. Because the MLVs would be built primarily within the pipeline construction right-of-way, additional vegetation impacts would be minimal. The MXP includes modifications and upgrades to existing facilities within fenced areas or within previously disturbed areas adjacent to existing facilities. Limited temporary and permanent impacts on vegetation would occur at these existing locations and are not considered significant. Temporary

impacts on vegetation within the construction work areas would be similar to those described for the pipeline facilities. Columbia Gas would stabilize, seed, and allow the TWS areas used during construction to revegetate.

Permanent vegetation impacts would include conversion of about 19 acres of upland forest, 17 acres of agricultural land, and 4 acres of open land to developed land. Most permanent upland forest impacts (9 acres) would occur at the Mount Olive Compressor Station site.

4.5.1.1.3 Pipe Yards and Staging Areas

The pipe yards and staging areas would impact about 234 acres of agricultural land, 108 acres of open land, and almost 82 acres of forest. During construction, contractors would use off-right-of-way areas for office trailers, parking, vehicle maintenance, and storage of materials and equipment. Columbia Gas has identified temporary staging areas, pipe yards, and contractor yards and is in the process of obtaining landowner permissions to use these areas. Following construction, all staging areas and pipe yards would be restored to preconstruction conditions in accordance with Columbia Gas' ECS or per landowner agreements. No seeding would occur in actively cultivated cropland without landowner approval.

4.5.1.1.4 Access Roads

Columbia Gas would use approximately 204 acres (sum of construction impacts on forested, agricultural, and open land from table 4.8-1 in section 4.8) for temporary access roads during construction activities; 3.5 acres (sum of permanent operational impacts on forested, agricultural, and open land from table 4.8-1 in section 4.8) of permanent access roads would be used during operation. Temporary disturbance associated with all access roads would total about 202 acres (sum of construction impacts on forested, agricultural, and open land minus the permanent operational impacts from table 4.8-1 in section 4.8) of land, of which about 152 acres is forested land, 16 acres is agricultural land, and 34 acres is open land.

All access roads, whether existing or new, would generally be 25 feet wide, with additional modifications to accommodate turning radius improvements. Appropriate drainage structures would be installed per the ECS or applicable permit requirements. Columbia Gas anticipates that most existing private access roads would require widening or improvements for construction activities, which may involve clearing or trimming of select trees. After construction has been completed, access roads would be restored in accordance with landowner agreements and applicable permits, or used for permanent access to accommodate operations for the facility.

Impacts on vegetation would be comparable to those described for the pipeline, including the potential for soil compaction and erosion, establishment of invasive species, and fragmentation of interior forested tracts. Following construction, Columbia Gas would restore and seed any previously vegetated areas affected by construction of the temporary access roads according to its ECS or landowner agreements. During operations, only 16 of the new access roads would be required, permanently converting 11.6 acres to developed lands.²⁷

²⁷ These numbers account for access roads that would be permanently utilized for accessing aboveground facilities.

4.5.1.2 Gulf XPress Project

The GXP would be constructed within four ecoregions, as shown in table 4.5-2.

Ecoregion	Facility	Region Characteristics
Western Allegheny Plateau	Existing Leach C Meter Station, approved Grayson Compressor Station, and new Morehead Compressor Station	Forested land, agricultural land, and developed land (USGS, 2014). The forest is mostly mixed oak and mixed temperate forests that still exist today on most of the remaining rounded hills. Dairy, livestock, and general farming, as well as residential developments, are concentrated in the valleys.
Interior Plateau	New Paint Lick, Goodluck, Cane Ridge, and Clifton Junction Compressor Stations	Open valleys, hills, and plains (USGS, 2014). Relatively flat and fertile lowlands, which include the Bluegrass area of central Kentucky and the Nashville Basin in central Tennessee. Oak-hickory stands are the most common forest type, although mixed stands of red cedar and hardwoods grow on many of the rockier sites and limestone glades. Blue-stem prairie is the most common grassland.
Southeastern Plains	New Albany Compressor Station	Irregular, relatively flat plains of the ecoregion are covered by a mosaic of cropland, pasture, forest, and wetland. Long growing seasons and abundant rainfall, but the relatively poor sandy soils limit agricultural competitiveness with many other regions. Natural forests of pine, hickory, and oak once covered most of the ecoregion; much of the natural forest cover has been replaced by heavily managed timberlands.
Mississippi Alluvial Plains	New Holcomb Compressor Station	Impenetrable forested floodplain broken in places by dense cane thickets or prairie terraces above the flood lines. Over 80 percent of the forests have been cleared and replaced by agricultural crops such as cotton and soybeans. In addition, thousands of miles of levees and ditches have been constructed to control flooding and drain wetlands for agriculture.

Source: EPA, 2010 and USGS, 2014

The GXP would be in three natural upland vegetation cover types: forested land, agricultural land, and open land. Various classes of vegetation exist within each upland vegetation cover type. Information on the various classes of vegetation (e.g., descriptions, acreages, miles crossed) is provided in table 4.5-3 (LANDFIRE, 2016).

**Table 4.5-3
Upland Vegetation Cover Types Affected by the Gulf XPress Project**

Class Name <u>a/</u>	System Location and Description <u>a/</u> , <u>b/</u>	Acres <u>b/</u>		Total Acres <u>b/</u>
		Temporary	Permanent (Operation)	
Forests				
Allegheny-Cumberland Dry Oak Forest and Woodland	See Table 4.5-1 for class location and description.	0.1	0.7	0.8
Central Interior and Appalachian Floodplain Forest	See Table 4.5-1 for class location and description.	<0.1	<0.1	<0.1
Central Interior and Appalachian Riparian Forest	See Table 4.5-1 for class location and description.	<0.1	<0.1	<0.1
Eastern Cool Temperate Urban Deciduous, Evergreen, and Mixed Forest	See Table 4.5-1 for class location and description.	0.4	0.0	0.4
Introduced Upland Vegetation - Treed	Introduced Upland Vegetation – Treed areas that are spontaneous, self-perpetuating, and dominated by introduced species that are not the result of planting, cultivation, or human maintenance.	<0.1	<0.1	<0.1
South-Central Interior Mesophytic Forest	See Table 4.5-1 for class location and description.	0.7	4.0	4.7
East Gulf Coastal Plain Northern Loess Bluff Forest	Steep bluffs mapped as Jackson formation bordering the northern portion of the eastern edge of the Mississippi River Alluvial Plain. Mesic forests tree species found in bottomland habitats are abundant or even dominant in non-flooded uplands. Bluffs provide habitat for plant species more common in the north. Species composition changes from north to south. Dominant species may include American beech (<i>Fagus grandifolia</i>), sweet gum, tulip tree, and white oak. Other characteristic species may include cucumber tree, red mulberry (<i>Morus rubra</i>), cherryback oak and littlebrownjug (<i>Hexastylis arifolia</i>).	<0.1	<0.1	<0.1
Gulf and Atlantic Coastal Plain Floodplain Forest	Floodplain forests associated with broad gradients of river size, soil nutrient levels and flood frequency ranging from semipermanent to intermittent. Major geomorphic features include natural levees, point bars, meander scrolls, oxbows, and sloughs. Species include hardwoods and other trees, shrubs and herbaceous vegetation tolerant of flooding. Typical trees include bald cypress (<i>Taxodium distichum</i>), water tupelo (<i>Nyssa aquatica</i>), silver maple, American sycamore, eastern cottonwood, box elder, and black willow. Giant cane (<i>Arundinaria gigantea</i>) is a common understory plant. Woody vines are commonly present. Shrubs and small trees include hazel alder, American hornbeam (<i>Carpinus caroliniana</i>), buttonbush, coastal sweetpepperbush (<i>Clethra alnifolia</i>), stiff dogwood (<i>Cornus foemina</i>), green hawthorn (<i>Crataegus viridis</i>), eastern swampprivet (<i>Forestiera acuminata</i>),	0.5	0.0	0.5

**Table 4.5-3
Upland Vegetation Cover Types Affected by the Gulf XPress Project**

Class Name <u>a/</u>	System Location and Description <u>a/, b/</u>	Acres <u>b/</u>		Total Acres <u>b/</u>
		Temporary	Permanent (Operation)	
	possumhaw (<i>Ilex decidua</i>), Virginia sweetspire (<i>Itea virginica</i>), wax myrtle (<i>Morella cerifera</i>), planertree (<i>Planera aquatica</i>), dwarf palmetto (<i>Sabal minor</i>), and gulf Sebasian-bush (<i>Sebastiania fruticosa</i>). Vines may include Alabama supplejack (<i>Berchemia scandens</i>) and saw greenbrier (<i>Smilax bona-nox</i>). Herbaceous species may include smallspike false nettle (<i>Boehmerica cylindrica</i>), hirsute sedge (<i>Carex complanata</i>), white edge sedge (<i>C. debilis</i>), greater bladder sedge (<i>C. intumescens</i>), cypress swamp sedge (<i>C. jooii</i>), whitegrass (<i>Leersia virginica</i>), Virginia water horehound (<i>Lycopus virginicus</i>), climbing hempvine (<i>Mikania scandens</i>), and narrow pumegrass (<i>Saccharum baldwinii</i>).			
Lower Mississippi River Flatwoods	Forests, prairies, and woodlands on Pleistocene terraces in the Mississippi Alluvial Plain. These features are higher in elevation than floodplains but have poor internal drainage and runoff. These areas have very wet conditions in winter and spring and very dry in the summer. Based on the moisture regime, the vegetation communities range from willow oak (<i>Quercus phellos</i>) flats to post oak (<i>Q. stellata</i>) flats to prairies. Trees include both upland and lowland species, ranging from post oak to overcup (<i>Q. lyrata</i>) oak.	0.1	0.0	0.1
Southern and Central Appalachian Cove Forest	Mesophytic hardwood or hemlock-hardwood forests on acidic bedrock in sheltered topographic positions. This forest type includes a mosaic of acidic and rich covers that may be identified by individual plant communities. Characteristic canopy species include yellow buckeye (<i>Aesculus flava</i>), sugar maple (<i>Acer saccharum</i>), white ash (<i>Fraxinus americana</i>), American basswood (<i>Tilia americana</i>), tulip tree, mountain silverbell (<i>Halesia tetraptera</i>), eastern hemlock, American beech, cucumbertree, and mountain magnolia (<i>Magnolia fraseri</i>).	<0.1	<0.1	<0.1
Southern Appalachian Low-Elevation Pine Forest	Shortleaf pine- and Virginia pine-dominated forests on ridgetops, upper and midslopes, as well as lower elevations in the Southern Appalachians such as mountain valleys. Stands are dominated by shortleaf pine, Virginia pine, or pitch pine (<i>Pinus rigida</i>). Hardwoods may be abundant and may include southern red oak, swamp chestnut oak (<i>Quercus prinus</i>), scarlet oak, pignut hickory, and red maple. The shrub layer may include Blue Ridge blueberry (<i>Vaccinium pallidum</i>), black huckleberry (<i>Gaylussacia baccata</i>), or other acid-tolerant species. The herbaceous layer is typically sparse but may include narrowleaf silkgrass (<i>Pityopsis graminifolia</i>) and Virginia tephrosia (<i>Tephrosia virginiana</i>).	0.1	0.4	0.5
Southern Interior Low Plateau Dry-Mesic Oak Forest	Hardwood-dominated forests along ridgetops and slopes with various aspects. Oaks and hickories may dominate this forest. Swamp chestnut oak, post oak, blackjack oak (<i>Quercus marilandica</i>), scarlet oak, chinquapin oak (<i>Q. muehlenbergii</i>), and Shumard's oak (<i>Q. shumardii</i>) are typical in drier more acidic	3.8	4.9	8.7

**Table 4.5-3
Upland Vegetation Cover Types Affected by the Gulf XPress Project**

Class Name <u>a/</u>	System Location and Description <u>a/</u> , <u>b/</u>	Acres <u>b/</u>		Total Acres <u>b/</u>
		Temporary	Permanent (Operation)	
	substrates. In more mesic conditions, white oak, black oak (<i>Q. velutina</i>) or southern red oak may be dominant. Understories are typically dominated by shrubs and small trees. Specific species are dependent on directional aspect, soil, and moisture.			
Southern Ridge and Valley/Cumberland Dry Calcareous Forest	Dry to dry-mesic calcareous forests on a variety of topographic and landscape positions including ridgetops and midslopes. These forests are typically dominated by oak and hickory species. Sometimes pines and/or eastern red cedar (<i>Juniperus virginiana</i>) are a key component. These forests are successional and have developed after repeated cutting, clearing, and cultivation of original forests.	0.3	0.3	0.6
Agriculture				
Eastern Cool and Warm Temperate Pasture and Hayland	Areas of grasses, legumes, or grass-legume mixtures planted for livestock grazing or the production of seed or hay crops. Pasture and hay vegetation accounts for greater than 20 percent of the total vegetation.	52.4	48.5	100.9
Eastern Cool and Warm Temperate Row Crop – Close Grown Crop	Cropland with greater than 20 percent vegetation that is generally drill-seeded or broadcast with wheat, oats, rice, barley, flax, corn, soybeans, vegetables, tobacco, and cotton. Cropland may also include orchards and vineyards or areas that are tilled.	42.7	18.2	60.9
Eastern Warm Temperate Fallow/Idle Cropland	Cropland that has been removed from active production.	0.1	0.0	0.1
Open Lands				
Eastern Cool and Warm Temperate Urban Herbaceous and Shrubland	Areas of lawn grasses and shrubs commonly within single-family housing units, parks, and golf courses. Vegetation is planted in developed settings for recreation, erosion control, or aesthetics.	6.4	1.9	8.3
Ruderal Upland Herbaceous	See Table 4.5-1 for class location and description.	<0.1	0.3	0.3
Central Interior Highlands Calcareous Glade and Barrens Herbaceous	Occurs on moderate to steep slopes and step valleys on primarily southerly to westerly facing slopes. Bedrock includes limestone or dolomite. Soils are shallow, moderately well drained, and interspersed with rocks. Soils often dry out during the summer and fall and become saturated during winter and spring. Dominant plant species include little bluestem (<i>Schizachyrium scoparium</i>), big bluestem (<i>Andropogon gerardii</i>), sideoats grama (<i>Bouteloua curtipendula</i>), and other calcium loving plant species. Stunted woodlands dominated by chinquapin oak interspersed with eastern red cedar may occur.	0.1	0.7	0.8

**Table 4.5-3
Upland Vegetation Cover Types Affected by the Gulf XPress Project**

Class Name <u>a/</u>	System Location and Description <u>a/</u> , <u>b/</u>	Acres <u>b/</u>		Total Acres <u>b/</u>
		Temporary	Permanent (Operation)	
Central Interior Highlands Dry Acidic Glade and Barrens	Occurs on flatrock outcrops and along moderate to steep slopes or valley walls of rivers. Parent material includes chert, igneous and/or sandstone bedrock with well-to excessively well-drained shallow soils interspersed with rock and boulders. Soils are typically dry in the summer and fall and saturated during the spring and winter. Dominant vegetation includes little bluestem, Indian grass (<i>Sorghastrum nutans</i>) with stunted oak species including post oak and blackjack oak. Shrubs, such as blueberry (<i>Vaccinium</i> spp.) occur on variable depth soils. Eastern red cedar can also be present. This system is influenced by drought and fire.	<0.1	<0.1	<0.1
Western Highland Rim Prairie and Barrens	Open, fire maintained barrens on flat to gently sloping uplands. Barrens may occur in part on Cretaceous gravels which cap Mississippian limestone strata on hills or cherty residuum. Droughty, gravelly soils and resulting stresses to vegetation as well as fire maintain this system.	<0.1	<0.1	<0.1

a Class name, location and description were obtained from LANDFIRE (LANDFIRE, 2016). LANDFIRE data are different from the data used to calculate total vegetation and land use impacts for the project (as reported in table 4.8-3). Thus, the totals for different vegetative cover types in this table may not reflect the totals in table 4.8-3.

b Acreages and miles in this table have been rounded for presentation purposes. Thus, the totals may not reflect the exact sum of the addends in all cases.

Impacts that would occur to the natural upland cover types from construction and operation of the GXP are provided in table 4.8-3 in section 4.8. Based on table 4.8-3, the largest natural upland cover type that the GXP would affect is agricultural land (about 149 acres). Agricultural land is primarily comprised of Eastern Cool and Warm Temperate Pasture and Hay Land and Eastern Cool and Warm Temperate Row Crop – Close Grown Crop. The next largest upland cover type that the GXP would affect is forested land (about 22 acres). The largest forested land class is Southern Interior Low Plateau Dry-Mesic Oak Forest. The smallest natural upland cover type that the GXP would impact is open land (about 13 acres), primarily comprised of Eastern Cool Temperate Urban Herbaceous and Shrubland.

During construction, contractors would use TWS on the compressor station sites for office trailers, parking, and storage of materials and equipment. Following construction, all disturbed areas outside of the compressor station permanent footprints would be restored to preconstruction conditions in accordance with Columbia Gulf's ECS.

The degree of impact on vegetation would depend on the type of vegetation affected, the rate at which the vegetation would regenerate after construction, and the area and frequency of vegetation maintenance conducted during operation. The primary impact of compressor station construction would be the cutting, clearing, and/or removal of about 183 acres (sum of temporary construction impacts on forested, agricultural, and open land from table 4.8-3 in section 4.8) of existing vegetation, of which the predominant type (about 149 acres) is agriculture land.

Impacts associated with disturbances to vegetation could include increased soil compaction and erosion, increased potential for the introduction and establishment of non-native and invasive species, and a local reduction in available wildlife habitat (see section 4.6.2.1). Columbia Gulf would implement erosion control measures as described in its ECS and mitigate the introduction of non-native and invasive species by post-construction monitoring of revegetated areas.

During clearing activities, Columbia Gulf would mow non-woody vegetation to ground level and cut and remove woody vegetation and stumps, as necessary. Columbia Gulf would fell trees and other woody material into the work area, then chip, burn (if approved by state and/or local regulations), or remove debris to a commercial disposal facility. Chipped material may be spread across upland areas in the work area during construction. To limit overall impact, clearing and grading would incorporate procedures to:

- limit vegetation removal to the extent necessary for construction of the GXP;
- restore pre-construction ground contours, where possible; and
- prevent topsoil erosion.

Following construction, Columbia Gulf would seed all previously vegetated workspaces disturbed by construction (and not covered by concrete, asphalt, or aggregate) in accordance with its ECS.

Lands currently dominated by herbaceous growth would be expected to revegetate quickly, often within one growing season after seeding and otherwise typically within 3 years, depending on a number of factors.

Construction in the limited forested lands affected would remove the tree canopy, which would change the structure and environment of the underlying area. Forested lands within the maintained project areas would be permanently converted to an herbaceous cover type. The regrowth of shrubs and trees within the previously forested areas may take decades to resemble the forest vegetation that was present before construction. In addition, soils that were previously shaded by the tree canopy would receive increased amounts of light, which could lead to drier soils and higher soil temperatures.

4.5.2 Federal Lands

No federally owned or managed lands have been identified within the MXP or GXP areas of disturbance. Information regarding federally listed plant species is included in section 4.7.

4.5.3 State Natural Heritage Communities

Natural heritage communities are typically tracked at the state level. This designation is given to areas that possess rare plants, rare animals, exemplary natural communities, or special geological features. Vegetation communities discussed in this section were identified through review of official agency data and direct consultations with state agencies. Information regarding state-listed plant species (including species of special concern) is included in section 4.7.

4.5.3.1 Mountaineer XPress Project

At Columbia Gas' request, the WVDNR Natural Heritage Program (NHP) conducted a review of the state Natural Heritage Inventory to determine possible impacts on known locations of rare, significant, or unique ecological communities within the project area (WVDNR, 2015a). No WVDNR NHP rare, significant, or unique ecological communities were identified during the review. However, four state-owned Wildlife Management Areas (WMA) are crossed by the pipeline centerline:

- Cecil H. Underwood WMA, crossed from approximately MP 9.2 to MP 9.4;
- Lewis Wetzel WMA, crossed from approximately MP 28.3 to MP 33.4;
- Frozen Camp WMA, crossed from approximately MP 113.2 to MP 113.1 and MP 113.3 to MP 114.4; and
- O'Brien Lake WMA, crossed from approximately MP 120.4 to MP 120.7 and MP 120.9 to MP 121.5.

These WMAs are managed for habitat and are not considered unique, rare, or significant except for Lewis Wetzel, which has been recognized as an Important Bird Area (IBA) for the management of cerulean warblers. IBAs and cerulean warblers are further discussed in section 4.6.1.1 and 4.6.2.1. WMAs are further discussed in section 4.6.1.1.

4.5.3.2 Gulf XPress Project

No unique, sensitive, or protected vegetation communities were identified within the GXP areas. No state-owned or managed lands would be affected.

4.5.4 Interior Forest Habitat

Interior forest habitat is not managed as a federal or state-regulated sensitive area, but does provide habitat for a variety of wildlife species. We are defining interior forests as forested areas greater than 300 feet from the influence of forest edges or open habitat (Jones et al., 2001). These habitats provide protection from disturbance and predation, food resources, and breeding habitat for wildlife. Clearing or fragmentation of interior forests creates more edge habitat and smaller forested tracts, which can impact availability and quality of feeding and nesting habitat for certain species, as well as isolate species populations (Rosenberg et al., 1999). Some species require large, un-fragmented blocks of habitat, and fragmentation can lead to reduced habitat quality. Habitat fragmentation can negatively impact habitat-specialist species, while having a positive or neutral effect to habitat-generalist species (Graham, 2002). Utility corridors also can create a barrier to wildlife movement for some species and a travel corridor for others. Additionally, corridor widths and vegetation characteristics can have varying effects to different species. Abrupt vegetation transitions (i.e., mature forest to open land) often cause the greatest barriers, while a forest-to-shrub-to-grassland transition can have minimal to no effect to transiting species (Graham, 2002).

4.5.4.1 Mountaineer XPress Project

We received comments during public scoping expressing concern regarding the potential impacts of the MXP on interior forest. We assessed interior forests using a dataset produced by the Natural Resource Analysis Center at West Virginia University (Strager and Maxwell, 2012), which identifies Core Forest Area (CFA) based upon the acreage of contiguous habitat. CFA rankings include patch (small forest fragments), edge (continuous forest periphery), perforated (core forest containing a small clearing(s) within the forest), small core (less than 250 acres), medium core (250 to 500 acres), and large core (greater than 500 acres). Table 4.5-4 provides a breakdown of small, medium, and large CFAs that would be directly affected by the MXP. Figures in appendix I illustrate the CFAs traversed by the MXP. Figures are provided at two different scales (1:10,000 and 1:2,000).

Based on our independent analysis, construction of the MXP would directly impact about 1,311 acres of small, medium, and large CFAs. Permanent impacts on CFA, from operation of the MXP, would total about 490 acres. About 1,218 acres of direct impacts would be to large core CFA. These CFA impact numbers have decreased from the issuance of the draft EIS because the original analysis and classifications included existing private roads that Columbia Gas is proposing to utilize during construction, as new impacts or new forest fragmentation. We determined that use of these existing private roads should not contribute to a new impact on CFAs; therefore, those existing roads were removed from the analysis.

**Table 4.5-4
Core Forest Area Directly Affected by the Mountaineer XPress Project (acres) a/, b/**

Project/Facility Type/Facility	Small Core (< 250 acres)		Medium Core (250-500 acres)		Large Core (< 500 acres)		Core Forest Total	
	Total Constr. (acres)	Perm. Oper. (acres)	Total Constr. (acres)	Perm. Oper. (acres)	Total Constr. (acres)	Perm. Oper. (acres)	Total Constr. (acres)	Perm. Oper. (acres)
New Pipelines								
MXP-100	33.4	13.3	11.3	4.4	1,131.0	453.2	1,175.7	470.8
Cathodic Protection	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MXP-200	4.0	1.9	0.0	0.0	16.4	8.2	20.4	10.1
Cathodic Protection	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	37.4	15.2	11.3	4.4	1,147.4	461.3	1,196.1	480.9
Pipeline Replacement								
SM80 Replacement	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SM80 Loop Replacement	0.0	0.0	0.0	0.0	0.0	0.1	0.2	1.0
Subtotal	0.0	0.0	0.0	0.0	0.0	0.1	0.2	1.0
Pipeline Facility Total	37.4	15.2	11.3	4.4	1,147.4	461.5	1,196.5	481.9
Access Roads								
MXP-100	0.5	0.5	0.0	0.0	0.4	0.0	0.9	0.5
MXP-200	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SM80 Loop Replacement	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Access Roads Total	0.5	0.5	0.0	0.0	0.4	0.0	0.9	0.5
New Aboveground Facilities								
LXP Tie-In	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sherwood CS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
White Oak CS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mount Olive CS	21.7	8.3	0.0	0.0	0.0	0.0	21.7	8.3
Ripley RS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Saunders Creek RS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MXP-200 Tie-in to Line 1983	0.0	0.0	0.0	0.0	<0.1	0.0	<0.1	0.0
MLV	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

**Table 4.5-4
Core Forest Area Directly Affected by the Mountaineer XPress Project (acres) a/, b/**

Project/Facility Type/Facility	Small Core (< 250 acres)		Medium Core (250-500 acres)		Large Core (< 500 acres)		Core Forest Total	
	Total Constr. (acres)	Perm. Oper. (acres)	Total Constr. (acres)	Perm. Oper. (acres)	Total Constr. (acres)	Perm. Oper. (acres)	Total Constr. (acres)	Perm. Oper. (acres)
Subtotal	21.7	8.3	0.0	0.0	<0.1	0.0	21.7	8.3
Existing Aboveground Facilities								
Lone Oak Compressor Station <u>c/</u>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ceredo Compressor Station	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Elk River Compressor Station <u>c/</u>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aboveground Facilities Total	21.7	8.3	0.0	0.0	<0.1	0.0	21.7	8.3
Pipe Yards	18.2	0.0	0.0	0.0	2.9	0.0	21.1	0.0
Staging Areas	1.2	0.0	0.0	0.0	0.0	0.0	1.2	0.0
Subtotal	19.3	0.0	0.0	0.0	2.9	0.0	22.3	0.0
ATWS								
MXP-100 ATWS	2.1	0.0	0.4	0.0	66.5	0.0	69.0	0.0
MXP-200 ATWS	0.1	0.0	0.0	0.0	0.6	0.0	0.6	0.0
X59M1 Line ATWS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SM80 Line ATWS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SM80 Loop Line ATWS	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0
Subtotal	2.2	0.0	0.4	0.0	67.2	0.0	69.7	0.0
PROJECT TOTAL	81.2	24.0	11.7	4.4	1,217.9	461.5	1311.1	490.7

a The subtotals and totals shown in this table may not equal the sums of the addends due to rounding.

b Core Forest Area type, location and description were obtained from Strager and Maxwell, 2012.

c The initial construction of the Lone Oak Compressor Station will be performed under the LXP, which was certificated by FERC on January 19, 2017. The Elk River Compressor Station is pending in another proceeding before FERC.

Table 4.5-5 depicts the various CFA forest systems that would be impacted by the MXP. LANDFIRE data (2016) were used in the analysis of impacts on forest systems within CFAs. This dataset provides a landscape-level characterization of specific forest systems crossed by the project. Although CFA includes patch, edge, and perforated areas, these areas have been converted to urban, agricultural or open land so they are not mapped in LANDFIRE data as forest systems. Even though they are not mapped in the LANDFIRE data, they are still relevant in the analysis because impacts on these features can have resulting impacts on small, medium, and large core forest area. By far, the largest CFA forest system that would be impacted by the MXP is South-Central Interior Mesophytic Forest (about 693 acres of small, medium, and large CFAs within this system). South-Central Interior Forest is believed to cover 2,777,629 acres in West Virginia and 3,543,609 acres across its total range within West Virginia, Pennsylvania, and Virginia (The Nature Conservancy, 2016). Impacts resulting from the MXP would result in a 0.02 percent decrease in West Virginia and a 0.01 percent decrease across the total range of South-Central Interior Mesophytic Forest.

Construction of the MXP would create a new, cleared corridor in areas of interior forest. Clearing or fragmentation of interior forests creates more edge habitat and smaller forested tracts, which can impact the characteristics of vegetation communities including their suitability for wildlife. Our review of CFA within 10 miles of either side of the MXP indicates that the project would traverse an area comprising approximately 577,583 acres (23 blocks) of large CFAs, 1,206 acres (4 blocks) of medium CFAs, and 1,613 acres (23 blocks) of small CFAs. Construction of the MXP would decrease large CFAs by 15,215 acres (3 percent) and create 21 additional blocks of large CFA (the newly created blocks would still be large enough to qualify as large CFAs). The MXP would increase medium CFAs by 3,742 acres (310 percent) and create 9 additional blocks of medium CFA. The MXP would increase small CFAs by 4,017 acres (249 percent) and create an additional 111 blocks of small CFA. The MXP also would create forest edge where the pipeline traverses CFAs. MXP facilities that would result in an impact on CFAs are included in table 4.5-4.

The MXP rights-of-way through forest and forest edges would result in the removal and modification of habitat for species that use these habitats as far as 300 feet into adjacent forest habitats. The creation of a new corridor and forest edges could impact micro-climate factors such as wind, humidity, and solar exposure, which could lead to a change in species composition. Forest edges also play a role in ecosystem functions, including the dispersal of plants and wildlife, the spreading of fire, movement of wildlife, and vegetation composition and structure. Non-native species could vegetate interior forests that are impacted by construction.

Edge effects could include a change in available habitat for some species due to an increase in light and temperature levels on the forest floor and the subsequent reduction in soil moisture; such changes may result in habitat that would no longer be suitable for species that require these specific habitat conditions. An alteration of habitat could affect the fitness of some species and increase competition within, between, or among species, possibly resulting in an overall change to the structure of the forest community.

**Table 4.5-5
Forest Systems Affected by the Mountaineer XPress Project (acres) a/, b/, c/, d/**

Forest System	Small Core (< 250 acres)		Medium Core (250-500 acres)		Large Core (> 500 acres)		Project Total	
	Total Constr. (acres)	Perm. Oper. (acres)	Total Constr. (acres)	Perm. Oper. (acres)	Total Constr. (acres)	Perm. Oper. (acres)	Total Constr. (acres)	Perm. Oper. (acres)
Allegheny-Cumberland Dry Oak Forest and Woodland	17.9	6.8	4.0	1.7	275.1	103.7	297	112.2
Appalachian Hemlock-Northern Hardwood Forest	5.8	0.8	0.0	0.0	70.4	26.4	76.2	27.2
Central Appalachian Alkaline Glade and Woodland	0.0	0.0	0.0	0.0	0.0	0.0	<0.1	0.0
Central Appalachian Rocky Pine-Oak Woodland	0.3	0.0	0.0	0.0	0.4	0.1	0.7	0.1
Central Interior and Appalachian Floodplain Forest	0.8	0.1	0.0	0.0	12.2	4.6	13	4.7
Central Interior and Appalachian Riparian Forest	0.0	<0.1	0.0	0.0	<0.1	<0.1	<0.1	<0.1
Central Interior Highlands Calcareous Glade and Barrens Woodland	0.0	<0.1	0.0	0.0	0.2	0.1	0.2	0.1
Eastern Cool Temperate Urban Forest	0.0	<0.1	<0.1	<0.1	2.4	0.7	2.4	0.7
Managed Tree Plantation-Northern and Central Hardwood and Conifer Plantation Group	1.6	0.7	0.5	0.2	33.2	13.6	35.3	14.5
Northeastern Interior Dry-Mesic Oak Forest	12.6	3.4	1.1	0.4	132.1	50.8	145.8	54.6
Ruderal Forest-Northern and Central Hardwood and Conifer	0.2	0.1	<0.1	<0.1	13.7	4.7	13.9	4.8
South-Central Interior Mesophytic Forest	37.3	12.1	4.4	1.4	651.4	247.0	693.1	260.5

- a The subtotals and totals shown in this table may not equal the sums of the addends due to rounding.
- b Class name, location, and description were obtained from LANDFIRE (LANDFIRE, 2016).
- c Core Forest Area type, location, and description were obtained from Strager and Maxwell, 2012.
- d Acres in this table will differ from 4.8-4, because Forest Systems are not mapped within the Patch, Edge, and Perforated designations.

The landscape along the MXP has already been fragmented in places by existing roads, utility rights-of-way, residential and commercial development, agricultural, and open land. Even though this fragmentation exists, the MXP could still impact migratory bird and other wildlife habitat. In sections 4.6.1 and 4.7, we discuss the MXP's potential impacts on migratory birds and their interior forest habitats in relation to the MBTA (as well as federally listed bat species), including proposed tree clearing outside of agency-recommended timeframes.

Construction in the forested areas affected would remove the tree canopy, which would change the structure and environment of the underlying area. Forested lands within the maintained project areas would be permanently converted to an herbaceous cover type. To encourage revegetation and minimize the potential spread of invasive species in temporarily impacted areas, Columbia Gas would implement the measures in Section I of its ECS (e.g., temporary and permanent seeding, mulch application, erosion control blanket installation), which would promote the establishment of desirable plant species and deter the spread of unwanted plant species. The regrowth of shrubs and trees within the previously forested areas may take decades to resemble the forest vegetation that was present before construction. In addition, soils that were previously shaded by the tree canopy would receive increased amounts of light, which could lead to drier soils and higher soil temperatures.

Based on its April 21, 2017 responses to our draft EIS, Columbia Gas indicated it is working towards a long-term agreement with the WVDNR that would incorporate special construction, restoration, and operational conditions within WVDNR-controlled tracts of land. However, no specific measures have been finalized. Therefore, **we recommend that:**

- **Prior to construction, Columbia Gas should file with the Secretary any specific construction, restoration, replacement, and/or operation mitigation measures identified through its discussions with the WVDNR that Columbia Gas would implement to promote compatibility with the restoration and management of upland forest areas.**

4.5.4.2 Gulf XPress Project

Most of the vegetation disturbed by construction of the GXP facilities is agricultural (about 149 acres, or 75 percent of the project total). The GXP impacts on upland forested vegetation is about 22 acres in various locations in Kentucky, Tennessee, and Mississippi: Moorhead (0.5 acre), Goodluck (4.7 acres), Cane Ridge (8.7 acres), Clifton (6.4 acres), and Holcomb Compressor Station (1.6 acre). Interior forest tracts would not be affected by GXP construction.

4.5.5 Noxious Weeds and Invasive Plant Species

Invasive species are those that display rapid growth and spread, becoming established over large areas (USDA, 2016d). Most commonly, they are exotic species that have been introduced from another part of the United States or another continent, although some native species that exhibit rapid growth and spread are also considered invasive. Invasive plant species can change or degrade natural vegetation communities, which can reduce the quality of habitat for wildlife and native plant species. Like invasive species, noxious weeds are frequently introduced but occasionally are native. Noxious weeds are defined as those that are injurious to commercial crops,

livestock, or natural habitats and typically grow aggressively in the absence of natural controls (USDA, 2016d). Under EO 13112, a federal agency shall not authorize, fund, or carry out actions likely to cause or promote the introduction or spread of invasive species in the United States.

4.5.5.1 Mountaineer XPress Project

The West Virginia Noxious Weed Act defines noxious weeds as “any living plant, or part thereof, declared to be detrimental to crops, other desirable plants, waterways, livestock, land or other property, or to be injurious to public health or the economy,” and prohibits persons from moving, transporting, delivering, shipping, or offering for shipment noxious weeds into or within the state without a permit from the Secretary of Agriculture (West Virginia Code, 1976; WVDA, 2007).

Columbia Gas included surveys for noxious and invasive weed species during its 2015 field survey season. The results are presented in table 4.5-6. Species sought were based on the recommendations of the West Virginia Department of Agriculture (see “West Virginia Noxious Species” in table). This table also presents West Virginia’s 12 most common invasive species (WVDNR, 2015a).

Table 4.5-6 Noxious Weed Species Potentially Located within the MXP Areas		
Common Name	Scientific Name	Identified within the Project Survey Corridor
West Virginia Noxious Species <u>a/</u>		
Autumn olive	<i>Elaeagnus umbellata</i>	Yes; multiple sites in Doddridge, Jackson, Marshall, Putnam, Ritchie, Roane, and Wirt Counties
Curled thistle	<i>Carduus crispus</i>	No
Japanese knotweed <u>b/</u>	<i>Polygonum cuspidatum</i>	Yes; multiple sites in Doddridge, Marshall, Putnam, and Ritchie Counties
Japanese stiltgrass <u>b/</u>	<i>Microstegium vimineum</i>	Yes; multiple sites in all counties
Johnsongrass	<i>Sorghum halepense</i>	Yes; multiple sites in Jackson, Marshall, Ritchie, and Roane Counties
Kudzu <u>b/</u>	<i>Pueraria montana</i> , <i>Pueraria thunbergiana</i>	Yes; MP 134.6 in Putnam County
Marijuana	<i>Cannabis sativa</i>	Yes; MP 134.6 in Putnam County
Mile-a-minute <u>b/</u>	<i>Polygonum perfoliatum</i>	No
Morrow’s honeysuckle	<i>Lonicera morrowii</i>	Yes; multiple sites in Doddridge, Jackson, Marshall, and Putnam Counties
Multiflora rose <u>b/</u>	<i>Rosa multiflora</i>	Yes; multiple sites in Calhoun, Doddridge, Jackson, Marshall, Putnam, Ritchie, Roane, Wirt, and Wetzel Counties
Musk thistle	<i>Carduus nutans</i>	Yes; multiple sites in Jackson County
Opium poppy	<i>Papaver somniferum</i>	No
Plumeless thistle	<i>Carduus acanthoides</i>	No
Poison hemlock	<i>Conium maculatum</i>	No
Purple loosestrife <u>b/</u>	<i>Lythrum salicaria</i>	No
Tartarian honeysuckle	<i>Lonicera tartarica</i>	Yes; multiple sites in Doddridge, Jackson, Putnam, Ritchie, Wirt, and Wetzel Counties

Table 4.5-6 Noxious Weed Species Potentially Located within the MXP Areas		
Common Name	Scientific Name	Identified within the Project Survey Corridor
Tree of heaven ^{b/}	<i>Ailanthus altissima</i>	Yes; multiple sites in Calhoun, Doddridge, Jackson, Marshall, Putnam, Ritchie, Roane, Wirt, and Wetzel Counties
Common West Virginia Invasive Species		
Crown vetch	<i>Securigera varia</i>	No
Garlic mustard	<i>Alliaria petiolata</i>	Yes; MP 153 in Putnam County
Reed canary grass	<i>Phalaris arundinacea</i>	No
Water-shield	<i>Brasenia schreberi</i>	No
Yellow iris	<i>Iris pseudacorus</i>	No
a Source: USDA, 2016d.		
b Also one of the 12 most common invasive plant species in West Virginia (WVDNR, 2017).		

The removal of existing vegetation and disturbance of soils along the rights-of-way during construction would create conditions conducive to the spread and establishment of noxious and invasive weeds, particularly where new corridors are established in previously vegetated areas. To limit the potential spread of invasive species, Columbia Gas states that it is continuing consultations with the WVDNR, WVDEP, and West Virginia Office of the NRCS to develop BMPs to control the spread of invasive and noxious species.

Based on our review and EPA’s recommendations, we believe this issue merits additional effort. Therefore, **we recommend that:**

- **Prior to construction, Columbia Gas should develop, in consultation with the appropriate West Virginia state agencies and local NRCS, a noxious and invasive weed management plan. This plan should include:**
 - a. **identification of the locations by milepost where noxious or invasive weeds are currently present either within or immediately adjacent to all areas of project-related disturbance; and**
 - b. **BMPs that include integrated vegetation management and a site-specific plan for each location where weeds are present which:**
 - i. **describes options for pretreatment (including the month(s) of the year when pretreatment would be effective), treatment during construction (to avoid introducing or spreading invasive species), and post-construction treatment and monitoring;**
 - ii. **identifies who was consulted regarding possible treatment options; and**
 - iii. **includes whether the landowner/administrator has approved of the treatment options proposed.**

Columbia Gas should file this plan with the Secretary, for the review and written approval from the Director of OEP, before implementation and include the comments of the various agencies consulted during its development.

Invasive species also could spread during project operation from the transmission of seeds or viable plant fragments from infested areas via mowing equipment. Columbia Gas has committed to monitoring for invasive species for 3 years following construction; however, we believe that additional post-construction invasive species monitoring is needed. The risk of invasive species introduction decreases once revegetation of native species is successful and complete, although mowing could re-introduce invasive species during operation of the project. Therefore, **we recommend that:**

- **Following construction, Columbia Gas should conduct noxious and invasive species monitoring within the maintained rights-of-way for 3 years following successful completion of revegetation, and file with the Secretary the results of these surveys. Columbia Gas should not move mowing and maintenance equipment from an area where invasive species have been encountered during operation of the project unless the equipment is cleaned to remove invasive species and seeds prior to moving.**

Based on our recommendations, we conclude that the potential spread of noxious or invasive weeds would be effectively avoided or mitigated.

4.5.5.2 Gulf XPress Project

Columbia Gulf's removal of existing vegetation and disturbance of soils during construction could create conditions conducive to the establishment of invasive weeds. Kentucky, Tennessee, and Mississippi all have state-listed noxious or invasive weeds. In Kentucky, there are eight species that have the potential to occur in project areas; in Tennessee, there are three; and in Mississippi, there are eight. Columbia Gulf conducted noxious weed surveys at each of the areas where soils would be disturbed by the GXP. Table 4.5-7 lists noxious weed species potentially present in each state affected by the GXP, as well as the results of Columbia Gulf's surveys of each location.

**Table 4.5-7
Noxious Weed Species Potentially Located within the GXP Areas**

Common Name	Scientific Name	Identified within GXP Area of Disturbance
Kentucky		
Black nightshade	<i>Solanum ptycanthum</i>	No
Canadian thistle	<i>Carduus crispus</i>	No
Giant foxtail	<i>Polygonum cuspidatum</i>	No
Johnsongrass	<i>Sorghum halepense</i>	Morehead Compressor Station site
Kudzu	<i>Pueraria montana</i>	No
Multiflora rose	<i>Rosa multiflora</i>	Morehead Compressor Station site
Musk thistle	<i>Carduus nutans</i>	No
Wild cucumber	<i>Sicyos angulatus</i>	No
Tennessee		
Purple loosestrife (two species)	<i>Lythrum salicaria, Lythrum virgatum</i>	No
Tropical soda apple	<i>Solanum viarum</i>	No
Mississippi		
Brazilian satintail	<i>Imperata brasiliensis</i>	No
Chinese tallow tree	<i>Triadica sebifera</i>	No
Cogon grass	<i>Imperrata cylindrica</i>	No
Giant salvinia	<i>Salvinia molesta</i>	No
Hydrilla	<i>Hydrilla verticillata</i>	No
Itchgrass	<i>Rottboellia cochinchinensis</i>	No
Kudzu	<i>Pueraria montana</i>	New Albany Compressor Station site
Tropical soda apple	<i>Solanum viarum</i>	No
Source: USDA, 2012		

To limit the potential spread of invasive species, Columbia Gulf would limit vegetation removal to the extent necessary to construct the project, and either burn, chip, or haul cleared vegetation to a commercial disposal facility. Additionally, Columbia Gulf would implement the measures in its ECS (e.g., temporary and permanent seeding, mulch application, erosion control blanket installation), which would promote the establishment of desirable plant species and deter the spread of unwanted plant species.

Columbia Gulf would also conduct post-construction monitoring for noxious weed growth in revegetated areas. Based on these measures, we conclude that the potential spread of noxious or invasive weeds would be avoided or effectively mitigated.

During the public comment period for the draft EIS, we received a comment regarding the potential for the emerald ash borer to exist within the GXP areas in Tennessee where ash trees are present. Adult ash borers are emerald green beetles about 0.5-inch long. They leave “D-shaped” holes in the tree bark when they emerge in early June. The larvae feed on the inner bark of ash trees, disrupting the tree’s ability to transport water and other nutrients. Woodpeckers prey on the larvae; so, heavy woodpecker damage on an ash tree could indicate an infestation. To reduce the

potential that GXP activities could contribute to the spread of emerald ash borers, **we recommend that:**

- **Prior to removal of any ash tree from the GXP areas in Tennessee, Columbia Gulf should inspect all ash trees that would be removed for indications of emerald ash borer infestations, before transporting ash trees away from the area. If signs of an infestation exist, Columbia Gulf should immediately contact the USDA Emerald Ash Borer Hotline at 866-322-4512 to determine the appropriate method for disposing of the tree(s). Prior to operation of the GXP, Columbia Gulf should file with the Secretary the results of these inspections.**

4.5.6 Conclusion

4.5.6.1 Mountaineer XPress Project

Construction of the MXP, including the construction rights-of-way, extra workspaces, aboveground facilities, contractor yards, and access roads, would result in impacts on about 3,389 acres of vegetated lands.

Based on our review of the potential impacts on vegetation as described above, we conclude that the primary impact from project construction and operation would be on forested lands and fragmentation of interior forest blocks. Due to the length of time required to recover forested vegetation, these impacts would be considered long-term to permanent. Columbia Gas would attempt to minimize these impacts through the implementation of their ECS, in addition to recommendations made throughout this EIS. Therefore, despite impacting a small percentage of the primary CFA forest system (South-Central Interior Forest), co-locating a portion of the pipeline with existing utilities, and with implementation of the ECS, we have determined that MXP impacts on forested lands would be significant.

4.5.6.2 Gulf XPress Project

Construction of the GXP, including work conducted at two existing facilities and seven new compressor station sites, would result in impacts on about 191 acres of vegetated lands. This total includes about 163 acres of agricultural land, 17 acres of forested land, and 9 acres of open land.

As discussed for the MXP above, construction impacts on vegetation resources are classified based on the duration and significance of impacts. Based on our review of the potential impacts on vegetation as described above, we conclude that the primary impact from construction and operation would be on agricultural land. Impacts on forested and non-forested vegetation types would be minor, and mitigated through adherence to the measures described in Columbia Gulf's ECS.

4.6 WILDLIFE AND FISHERIES

4.6.1 Existing Wildlife Resources

4.6.1.1 Mountaineer XPress Project

The MXP would traverse terrestrial and wetland habitats that support a diversity of wildlife species. Representative wildlife species include various species of waterfowl and migratory birds including raptors (e.g., red-tailed hawks), white-tailed deer, raccoons, Virginia opossums, beavers, little brown myotis, eastern pipistrelle bats, eastern snapping turtles, and spotted salamanders. Four state-managed WMAs would be traversed by the MXP. One of the WMAs, the Lewis Wetzel WMA, is also part of an IBA. Information on the four WMAs and the IBA is provided in section 4.6.2.1.

Terrestrial vegetation communities include forested land, agricultural land, and open land. Descriptions of these communities are provided in section 4.5.1.1. Upland hardwood forests provide food resources, nesting habitat, and cover for a variety of reptiles, amphibians, mammals, birds, and invertebrates. Agricultural land provides forage and nesting habitat for a variety of songbirds. Open land provides cover as well as foraging and nesting habitat for a variety of species. Wetlands provide cover, forage, and nesting habitat for a variety of reptiles, amphibians, mammals, and birds. Descriptions of wetland habitats are provided in section 4.4.1.1. In addition to terrestrial and wetland habitats, the MXP would cross developed land including roadways, mining operations, and residential, commercial, and industrial lands. Developed lands are generally devoid of native vegetation and provide little wildlife habitat.

4.6.1.1.1 Pipeline Facilities

Wildlife could be impacted by clearing of vegetation; alteration of the landscape from soil disturbance during grading and recontouring; conflicts with vehicles; human presence; activities associated with trenching; increased predation; and edge effects and habitat fragmentation. During construction, more mobile species would be temporarily displaced from the construction right-of-way to similar habitats nearby due to human presence and increases in noise. Noise impacts would typically be temporary and intermittent, as pipeline construction normally occurs in a linear fashion, like a moving assembly line. Less mobile species, such as small mammals, reptiles, amphibians, and nesting birds, may experience direct mortality or permanent displacement. Displacement of species from the project area could lead to increased competition for resources in the areas where they relocate. Some wildlife displaced from the right-of-way would return to the newly disturbed area and adjacent, undisturbed habitats after completion of construction. Soil-dwelling invertebrates would be impacted directly through movement of soil from one place to another, resulting in some mortality and displacement. This could reduce the forage potential for insectivores and other small predators that inhabit the area. The overall impact of these effects, however, would be minor due to the temporary nature of the effects and limited area affected by construction.

Clearing vegetation on the construction right-of-way and extra workspaces would reduce cover, foraging, breeding, and nesting habitat for some wildlife. The degree of impact would depend on the type of habitat affected, the timing of clearing and construction activities, and the

rate at which the area recovers after disturbance from construction. Seasonal habitat use for migratory birds is discussed above. The effect to species that rely on open land habitats would be short-term, as Columbia Gas would seed these areas, and vegetation would likely recover within 1 to 3 years after construction. Cleared scrub-shrub vegetation would likely require several years to regain woody composition. The effect of workspace clearing on forest-dwelling wildlife species would be greater than the effect open and scrub-shrub habitat wildlife because forested lands could take decades to return to pre-construction condition, and Columbia Gas would prevent trees from reestablishing on the permanent right-of-way. Columbia Gas would limit the potential for these long-term effects by co-locating the proposed workspace with other existing rights-of-way in certain areas to reduce the amount of additional clearing required.

Trenching activities and the spoil piles generated during construction could create potential traps where wildlife could fall into the pipeline trenches. In addition, spoil piles could create barriers to some less mobile species such as small reptiles and amphibians. Prior to the start of the construction day, Columbia Gas would inspect open trenches for wildlife and return any wildlife found to the appropriate suitable habitat. Columbia Gas would also sequence construction to limit the amount and duration of open trenching (and related spoil piles). Columbia Gas would maintain breaks in the trench and place gaps in the temporary spoil piles to allow wildlife to migrate through the construction corridor. Escape ramps would be installed about every 50 feet within the trench to provide a wildlife exit. Therefore, we conclude that potential trenching and spoil pile impacts on wildlife movement would be minimized to the extent practicable.

Increased predation could occur during construction and operation of the pipeline due to the removal of vegetation and the resulting increase in visibility. While individual mortality rates could increase, the project would not likely have any population-level impact due to these effects.

Interior forests (CFAs) and habitat fragmentation are discussed in detail in section 4.5.4.1. In general, habitat fragmentation and the creation of additional edge habitat has the potential to cause changes in vegetation composition, species distributions, and available foraging and nesting habitat (Rosenberg et al., 1999). Forest habitat (and interior forest habitat in particular) can take decades to become established compared to forest edges and scrub or herbaceous habitats, which can be established much more rapidly and which are relatively common in the project area. Conversely, the creation of additional edge habitat could benefit certain mammal species, such as white-tailed deer and raccoons, by providing travel corridors and additional forage habitat. Following construction, Columbia Gas would re-seed soils disturbed by project activities to facilitate revegetation which would support the movement of mammals between adjacent forested areas. Project-related CFA impacts on sensitive or managed wildlife habitats and species protected under the MBTA and BGEPA are discussed in sections 4.6.2 and 4.6.3, respectively.

Blasting may be necessary along the pipeline routes, including in sensitive wildlife areas with shallow depth-to-bedrock, as well as interior forest areas. Impacts from blasting would be similar to those described for trenching, in that larger animals would likely be displaced, but that smaller or less mobile individuals could be killed. Columbia Gas has developed a Blasting Plan that would limit potential impacts.

Riparian zones adjacent to waterbodies contain vegetation dependent on moist soils. These habitats are important for water quality and bank stabilization and provide shelter, foraging areas,

and nesting habitat for species of birds, mammals, reptiles, amphibians, and invertebrates. Potential impacts on wildlife from the removal of riparian habitat include loss of habitat, reduced habitat quality, increased predation, temporary displacement of individuals, and alteration of migration and breeding habits. Columbia Gas would allow riparian areas to permanently revegetate across the pipeline rights-of-way at each waterbody crossing, except for a 10-foot-wide corridor centered over the pipeline that would be maintained in an herbaceous state, to facilitate bank stabilization, facilitate stream shading, and provide wildlife habitat.

Columbia Gas would minimize impacts on wildlife habitat further by adhering to its ECS, as well as recommendations from wildlife management agencies. Columbia Gas would restore herbaceous and scrub-shrub wetlands within its rights-of-way, and would mitigate for permanent impacts on forested wetlands (see section 4.4.2.1).

4.6.1.1.2 Aboveground Facilities

Three new compressor stations would be constructed for the MXP. A total of 77.6 acres would be utilized during construction of the three facilities, with about 29.7 acres utilized for operation. The permanent footprint at each new compressor station would be converted to developed land. Areas used for TWS at each facility would be restored and maintained as open land or allowed to revert to pre-construction land use cover. We expect wildlife would return to the restored areas post-construction. Wildlife habitat within the permanent footprint, which would be fenced-off, would be limited primarily to supporting songbirds and small mammals.

Three new regulator stations also would be constructed for the MXP, one at the Sherwood Compressor Station and one each at the Ripley and Saunders Creek Regulator Stations. Land use and impacts for the Sherwood Compressor Station (including the regulator station located within) are discussed in the previous paragraph. Each of the new regulator station sites would be permanently converted to developed land uses. Conversion of existing habitats (0.3 acre agricultural land, 5.2 acres forested land, 2.2 acres open land, and less than 0.1 acre of open water) totaling 7.7 acres at the Ripley and Saunders Creek Regulator Station sites would not have a significant impact on wildlife in these areas due to the limited size of these facilities.

The project would require the construction of 10 new pig launcher/receiver facilities. All the new launcher/receiver facilities would be installed within other proposed aboveground facilities; therefore, impacts associated with the installation of these launcher/receivers are included with the impacts reported for the aboveground facilities within which they would be located.

Modifications and upgrades associated with existing Ceredo, approved Lone Oak and pending Elk River Compressor Stations would be completed within the fenced facilities, existing rights-of-way, and previously disturbed areas adjacent to the facilities. Therefore, no new permanent impacts would occur as a result of the modifications at the existing facilities.

4.6.1.1.3 Pipe Yards and Staging Areas

Pipe yards and staging areas would impact 234.3 acres of agricultural land, 108.3 acres of open land, and almost 82 acres of forest. Following construction, Columbia Gas would restore and reseed any previously vegetated areas affected, except for actively cultivated croplands (unless

approved in writing by the landowner). Use of these areas would temporarily displace wildlife species; however, displaced wildlife would likely return to these areas following restoration. Therefore, no permanent impacts on wildlife would result from the use of the pipe yards and staging areas.

4.6.1.1.4 Access Roads

After construction is complete, only 3.7 acres of new access roads would be maintained permanently for project operation. Use of access roads by construction personnel would temporarily displace wildlife species. Additionally, there would be the potential for a minor increase in wildlife fatalities along access roads due to the temporary increase in traffic during construction. After construction, the access roads would be restored in accordance with landowner agreements and applicable permits, or used for permanent access to accommodate facility operations.

4.6.1.1.5 Other Project Impacts

Trash and debris could impact wildlife. Animals could eat contaminated or dangerous items. The presence of trash and debris could encourage certain species to move into areas where humans are working, resulting in potential wildlife-human interaction and conflict. To limit the potential for wildlife attraction, Columbia Gas would maintain construction debris in a neat and orderly manner, remove it from all work areas, and dispose of it in an approved offsite location.

A spill of hazardous materials during construction, such as diesel fuel or oil, or the excavation and exposure of contaminated soil or groundwater could impact wildlife. Columbia Gas would minimize impacts from chemicals or contaminants by adhering to its ECS and SPCC Plan, which include measures such as storing hazardous materials with adequate containment (e.g., containment dikes and impervious liners) and refueling in designated areas at least 100 feet from wetlands and waterbodies (or in accordance with EI guidance). Thus, we conclude the risk of chemical exposure to individual animals would be low, and there would be no risk of population-level impacts on any wildlife species.

Construction traffic on paved and unpaved roads could temporarily disturb birds and other wildlife near the roadways. There could also be an increase in direct mortality of certain wildlife resulting from animal/vehicle collisions. However, due to the use of existing roads when practicable, and the short timeframe of construction, we would expect the overall impacts on wildlife from increased vehicular traffic to be minor.

4.6.1.2 Gulf XPress Project

The GXP would be constructed within the Western Allegheny Plateau, Interior Plateau, Southeastern Plains, and Mississippi Alluvial Plains ecoregions. Wildlife species commonly found throughout the project region include white-tailed deer; black bears; bobcats; foxes; raccoons; cottontail rabbits; gray squirrels; river otters; beavers; various species of snakes, turtles, and frogs; lizards; raptors; wild turkeys and other game birds; ducks, herons and egrets; songbirds; and many small rodents, bats, and shrews.

Game and non-game wildlife species are regulated and protected through state and federal laws and regulations covering the project areas in Kentucky, Tennessee, and Mississippi. Even though the GXP areas fall within certain ecoregions, the workspaces are primarily located in open, disturbed, and agricultural lands, or existing/pending fenced facilities, and not all the affected habitat types support a diversity of species. Detailed information on upland cover types and GXP impacts are provided in section 4.5.

Construction of the GXP facilities could affect wildlife resources through:

- temporary or permanent wildlife displacement due to human activity, lighting, and noise;
- habitat loss or modification;
- wildlife harassment, injury, or mortality by construction machinery and vehicles.

Wildlife sensitivity to elevated noise, light, and human activity varies by species and individuals, with some species becoming quickly acclimated to human activities. We expect that wildlife present within project areas when construction activities commence would likely be displaced to nearby areas of suitable habitat. Construction of the project would temporarily disturb about 191 acres of wildlife habitat, of which about 109 acres would be restored to preconstruction conditions. Operation of the project facilities could result in the permanent loss of about 80 acres of potential wildlife habitat, although most of these impacts (84 percent) would be on agricultural land. Increased vehicle traffic also may result in the mortality of wildlife species; collisions with motor vehicles are a known cause of mortality for birds, mammals, reptiles, and amphibians.

4.6.2 Sensitive or Managed Wildlife Habitats

4.6.2.1 Mountaineer XPress Project

Four state-managed WMAs would be traversed by the MXP-100 pipeline corridor (see section 4.8.2.2). These areas are managed by the WVDNR for habitat and to provide opportunities for hunting and fishing.

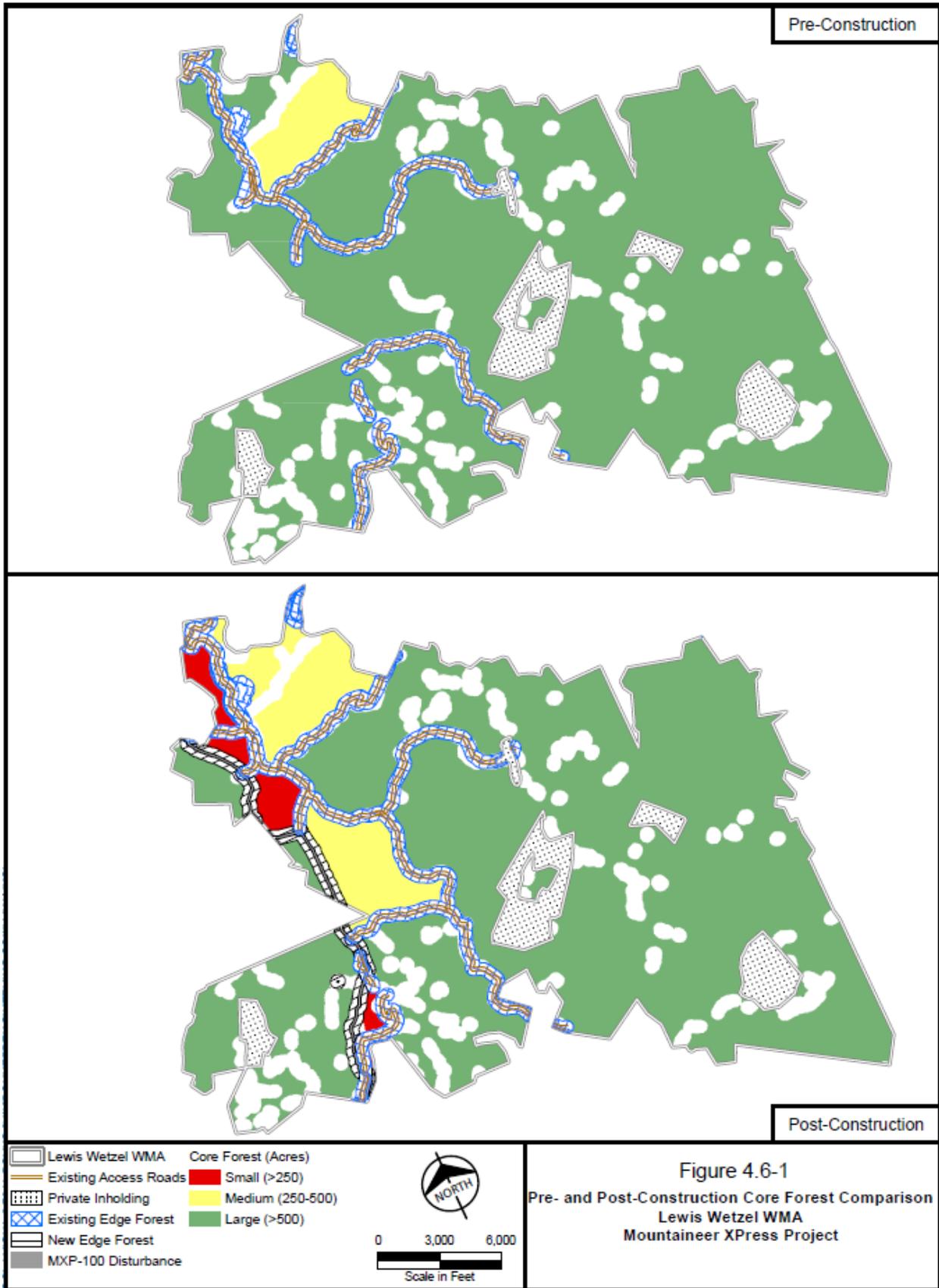
The project would cross the western unit of the Cecil H. Underwood WMA from MP 9.2 to MP 9.4. The WMA is made up of three portions, with the smaller western unit about 5 miles from the main parcel. The WMA is located on 2,072 acres comprising mixed hardwood forest in steep-to-moderate terrain. The forest canopy is dominated by oak-hickory and cove hardwoods. The WMA provides hunting opportunities for deer, grouse, squirrel, and turkey. Fishing is limited to the eastern portion of the WMA on the West Virginia Fork of Fish Creek (WVDNR, 2003a).

The Lewis Wetzel WMA would be crossed from about MP 28.3 to MP 33.4. The WMA is 14,023 acres and is heavily forested. There are two major habitat types found within this WMA: dry deciduous forest and moist deciduous forest. The dry deciduous forest areas are dominated by an oak-hickory community. Moist hardwood forests occur within sheltered topographic areas such as within the interior concavity of a ridge formation. Here, hardwood or hemlock-hardwood forests form within the sheltered topographic positions. This WMA is also part of an IBA. IBAs represent a network of important sites needed to ensure the survival of global bird populations and are identified using internationally agreed upon criteria (BirdLife International, 2015). The

WVDNR owns and controls surface land at Lewis Wetzel, but mineral rights are largely controlled by private individuals. Thus, numerous natural gas wells and pipelines are in the WMA. Rights-of-way that bisect the WMA provide linear shrubland habitat scattered throughout the area. The WMA is managed for deer, grouse, raccoon, squirrel, and turkey hunting, and is listed as an IBA for cerulean warblers (*Dendroica cerulea*) in West Virginia (National Audubon Society, 2013).

The cerulean warbler is included as a Priority 1 species in the West Virginia State Wildlife Action Plan. Priority 1 species are those ‘Species of Greatest Conservation Need’ (SGCN) within West Virginia (WVDNR, 2015d). Cerulean warbler populations have steadily declined at a rate of about 3 percent per year since 1966. In 2006, populations were estimated to be approximately 400,000 (USFWS, 2017a). The MXP falls within Bird Conservation Region (BCR) 28, where approximately 80 percent of the remaining population of cerulean warblers breed. While BCR 28 is approximately 103,869,815 acres in size (NABCI, 2017), breeding areas for the cerulean warbler have been impacted by clearing of over 50 percent of historical forests. Suitable breeding habitat for cerulean warblers includes structurally diverse canopies with a large enough forest patch size to reduce the risk of nest parasitism and predation (USFWS, 2017a). The minimum isolated forest patch size for detection of the cerulean warbler is 341 acres (Robbins et al., 1989). Although the cerulean warbler makes use of canopy gaps and can be found using thin forest edges and small perforated areas near narrow roads or rights-of-way, they are less abundant near abrupt forest edges, and in West Virginia have been shown to avoid edges of powerlines with rights-of-way that are around 75 feet wide (Wood et al., 2013).

The Lewis Wetzel WMA includes 9,153 acres (1 block) of large CFA and 338 acres (1 block) of medium CFA. The amount of suitable habitat for the cerulean warbler is estimated to be 9,491 acres (large CFA plus medium CFA). The methodology used to identify CFA and associated edges is provided in section 4.5.4.1. The MXP components within the Lewis Wetzel WMA would include a 125-foot-wide pipeline construction corridor and the use of various existing access roads. The construction of the MXP would result in the creation of 8,134 acres (2 blocks) of large CFA, 838 acres (3 blocks) of medium CFA, and 241 acres (5 blocks) of small CFA. The total amount of suitable habitat for the cerulean warbler in the Lewis Wetzel WMA in post-construction conditions is estimated to be 8,972 acres (large CFA plus medium CFA), which is approximately a 5.5 percent decrease. There would be similar effects to cerulean warbler habitat outside the Lewis Wetzel WMA, when large and medium CFAs are converted to small CFA and/or forest edge habitat. Table 4.5-4 indicates that the MXP crosses 577,583 acres of large CFA and 1,206 acres of medium CFA, for a total of 578,789 acres of suitable habitat for the cerulean warbler. Post-construction there would be 562,368 acres of large CFA and 3,742 acres of medium CFA, for a total of 566,110 acres of suitable habitat for the cerulean warbler. The decrease in suitable habitat across the MXP would be about 2 percent. Figure 4.6-1 provides a comparison map of pre- and post-construction forest impacts within the Lewis Wetzel WMA.



We concluded in section 4.5 that impacts on upland forest habitat would be significant. Likewise, the reduction to the cerulean warbler habitat and the existing CFA within 10 miles of the MXP-100 corridor, as a direct result of the MXP construction, would be considered significant. This is based on the designation of the cerulean warbler as a Priority 1 species in West Virginia and the considerable reduction in an already limited amount of breeding habitat available.

The 2,587-acre Frozen Camp WMA is crossed from about MP 113.2 to MP 114.4. The WMA is hilly with wooded slopes, some open bottomland, and a few open ridge tops. The area is managed for deer, grouse, rabbit, squirrel, turkey, and waterfowl. Additionally, lakes and streams are managed for largemouth bass, bluegill, and channel catfish (WVDNR, 2003b).

The project would also cross the O'Brien Lake WMA between about MP 120.4 to MP 121.5. This area includes 217 acres of hilly, forested woodlands and is managed for biodiversity and public recreational use with fishing and hunting opportunities (WVDNR, 2003b).

Impacts on Cecil H. Underwood, Frozen Camp, and O'Brien Lake WMAs by construction and operation of the MXP would be comparable to impacts within other portions of the MXP-100 route as discussed in previous sections. Disturbances to natural habitats due to construction noise and the presence of equipment, machinery, vehicles, and workers would temporarily deter wildlife from the immediate construction areas. The temporary displacement of wildlife could negatively affect hunters using the area if active construction occurs during hunting seasons.

4.6.2.2 Gulf XPress Project

None of the proposed GXP components are within any sensitive or managed wildlife habitats.

4.6.3 Migratory Bird Treaty Act and Bald and Golden Eagle Protection Act

Migratory birds are species that nest in the United States and Canada during the summer, and then migrate south to the tropical regions of Mexico, Central and South America, and the Caribbean for the non-breeding season. Migratory birds are protected under the MBTA (16 USC 703-711). The MBTA, as amended, prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, or nests. Bald and golden eagles are additionally protected under the BGEPA (16 USC 668-668d).

EO 13186 (66 FR 3853) directs federal agencies to identify where unintentional take is likely to have a measurable negative effect to migratory bird populations and to avoid or minimize adverse impacts on migratory birds through enhanced collaboration with the USFWS and to restore and enhance migratory bird habitat. The EO states that emphasis should be placed on species of concern, priority habitats, and key risk factors, and that focus should be given to addressing population-level impacts. If a proposed project or action were to occur in areas where nesting, feeding, or roosting eagles are present, then project proponents would need to take additional conservation measures to achieve compliance with the BGEPA. Additionally, the USFWS has published National Bald Eagle Management Guidelines (National Guidelines; USFWS, 2007) intended to help minimize impacts on bald eagles, particularly where impacts constitute "disturbance," which is prohibited under the BGEPA.

As discussed in section 1.5.2, the USFWS and the Commission entered into an MBTA MOU in 2011. This voluntary memorandum focuses on avoiding or minimizing adverse impacts on migratory birds, as well as strengthening conservation through enhanced collaboration between the two agencies. It does not waive legal requirements under the MBTA, BGEPA, ESA, or any other statutes, and does not authorize the take of migratory birds.

In response to the 1998 amendment to the Fish and Wildlife Conservation Act, the USFWS established a list of Birds of Conservation Concern (BCC) that, without conservation action, were expected to become candidate species for listing under the ESA (USFWS, 2008). Although the MBTA provides protection for all migratory birds and their nests, it is standard practice, as noted in the MBTA MOU, to use the BCC list when evaluating the potential impact of a project on migratory birds. The BCC lists species of concern at national, USFWS region, and BCR geographic scales. BCRs are regions that encompass landscapes having similar bird communities, habitats, and resource issues. They are the fundamental biological units through which landscape-scale bird conservation is undertaken (NABCI, 2016). A total of 67 BCRs have been identified in North America (ACJV, 2016).

4.6.3.1 Mountaineer XPress Project

The MXP, sited entirely in West Virginia, falls within the BCR 28. Table 4.6-1 lists BCCs for Region 28. The *2015 West Virginia State Wildlife Action Plan (SWAP)* was reviewed to determine if any of the BCCs were also identified as SGCN and assigned a Priority 1 status. Priority 1 species are the focus of conservation activities. The 2015 SWAP was prepared by WVDNR to establish comprehensive goals over a 10-year period that will assist in the conservation of West Virginia's biological diversity. There are four key goals set forth by the SWAP:

- halt the decline of at-risk species which would reduce the number of species being listed as federally threatened or endangered;
- assist with the recovery of federally listed species;
- keep the common species common (i.e., keep them off any rare or protected species lists); and,
- conserve the full array of habitat types and biological diversity within West Virginia (WVDNR, 2015b).

**Table 4.6-1
Birds of Conservation Concern in Bird Conservation Region 28 (Appalachian Region)**

Common Name (Scientific Name)	Preferred Breeding Habitat	Individuals Observed in Project Area	Priority 1 Species	Additional Breeding/Habitat Notes
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Forested areas adjacent to large bodies of water	No	No	Breeding/nesting occurs December through May
Black-billed cuckoo (<i>Coccyzus erythrophthalmus</i>)	Prefer large tracts of forest, woodlands, and thickets	Yes	Yes	Tends to favor younger forests and dense, scruffy thickets. Orchards/open woodlands. Nests in early May. May lay eggs in nests of other bird species. Egg-laying to fledging = 17 days. Young leave nest at 6-7 days; can fly at 2 weeks. Most eggs laid 5/25-6/15. Most fledglings out by mid-July.
Black-capped chickadee (<i>Poecile atricapillus</i>)	Deciduous and mixed forests, open woods, and disturbed areas	Yes	No	Habitat generalist. Egg-laying to fledging = 25+ days. Eggs in May, fledge in June. One brood.
Blue-winged warbler (<i>Vermivora cyanoptera</i>)	Early to mid-successional habitats at forest/field edges	Yes	No	Breeds at forest/field edges. Nests on ground. Eggs in late May, young fledged by late June.
Cerulean warbler (<i>Setophaga cerulea</i>)	Tall deciduous forests with open understory	Yes	Yes	Most nesting in May, eggs first half of June, young fledged by mid-July.
Fox sparrow (<i>Passerella iliaca</i>) <u>a</u>	Scrubby, brushy woods and forest edges	No	No	Breeds in dense thickets. Non-breeding in West Virginia.
Golden-winged warbler (<i>Vermivora chrysoptera</i>)	Tangled, shrubby habitats	No	Yes	Breeding occurs in tangled, shrubby habitats, but move into mature forests immediately after fledging.
Henslow's Sparrow (<i>Ammodramus henslowii</i>)	Grasslands	No	Yes	Grasslands. Eggs 5/10-5/25. Fledglings out late June.
Kentucky warbler (<i>Oporornis formosus</i>)	Deciduous forests	Yes	Yes	Nests on ground. Nesting in May, eggs in early June, young fledged late June.
Least bittern (<i>Ixobrychus exilis</i>)	Freshwater marshes with tall emergent vegetation	No	Yes	Eggs 5/25-6/15, young out in June.
Louisiana waterthrush (<i>Parkesia motacilla</i>)	Riparian forests, along streams	Yes	Yes	Forest streams. Breeds along gravel-bottomed streams flowing through hilly, forested areas. Nests in shallow hollow or cavity on stream bank, under fallen log, or within roots of upturned tree. Eggs in May, young fledge in June.

**Table 4.6-1
Birds of Conservation Concern in Bird Conservation Region 28 (Appalachian Region)**

Common Name (Scientific Name)	Preferred Breeding Habitat	Individuals Observed in Project Area	Priority 1 Species	Additional Breeding/Habitat Notes
Northern saw-whet owl (<i>Aegolius acadicus</i>)	Mature forests with open understory	No	Yes	Breeds in extensive forests; prefer mature forest with open understory, deciduous trees for nesting, dense conifers for roosting, with riverside habitat nearby. Incubation about 26 days; nesting about 30 days. Eggs mid-March. Young leave late May.
Peregrine Falcon (<i>Falco peregrinus</i>)	High ledges of rocks	No	Yes	Nests in a scrape on the ground on a cliff ledge. Nesting April/May, fledging in June.
Pied-billed grebe (<i>Podilymbus podiceps</i>)	Wetlands and lake edges	No	No	Most eggs second half of April; young in 23 days (mid-May); fledge in mid-July.
Prairie warbler (<i>Setophaga discolor</i>)	Shrub habitats	Yes	Yes	Scrubby fields and forests; regenerating forests, open fields, Christmas tree farms. Nests in shrubs. Nesting prevalent in May (Ohio); most egg dates 5/25-6/14. Most fledglings out by second half of June. Two broods; fledglings in early August.
Red crossbill (<i>Loxia curvirostra</i>) <u>a/</u>	Mature coniferous forests	No	No	Nomadic movements driven by variable nature of cone production. Species is scarce in project area.
Red-headed woodpecker (<i>Melanerpes erythrocephalus</i>)	Deciduous forests, recently cleared areas, forest edges	No	No	Nests in cavities. Egg-laying to fledging = 40 days. Nest construction May/June. Fledglings appear in July.
Rusty blackbird (<i>Euphagus carolinus</i>) <u>a/</u>	Forested wetlands	Yes	No	Non-breeding in West Virginia.
Short-eared owl (<i>Asio flammeus</i>) <u>a/</u>	Open areas, such as fields and meadows	No	No	Non-breeding in West Virginia.
Swainson's warbler (<i>Limnothlypis swainsonii</i>)	Floodplain forests with heavy underbrush	No	Yes	Nests in shrubs. May-June.
Upland sandpiper (<i>Bartramia longicauda</i>)	Grasslands	No	Yes	Most clutches in May; young early June.
Willow Flycatcher (<i>Empidonax traillii</i>)	Moist shrubby areas	Yes	No	Nests low in bushes or small trees, often close to water. Egg laying to fledging = 29 days. Nesting late May to late June; fledging by mid-July.

Common Name (Scientific Name)	Preferred Breeding Habitat	Individuals Observed in Project Area	Priority 1 Species	Additional Breeding/Habitat Notes
Wood thrush (<i>Hylocichla mustelina</i>)	Mature deciduous or mixed forests	Yes	Yes	Nests in trees. Egg-laying to fledging = 27 days. Two clutches. Second half of May and late June; fledglings late June and early August, respectively.
Worm eating warbler (<i>Helmitheros vermivorum</i>)	Mature deciduous forests	Yes	Yes	Nests on ground. Young leave nest at 8-10 days. Most clutches mid-May through early June. Fledged through mid-July.
Whip-poor-will (<i>Antrostomus vociferus</i>)	Dry deciduous or evergreen deciduous forest with little underbrush and close to open areas	No	No	Lays eggs directly on leaf litter of forest floor. Egg laying to fledging = 29 days. Two clutches. Nocturnal.
Yellow-bellied sapsucker (<i>Sphyrapicus varius</i>) ^{a/}	Young forest and edge habitat	No	No	Winter habitat includes hickory or pine and oak forests.
Sources: USFWS, 2016d; Cornell Lab of Ornithology, 2016b; USFWS, 2008.				
a Species does not breed in state; wintering or migrating populations only.				

The BCCs within BCR 28 that are also Priority 1 species include the black-billed cuckoo, cerulean warbler, golden-winged warbler, Henslow’s sparrow, Kentucky warbler, least bittern, Louisiana waterthrush, northern saw-whet owl, peregrine falcon, prairie warbler, Swainson’s warbler, upland sandpiper, wood thrush, and worm-eating warbler.

The majority of the BCCs are habitat generalists and/or do not require CFA. These birds would likely not be significantly impacted by the fragmentation and forest edges created by the MXP. Eight of the birds (cerulean warbler, Kentucky warbler, Louisiana waterthrush, wood thrush, golden-winged warbler, northern saw-whet owl, worm eating warbler, whip-poor-will) are forest dependent and require forests for breeding, nesting, or overwintering. Of these eight forest-dependent birds, five (cerulean warbler, Kentucky warbler, Louisiana waterthrush, wood thrush, and worm eating warbler) were noted as being observed by Columbia Gas during biological surveys. Those birds which are forest-dependent would be most impacted by the MXP. A discussion of the cerulean warbler is provided in section 4.6.2.1. The remainder of these species require less contiguous acreage of forest habitat than the cerulean warbler. The Louisiana water thrush requires 61 contiguous acres and the worm eating warbler requires 52 acres (Robbins et al., 1989). Kentucky warbler requires 80 acres (Robbins, 1979) and wood thrush requires 200 acres (Rosenberg et al., 2003). Forest acreage requirement information was not found for the golden wing warbler, northern saw-whet owl, or the whip-poor-will. Based on the habitat preferences of those species where forest acreage requirements could be identified, conversions of large and medium CFA to small CFA and forest edges is unlikely to result in a significant impact on these species.

The primary migratory bird nesting season (for non-raptors) generally begins in early April and extends through August in West Virginia. The nesting season normally begins with courtship behaviors, followed by nest building and egg-laying. Bald eagles begin nesting earlier, but according to Columbia Gas, no nests have been documented in counties crossed by the MXP. In 2005 there were 19 known breeding pairs in West Virginia, however, as bald eagle numbers continue to rise the number of breeding pairs is likely higher (WVDNR, 2006). Golden eagles may migrate into West Virginia during the winter season (The Cornell Lab of Ornithology, 2016a). Although individual raptors (and some other migratory bird species) may nest outside of this primary window, the period during and after egg-laying is when most MBTA-related impacts occur, as eggs and unfledged young that cannot move are in nests.

Noise and nearby construction activities during migratory bird courtship and breeding periods could result in a decrease in reproduction and increase in nest abandonment. Columbia Gas intends to initiate, and complete (if possible), vegetation clearing within the rights-of-way before the primary nesting season begins in April. Nonetheless, potential delays (e.g., due to weather, receipt of permits) may result in some clearing continuing into May. Vegetation clearing activities that occur in May are not as likely to affect active nests containing eggs or unfledged young, as many nesting pairs are expected not to have reached this stage in the nesting process. Columbia Gas would attempt to complete clearing vegetation in forested areas before the nesting season begins in April; however, if limited vegetation clearing activities continue into May, there could be some risk of affecting active nests of migratory birds.

Maintenance of the permanent rights-of-way would create smaller contiguous tracts of forest habitat and might reduce available feeding and nesting habitat for certain bird species, such as woodland warblers. Habitat fragmentation also can result in increased predation and can alter wildlife use of these forests, in particular by habitat-specialist species, such as the cerulean warbler (Graham, 2002). However, corridor widths and vegetation characteristics can have varying effects to different species, and the creation of additional edge habitat could benefit certain species such as Bachman's sparrow by providing travel corridors and additional forage habitat (Dunning et al., 1995). Nest parasites, such as the brown-headed cowbird, which lay their eggs in the nests of other species also have been shown to benefit from fragmented forests (Wilcove, 1985).

Columbia Gas has consulted with the USFWS and WVDNR to implement appropriate steps to avoid or minimize the potential for the unintentional take of migratory birds during construction and operation of the proposed facilities. Implementation of Columbia Gas' ECS construction and operational practices (e.g., using the minimum land required for safe and efficient construction, confining disturbances to construction work areas, minimizing erosion, and enhancing revegetation after completing construction) would reduce the potential for impacts on migratory birds. Mitigation required for wetland impacts under CWA section 404, particularly mitigation for the conversion of forested wetlands to other cover types, would provide habitat mitigation for birds that utilize wetland habitats. In addition, timing restrictions on clearing as well as other AMMs that would be implemented to address impacts on federally listed species such as the Indiana bat and northern long-eared bat (NLEB) (e.g., restricting right-of-way clearing and trimming to periods when bats are not raising young; retaining snags, dead and dying trees in maternity areas; and limiting aerial applications of herbicides from April 15 to August 15) also would reduce impacts on migratory bird species.

With the development of a Migratory Bird Plan in addition to the ECS and AMMs, Columbia Gas could adequately reduce potential impacts on migratory birds, which would be consistent with the goals of EO 13186 and the MBTA MOU. In its April 21, 2017 response to our draft EIS, Columbia Gas provided a copy of its tree clearing strategy, which was submitted to the USFWS on February 3, 2017. The letter proposes tree clearing restrictions within areas identified by the National Audubon Society as IBAs from April 1 – October 15. Also, Columbia Gas proposes to limit clearing from May 1 – May 31 and avoid clearing June 1 – August 1 in all other forested areas not covered by the MSHCP. However, the USFWS has not yet responded to Columbia Gas' strategy; meaning it has not finalized this consultation or plan development. Therefore, **we recommend that:**

- **Prior to construction, Columbia Gas should file with the Secretary an update of its MBTA consultations with the USFWS and WVDNR regarding the development of its MBTA Tree Clearing Strategy (and provide a copy of the final plan, if available); and identify special measures, if any, that Columbia Gas would implement to reduce impacts on cerulean warbler habitat.**

4.6.3.2 Gulf XPress Project

In compliance with the MBTA MOU, Columbia Gulf consulted with the USFWS field offices in Kentucky, Tennessee, and Mississippi to identify BCC species in each region where the GXP would have impacts.

There are 29 bird species listed as breeding BCCs in the BCRs where the project is located, which includes Region 28, Appalachian Mountains; Region 24, Central Hardwoods; Region 27, Southeastern Coastal Plain; and Region 26, Mississippi Alluvial Valley. Based on reviews of the BCR boundaries, the Morehead Compressor Station would be in the Appalachian Mountains Region; the Paint Lick, Goodluck, Cane Ridge, and Clifton Junction Compressor Stations would be in the Central Hardwoods Region; the New Albany Compressor Station would be in the Southeastern Coastal Plain Region; and the Holcomb Compressor Station would be mostly within the Mississippi Alluvial Valley Region and partially within the Southeastern Coastal Plan Region (Bird Studies Canada and NACBI, 2014). No project areas are within an IBA; thus, no impacts on IBAs are expected.

Bald eagles have potential to occur in all areas affected by the GXP. Golden eagles are not known to occur in Tennessee or Mississippi, but may migrate into Kentucky during the winter season (The Cornell Lab of Ornithology, 2016a).

No bald eagle nests or eagles were identified in the project areas or along public roads near project areas in Kentucky. Additionally, the Kentucky Department of Fish and Wildlife Resources (KDFWR) did not identify golden eagle nests or documented occurrences in the project areas during review of the project. Based on the results of biological field surveys conducted by Columbia Gulf and KDFWR review, we believe that construction and operation of the project would comply with the National Guidelines (USFWS, 2007) and would not affect the bald eagle in Kentucky.

Information Planning and Conservation System (IPaC) data indicate that bald eagles may occur in the project areas in Tennessee. No bald eagle nests or eagles were identified at the project sites or along public roads near the project sites during field surveys. Additionally, the TDEC maintains records of known bald eagle nest locations in the state and confirmed that no bald eagle nests are documented within the project counties (Davidson and Williamson Counties). Based on the results of these surveys and TDEC review, we believe that construction and operation of the project would comply with the National Guidelines (USFWS, 2007) and not affect the bald eagle in Tennessee.

IPaC data indicate that bald eagles may occur in the project areas in Mississippi. No bald eagle nests or eagles were identified at the project sites or along public roads near the project sites during biological field surveys. Additionally, the Mississippi Department of Wildlife, Fish, and Parks (MDWFP) maintains records of known bald eagle nest locations in the state, and no bald eagle nests are documented within the project counties (Union and Grenada Counties). Based on the results of these surveys and MDWFP review, we believe that construction and operation of the project would comply with the National Guidelines (USFWS, 2007) and not affect the bald eagle in Mississippi.

Noise and construction activities during migratory bird courtship and breeding periods could result in reduced reproduction and increased nest abandonment; however, the project is not anticipated to have a significant impact on migratory birds, including BCC. Although most workspaces would be within open habitats, tree clearing would be required in certain areas. Columbia Gulf would implement tree-clearing timing restrictions related to protected bat species, which also would protect migratory birds and habitat. In correspondence from the USFWS Ecological Services Field Offices in Kentucky, Tennessee, and Mississippi, the agency concurred with Columbia Gulf's findings that no migratory birds would be adversely affected by GXP work activities. We agree with these findings.

4.6.4 Fisheries and Other Aquatic Resources

4.6.4.1 Mountaineer XPress Project

The MXP would cross freshwater waterbodies, including perennial, intermittent, and ephemeral streams. No marine or estuarine waterbodies would be crossed or affected by the project. Refer to section 4.3 for additional information regarding waterbodies; table 4.3-4 summarizes the waterbodies crossed by the MXP.

Title 47 of the WVCSR, Series 2, outlines water use, lists anti-degradation policies, and establishes Water Use Categories A through E for waters of West Virginia. Regarding fisheries, waterbodies are classified within Water Use Category B: Propagation and Maintenance of Fish and Other Aquatic Life. Within this category, fisheries are classified as warm water fishery streams (B1) or trout waters (B2) (WVCSR §47-2-6, 2014). West Virginia also designates three tiers of anti-degradation protection for state waters (see section 4.3.2.2.1). Tier 1 streams are those listed on the state's 303(d) list of impaired waterbodies and are maintained and protected for their existing uses and the water quality conditions necessary to support such uses. Tier 2 protection covers HQWs. These are waterbodies where the level of water quality exceeds levels necessary to support recreation and wildlife and the propagation and maintenance of fish and other aquatic

life. Waters placed in the Tier 3 category are known as Outstanding National Resource Waters (ORWs). These include waters in Federal Wilderness Areas, specifically designated federal waters, and HQWs or naturally reproducing trout streams in state parks, national parks, and national forests (WVCSR §47-2-4, 2014). West Virginia state fisheries classifications are further detailed in table 4.6-2.

Designation	Classification	Description	Designating Agency
Warm Water Fishery	B1	Streams or stream segments that contain populations of warm water aquatic life. Streams are managed for or currently support warm water fish species.	WVDNR
Trout Water	B2	Streams or stream segments that sustain year-round trout populations. Excluded are those streams or stream segments which receive annual stockings of trout but which do not support year-round trout populations.	WVDNR
High Quality Water	HQW <u>a</u>	Streams listed in the West Virginia Natural Stream Preservation Act, listed as High Quality Streams (HQS) by WVDNR, or receive annual stockings of trout but do not support year-round trout populations.	WVDEP, WVDNR
Outstanding National Resource Water	ORW	Streams located within a Federal Wilderness Area, listed as a Wild and Scenic River, or located within a state or national park or forest and are considered high quality waters or naturally reproducing trout streams.	WVDEP
Sources: WVCSR, 2014, and WVDEP, 2014.			
a Streams listed as HQW by the WVDNR include streams stocked with trout or containing native trout populations, and warm water streams over 5 miles in length with desirable fish populations and public utilization (WVDNR, 2001).			

In West Virginia, 947 streams are classified as HQW, and 132 of these are stocked with trout. While many tributaries are not classified as HQW, they may still be valuable, and impacts on a tributary of a HQW stream could adversely affect the main stream (WVDNR, 2001). The project pipelines would result in 123 crossings of B1 fisheries and 37 crossings of HQWs. HQWs crossed by the project are summarized in table 4.6-3. The project would not impact any B2 coldwater fisheries or ORW.

4.6.4.1.1 Waterbody Crossings

Waterbody crossings would be constructed in accordance with all federal, state, and local permits and the ECS. Columbia Gas proposes to cross most HQW streams using dry-ditch crossing methods (see section 2.4.4.2). Only three HQW streams are proposed for open-cut/wet crossings: Thirteenmile Creek (an intermittent stream at MP 129.3 in Jackson County), Five and Twenty Mile Creek (an intermittent stream at MP 152.4 in Putnam County), and Meathouse Fork Back Channel (an intermittent stream at MP 5.8 on MXP Line 200 in Doddridge County). Table 4.6-3 lists the HQWs that would be crossed by the MXP centerline and the proposed crossing method.

**Table 4.6-3
High Quality Waters Crossed by the MXP Centerline**

County a/	Waterbody Name	MP	Flow Type	Crossing Method	FERC Classification d/
MXP-100					
Marshall	Fish Creek	7.1	Perennial	Dry-ditch	Major
Wetzel	Little Fishing Creek	18.4	Perennial	Dry-ditch	Intermediate
	Fishing Creek	24.5	Perennial	Dry-ditch	Intermediate
Tyler	Indian Creek	35.0	Perennial	Dry-ditch	Intermediate
Doddridge	McElroy Creek	38.5	Perennial	Dry-ditch	Intermediate
	Flint Run	43.9	Perennial	Dry-ditch	Intermediate
	Buckeye Creek	48.5	Perennial	Dry-ditch	Intermediate
	Meathouse Fork <u>b/</u>	50.3	Perennial	Dry-ditch	Major
	Meathouse Fork <u>b/</u>	51.6	Perennial	Dry-ditch	Intermediate
	Bluestone Creek	53.8	Perennial	NA <u>c/</u>	Intermediate
	South Fork Hughes River	59.6	Perennial	Dry-ditch	Intermediate
Ritchie	South Fork Hughes River	67.4	Perennial	Dry-ditch	Intermediate
	Slab Creek	71.5	Perennial	Dry-ditch	Intermediate
	South Fork Hughes River	72.4	Perennial	Dry-ditch	Major
	South Fork Hughes River	72.6	Perennial	Dry-ditch	Major
	South Fork Hughes River	77.0	Perennial	Dry-ditch	Intermediate
	Leatherbark Creek	79.0	Perennial	Dry-ditch	Intermediate
Wirt	Straight Creek	87.6	Perennial	Dry-ditch	Intermediate
	Little Kanawha River	94.9	Perennial	Dry-ditch	Major
	Spring Creek	96.6	Perennial	Dry-ditch	Intermediate
	Spring Creek	97.0	Perennial	Dry-ditch	Major
	Spring Creek	97.4	Perennial	Dry-ditch	Intermediate
Roane	Middle Fork Reedy Creek	104.6	Perennial	Dry-ditch	Intermediate
Jackson	Little Mill Creek	113.4	Perennial	Dry-ditch	Intermediate
	Elk Fork	118.7	Perennial	Dry-ditch	Intermediate
	Tug Fork	122.0	Perennial	Dry-ditch	Intermediate
	Thirteenmile Creek	129.4	Intermittent	Open-cut/wet trench	Minor
Putnam	Eighteenmile Creek	138.6	Perennial	Dry-ditch	Intermediate
	Eighteenmile Creek	139.1	Perennial	Dry-ditch	Intermediate
	Eighteenmile Creek	140.2	Perennial	Dry-ditch	Intermediate
	Kanawha River	147.2	Perennial	HDD	Major
	Five and Twenty Mile Creek	152.6	Intermittent	Open-cut/wet trench	Intermediate
Cabell	Mud River	163.6	Perennial	Dry-ditch	Major
MXP-200					
Doddridge	Meathouse Fork	1.1	Perennial	Dry-ditch	Intermediate
	Toms Fork	3.7	Perennial	Dry-ditch	Intermediate
	Meathouse Fork	5.9	Perennial	Dry-ditch	Minor
	Meathouse Fork - Back Channel	5.8	Ephemeral	Open-cut/wet trench	Intermediate
a	No HQWs are within the Sherwood Compressor Station, White Oak Compressor Station, Mount Olive Compressor Station, Ripley Regulator Station, X59M1 Tie-In, SM80 Line or SM80 Loop Line Replacement workspace.				
b	Meathouse Fork would be crossed by the MXP-100 pipeline inbound into Sherwood Compressor and Regulator Station, MXP-100 outbound from the station, and MXP-200 outbound from the station. All three crossings would be installed concurrently and are therefore counted as 1 crossing.				
c	Waterbody is within the construction workspace but not crossed by the pipeline centerline.				
d	FERC classification is based on pipeline centerline crossing disturbance or perpendicular distance of water edge to water edge when stream is not crossed by the centerline.				

Temporary impacts on fisheries and other aquatic resources, such as macroinvertebrates, from pipeline crossings would result from stream bank disturbance, increased sedimentation, waterbody turbidity (upon the return of flow to the stream following restoration), reduction in shading and cover, and modification of stream flow. Additionally, macroinvertebrates within the area of disturbance at an open-cut/wet crossing could be crushed or buried. Further information regarding Columbia Gas' coordination with the USFWS and WVDNR on fisheries and aquatic resources with special designations is provided in section 4.7. Studies have found that instream disturbance from pipeline crossings and similar projects does not have a significant long-term effect to fish and benthic communities (Winesett and Cook, 1999; Wellman Combs, and Cook, 1999; Anderson et al., 1995). Potential short-term effects of stream crossing techniques that adversely affect vegetation, benthic invertebrates, and/or fish often involve water quality parameters such as total suspended solids (TSS) and turbidity. Varying levels of TSS and turbidity occur naturally in streams, and instream organisms are adapted to withstand the natural range of such conditions. During the pipeline construction process, however, additional sediment enters a waterbody as the substrate is disturbed. Suspended solids and turbidity in levels beyond the tolerable range for floral and faunal communities can choke organisms, depriving them of food, oxygen, and light, and can cause abrasive damage to essential organs and tissues (James and Evison, 1979; Wilber, 1983; NCSU, 2001). These temporary impacts also could disrupt food sources and predator/prey interactions, impact fish passage, increase ambient water temperature, degrade spawning and nursery habitat, smother demersal eggs, and temporarily reduce reproduction potential. Aquatic invertebrates and macroinvertebrates such as caddisflies, dragonflies, and damselflies, which are preyed upon by fishes, could be impacted by direct mortality from construction, increased sedimentation filling interstitial spaces of streambed substrates, and reduced reproduction potential.

All stream crossing construction techniques result in temporary spikes of TSS and turbidity, but elevated levels of these parameters resulting from conventional crossing activities usually are local in extent and return to normal ranges within a short time, usually 24 hours. Studies show that increased TSS levels resulting from open-cut crossings drop rapidly as downstream distances increase. These studies note significant reductions within 1 day following cessation of the stream crossing activities (Trow Engineering Consultants, 1996). Furthermore, aquatic species displaced by construction activities are expected to rapidly recolonize the relatively small impacted areas (Matthaei et al., 1996; McCabe and Gotelli 2000).

Columbia Gas would adhere to the BMPs described in the ECS to mitigate impacts on aquatic resources, including the use of erosion and sediment control measures; use of temporary equipment bridges to transport construction equipment; and limiting instream equipment to that required to construct the crossing. Equipment bridges would be designed to avoid or minimize impacts on channel bottoms and banks, allow normal flow, and withstand maximum expected flows at each location. Waterbodies crossed by access roads would be stabilized with culverts and clean rock fill or bridge structures, in compliance with federal and state permit requirements.

Columbia Gas would not use permanent fill at any waterbody for pipeline activities. Where waterbodies are within the construction right-of-way, but not directly crossed by the pipeline, impacts would be limited to installation of equipment crossings such as bridges or clearing of vegetation adjacent to the stream. Columbia Gas would maintain a minimum 15-foot undisturbed vegetation buffer between construction activities and the waterbody in most areas where the

corridor parallels the waterbody (see section 2.4). All spoil from minor and intermediate waterbody crossings would be placed in the construction right-of-way at least 10 feet from the water's edge or in extra work areas.

4.6.4.1.2 Blasting

Waterbodies with a shallow depth to bedrock along the pipeline corridor are anticipated; however, blasting in streams would be conducted only when traditional means of trenching (excavators, rock hammers, etc.) are deemed impractical due to the time required to complete excavation using these techniques. Instream blasting, if required to excavate the pipeline trench, could have acoustic impacts on fisheries resources. Sound pressure waves can change fish behavior or injure/kill fish by rupturing swim bladders or causing internal hemorrhaging (Hastings and Popper, 2005).

Stream crossing locations where blasting is required would be identified during construction based on site-specific conditions. Blasting may occur up to 1 week prior to initiating excavation of the waterbody, where approved by the applicable agencies. If required, blasting would primarily occur under dry conditions (i.e., dry intermittent/ephemeral waterbodies or waterbodies being crossed using a dry-ditch crossing technique), thereby avoiding impacts on fisheries by isolating the work area from stream flow. If blasting is necessary in a flowing waterbody, the use of controlled blasting techniques (where small, localized detonations are utilized) would avoid or minimize the impacts of blasting and limit rock fracture to the immediate vicinity of these activities. Immediately following blasting, Columbia Gas would remove any shot rock impeding stream flow.

Because of the potential for blasting, Columbia Gas has developed a project-specific Blasting Plan. Columbia Gas would attempt to minimize disturbance associated with blasting by employing BMPs described in the Blasting Plan, which includes consulting with regulatory agencies to determine appropriate protective measures. If blasting is required in waterbodies containing sensitive species, Columbia Gas would consult with the appropriate federal and state agencies to determine what, if any, additional mitigation measures would be necessary.

4.6.4.1.3 Hydrostatic Test Water

To confirm the integrity of the pipelines, hydrostatic testing would be conducted in accordance with the requirements of the USDOT pipeline safety regulations (49 CFR 192), Columbia Gas testing specifications, and applicable permit conditions. Hydrostatic testing involves filling the pipeline with water, pressurizing the water, and checking for pressure losses due to leaks. Test water would typically be withdrawn from water sources either crossed by or near the pipeline facilities in accordance with West Virginia State regulations and required permits. No chemicals or additives would be mixed with the test water. Potential impacts on fisheries resources associated with hydrostatic testing include entrainment of fish during water withdrawals; reduction of downstream flows; impairment of downstream uses due to water withdrawals; and erosion or scour due to water discharges. To avoid impacting fisheries resources during this process, Columbia Gas would implement procedures described in the ECS, including:

- installing appropriately sized screens on water intakes to avoid entrapment per agency recommendations;
- controlling water withdrawal rates to avoid impingement;
- placing water intakes above streambeds to avoid disturbing sediments on the streambeds;
- re-using water from one test section to another (termed “cascading”), where practicable, to reduce the amount of water withdrawn for testing;
- discharging water back to the waterbody after filtration or settling through an approved holding structure to avoid affecting water quality, or discharging water into containment structures such as hay bales and/or filter bags located in well-vegetated upland areas; and
- regulating discharge rates to prevent scour in streambeds or erosion in uplands.

Test waters would be discharged back into the waterbody of origin, within waterbodies of the same watershed, or within upland areas, which would eliminate the translocation of invasive aquatic species that may be present. Discharges would be conducted in accordance with the applicable project permits. In addition to these measures, Columbia Gas would coordinate with the appropriate agencies and implement measures from the ECS to reduce the potential for depletion of stream flow at water sources and allow for fish passage. See section 4.3.2.4.1 for mitigation measures proposed by Columbia Gas to minimize impacts during hydrostatic testing.

4.6.4.1.4 Spill Prevention Control and Countermeasures

Accidental spills of construction-related hazardous fluids (e.g., oil, gasoline, or hydraulic fluids) into waterbodies could result in water quality impacts that affect fish and other aquatic organisms. The potential impact would depend on the type and quantity of the spill, and the dispersal and attenuation characteristics of the waterbody. Minimization and mitigation procedures related to water quality are discussed in section 4.3.2.4. To reduce the potential for surface water contamination and resulting impacts on aquatic life, Columbia Gas would implement the measures in its ECS and SPCC Plan which include conducting routine inspections of construction equipment, tanks, and storage areas to help reduce the potential for spills or leaks; restricting refueling and the handling of hazardous materials to greater than 100 feet from wetland and waterbody resources; and the use of secondary containment around all containers and tanks. With adherence to these measures, we conclude that impacts on aquatic resources from potential spills would be adequately minimized.

4.6.4.1.5 Fisheries of Special Concern

No EFH is in the vicinity of the MXP area. Fisheries information is based on review of publicly available information including USGS topographic maps, aerial photographs, spatial data layers, and results from waterbody field surveys. Fisheries of special concern may include waterbodies that provide habitat for federal- or state-listed fish species, support naturally reproducing coldwater fisheries, or support commercial fishing. Columbia Gas consulted NOAA Fisheries, the USFWS, and the WVDNR to identify waterbodies that may contain federally or state-listed threatened, endangered, or candidate species and their habitats, coldwater fisheries, and other fisheries resources that could be considered fisheries of special concern.

Based on a review of Columbia Gas' Multi-Species Habitat Conservation Plan (MSHCP) database, USFWS's IPaC, and consultation with the WVDNR, one protected fish species, the federally endangered diamond darter (*Crystallaria cincotta*), and no commercial fish species or coldwater fisheries, are known or believed to occur within waterbodies crossed by or located near the MXP. The diamond darter is discussed further in section 4.7.4.

The Lewis Wetzel WMA, in Wetzel County, includes a public fishing area. The primary recreational fishing opportunity in this area is South Fork of Fishing Creek, which contains smallmouth bass, spotted bass, and stocked trout (WVDNR, 2003a). While the MXP-100 would cross this WMA at four locations (and several access roads also would cross the WMA), the pipeline would not cross South Fork of Fishing Creek.

4.6.4.2 Gulf XPress Project

The GXP would be constructed within three regional watersheds (Ohio, Tennessee, and Lower Mississippi Regions). Columbia Gulf identified surface water resources in the project area during field surveys conducted in 2015. A total of 15 waterbodies could potentially be affected by the project, including 12 ephemeral streams and 3 impoundments/stock ponds. Detailed information on these waterbodies is provided in section 4.3.

As noted, no perennial waterbodies would be crossed at any of the GXP facilities. As a result, very limited fishery impacts are anticipated. A discussion of hazardous materials spills as well as water withdrawals for hydrostatic testing and dust control is provided in section 4.3. Based on this information, significant impacts on fisheries are not anticipated. Columbia Gulf would implement the measures included in its ECS, which incorporates FERC's Procedures, to limit potential impacts on ephemeral waterbodies and ponds present on several of the sites.

No EFH is in the vicinity of the GXP facilities. Fisheries information is based on review of publicly available information including USGS topographic maps, aerial photographs, and spatial data layers, and results from waterbody field surveys. State fisheries classifications for Kentucky, Tennessee, and Mississippi are provided in table 4.6-4.

Table 4.6-4 Gulf XPress Project Kentucky, Tennessee, and Mississippi State Fisheries Classification			
Designation	Classification	Description	Designating Agency
Kentucky			
Warm Water Aquatic Habitat	WAH	Surface water and associated substrate capable of supporting indigenous warm water aquatic life.	KAR <u>b/</u>
Cold Water Aquatic Habitat	CAH	Surface waters and associated substrate that will support indigenous aquatic life or self-sustaining or reproducing trout populations on a year-round basis.	KAR <u>b/</u>
Outstanding State Resource Water	OSRW	Unique waters of the Commonwealth, including those with federally threatened or endangered species.	KAR <u>b/</u>
Tennessee			
Fish and Aquatic Life	FAL	Assigned to all waterbodies for the protection of fish and aquatic life such as aquatic insects, snails, mussels, and crayfish.	TDEC
Trout Stream	TS	Stocked trout/low abundance of wild trout streams.	TDEC
Naturally Reproducing Trout Stream	NRTS	Found in cold headwaters in eastern Tennessee. Wild populations include brook, rainbow, and brown trout.	TDEC
Mississippi (Inland Waterbodies <u>a/</u>)			
Fish and Wildlife	N/A	Waters intended for fishing and for propagation of fish, aquatic life, and wildlife. Waters that meet these criteria are also suitable for secondary contact recreation (incidental contact with the water during activities such as wading, fishing, and boating).	MDEQ
Sources: KAR, 2014; TDEC, 2014; TDEC, 2015; MDEQ, 2003.			
a Only inland waterbodies are potentially affected by the project.			
b Kentucky Administrative Regulations (KAR): Title 301. Tourism, Arts, and Heritage Cabinet. Department of Fish and Wildlife Resources.			

Fisheries in Kentucky are classified according to water temperature (Warm Water Aquatic Habitat or Cold Water Aquatic Habitat), type of use (Primary Recreation and Secondary Recreation), Domestic Water Supply, and Outstanding State Resource Water. No Special Designated Use Waters of Kentucky were identified within the project areas (Boyd, Carter, Garrard, Metcalfe, and Rowan Counties) (Kentucky Administrative Regulations [KAR] 401 10:026, 2008). North Triplett Creek in Rowan County (Morehead compressor station site) is within the Licking Basin, where a portion of the stream is stocked and designated as a rainbow trout put-and-take fishery. However, this 4-mile section occurs about 5 miles upstream from the vicinity of the Morehead site.

Tennessee designates all waterbodies as Fish and Aquatic Life for the protection of fish and aquatic life such as aquatic insects, snails, mussels, and crayfish. Trout Streams and Naturally Reproducing Trout Streams are fisheries-specific designations in the state (TDEC, 2014). No Trout Streams or Naturally Reproducing Trout Streams are in the project area (Davidson and Wayne Counties).

Mississippi stream classification for fisheries includes the Fish and Wildlife designation. These streams include waters that are intended for fishing and propagation of fish, aquatic life, and

wildlife. Other stream classifications include PWS, Shellfish Harvesting, Recreation, and Ephemeral Stream. Many of the streams in the project area (Union and Grenada Counties) are classified under the Fish and Wildlife designation.

No waterbodies classified as a fishery resource would be affected by any of the compressor station sites in Kentucky, Tennessee, or Mississippi. Columbia Gulf would implement the measures included in its ECS, which adopts the measures of FERC's Plan and Procedures, to limit impacts on waterbodies and associated fisheries.

4.6.5 Conclusion

4.6.5.1 Mountaineer XPress Project

The majority of impacts on wildlife resources would generally be temporary in nature, occurring mostly during construction activities. Larger, more mobile generalist fauna would be displaced during construction because of vegetation loss, increased noise and ground disturbance. Despite a considerable amount of linear clearing of upland forested habitat (which we have concluded is a significant impact), we expect that the remaining amount of forested habitat in the surrounding areas would be sufficient to incorporate displaced wildlife. Non-forested habitat and associated wildlife would likewise not be significantly impacted (except for the cerulean warbler, discussed below). Because of the linear nature of the project, temporary impacts from construction would be offset by the presence of similar habitat communities adjacent to the rights-of-way. Neighboring areas would allow wildlife to disperse sufficiently to continue to utilize similar habitats. The temporary effects to these habitats should have little or no significant impact on their importance to wildlife, and no changes to wildlife populations are anticipated.

Impacts could occur on individual animals, however. Incidental mortality of immobile wildlife may occur during construction clearing and grading, and displacement of mobile species could induce resource competition and lead to stress and mortality. Species are expected to recolonize habitats within permanent rights-of-way and TWS post-construction; however, the increase in ambient noise in the immediate vicinity of compressor stations during construction and operation may result in a decrease in wildlife use of adjacent habitat. Columbia Gas would implement measures to limit noise exposure during both construction and operation of the project. Wildlife resources are not expected to be significantly impacted due to construction and operation of the project because of the amount of similar adjacent habitat available for use.

Impacts on the majority of BCC that are dependent on forests are not expected to be significant due to the birds' ability to inhabit the smaller blocks of CFA that would be created by the construction of the MXP. Columbia Gas would adhere to recommended clearing windows to the extent practicable for avoidance of migratory birds during nesting season, which would minimize impacts on other wildlife species from forest clearing. Both temporary and permanent impacts on existing land use would be mitigated by implementation of Columbia Gas' ECS. However, the amount of impacts that would occur to cerulean warbler habitat within large and medium CFAs within 10 miles of the MXP would be significant. This is based on the designation of the cerulean warbler as a Priority 1 species in West Virginia and the limited amount of breeding habitat available. We are recommending that Columbia Gas continue its coordination with WVDNR to finalize a Migratory Bird Plan (including mitigation measures) and consult with the

USFWS and the WVDNR to avoid and minimize the take of BCC and other migratory birds during construction and operation of the proposed facilities.

During operation, maintenance of the permanent rights-of-way and fenced facilities would be performed in accordance with the requirements and timing identified in Columbia Gas' ECS, and in consideration of recommendations provided by wildlife management agencies. Columbia Gas would continue to consult with authorizing agencies to address location-specific impact minimization and mitigation measures regarding wildlife, wetlands, and other regulated sensitive environmental features.

Based on our review of potential MXP impacts on fisheries and other aquatic resources, we conclude that the MXP would result in some temporary impacts but that these impacts would be adequately mitigated through adherence to the measures described in Columbia Gas' ECS and other construction plans, timing of construction activities, and implementation of instream blasting plans.

4.6.5.2 Gulf XPress Project

Overall, wildlife resources would not be significantly impacted by construction and operation of the GXP compressor stations. This conclusion is based on the small amount of habitat disturbed, the criteria considered when siting the stations, the amount of similar adjacent habitat available for use, and the proposed vegetation clearing windows for avoidance of the migratory bird nesting season. In addition, Columbia Gulf would minimize impacts to the extent possible through adherence to its ECS and SPCC Plan.

Based on our review of potential project impacts on aquatic resources, we conclude that any impacts that may occur, would be negligible. These impacts would be mitigated through adherence to the measures described in Columbia Gulf's ECS and SPCC Plan, as well as the conditions and requirements of water resource agencies with jurisdiction over resources affected by the project.

4.7 THREATENED, ENDANGERED, AND OTHER SPECIAL STATUS SPECIES

Special status species are those species for which state or federal agencies afford an additional level of protection by law, regulation, or policy. For the purposes of this analysis, special status species of plants and animals include species officially listed by the federal government as endangered or threatened (as per the ESA), and those that are state-listed by West Virginia, Kentucky, Tennessee, and Mississippi as endangered or threatened, or as a species of special concern. Other applicable federal laws and regulations protecting wildlife resources include the Fish and Wildlife Coordination Act of 1958, Fish and Wildlife Conservation Act of 1980, the BGEPA, and MBTA.

The ESA requires each federal agency to ensure that any actions authorized, funded, or carried out by the agency do not jeopardize the continued existence of a federally listed endangered or threatened species, or result in the destruction or adverse modification of the designated critical habitat of a federally listed species. As the lead federal agency, FERC is required to consult with the USFWS and/or NOAA Fisheries to determine whether federally listed endangered or

threatened species or designated critical habitat are found in the vicinity of a proposed project, and to determine the proposed action's potential effects on those species or critical habitats.²⁸

For actions involving major construction activities with the potential to adversely affect federally listed species or designated critical habitat, FERC must prepare a BA for those listed species that may be affected and report its findings to the USFWS. If it is determined that the action would adversely affect a federally listed species, FERC must submit a request for formal consultation to comply with section 7 of the ESA. In response, the USFWS would issue a biological opinion (BO) as to whether the federal action would likely jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of designated critical habitat.

Columbia Gas and Columbia Gulf, acting as FERC's non-federal representatives for complying with section 7(a)(2) of the ESA, requested technical assistance and initiated informal consultation with the USFWS on July 22, 2015, and June 6, 2015, respectively. Columbia Gas submitted letters to the USFWS West Virginia Field Office, and Columbia Gulf submitted letters to the USFWS Kentucky Ecological Services Field Office, Tennessee Ecological Services Field Office, and Mississippi Ecological Services Field Office. Additionally, Columbia Gas consulted with the WVDNR, Wildlife Resources Section; and Columbia Gulf consulted with the KDFWR, TDEC's Natural Heritage Inventory Program, and the MDWFP's Museum of Natural Science. Both applicants also consulted the USFWS Environmental Conservation Online System to identify federally listed species in their respective project areas.

To comply with section 7 of the ESA, we consulted either directly or indirectly (by using Columbia Gas or Columbia Gulf as our federal representative for informal consultations) with the USFWS and state resource agencies regarding the presence of federally listed, proposed for listing, or state-listed species in the project area. The USFWS identified 43 federally listed threatened or endangered species, and 1 species that is currently under review for federal listing, that are known to occur in the MXP and GXP areas. Some of these species are already covered under CPG's Multi-species Habitat Conservation Plan (MSHCP), and some require additional consultation.

Currently, we have determined that without implementation of the appropriate AMMs, the MXP is likely to adversely affect the northern long-eared bat, Indiana bat, and several federally listed mussels, including the clubshell, fanshell, pink mucket, rayed bean, sheepnose, snuffbox, and spectaclecase. The GXP would not adversely affect any federally listed species. We have received the necessary concurrences from the USFWS for the GXP, which concludes section 7 consultation for that project.

The West Virginia Field Office has been working with Columbia Gas since 2015 to identify survey and project information needed, including surveys for federally listed bats and mussels in

²⁸ The USFWS, which is responsible for terrestrial and freshwater species, and NOAA Fisheries, which is responsible for marine species, jointly administer the ESA. NOAA Fisheries, during early coordination with Columbia Gas, indicated that no threatened or endangered species under its purview are expected to be within the MXP area and that no further consultation was required. Likewise, we determined there are no federally listed species under NOAA's jurisdiction in the vicinity of the GXP; therefore, section 7 consultation was conducted solely with the USFWS.

West Virginia. Once additional information becomes available (surveys are anticipated to be completed in late spring/early summer 2017), the USFWS will work with Columbia Gas to address any species-specific issues and develop AMMs for USFWS trust resources, which would facilitate FERC's ability to conclude section 7 consultation with the USFWS for the MXP.

4.7.1 Multi-Species Habitat Conservation Plan

In coordination with the USFWS, NPS, USFS, USACE, and FERC, in 2013 NiSource²⁹ (predecessor to CPG, which includes Columbia Gas and Columbia Gulf) developed a programmatic MSHCP compliant with section 10 of the ESA to streamline consultations under section 7 of the ESA related to construction, operation, and maintenance of NiSource's natural gas pipelines and ancillary facilities. The USFWS also issued a programmatic BO resulting in an Incidental Take Permit for 10 MSHCP species for 50 years, in addition to a series of one-time consultation letters for Columbia Gas' and Columbia Gulf's activities within designated MSHCP covered lands.³⁰ NiSource did not request take authorization for the remaining 32 species addressed in the MSHCP.³¹ Furthermore, the MSHCP does not address 47 additional listed, proposed, or candidate species that may occur within the MSHCP covered lands. Therefore, NiSource and the USFWS worked together to develop AMMs for the non-MSHCP species. The MSHCP became effective on January 1, 2014 (NiSource/Columbia, 2014). An amendment to the MSHCP to include the NLEB, which provides a detailed analysis of impacts, calculates incidental take, and provides mitigation for potential impacts on this species within MSHCP covered lands, was approved by the USFWS on May 1, 2015.

Columbia Gas would use the MSHCP for those portions of the MXP located within covered lands, which includes portions of Cabell, Kanawha, Jackson, Marshall, and Wetzel Counties, West Virginia (figure 4.7-1). All activities associated with GXP are within MSHCP covered lands. Within covered lands, Columbia Gas and Columbia Gulf would implement AMMs for species identified in the MSHCP. Where we (representing the lead federal agency) have determined that the proposed activities are consistent with the MSHCP, programmatic BO, and/or resource agency concurrence letters, no further section 7 consultation is required. For non-MSHCP species (i.e., 47 additional species evaluated in the programmatic BO but not authorized for incidental take under the MSHCP), the Companies would implement BMPs similar to the AMMs, and additional section 7 consultation may or may not be required. Section 7 consultation remains required for any and all project areas or species that are not covered under the MSHCP (i.e., non-covered lands, non-MSHCP species).

²⁹ In mid-2015, NiSource Inc. separated its natural gas pipeline and related businesses into a stand-alone publicly traded company, CPG. CPG is a pure-play natural gas pipeline, midstream, and storage company. CPG includes Columbia Gas Transmission, Columbia Gulf Transmission, NiSource Midstream Services, and other current NiSource natural gas pipeline, storage, and midstream holdings. TransCanada Corporation acquired CPG in July 2016.

³⁰ Covered lands include a 1-mile wide linear corridor of Columbia Gas' existing pipeline facilities and 12 counties where storage fields are located.

³¹ The 32 species for which NiSource did not request take authorization have been addressed through AMMs, are not affected by NiSource activities, have been de-listed, or are species for which the USFWS cannot provide incidental take authorization.

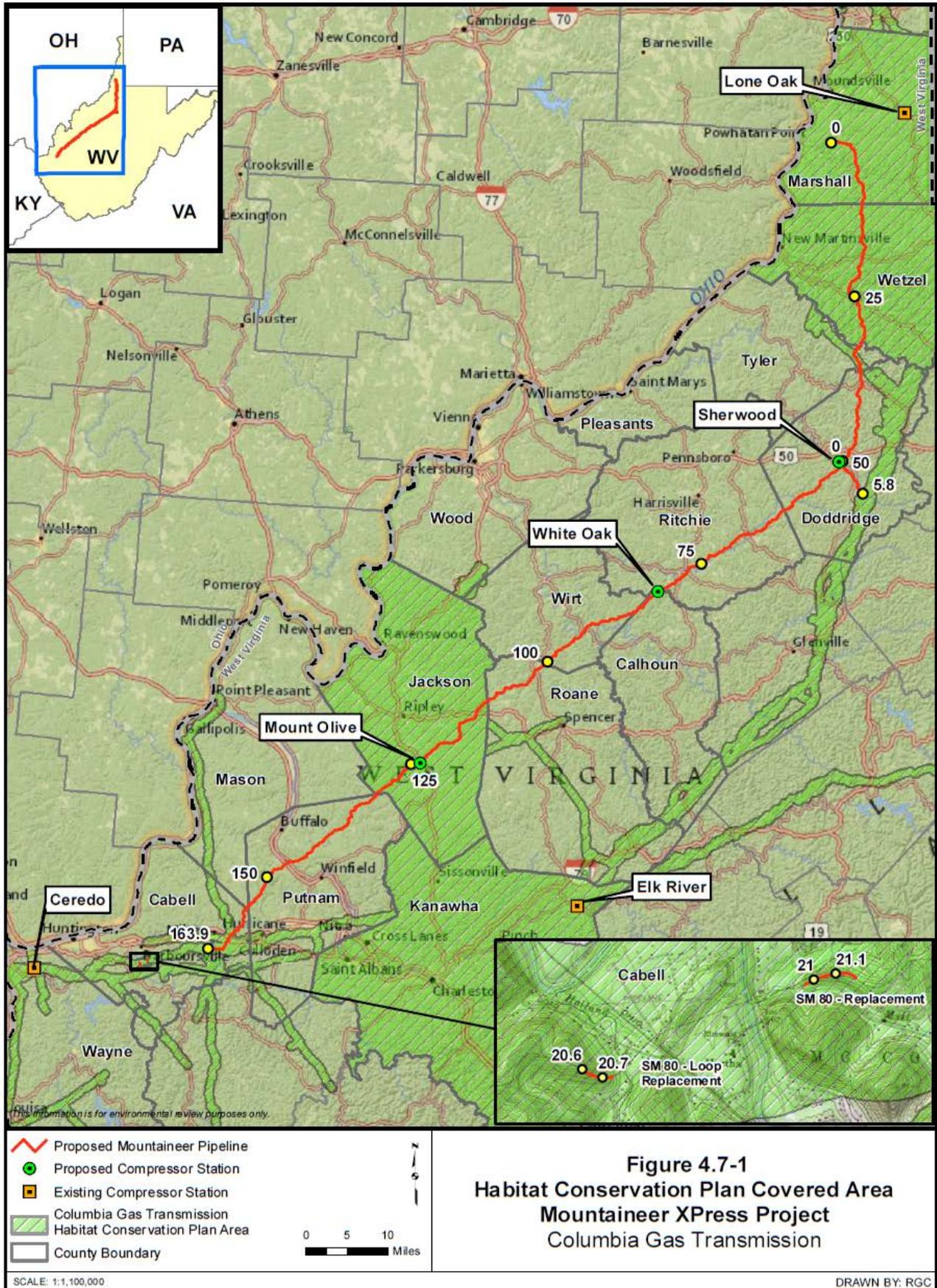
In addition to federal law, West Virginia, Kentucky, Tennessee, and Mississippi have passed laws to protect state-listed threatened and endangered species. The state-specific regulations include the Kentucky Administrative Regulations (301 KAR 3:061), Tennessee Nongame and Endangered or Threatened Wildlife Species Conservation Act of 1974 and Tennessee Rare Plant Protection and Conservation Act of 1985, and the Mississippi Nongame and Endangered Species Conservation Act of 1974. West Virginia provides protection for all freshwater mussels under West Virginia Code Section 20-2-4 and Code of State Rules at 58-605.11.

4.7.2 Species Identification

Various sources of available data were reviewed to identify federally and state-listed species and other special status species that could potentially be present in the project areas, including letters of request to federal and state resource agencies for technical assistance, informal consultations, review of NiSource's MSHCP database, and field surveys. Further details regarding agency correspondence, consultations, and field surveys are provided in the following subsection. An overview of field survey timing and methodology is provided below.

During the 2015 and 2016 field seasons (June to October), Columbia Gas conducted habitat evaluations of the MXP-100 corridor to identify potential areas of special status species habitat. The survey corridor was approximately 300 feet wide, centered on the proposed pipeline alignment. Corridor surveys also included the approximately 6-mile-long MXP-200 line from the Sherwood Compressor Station site to Columbia Gas' existing T-System Line 1983 in Doddridge County, and approximately 0.4 mile within two SM80 corridors in Cabell County. Compressor station sites in Doddridge, Calhoun, and Jackson Counties and some temporary work areas also were surveyed. In addition to generalized surveys of the pipeline corridors, Columbia Gas initiated specialized surveys for federally protected species in areas not covered under the MSHCP.

During the 2015 field season, Columbia Gas completed acoustic surveys at 45 1-kilometer segments covering about 53 kilometers to determine presence or probable absence of the NLEB and Indiana bat. Of these 45 segments surveyed, 32 were determined to have probable presence of NLEBs, and 2 segments had positive detections of Indiana bats. In 2016, probable presence/absence surveys were completed for areas that were not completed during 2015 (129 1-kilometer segments), as well as for portions of the modified route not previously covered by environmental survey. Surveys were not conducted in areas where Columbia Gas had not yet obtained survey access. Where Indiana bats were acoustically detected, Columbia Gas followed up with six net-nights (three nets set for two nights) at each site to determine if Indiana bats were present. No Indiana bats were captured. Columbia Gas plans to survey all remaining sites in 2017 (approximately 67 1-kilometer segments), including associated access roads and construction/storage yards.



With USFWS and WVDNR approval, Columbia Gas also conducted initial surveys for protected mussel species in 2015 and 2016. In consultation with these agencies, Columbia Gas is determining the need for additional stream surveys for mussel species. The mussel survey period in West Virginia as outlined in the current West Virginia Mussel Survey Protocols is May 1 to October 1. Columbia Gas anticipates completing the remaining mussel surveys in late spring 2017. Once additional information becomes available, the USFWS will work with Columbia Gas to address any species-specific issues and develop AMMs for federally protected species affected by the project.

Columbia Gulf conducted field surveys of all GXP preferred site locations and suitable alternatives in June 2015, including observation and documentation of vegetation communities and wildlife. This information was used to characterize habitats and determine if potential threatened and endangered species habitat may be present in the GXP area.

Based on consultations with federal and state agencies and our own research, we identified 13 federally listed species in the general area of the MXP, and 31 federally listed species in the general areas of the various GXP compressor station sites. The potential effects of the MXP and GXP on these species are discussed below.

4.7.3 Federally Listed Species

In their respective applications and supplemental filings, Columbia Gas and Columbia Gulf provided information on their project locations and the extent of coverage by the MSHCP, as well as a description of activities and status of consistency with the MSHCP.

4.7.3.1 Mountaineer XPress Project

We reviewed the information submitted by Columbia Gas, performed our own research, and consulted with wildlife management agencies concerning protected species. According to the USFWS, four bat species, one fish species, and eight mussel species protected under the ESA are in the MXP vicinity. These species are listed in table 4.7-1. Our determination of effect for each species is also summarized in table 4.7-1 and described in the species-specific discussions below. We have included the signed MSHCP Interagency ESA Consultation Checklists for the MXP in appendix J-1.

Of the 13 federally protected species identified that may be present in the MXP area, three are MSHCP species associated entirely with covered lands, five are MSHCP species associated with both covered and non-covered lands, and five are non-MSHCP species, as listed below:

- gray bat, Virginia big-eared bat, and northern riffleshell are MSHCP species associated entirely with covered lands (these three species were eliminated from extensive analysis because Columbia Gas would implement AMMs identified for these species according to the provisions in the MSHCP);
- Indiana bat, NLEB, and the clubshell, fanshell, and sheepnose mussels are MSHCP species associated with both covered and non-covered lands; and

- diamond darter, and pink mucket, rayed bean, snuffbox, and spectaclecase mussels are non-MSHCP species; these automatically receive an assigned determination of likely to adversely affect per the BO for the MSHCP.³²

Detailed impact evaluations are being undertaken for the covered species where they occur on non-covered lands, and for the non-covered species.

³² However, a non-jeopardy finding can be attained through compliance with and full implementation of measures described in the MSHCP, the existing Implementing Agreement, or the existing Incidental Take Permit.

**Table 4.7-1
Mountaineer XPress Project Federally Listed Threatened and Endangered Species that Potentially Occur in the Vicinity of the Project**

Species (Scientific name)	Status <u>a</u>, <u>b</u>	MSHCP Status	MSHCP Covered (C) or Non-Covered (NC) Lands	Habitat	West Virginia Counties Where Species May Occur	Determination of Effect <u>d</u>, <u>e</u>
Mammal						
Gray bat (<i>Myotis grisescens</i>)	E	MSHCP	C	Roosts almost exclusively in caves.	Kanawha, Wayne <u>c</u>	NLAA (consultation complete)
Indiana bat (<i>Myotis sodalis</i>)	E	MSHCP	C, NC	Roosts singly or in colonies underneath bark and in crevices of dead or dying trees.	All	Consultation ongoing
Virginia big-eared bat (<i>Corynorhinus townsendii</i>)	E	MSHCP	C	Roosts singly or in colonies in caves; typically in limestone karst regions dominated by mature hardwood forests of hickory, beech, maple, and hemlock.	Kanawha	NLAA (consultation complete)
Northern long-eared bat (<i>Myotis septentrionalis</i>)	T	MSHCP	C, NC	NLEB roost alone or in colonies in large caves and abandoned mines; summers in forested areas near wetlands.	All	Consultation ongoing
Fish						
Diamond darter (<i>Crystallaria cincotta</i>)	E	Non-MSHCP (LAA)	C	Large warm-water rivers with very clear water and extensive sand and gravel bars free of mud and silt.	Kanawha	NLAA (consultation complete)
Mussel						
Clubshell (<i>Pleurobema clava</i>)	E	MSHCP	C, NC	Rivers and creeks with coarse sand and gravel in runs often just downstream of riffles.	Doddridge, Kanawha, Ritchie, Tyler, and Wirt	Consultation ongoing
Fanshell (<i>Cyprogenia stegaria</i>)	E	MSHCP	C, NC	Medium to large streams with strong currents and gravel substrates.	Cabell, Jackson, Kanawha, Putnam, Tyler, Wayne, and Wetzel	Consultation ongoing
Northern riffleshell (<i>Epioblasma torulosa rangiana</i>)	E	MSHCP	C	Creeks and small to medium rivers with high-gradient riffles.	Kanawha	NLAA (consultation complete)
Pink mucket (<i>Lampsilis abrupta</i>)	E	Non-MSHCP (LAA)	C, NC	Generally a large-river species, preferring sand-gravel or rocky	Cabell, Jackson, Kanawha, Putnam,	Consultation ongoing

**Table 4.7-1
Mountaineer XPress Project Federally Listed Threatened and Endangered Species that Potentially Occur in the Vicinity of the Project**

Species (Scientific name)	Status <u>a</u>, <u>b</u>	MSHCP Status	MSHCP Covered (C) or Non-Covered (NC) Lands	Habitat	West Virginia Counties Where Species May Occur	Determination of Effect <u>d</u>, <u>e</u>
				substrates with moderately strong currents.	Tyler, Wayne, and Wetzel	
Rayed bean (<i>Villosa fabalis</i>)	E	Non-MSHCP (LAA)	C, NC	Generally found in smaller, headwater creeks, but is sometimes found in large rivers and wave-washed areas of glacial lakes. Prefers gravel or sand substrates, and is often found in and around roots of aquatic vegetation.	Doddridge, Kanawha, and Tyler	Consultation ongoing
Sheepnose (<i>Plethobasus cyphus</i>)	E	MSHCP	C, NC	Generally a large river species, preferring sand-gravel or rocky substrates with mod-strong currents.	Cabell, Jackson, Kanawha, Putnam, Tyler, Wayne, Wetzel	Consultation ongoing
Snuffbox mussel (<i>Epioblasma triquetra</i>)	E	Non-MSHCP (LAA)	C, NC	Found in small to medium size creeks with swift currents; sometimes in larger rivers.	Cabell, Calhoun, Doddridge, Jackson, Kanawha, Marshall, Ritchie, Roane, Tyler, Wetzel, and Wirt	Consultation ongoing
Spectaclecase (<i>Cumberlandia monodonta</i>)	E	Non-MSHCP (LAA)	C, NC	Habitat specialist to the bends below cliff bluffs in large rivers.	Kanawha and Putnam	Consultation ongoing

Sources: NiSource/Columbia, 2014; USFWS, 2015g.

a T=Federally Threatened, E=Federally Endangered.

b West Virginia has no state endangered species legislation; therefore, the only species listed as threatened or endangered in the state are federally listed species.

c On September 29, 2016, the USFWS sent out notification that a gray bat had been captured in Logan County, West Virginia and indicated that gray bats could occur in Wayne and Kanawha Counties in the MXP area.

d LAA – Likely to Adversely Affect, NLAA – Not Likely to Adversely Affect. Status in parentheses [i.e., (LAA)] represents the pre-determined (assigned) MSHCP status without applied AMMs.

e Our project-specific determination of effect that results in NLAA assumes that Columbia Gas would implement all mandatory AMMs for MSHCP species and BMPs for non-MSHCP species. For species not fully covered in the MSHCP or outside of MSHCP lands, Columbia Gas would prepare specific plans that provide equal or greater protection than the MSHCP. All species-specific plans would receive prior approval from USFWS prior to implementation.

f For any species where our final determination of effect is noted as LAA, our BA will be requesting that the USFWS evaluate the likely effects of the proposed action to ensure that it will not jeopardize the continued existence of the species or its critical habitat.

4.7.3.2 Gulf XPress Project

We reviewed the information submitted by Columbia Gulf, performed our own research, and consulted with the USFWS regarding federally listed species in the GXP areas. We identified 4 bat species, 1 fish, 18 species of mussels, 1 insect, 1 crustacean, and 6 plant species that are protected under the ESA (or candidate species³³). These species are listed in table 4.7-2, and are described in the species-specific discussions below.

Of the 31 species identified as potentially occurring in the GXP area, 17 are MSHCP species associated entirely with covered lands, 11 are non-MSHCP species, and 3 are not addressed by the MSHCP, as listed below:

- gray bat, Virginia big-eared bat, Indiana bat, NLEB, Braun's rockcress, Nashville crayfish, and the clubshell, cracking pearlymussel, dromedary pearlymussel, fanshell, northern riffleshell, oyster, sheepnose, pale lilliput, purple cat's paw, tan riffleshell, and white wartyback mussels are MSHCP species associated entirely with covered lands;
- spotfin chub, leafy prairie-clover, running buffalo clover, Short's bladder pod, Price's potato-bean, and orangefoot pimpleback, pink mucket, snuffbox, ring pink, rough pigtoe, and spectaclecase mussels are non-MSHCP species; and
- Cumberlandian combshell, Baker Station cave beetle, and Guthrie's ground-plum are not addressed as part of the MSHCP.

Columbia Gulf conducted field surveys of all GXP preferred site locations and suitable alternatives in June 2015. The emphasis of the field effort was on identification and delineation of wetlands and waterbody features; however, surveys also included habitat assessments for listed species and invasive plant species. Targeted federal species included running buffalo clover, Short's bladderpod, Price's potato-bean, Tennessee purple coneflower, leafy prairie clover, spotfin chub, pygmy madtom, and Nashville crayfish. Survey efforts also considered species on each state's endangered and threatened species list.

Generally, further section 7 consultation would be required for all species not covered under the MSHCP. However, the USFWS has already concurred that GXP activities would have *no effect* or would *not likely to adversely affect* the 11 non-MSHCP species listed above and no further consultation is required. The USFWS also indicated that no further consultation is required for the three species (Cumberlandian combshell, Baker Station cave beetle, and Guthrie's ground-plum) not addressed in the MSHCP. We have independently reviewed the habitat and life history requirements of these 10 species, along with Columbia Gulf's proposed action, and agree that the GXP would have little to no impacts on these species. We have included the signed MSHCP Interagency ESA Consultation Checklists for the GXP in appendix J-2.

The snuffbox was identified as potentially occurring in Carter County, Kentucky. This mussel is a non-MSHCP species with an assigned determination of likely to adversely affect per

³³ Candidate species are not protected under the ESA, but are often considered in order to facilitate consultation if they do become federally listed during project review.

the MSHCP BO; however, we have independently assessed the habitat needs for this mussel species along with the habitat in and around the proposed Grayson Compressor Station, and concluded that required habitat for the snuffbox is not present. Accordingly, we conclude that the GXP would have *no effect* on the snuffbox mussel. The USFWS has concurred with our determination in its correspondence dated April 24, 2017.

**Table 4.7-2
Gulf XPress Project Federally Listed Species that Potentially Occur in the Vicinity of the Project**

Species (Scientific name)	Federal Status <i>a/</i>	State Status	MSHCP Status <i>b/</i>	Habitats	GXP Facilities <i>c/</i>									Determination of Effect
					Kentucky					Tennessee		Mississippi		
					Leach C Meter Boyd County	Grayson CS - Carter County	Morehead CS - Rowan County	Paint Lick CS - Garrard County	Goodluck CS - Metcalfe County	Cane Ridge CS - Davidson County	Clifton Junction CS - Wayne County	New Albany CS - Union County	Holcomb CS - Grenada County	
Mammal														
Gray bat (<i>Myotis grisescens</i>)	E	E (KY, TN)	MSHCP	Roosts almost exclusively in caves.	X	X	X	X	X		X			NLAA (consultation complete)
Indiana bat (<i>Myotis sodalis</i>)	E	E (KY, TN, MS)	MSHCP	Roosts singly or in colonies underneath bark and in crevices of dead or dying trees.	X	X	X	X	X	X	X	X <i>d/</i>	X <i>d/</i>	NLAA (consultation complete)
Virginia big-eared bat (<i>Corynorhinus townsendii virginianus</i>)	E	E (KY)	MSHCP	Roosts singly or in colonies in caves; typically in limestone karst regions dominated by mature hardwood forests of hickory, beech, maple, and hemlock.			X							NLAA (consultation complete)
Northern long-eared bat (<i>Myotis septentrionalis</i>)	T	E (KY)	MSHCP	NLEB roost alone or in colonies in large caves and abandoned mines; summers in forested areas near wetlands.	X		X	X	X	X	X	X	X	NLAA (consultation complete)
Fish														
Spotfin chub (<i>Erimonax monachus</i>)	T	T (TN)	Non- MSHCP	Streams with low-silt substrates in good flows; forages commonly on bedrock, boulders, cobble.							X			NLAA (consultation complete)

**Table 4.7-2
Gulf XPress Project Federally Listed Species that Potentially Occur in the Vicinity of the Project**

Species (<i>Scientific name</i>)	Federal Status <u>a/</u>	State Status	MSHCP Status <u>b/</u>	Habitats	GXP Facilities <u>c/</u>								Determination of Effect	
					Kentucky					Tennessee		Mississippi		
					Leach C Meter Boyd County	Grayson CS - Carter County	Morehead CS - Rowan County	Paint Lick CS - Garrard County	Goodluck CS - Metcalfe County	Cane Ridge CS - Davidson County	Clifton Junction CS - Wayne County	New Albany CS - Union County		Holcomb CS - Grenada County
Mussel														
Clubshell (<i>Pleurobema clava</i>)	E	E (KY, TN)	MSHCP	Rivers and creeks with coarse sand and gravel in runs often just downstream of riffles.	X						X		NLAA (consultation complete)	
Cracking pearlymussel (<i>Hemistena lata</i>)	E	E (TN)	MSHCP	Sand, gravel, and cobble substrates in swift currents or mud and sand in slower currents.							X		NLAA (consultation complete)	
Cumberlandian combshell (<i>Epioblasma brevidens</i>)	E	E (TN)	N/A <u>e/</u>	Large creeks to large rivers, in coarse sand or mixtures of gravel, cobble, or rocks.						X			NE (consultation complete)	
Dromedary pearlymussel (<i>Dromus dromas</i>)	E	E (TN)	MSHCP	Found in river headwaters; in riffles and shoals in sand and gravel substrates.						X			NE (consultation complete)	
Fanshell (<i>Cyprogenia stegaria</i>)	E	E (KY, TN)	MSHCP	Medium to large streams with strong currents and gravel substrates.	X	X					X		NLAA (consultation complete)	
Northern riffleshell (<i>Epioblasma torulosa rangiana</i>)	E	E (KY)	MSHCP	Creeks and small to medium rivers with high-gradient riffles.			X						NLAA (consultation complete)	

**Table 4.7-2
Gulf XPress Project Federally Listed Species that Potentially Occur in the Vicinity of the Project**

Species (Scientific name)	Federal Status <u>a/</u>	State Status	MSHCP Status <u>b/</u>	Habitats	GXP Facilities <u>c/</u>								Determination of Effect	
					Kentucky					Tennessee		Mississippi		
					Leach C Meter Boyd County	Grayson CS - Carter County	Morehead CS - Rowan County	Paint Lick CS - Garrard County	Goodluck CS - Metcalfe County	Cane Ridge CS - Davidson County	Clifton Junction CS - Wayne County	New Albany CS - Union County		Holcomb CS - Grenada County
Orangefoot pimpleback (<i>Plethobasus cooperianus</i>)	E	E (KY, TN)	Non-MSHCP	Large rivers in sand-gravel-cobble substrates in riffles and shoals in deep flowing water.	X					X	X			NLAA (consultation complete)
Oyster mussel (<i>Epioblasma capsaeformis</i>)	E	E (TN)	MSHCP	Found in large rivers with rocky substrates.						X				NLAA (consultation complete)
Sheepnose mussel (<i>Plethobasus cyphus</i>)	E	--	MSHCP	Generally a large river species, preferring sand-gravel or rocky substrates with mod-strong currents.	X									NLAA (consultation complete)
Pale lilliput (<i>Toxoplasma cylindrellus</i>)	E	E (TN)	MSHCP	Small streams with firm rubble, gravel, and sand substrates in shallow riffles and shoals.							X			NE (consultation complete)
Pink mucket (<i>Lampsilis abrupta</i>)	E	E (KY, TN)	Non-MSHCP	Generally a large-river species, preferring sand-gravel or rocky substrates with moderately strong currents.	X		X			X	X			NLAA (consultation complete)
Purple cat's paw (<i>Epioblasma obliquata obliquata</i>)	E	E (TN)	MSHCP	Found in riffles of large to medium rivers with moderate gradient.						X				NE (consultation complete)

**Table 4.7-2
Gulf XPress Project Federally Listed Species that Potentially Occur in the Vicinity of the Project**

Species (<i>Scientific name</i>)	Federal Status <i>a/</i>	State Status	MSHCP Status <i>b/</i>	Habitats	GXP Facilities <i>c/</i>								Determination of Effect	
					Kentucky					Tennessee		Mississippi		
					Leach C Meter Boyd County	Grayson CS - Carter County	Morehead CS - Rowan County	Paint Lick CS - Garrard County	Goodluck CS - Metcalfe County	Cane Ridge CS - Davidson County	Clifton Junction CS - Wayne County	New Albany CS - Union County		Holcomb CS - Grenada County
Snuffbox mussel (<i>Epioblasma triquetra</i>)	E	E (KY)	Non-MSHCP	Found in small to medium size creeks with swift currents; sometimes in larger rivers.		X								NE (consultation complete)
Ring pink (<i>Obovaria retusa</i>)	E	E (KY, TN)	Non-MSHCP	Generally a large river species, preferring sand-gravel or rocky substrates with mod-strong currents.	X					X	X			NLAA (consultation complete)
Rough pigtoe (<i>Pleurobema plenum</i>)	E	E (KY, TN)	Non-MSHCP	Medium to large rivers in sand, gravel, and cobble substrates in shoals.	X					X	X			NLAA (consultation complete)
Spectaclecase (<i>Cumberlandia monodonta</i>)	E	E (TN)	Non-MSHCP	Habitat specialist to the bends below cliff bluffs in large rivers.							X			NLAA (consultation complete)
Tan riffleshell (<i>Epiolasma florentina walkeri</i>)	E	E (TN)	MSHCP	Found in river headwaters, in riffles and shoals in sand and gravel substrates.						X				NE (consultation complete)
White wartyback (<i>Plethobasus cicatricosus</i>)	E	E (TN)	MSHCP	Inhabit shoals and riffles in large rivers.						X	X			NE (consultation complete)

**Table 4.7-2
Gulf XPress Project Federally Listed Species that Potentially Occur in the Vicinity of the Project**

Species (<i>Scientific name</i>)	Federal Status <u>a/</u>	State Status	MSHCP Status <u>b/</u>	Habitats	GXP Facilities <u>c/</u>								Determination of Effect
					Kentucky				Tennessee		Mississippi		
					Leach C Meter Boyd County	Grayson CS - Carter County	Morehead CS - Rowan County	Paint Lick CS - Garrard County	Goodluck CS - Metcalfe County	Cane Ridge CS - Davidson County	Clifton Junction CS - Wayne County	New Albany CS - Union County	
Insect													
Baker Station cave beetle (<i>Pseudanophthalmus insularis</i>)	C	--	n/a <u>e/</u>	Subterranean obligate of the twilight zone in caves.						X			NLAA (consultation complete)
Crustacean													
Nashville crayfish (<i>Orconectes shoupi</i>)	E	E (TN)	MSHCP	First-order and larger streams, generally with bedrock bottom, under slab rock; endemic to Mill Creek watershed.						X			NLAA (consultation complete)
Plant													
Braun's rockcress (<i>Boechera perstellata</i>)	E	E (TN)	MSHCP	Limestone bluffs						X			NE (consultation complete)
Guthrie's ground-plum (<i>Astragalus bibullatus</i>)	E	E (TN)	n/a <u>e/</u>	Ordovician limestone glades						X			NE (consultation complete)
Leafy prairie-clover (<i>Dalea foliosa</i>)	E	E (TN)	Non-MSHCP	Rocky washes in glades						X			NLAA (consultation complete)

**Table 4.7-2
Gulf XPress Project Federally Listed Species that Potentially Occur in the Vicinity of the Project**

Species (Scientific name)	Federal Status a/	State Status	MSHCP Status b/	Habitats	GXP Facilities c/								Determination of Effect	
					Kentucky					Tennessee		Mississippi		
					Leach C Meter Boyd County	Grayson CS - Carter County	Morehead CS - Rowan County	Paint Lick CS - Garrard County	Goodluck CS - Metcalfe County	Cane Ridge CS - Davidson County	Clifton Junction CS - Wayne County	New Albany CS - Union County		Holcomb CS - Grenada County
Price's potato-bean (<i>Apios priceana</i>)	T	T (TN, MS)	Non-MSHCP	Openings in rich woods						X	X	X		NE (consultation complete)
Running buffalo clover (<i>Trifolium stoloniferum</i>)	E	E (KY)	Non-MSHCP	Mesic woodlands with partial to filtered sunlight underlain with limestone bedrock.				X						NLAA (consultation complete)
Short's bladderpod (<i>Physaria globosa</i>)	E	E (KY, TN)	Non-MSHCP	South to west facing dry, open limestone ledges on river bluffs, talus of lower bluff slopes, and shale at cliff bases.				X		X				NLAA (consultation complete)

Sources: IPaC 2015 & 2016. Information supplemented with information provided by USFWS Ecological Field Offices in the project region; Kentucky State Nature Preserves Commission; Tennessee Wildlife Resources Commission; and MDWFP & Mississippi Museum of Natural Science Endangered Species of Mississippi.

a E=endangered, T=threatened, C=candidate.

b MSHCP = MSHCP evaluated species; non-MSHCP = species evaluated outside the context of the MSHCP; LAA = likely to adversely affect; NLAA = not likely to adversely affect; NE = no effect.

c CS=Compressor Station.

d The Indiana bat was not listed by the MSHCP or IPaC as potentially occurring in Mississippi, but was added during consultation with the USFWS Ecological Services Mississippi Field Office in 2015.

e Species not evaluated as part of the USFWS MSHCP analysis.

4.7.4 Fish

4.7.4.1 Mountaineer XPress Project

Only one federally protected fish species, the diamond darter, occurs in the MXP area.

4.7.4.1.1 Diamond Darter

The diamond darter is a member of the perch family, but differs from most other perch by its smaller size and more slender shape. Diamond darters are translucent with silvery sides and a white belly. They are yellow-tan on the back, with four wide olive-colored saddle patterns on the body, and have a dark blotch on the snout below the eyes. Adults reach 3 to 5 inches.

Diamond darters are found in large warm-water rivers with very clear water and extensive sand and gravel bars free of mud and silt. Lack of a swim bladder increases the density of the diamond darter and allows it to remain near the river bottom with little effort. The diamond darter was listed as an endangered species in 2013. The only diamond darter population known to exist is found along a specific reach in the Elk River of West Virginia (USFWS, 2010). As such, all areas of the Elk River in the vicinity of the pending Elk River Compressor Station are assumed to be occupied by the diamond darter.

The MXP would not involve instream work at the Elk River site; however, upland construction immediately adjacent to the river is proposed to add compression at the pending station. This MXP activity is located within a MSHCP covered area; but the diamond darter is not a covered species. The programmatic BO prepared for the MSHCP determined that without implementation of approved BMPs, the diamond darter is likely to be adversely affected by activities within known habitat. Columbia Gas has assumed presence of this species in the Elk River, which is adjacent to the Elk River station. No direct impacts are anticipated on this species and applicable AMMs and BMPs for this species (as identified in the BO and agreed to by Columbia Gas) would be implemented by Columbia Gas. For any activity within 100 feet of the Elk River with potential effects, Columbia Gas would include site-specific details particular to the project area and potential impacts within its Environmental Management and Construction Plan (EM&CP). The EM&CP is a comprehensive and project-specific manual that contains all applicable environmental permits, requirements, and compliance measures to be implemented during construction. These procedures may include, but are not limited to, minimization of riparian disturbance, preventing downstream sedimentation using redundant erosion and sediment control devices, and storage of fuel and other contaminants at least 300 feet from the waterway. No fertilizers or herbicides would be used within 100 feet of the Elk River, and no hydrostatic test water would be withdrawn from or be discharged to the waterbody. Columbia Gas' implementation of these measures would control erosion and sedimentation and minimize the potential for water quality impacts on the Elk River. Based on these measures and the fact that the project would not directly impact the Elk River, we have concluded that the project is *not likely to adversely affect* the diamond darter. In its correspondence dated March 22, 2017, the USFWS concurred with the *not likely to adversely affect* determination for the diamond darter.

4.7.4.2 Gulf XPress Project

Only one federally protected fish species, the spotfin chub, occurs in the GXP area.

4.7.4.2.1 Spotfin Chub

The spotfin chub is a small minnow, growing to around 5 inches in length. Preferred habitat includes large creeks with moderate flow, clear cool or warm water, and gravel or bedrock bottoms (NatureServe, 2015). Spotfin chub was a targeted species during field surveys; however, habitat was not identified at project sites within its range. All GXP activities would occur at relatively small, discrete, primarily upland sites with little to no waterbody impacts. The USFWS Tennessee Ecological Services Field Office provided concurrence in correspondence dated February 15, 2016, that project activities would have no adverse impacts on the spotfin chub. We agree.

4.7.5 Mussels

4.7.5.1 Mountaineer XPress Project

Eight federally listed freshwater mussels may occur within the MXP area. Four of the species are MSHCP species and four are non-MSHCP species. All are automatically assigned a determination of *likely to adversely affect* without implementation of appropriate AMMs for project activities per the MSHCP BO. AMMs for all species include surveys to evaluate presence and relocation of species in project action areas, preparation of an EM&CP with site-specific details particular to the project area and potential impacts, preference for HDD or other trenchless pipe installation, implementation of a SPCC Plan, and restrictions on water withdrawals from and discharges to streams with known or presumed occupied habitat. Columbia Gas has completed surveys for some, but not all Group 2 streams where federally protected mussels may occur.

Because we may require formal ESA section 7 consultation with the USFWS for federally listed mussel species potentially impacted by the MXP on non-covered lands, **we recommend that:**

- **Prior to construction, Columbia Gas should**
 - a. **complete required mussel surveys as soon as conditions allow and file the results of the surveys with the Secretary and concurrently provide the survey results to the USFWS and WVDNR; and**
 - b. **file an update with the Secretary of any further discussions or progress made with the USFWS regarding recommendations on stream crossing locations and construction methodologies where federally protected mussel species may be present.**

Columbia Gas should not begin construction of the MXP until FERC staff has completed all necessary section 7 consultation with the USFWS for federally listed mussel species, and the Director of OEP authorizes construction or implementation of mitigation measures to begin.

A brief description of each species and the status of surveys and consultations with state and federal regulatory agencies follows.

4.7.5.1.1 Clubshell

The clubshell mussel was listed as endangered in 1993. The clubshell prefers clean, loose sand and gravel in medium to small rivers and streams. The clubshell will bury itself in the bottom substrate to depths of up to 4 inches (USFWS, 1997a).

The clubshell mussel is an MSHCP species that may occur in covered and non-covered MSHCP areas in Doddridge, Kanawha, Ritchie, Tyler, and Wirt Counties. According to the USFWS (September 16, 2016), suitable habitat for the clubshell mussel occurs at Fish Creek, Fishing Creek, McElroy Creek, the South Fork Hughes River, Spring Creek, Little Kanawha River, and Meathouse Fork. The USFWS has requested additional information from Columbia Gas regarding these crossings and recommends avoiding or drastically minimizing the number of crossings of these streams to avoid adverse impacts on federally listed mussel species. Columbia Gas is continuing to work with the USFWS and WVDNR to re-align its pipeline crossings to minimize impacts on mussels to the extent possible, and to date has filed five route variations where stream crossings have been modified to minimize construction impacts.

Columbia Gas also is conducting multi-year instream surveys at Group 1 (small to mid-sized streams where mussels are known to exist but federally protected species are not expected to occur) and Group 2 (small to mid-sized streams where federally protected mussels are expected to occur) stream crossings to determine presence/absence of listed mussel species. All survey methods have been reviewed and approved by the WVDNR for Group 1 streams and by the WVDNR and USFWS for Group 2 streams. Surveys have been completed for Group 2 streams within MSHCP covered lands (Fish Creek, MP 7.1 and Fishing Creek, MP 24.4). No federally listed mussel species were collected at either of these crossing locations, or at any crossing location surveyed to date. Additional surveys are proposed in 2017 at multiple crossings, including McElroy Creek, Meathouse Fork, the South Fork Hughes River, Little Kanawha River, and Spring Creek. The USFWS has been working with Columbia Gas to identify survey and project information needed for federally listed mussels in West Virginia. Once stream surveys are completed and additional species information becomes available, the USFWS will work with Columbia Gas to address any species-specific issues and develop AMMs for the federally protected clubshell mussel, if there is potential for the species to be affected by the MXP. We will continue to consult with the USFWS to ensure that the appropriate section 7 consultation is completed prior to any construction.

4.7.5.1.2 Fanshell

The fanshell mussel was listed as endangered in 1993 due to dams and reservoirs that flooded most of this mussel's habitat, reducing its gravel and sand habitat, and probably affecting the distribution of its fish hosts. This mussel is found in medium to large rivers. It buries itself in sand or gravel in deep water of moderate current, with only the edge of its shell and its feeding siphons exposed (USFWS, 1997b).

The fanshell mussel is a MSHCP species that may occur in covered and non-covered MSHCP areas in Cabell, Jackson, Kanawha, Putnam, Tyler, Wayne, and Wetzel Counties. Columbia Gas has completed mussel surveys for Group 2 streams within MSHCP covered lands (Fish Creek, MP 7.1 and Fishing Creek, MP 24.4). No federally listed mussel species were collected at either of these crossing locations, or at any crossing location surveyed to date. Additional surveys are still needed at multiple stream crossings in 2017. Once stream surveys are completed and additional species information becomes available, the USFWS will work with Columbia Gas to address any species-specific issues and develop AMMs for the federally protected fanshell mussel, if there is potential for the species to be affected by the MXP. We will continue to consult with the USFWS to ensure that the appropriate section 7 consultation is completed prior to any construction.

4.7.5.1.3 Northern Riffleshell

The northern riffleshell mussel was historically found in a wide variety of streams in Illinois, Indiana, Kentucky, Michigan, Ohio, Pennsylvania, West Virginia, and western Ontario, but its current range has been greatly reduced. It was listed as endangered in 1993, and restoration efforts are ongoing in Illinois, Ohio, and West Virginia. The mussel is found in small streams and large rivers. It buries itself in firmly packed sand or gravel stream beds with its feeding siphons exposed (USFWS, 1997c). The northern riffleshell is an MSHCP species that may occur in MSHCP-covered areas in Kanawha County.

Project construction in Kanawha County is restricted to the addition of compression at the pending Elk River Compressor Station, and no instream impacts at the Elk River are anticipated. For any activity within 100 feet of the Elk River with potential effects, Columbia Gas would include site-specific details particular to the project area and potential impacts within its EM&CP. These procedures may include, but are not limited to, minimization of riparian disturbance, preventing downstream sedimentation using redundant erosion and sediment control devices, and storage of fuel and other contaminants at least 300 feet from the waterway. No fertilizers or herbicides would be used within 100 feet of the Elk River, and no hydrostatic test water would be withdrawn from or be discharged to the waterbody. Columbia Gas' implementation of these measures would control erosion and sedimentation and minimize the potential for water quality impacts on the Elk River. Because the riffleshell is an MSHCP species associated entirely with covered lands, and Columbia Gas has committed to implementing the AMMs identified for this species according to the provisions in the MSHCP, consultation is determined to be complete.

4.7.5.1.4 Pink Mucket

The pink mucket was listed as endangered in 1976. It is found in mud and sand and in shallow riffles and shoals swept free of silt in major rivers and tributaries. This mussel buries itself in sand or gravel, with only the edge of its shell and its feeding siphons exposed (USFWS, 1997d).

The pink mucket is a non-MSHCP species that may occur on covered and non-covered lands in Cabell, Jackson, Kanawha, Putnam, Tyler, Wayne, and Wetzel Counties. In coordination with the WVDNR and USFWS, Columbia Gas is conducting mussel surveys at Group 2 stream crossings where federally listed mussels are expected to occur. Surveys are scheduled for completion in 2017. Once stream surveys are completed and additional species information

becomes available, the USFWS will work with Columbia Gas to address any species-specific issues and develop AMMs for the federally protected pink mucket mussel, if there is potential for the species to be affected by the MXP. We will continue to consult with the USFWS to ensure that the appropriate section 7 consultation is completed prior to any construction.

4.7.5.1.5 Rayed Bean

The rayed bean is a small mussel that is smooth-textured and green, yellowish-green, or brown with numerous dark-green wavy lines. It generally lives in smaller, headwater creeks, but it is sometimes found in large rivers and wave-washed areas of glacial lakes. It prefers gravel or sand substrates, and is often found in and around roots of aquatic vegetation. The rayed bean was listed as endangered in 2012 due to reduction of habitat caused by dams, sedimentation, and pollution from agricultural and industrial runoff (USFWS, 2012a).

The rayed bean mussel is a non-MSHCP species that may occur on covered and non-covered lands in Doddridge, Kanawha, and Tyler Counties. In coordination with the WVDNR and USFWS, Columbia Gas is conducting mussel surveys at Group 2 stream crossings where federally listed mussels are expected to occur. Once stream surveys are completed and additional species information becomes available, the USFWS will work with Columbia Gas to address any species-specific issues and develop AMMs for the federally protected rayed bean mussel, if there is potential for the species to be affected by the MXP. We will continue to consult with the USFWS to ensure that the appropriate section 7 consultation is completed prior to any construction.

4.7.5.1.6 Sheepnose

The sheepnose mussel is a medium-sized mussel that grows to about 5 inches in length. It lives in larger rivers and streams where it is usually found in shallow areas with moderate to swift currents flowing over coarse sand and gravel. The sheepnose was listed as endangered in 2012 due to reduction of habitat caused by dams, sedimentation, and pollution from agricultural and industrial runoff (USFWS, 2012b).

The sheepnose mussel is a MSHCP species that may occur in covered and non-covered MSHCP areas in Cabell, Calhoun, Doddridge, Jackson, Kanawha, Marshall, Ritchie, Roane, Tyler, Wetzel, and Wirt Counties. In coordination with the WVDNR and USFWS, Columbia Gas is conducting mussel surveys at Group 2 stream crossings where federally listed mussels are expected to occur. Surveys are scheduled for completion in 2017. Once stream surveys are completed and additional species information becomes available, the USFWS will work with Columbia Gas to address any species-specific issues and develop AMMs for the federally protected sheepnose mussel, if there is potential for the species to be affected by the MXP. We will continue to consult with the USFWS to ensure that the appropriate section 7 consultation is completed prior to any construction.

4.7.5.1.7 Snuffbox

The snuffbox mussel has a yellow, green, or brown shell interrupted with green rays, blotches or chevron-shaped lines. The shell becomes darker and the interruptions less clear with age. The snuffbox is usually found in smaller streams, inhabiting areas with a swift current,

although it is also found in Lake Erie and some larger rivers. The snuffbox was listed as endangered in 2012 (USFWS, 2012c).

The snuffbox mussel is a non-MSHCP species that may occur in Cabell, Calhoun, Doddridge, Jackson, Kanawha, Marshall, Ritchie, Roane, Tyler, Wetzel, and Wirt Counties. According to the USFWS (September 16, 2016), suitable habitat for the snuffbox occurs at Fish Creek, Fishing Creek, McElroy Creek, the South Fork Hughes River, Spring Creek, Little Kanawha River, and Meathouse Fork. The USFWS has requested additional information from Columbia Gas regarding these crossings and recommends avoiding or drastically minimizing the number of crossings to these streams to avoid adverse impacts to federally listed mussel species. As discussed previously in Section 4.7.5.1.1, Columbia Gas has been working with the USFWS and WVDNR to route its pipelines to minimize impacts on mussels to the extent possible and has conducted multi-year instream surveys at Group 1 and Group 2 stream crossings to determine presence/absence of listed mussel species. Surveys have been completed for Group 2 streams within MSHCP covered lands (Fish Creek, MP 7.1 and Fishing Creek, MP 24.4). No federally listed mussel species were collected at either of these crossing locations, or at any crossing location surveyed to date. Additional surveys are proposed at multiple crossings in 2017, including McElroy Creek, Meathouse Fork, the South Fork Hughes River, Little Kanawha River, and Spring Creek. Once stream surveys are completed and additional species information becomes available, the USFWS will work with Columbia Gas to address any species-specific issues and develop AMMs for the federally protected snuffbox mussel, if there is potential for the species to be affected by the MXP. We will continue to consult with the USFWS to ensure that the appropriate section 7 consultation is completed prior to any construction.

4.7.5.1.8 Spectaclecase

The spectaclecase is a large elongated mussel, sometimes curved, and somewhat inflated. This mussel is found in large rivers where it lives in areas sheltered from the main force of the river current. The species often clusters in firm mud and in sheltered areas, such as beneath rock slabs, between boulders, and even under tree roots. The spectaclecase was listed as endangered in 2012 (USFWS, 2012d).

The spectaclecase mussel is a non-MSHCP species that may occur on covered and non-covered lands in Kanawha and Putnam Counties. In coordination with the WVDNR and USFWS, Columbia Gas is conducting mussel surveys at Group 2 stream crossings where federally listed mussels are expected to occur. Surveys are scheduled for completion in 2017. Once stream surveys are completed and additional species information becomes available, the USFWS will work with Columbia Gas to address any species-specific issues and develop AMMs for the federally protected spectaclecase mussel, if there is potential for the species to be affected by the MXP. We will continue to consult with the USFWS to ensure that the appropriate section 7 consultation is completed prior to any construction.

4.7.5.1.9 MXP Conclusion on Special Status Mussel Species

Eight federally protected mussel species may occur within the MXP area, and we have determined that there is potential for project activities to adversely affect seven of these species (clubshell, fanshell, pink mucket, rayed bean, sheepnose, snuffbox, and spectaclecase) if they

occur at MXP crossing locations. Project activities, as per the consultation and provision of the MSHCP, are deemed *not likely to adversely affect* the northern riffleshell. Columbia Gas anticipates completion of instream surveys for federally listed mussel species in 2017 and will provide its findings to the USFWS and WVDNR for evaluation. In response to concerns identified by the USFWS regarding the number and locations of stream crossings, Columbia Gas is continuing to work with regulatory agencies to re-align its pipeline crossings to minimize impacts on mussels to the extent possible. In section 4.7.5.1 we have recommended that Columbia Gas complete mussel surveys as soon as conditions allow and provide results to the USFWS and WVDNR, as well as the FERC. Once we have reviewed this information, as well as any AMMs developed for federally protected species affected by the MXP, we will finalize our section 7 consultation with the USFWS.

4.7.5.2 Gulf XPress Project

All GXP activities would occur at relatively small, discrete, primarily upland sites with little to no waterbody impacts. A number of mussel species were identified from agency databases as potentially occurring in the Tennessee and Kentucky counties where GXP facilities are proposed (see discussion in section 4.7.3.2 and table 4.7-2). However, suitable mussel habitat is not present at the proposed compressor station sites, and Columbia Gulf would implement applicable measures in its ECS that are in accordance with state erosion and sediment control standards, as well as the AMMs from the MSHCP designed to protect mussel species. Further, Columbia Gulf would not withdraw or discharge water from area streams. As such, any waterbodies in the general project area that may contain federally listed mussels would be protected. As discussed above, section 7 consultation for all mussel species is complete for the GXP, either by the USFWS providing clearance for a *not likely to adversely affect* determination, or our *no effect* determination.

4.7.6 Mammals

4.7.6.1 Mountaineer XPress Project

Four protected bat species occur in the MXP area. All four species are MSHCP species. Two of these, the Indiana bat and NLEB, occur on both MSHCP-covered and non-covered lands. Surveys are ongoing for the Indiana bat and NLEB on non-covered lands. In its April 21, 2017 response to our draft EIS, Columbia Gas provided a copy of its draft tree clearing strategy, which was submitted to USFWS on February 3, 2017. The USFWS has not yet responded to Columbia Gas' proposed tree clearing strategy. Because ESA section 7 consultation is ongoing for federally protected bat species, **we recommend that:**

- **Prior to construction, Columbia Gas should:**
 - a. **complete required bat surveys as soon as conditions allow and file the survey results with the Secretary and concurrently provide the results to the USFWS and WVDNR; and**
 - b. **file an update with the Secretary regarding any further discussions and/or progress made through consultations with the USFWS for the Indiana bat and the NLEB.**

Columbia Gas should not begin construction of the MXP until FERC staff has completed all necessary section 7 consultation with the USFWS for federally listed bat species, and the Director of OEP authorizes construction or implementation of mitigation measures to begin.

A description of each of these species, potential project impacts, and consultation status is provided in the following sections.

4.7.6.1.1 Gray Bat

The gray bat is a cave-dependent species distributed primarily through the cave regions of Missouri, Kentucky, and Tennessee. This species has very specific habitat preferences, and hibernates only in caves that average 42 to 52 °F. It summers in caves that are usually located near rivers and lakes to provide easy access to foraging areas. Reproductive females roost in separate maternity caves, away from males and non-reproductive females. Hibernation begins in November, and emergence begins in late March, when females migrate to their maternity caves. Pups are born in May and June. The gray bat was listed as endangered in 1976. Population declines are attributed to vulnerability to human disturbance and alterations of caves and cave entrances (KDFWR, 2014).

MPX activities in Wayne County include modifications to the existing Ceredo Compressor Station. In Kanawha County, the MXP would add compression to the pending Elk River Compressor Station, associated with the WBX (FERC Docket No. CP16-38-000). The gray bat is addressed in the MSHCP and is automatically assigned a determination of not likely to adversely affect based on the species' range and known occurrences relative to the location of the covered lands footprint, the types and anticipated impacts of covered activities, and through the development of mandatory species-specific avoidance measures. Take was not requested for this species by NiSource during development of the MSHCP, but AMMs have been proposed, which include surveys to determine presence of potential summer roosts or winter hibernacula, protection of summer roosts and winter hibernacula, minimizing tree clearing in known gray bat foraging areas, restricting the use of herbicides for vegetation management, and protection of perennial streams, including constructing crossings of perennial streams during low flow conditions between June 1 and November 30. Other AMMs include restrictions on burning and disposal of woody vegetation in the vicinity of known hibernacula, controlling the use and storage of contaminants, erosion control, and restoration of native vegetation where possible. A detailed EM&CP is required for any project within gray bat habitat. If surveys determine that roosting habitat is not present in the project area, the project may proceed with no AMMs required. On September 29, 2016, the USFWS sent out notification that a gray bat had been captured in Logan County, West Virginia, and indicated that gray bats could occur in Wayne and Kanawha Counties in the MXP area. The letter was received after Columbia Gas filed its application; therefore, project specific information for the gray bat was not provided in Columbia Gas' consultation reports. We have assessed the impacts on the gray bat in the context of the MSHCP, and have determined that the provisions of the MSHCP have been met for the gray bat, and no further consultation is necessary.

4.7.6.1.2 Indiana Bat

The Indiana bat is a small bat, weighing only one-quarter of an ounce, although in flight they have a wingspan of 9 to 11 inches. Their fur is dark-brown to black. Indiana bats are found over most of the eastern half of the United States where they forage for flying insects found along rivers or lakes, and in uplands. They hibernate during winter in caves or, occasionally, in abandoned mines. For hibernation, they require cool, humid caves with stable temperatures, under 50 °F but above freezing. Almost half of the known population hibernates in caves in southern Indiana. After hibernation, they migrate to summer habitats in wooded areas where they usually roost under loose tree bark on dead or dying trees (USFWS, 2006). The 2009 population estimate was about 387,000 individuals, less than half as many as when the species was first listed.

The Indiana bat was listed as endangered in 1967 because of disturbance to cave habitats, leading to the loss of hibernating bats (USFWS, 2015a). In addition to disturbance of cave habitats, the continued decline in numbers is attributed primarily to a fungal infection first identified in 2006, White-Nose Syndrome, which affects many species of bats. White-Nose Syndrome is estimated to have killed 5.5 million bats (multiple species) in the northeastern United States and Canada (USFWS, 2015b). Other factors that may be contributing to population loss include summer habitat loss or degradation, pesticides, and environmental contaminants. Indiana bats have been documented in all counties where the MXP would be constructed. On lands covered by the MSHCP, Columbia Gas has identified potential presence through its MSHCP GIS database, which indicates locational presence data for the species.

In MSHCP-covered project areas where this species occurs, Columbia Gas would implement the appropriate AMMs for this species, including prohibiting clearing activities in areas with known maternity colonies between April 1 and October 15 to avoid direct affects to females (pregnant, lactating, and post-lactating) and juveniles (non-volant and volant). Clearing also is prohibited between June 1 and August 1 to protect non-volant Indiana bat pups. No right-of-way side trimming is allowed between April 15 and September 1 to avoid direct affects to females (pregnant, lactating, and post-lactating) and juveniles (non-volant and volant). Other AMMs include restrictions on burning and disposal of woody vegetation in the vicinity of known hibernacula, protections for recharge areas of cave streams and other karst features, restrictions on drilling and blasting in the vicinity of known or presumed hibernacula, and restrictions on the use of herbicides for vegetation management within 5 miles of known or presumed occupied hibernacula. Operators, employees, and contractors working in areas of known or presumed Indiana bat habitat would be educated on the biology of the Indiana bat, activities that may affect bat behavior, and ways to avoid and minimize these effects. We have included the signed MSHCP Interagency ESA Consultation Checklists for the MXP in appendix J-1 and consultation for the Indiana bat within covered lands is complete.

In the remaining counties crossed by the project that are not covered by the MSHCP, Columbia Gas identified suitable summer habitat and initiated presence or probable absence surveys, via acoustic surveys, in summer 2015 and summer 2016. Summer roost tree surveys and hibernaculum portal surveys also were conducted in 2016. For any suitable habitat where presence or probable absence surveys are not conducted, species presence is assumed. During the 2015 survey effort, Columbia Gas completed acoustic surveys for multiple sites spanning about 33 miles of portions of the MXP not covered by the MSHCP. Indiana bats were confirmed at two sites in

Ritchie County, and at none of the survey sites in Calhoun or Wirt Counties. In 2016, Columbia Gas completed acoustic surveys for Indiana bats for the remainder of the MXP. No Indiana bats were confirmed during the 2016 surveys. Mist netting was conducted in 2016 at the two sites in Ritchie County where Indiana bats were identified in 2015, but no Indiana bats were captured. Columbia Gas is continuing consultations with the USFWS regarding the Indiana bat on non-covered lands, and has provided a tree clearing strategy for USFWS and WVDNR review. Once surveys are completed and additional species information becomes available, the USFWS will work with Columbia Gas to address any species-specific issues and develop AMMs for Indiana bats occurring on non-MSHCP lands. We would continue to consult with the USFWS to ensure that section 7 consultation is complete for the Indiana bat prior to the beginning of any construction activity.

4.7.6.1.3 Northern Long-eared Bat

The NLEB is a medium-sized bat with a wingspan of 9 to 10 inches. As its name suggests, this bat is distinguished by its long ears, particularly as compared to other bats in its genus. NLEBs are found across much of the eastern and north-central United States and all Canadian provinces from the Atlantic Coast west to the southern Northwest Territories and eastern British Columbia. The species' range includes 37 states.

The NLEBs spend winter hibernating in caves and mines. They use areas in various sized caves or mines with constant temperatures, high humidity, and no air currents, often in small crevices or cracks with only the nose and ears visible. During the summer, the NLEB roost singly or in colonies underneath bark, in cavities or crevices of both live and dead trees. Males and non-reproductive females may also roost in cooler places like caves and mines. Less frequently, the bat has also been found roosting in structures such as barns or sheds (USFWS, 2015c).

In April 2015, the NLEB was listed as threatened throughout its range with an interim 4(d) rule (80 FR 17973-18033). The USFWS issued notice of its Final 4(d) Rule on January 14, 2016, and it became effective February 16, 2016.

An MSHCP amendment to include the NLEB was approved by the USFWS and is applicable as of May 1, 2015. AMMs have been approved and incorporated into the amended MSHCP and Incidental Take Permit. AMMs for the NLEB in summer habitat are similar to those for the Indiana bat described above, but clearing windows differ for the species. Where known maternity colonies occur, clearing is prohibited between April 1 and May 31 and from August 2 to October 15 to avoid direct affects to females (pregnant, lactating, and post-lactating) and juveniles (non-volant and volant). Clearing or side trimming is prohibited in known maternity colony or suitable summer habitat areas from June 1 to August 1 to protect non-volant NLEB pups. In accordance with the MSHCP, Columbia Gas identified potential presence of the NLEB in the project area through a search of its MSHCP GIS database. Timing restrictions on clearing, as well as other applicable AMMs would be implemented by Columbia Gas to address impacts. Incidental take for the NLEB on MSHCP-covered lands has been addressed by the MSHCP, and consultation for the NLEB within covered lands is complete. We have included the signed MSHCP Interagency ESA Consultation Checklists for the MXP in appendix J-1.

In the counties crossed by the project that are not covered by the MSHCP, Columbia Gas identified suitable summer habitat and initiated presence or probable absence surveys, via acoustic surveys, in summer 2015. NLEB presence was confirmed at multiple locations. Further acoustic surveys were completed where access was available in 2016. Access was not available at all locations; therefore, surveys must be completed in 2017, when access to the sites is available. Approximately 67 1-kilometer segments, including associated access roads and construction/storage yards, where applicable, are proposed for survey in 2017. In any suitable habitat where presence or probable absence surveys are not conducted, species presence will be assumed. Summer roost tree surveys and potential hibernaculum portal surveys also were conducted in 2016. NLEB presence was confirmed at project locations in Doddridge, Ritchie, Calhoun, Wirt, Roane, and Putnam Counties. No suitable hibernacula were identified. Consultations with USFWS regarding the NLEB on non-covered lands are continuing. Once surveys are completed and additional species information becomes available, the USFWS will work with Columbia Gas to address any species-specific issues and develop AMMs for NLEBs occurring on non-MSHCP lands. We would continue to consult with the USFWS to ensure that section 7 consultation is complete for the NLEB prior to the beginning of any construction activity.

4.7.6.1.4 Virginia Big-Eared Bat

The Virginia big-eared bat is a medium-sized cave bat found in the mountains of western Virginia and into West Virginia, Kentucky, and North Carolina and is considered a subspecies of the Townsend's big-eared bat. They have elongated nostril openings, and light to dark brown fur, depending on the age of the individual and sub-species. As the name implies, the ears of the big-eared bat are extremely large, exceeding the length of the entire head by up to two times. This is not a migratory bat, although if disturbed, the entire colony may move to an alternate site (Virginia Department of Game and Inland Fisheries [VDGIF], 20156). The Virginia big-eared bat was listed as endangered in 1979 (USFWS, 1979).

Virginia big-eared bats have been documented in Kanawha County. The only project activity to take place in Kanawha County is the addition of compression at Columbia Gas' pending Elk River Compressor Station, which would be constructed as part of the WB XPress Project, prior to commencement of construction of the MXP. The Elk River Compressor Station would be located within MSHCP-covered lands, and as such MXP activities would be covered by the MSHCP. No known roosting habitat is present within 6 miles of the project area. As this species is a MSHCP-covered species in covered lands and no suitable habitat is present at the compressor station, no AMMs or mitigation are required and section 7 consultation is complete. We have included the signed MSHCP Interagency ESA Consultation Checklists for the MXP in appendix J-1.

4.7.6.1.5 MXP Conclusion on Special Status Bat Species

We have determined that the MXP is *not likely to adversely affect* the Virginia big-eared bat and the gray bat. Surveys are expected to be completed on the gray bat in 2017. We do not anticipate Columbia Gas will identify habitat for these species; and, since they are covered under the MSHCP, and Columbia Gas would follow AMMs, no further consultations would be required. Surveys are expected to be completed for the Indiana bat and NLEB on non-covered lands in 2017, after which Columbia Gas would submit its survey results to the USFWS for review. In section

4.7.6.1 we have recommended that Columbia Gas complete bat surveys as soon as conditions allow and provide results to the USFWS and WVDNR, as well as the FERC. We also have recommended that Columbia Gas provide updates to us regarding ESA consultations with the USFWS, and that no construction activity may begin until we have completed all necessary section 7 consultation with the USFWS.

4.7.6.2 Gulf XPress Project

Four protected bat species occur in the GXP area.

4.7.6.2.1 Gray Bat

A description and habitat requirements for the gray bat are provided in section 4.7.6.1.1. Gray bats may occur in all counties in Kentucky where GXP facilities are proposed, and in Wayne County, Tennessee; however, suitable gray bat habitat (i.e., cave habitat) was not identified at project sites during field surveys. In correspondence to Columbia Gulf dated February 16, 2016, the USFWS Kentucky Ecological Services Field Office responded to Columbia Gulf's finding (that no suitable habitat existed for the gray bat at GXP sites) that the USFWS had no further comment and that the requirements of section 7 of the ESA had been fulfilled for the project. In correspondence dated February 15, 2016, the USFWS Tennessee Ecological Services Field Office offered its concurrence that the project would have no adverse impacts on the gray bat. We agree.

4.7.6.2.2 Indiana Bat

A description and habitat requirements for the Indiana bat are provided in section 4.7.6.1.2.

Potential Indiana bat summer habitat was identified in the vicinity of all GXP sites. The Indiana bat is a covered species in the MSHCP with a likely to adversely affect determination. Thus, a project is defined as likely to adversely affect this species without the implementation of AMMs. However, Columbia Gulf has agreed to implement the appropriate AMMs for this species (which are described in section 4.7.6.1.2), including clearing only during those periods described in the MSHCP, when Indiana bats would be less likely to be affected by construction activities.

In its correspondences to Columbia Gulf dated December 9, 2015 (Mississippi Field Office), February 15, 2016 (Tennessee Field Office), and May 24, 2016 (Kentucky field Office), the USFWS concurred that the GXP would not affect federally listed bat species and stated that no additional section 7 consultation would be required. We agree.

4.7.6.2.3 Northern Long-eared Bat

A description and habitat requirements for the NLEB are provided in section 4.7.6.1.3.

Potential NLEB summer habitat was identified in the vicinity of all GXP sites. The NLEB is a covered species in the MSHCP with a likely to adversely affect determination. Thus, a project is defined as *likely to adversely affect* this species without the implementation of AMMs. However, Columbia Gulf has agreed to implement the appropriate AMMs for NLEBs (which are described in section 4.7.6.1.3), including clearing only during those periods described in the MSHCP, when NLEBs would be less likely to be affected by construction activities.

In its correspondences to Columbia Gulf dated December 9, 2015 (Mississippi Field Office), February 15, 2016 (Tennessee Field Office), and May 24, 2016 (Kentucky field Office), the USFWS concurred that the GXP would not affect federally listed bat species and stated that no additional section 7 consultation would be required. We agree.

4.7.6.2.4 Virginia Big-eared Bat

A description and habitat requirements for the Virginia big-eared bat are provided in section 4.7.6.1.4.

Virginia big-eared bat habitat was not identified at project sites occurring within its range. The Virginia big-eared bat is a covered species in the MSHCP with an assigned determination of not likely to adversely affect. Because no habitat exists for this species at project sites within its range, no AMMs would be implemented and no further section 7 consultation is required. In correspondence to Columbia Gulf dated February 16, 2016, the USFWS Kentucky Ecological Services Field Office responded that it had no further comment and that the requirements of section 7 of the ESA had been fulfilled for the project. We agree.

4.7.7 Insects

4.7.7.1 Mountaineer XPress Project

No federally protected insects are within the MXP area.

4.7.7.2 Gulf XPress Project

One federally protected insect species occurs in the GXP area.

4.7.7.2.1 Baker Station Cave Beetle

The Baker Station cave beetle is a subterranean obligate of the twilight zone in limestone caves. It is endemic to Davidson County, Tennessee and is specifically known from the privately owned Baker Station and Bull Run Caves. It is a candidate for listing under the ESA (USFWS, 2014). However, no caves were identified at project sites during field surveys. Furthermore, the GXP would not impact either of the known cave habitats for the Baker Station cave beetle. In correspondence dated February 15, 2016, the USFWS Tennessee Ecological Services Field Office provided concurrence to Columbia Gulf that project activities would have no adverse impacts on the Baker Station cave beetle. We agree.

4.7.8 Crustaceans

4.7.8.1 Mountaineer XPress Project

No federally listed crustaceans occur within the MXP area.

4.7.8.2 Gulf XPress Project

One federally listed crustacean occurs within the GXP area.

4.7.8.2.1 Nashville Crayfish

The Nashville crayfish is a pigmented crayfish with well-developed eyes. Young are released annually during early summer, and the expected lifespan of an individual is about 3 years. The crayfish requires habitat with high water quality, moderate water flow, and rocky substrate, and is endemic to the Mill Creek watershed in Tennessee. It was listed as endangered in 1986. The population is thought to be stable, but threats include water quality deterioration related to nearby development (NatureServe, 2015). The Cane Ridge Compressor Station site is in the Mill Creek watershed; however, it is separated by 470 to 1,100 feet from the creek itself (see section 4.3.2.4.2). Field surveys conducted at this site did not identify wetland and waterbody features or any habitat suitable for the Nashville crayfish.

During public scoping, we received comments regarding potential impacts on the Nashville crayfish from construction and operation of the Cane Ridge Compressor Station. In response to the findings of Columbia Gulf, the USFWS Tennessee Ecological Field Services Office stated in its February 15, 2016, letter, “Although we would not anticipate the Nashville crayfish occurring on the proposed Nolensville [i.e., Cane Ridge] site, due to its proximity to Mill Creek with its known occurrences, strict sediment and contaminant runoff prevention measures should be in place during construction of the station and day-to-day operations.” The USFWS concurred that avoidance and mitigation measures required in the MSHCP are sufficient for covering potential impacts on the Nashville crayfish. Columbia Gulf has agreed to implement the appropriate protective measures. As such, we agree that the GXP is *not likely to adversely affect* the Nashville crayfish, and that no further section 7 consultation is necessary.

4.7.9 Plants

4.7.9.1 Mountaineer XPress Project

No federally listed plant species within the MXP area.

4.7.9.2 Gulf XPress Project

Six federally listed plant species are within the GXP area.

4.7.9.2.1 Braun’s Rockcress

The Braun’s rockcress is a perennial herb of the mustard family with small white-pink flowers. It is endemic to Kentucky and Tennessee, found specifically near the Kentucky River in Kentucky and the Stones River in Davidson County, Tennessee (USFWS, 1997e). Braun’s rockcress habitat was not identified at any of the project sites surveyed in Davidson County in 2015. Because this species was not identified at the site, and because project activities would be consistent with the MSHCP, the GXP *would not affect* this species and no further section 7 consultation is required.

4.7.9.2.2 Guthrie’s Ground-plum

The Guthrie’s ground-plum, also known as Pyne’s ground-plum, is a perennial legume and member of the pea family found at the edges of limestone cedar glades and open areas around

woodlands. It is endemic to Rutherford County, Tennessee, and is known from only eight occurrences (USFWS, 2009). There are no GXP facilities proposed for Rutherford County, nor was this species identified as occurring at the Cane Ridge Compressor Station site in Davidson County during project field surveys. A letter dated February 15, 2016, from the USFWS concurred with Columbia Gulf's determination that Guthrie's ground-plum is not anticipated in the project area and *no effect* on this species is anticipated as a result of project activities. We agree.

4.7.9.2.3 Leafy Prairie-clover

The leafy prairie-clover is a flowering legume found in prairie remnants where thin soil exists over limestone substrate. In Tennessee, it prefers prairie-like areas at the edge of cedar glades. It currently exists at only 14 sites in Illinois, Tennessee, and Alabama (USFWS, 1997f). Leafy prairie-clover was a targeted species during surveys of project sites; however, habitat was not identified during field surveys. Leafy prairie-clover was not identified at either Tennessee site and because project activities would be consistent with the MSHCP. Further, the USFWS provided concurrence that the GXP would not likely to adversely affect the leafy prairie clover and that no further section 7 consultation is necessary. We agree.

4.7.9.2.4 Price's Potato-bean

Price's potato-bean is an herbaceous, twining, perennial vine that arises from a large underground tuber. It prefers lightly disturbed areas such as forest openings and wood edges, and bluffs near streams. Only 13 populations remain today (USFWS, 2015d). Price's potato-bean was a targeted species during surveys of project sites; however, habitat was not identified at any of the project sites. In correspondence dated February 15, 2016, the USFWS Tennessee Ecological Services Field Office provided concurrence to Columbia Gulf that project activities would have no adverse impacts on Price's potato-bean. We agree.

4.7.9.2.5 Running Buffalo Clover

The running buffalo clover is a flowering perennial plant named for the stolons that extend from the base of erect stems and run along the ground surface. The stolons are capable of rooting and expanding the size of a running buffalo clover population. The flower of this species is white and sits above two opposite leaves with three leaflets each (USFWS, 2015e). Running buffalo clover was a targeted species during surveys of project sites; however, habitat was not identified. In correspondence to Columbia Gulf dated February 16, 2016, the USFWS stated that it had no further comments on the running buffalo clover and that project requirements under section 7 of the ESA have been fulfilled. We agree.

4.7.9.2.6 Short's Bladderpod

The Short's bladderpod is a biennial or perennial flowering plant in the mustard family and can grow 20 inches tall. The stem is topped with a cluster of small yellow flowers that bloom in April and May. Typical habitat includes south- to west-facing steep, rocky, wooded and talus slopes along bluffs near rivers and streams. Populations are commonly associated with calcareous outcrops. Its range is limited to habitat in Indiana, Kentucky, and Tennessee. It was listed as endangered in 2014, and critical habitat was designated in Davidson County, Tennessee, later that year (USFWS, 2015f). Threats to this species' viability include maintenance of transportation

rights-of-way, soil erosion, forest succession, and non-native plants (79 FR 148). Critical habitat was designated as 925.5 acres in 20 units in Posey County, Indiana; Clark, Franklin, and Woodford Counties, Kentucky; and Cheatham, Davidson, Dickson, Jackson, Montgomery, Smith, and Trousdale Counties, Tennessee (79 FR 165).

Short's bladderpod was considered as potentially occurring at the Paint Lick site in Garrard County, Kentucky and at the Cane Ridge site in Davidson County, Tennessee. However, suitable habitat was not identified at either of these sites. In correspondence dated November 25, 2015, Columbia Gulf requested review and comment from the USFWS Tennessee Ecological Services Field Office regarding this and other species protected under the ESA. In its response dated February 15, 2016, the USFWS had no comment regarding Short's bladderpod and concluded that the requirements of section 7 of the ESA had been fulfilled. In correspondence to Columbia Gulf dated February 16, 2016, the USFWS Kentucky Ecological Field Services Office stated that it had no further comments on Short's bladderpod and that project requirements under section 7 of the ESA have been fulfilled. We agree.

4.7.10 State-listed Species

4.7.10.1 Mountaineer XPress Project

West Virginia has no state endangered species legislation; therefore, the only species listed as threatened or endangered in the state are those listed as such by the federal government. The WVDNR NHP does assign state rankings to species considered rare based on the species' documented occurrences and distributions as well as other factors, such as habitat and threats to existing populations (WVDNR, 2003c). The SWAP was prepared by the WVDNR to establish comprehensive goals over a 10-year period that will assist in the conservation of West Virginia's biological diversity.

Additionally, the SWAP identifies SGCN. The 2015 SWAP identifies 661 animal species as SGCN. Of the 661 animal species, 319 were assigned Priority 1 status. These 319 Priority 1 species are the focus of conservation activities. Priority 1 species have global and state conservation rankings. The remaining 342 species were assigned Priority 2 status (WVDNR, 2015b).

During the initial phases of the MXP, as part of Columbia Gas' agency consultations, the WVDNR NHP provided electronic shapefiles to Columbia Gas showing SGCN species as well as federally listed threatened and endangered species identified within 10 miles of the MXP. To date, Columbia Gas has identified eight Priority 1 species of birds in the MXP area. Section 4.6.3.1 provides further details and our recommendations regarding these bird species.

Surveys are being undertaken for mussels in suitable streams crossed by the MXP where S2 species have been confirmed (table 4.7-3 provides results through the 2016 survey season). The diamond darter, an S1 species also protected under the ESA, is presumed to be present in the Elk River at the Elk River Compressor Station; however, no instream activities are proposed for the MXP modifications at the pending Elk River Compressor Station, and project activities are *not likely to adversely affect* the diamond darter.

Table 4.7-3 Mountaineer XPress Project Mussel Survey Results for Group 1 and Group 2 Streams				
Stream Name (Year Survey Performed)	Nearest Milepost	Species Identified <u>a/</u>	State Ranking <u>b/</u>	Determination/Result
Group 1 Streams				
MXP-100				
Little Fishing Creek (2015, 2016)	18.4	None		
Indian Creek (2015)	35.0	None		
Flint Run (2015)	43.9	None		
Buckeye Creek (2015)	48.5	None		
Bluestone Creek (2016)	53.8	None		
Slab Creek (2015, 2016)	71.5	None		
Leatherbark Creek (2015, 2016)	79.0	None		
Straight Creek (2015)	87.6	None		Additional Phase 1 survey required in 2017
Left Fork Reedy Creek	102.9	None		
Middle Fork Reedy Creek (2015)	104.6	None		
Little Mill Creek (2015, 2016)	113.4	None		
Elk Fork (2015)	118.7	Cylindrical papershell	S2	Consultation ongoing
		Fat mucket	S3	
Tug Fork (2015)	122.0	None		
Grasslick Run (2015)	124.6	None		
Parchment Creek (2015)	127.2	None		
Eighteenmile Creek-2 (2015)	138.6	None		
Eighteenmile Creek-3 (2015)	139.1	Wabash pigtoe, fat mucket, pink heelsplitter	S3	Consultation ongoing
Eighteenmile Creek-1 (2015)	140.2	Pocketbook	S1	Consultation ongoing
		White heelsplitter	S2	
Buffalo Branch (2015, 2016)	140.4	None		
Trace Creek (2016)	154.9	None		
Indian Fork (2016)	161.5	None		
Mud River (2015)	163.6	None		
Group 2 Stream Scoping Surveys				
MXP-100				
Fish Creek (2015, 2016)	7.0	Plain pocketbook	S2	Consultation ongoing
		Pink heelsplitter	S3	
Fishing Creek (2015)	24.5	Plain pocketbook,	S2	Consultation ongoing
		Fluted-shell, pink heelsplitter	S3	
McElroy Creek (2015)	38.5	Rainbow mussel	S2	Consultation ongoing – additional surveys to be completed in 2017
		Threeridge, fatmucket, fluted-shell, round hickorynut	S3	

Table 4.7-3 Mountaineer XPress Project Mussel Survey Results for Group 1 and Group 2 Streams				
Stream Name (Year Survey Performed)	Nearest Milepost	Species Identified <u>a/</u>	State Ranking <u>b/</u>	Determination/Result
South Fork Hughes River (2015)	67.4	Threeridge, round hickorynut, giant floater, pink heelsplitter	S3	Consultation ongoing – additional surveys to be completed in 2017
	72.4	Threeridge, fatmucket, fluted-shell, round hickorynut, (shells of giant floater were found but no live individuals)	S3	Consultation ongoing – additional surveys to be completed in 2017
		Lady finger	S2, S3	
	72.6	Pistolgrip	S2	Consultation ongoing – additional surveys to be completed in 2017
		Lady finger	S2, S3	
		Threeridge, fatmucket, fluted-shell, round hickorynut, pink heelsplitter	S3	
	77.0	Pistolgrip	S2	Consultation ongoing – additional surveys to be completed in 2017
		Lady finger	S2, S3	
		Threeridge, fatmucket, fluted-shell, round hickorynut, Wabash pigtoe, kidneyshell	S3	
	Little Kanawha River (2015)	94.8	Wavy-rayed lampmussel, fragile papershell	S2
Lady finger			S2, S3	
Mucket, kidneyshell, pimpleback, creeper			S3	
Spring Creek (2015)	96.6	Wavy-rayed lampmussel, plain pocketbook	S2	Consultation ongoing – additional surveys to be completed in 2017
		Lady finger	S2, S3	
		Threeridge, fatmucket, fluted-shell, creeper, Wabash pigtoe, kidneyshell, round hickorynut	S3	
	97.0	Lady finger	S2, S3	Consultation ongoing – additional surveys to be completed in 2017
		Threeridge, fatmucket, fluted-shell, creeper, Wabash pigtoe, giant floater, pimpleback, kidneyshell	S3	
	97.3	Lady finger	S2, S3	Consultation ongoing – additional surveys to be completed in 2017
		Threeridge, fatmucket, fluted-shell, creeper, giant floater, Wabash pigtoe	S3	

Table 4.7-3 Mountaineer XPress Project Mussel Survey Results for Group 1 and Group 2 Streams				
Stream Name (Year Survey Performed)	Nearest Milepost	Species Identified <u>a/</u>	State Ranking <u>b/</u>	Determination/Result
Group 2 Streams Phase I Mussel Surveys				
MXP-100				
Fish Creek (2016)	7.0	Plain pocketbook	S2	Consultation ongoing
		Pink heelsplitter	S3	
Fishing Creek (2016)	24.5	Fragile papershell, plain pocketbook, white heelsplitter	S2	Consultation ongoing
		Mucket, Wabash pigtoe, fatmucket, fluted-shell, pink heelsplitter, giant floater, creeper	S3	
a None of the species identified are federally listed.				
b Source: NatureServe Explorer.				

Pursuant to West Virginia Code Section 20-2-4 and Code of State Rules 58-60-5.11, and in accordance with the West Virginia Mussel Survey Protocols (Protocols), in addition to the nine federally listed mussel species known to occur in West Virginia, all native freshwater mussels are protected within the state (USFWS, 2015g). Columbia Gas, in consultation with the WVDNR, has developed survey protocols for determining MXP impacts on protected mussel species. For ease of determining the appropriate protocol for mussel surveys, West Virginia streams have been categorized into four groups (Clayton et al., 2014):

- Group 1: High Quality Streams (as listed by the WVDNR as having potential for habitat for mussels) and state-listed mussel streams. Endangered species are not expected.
- Group 2: Small to mid-sized streams where endangered species are expected.
- Group 3: Large rivers where endangered species are not expected. These include the Ohio River upstream of Hannibal Lock and Dam (New Martinsville, West Virginia) and the Monongahela River.
- Group 4: Large rivers where endangered species are expected. These include the Ohio River downstream of Hannibal Lock and Dam, Little Kanawha River (slackwater section adjoining the Ohio River), and Kanawha River.

Based on review of the WVDNR Mussel Stream Listings, 22 project waterbody crossings are categorized as Group 1 streams (high quality streams where federally listed species are not anticipated but mussels protected by the WVDNR may be present). Columbia Gas obtained permits from the WVDNR to survey Group 1 streams along the project route in 2015 and 2016, and has completed surveys of all Group 1 streams crossed by the MXP. As shown in table 4.7-3, state protected mussel species were identified in Elk Fork, at MP 118.7, and in Eighteenmile Creek at two crossing locations (MP 139.1 and MP 140.2).

Columbia Gas also obtained permits to conduct scoping surveys in Group 2 streams to identify habitat suitability and potential presence upstream and downstream of a “preferred” centerline crossing. State-protected mussel species were identified at 11 pipeline crossing locations of Group 2 streams along the MXP-100 corridor, as shown in table 4.7-3.

In 2016, Columbia Gas biologists also completed Phase 1 surveys of Fish Creek at MP 7.1 and Fishing Creek at MP 24.5. For pipeline disturbances in Group 2 streams, the Protocols require upstream and downstream buffer areas to be surveyed, as well as the area of direct impact. Qualified biologists searched upstream and downstream for a total distance of 558 feet at each Group 2 stream crossing. Mussel species identified during the Phase 1 survey of Fish Creek and Fishing Creek are listed in table 4.7-3. Additional surveys are scheduled for 2017 at specific crossings along the MXP corridor where additional information is required. Consultation with the WVDNR is ongoing regarding impacts on protected mussel species. Because this consultation has not been completed, **we recommend that:**

- **Prior to construction, Columbia Gas should file documentation with the Secretary regarding Columbia Gas’ consultation with the WVDNR for state-listed mussel species, including any updated stream crossing plans and/or additional mitigation measures for all locations where state-listed mussels may occur.**

4.7.10.2 Gulf XPress Project

In addition to species protected by the ESA, Kentucky, Tennessee, and Mississippi have state laws to protect threatened, endangered, rare, and sensitive species. These laws and programs are discussed below, and threatened or endangered species with potential to occur in counties where Columbia Gulf would construct and operate compressor stations or other facilities are listed in appendix K. Early in the project planning process, Columbia Gulf contacted the KDFWR, the Tennessee Natural Heritage Inventory Program, and the Mississippi Museum of Natural Science requesting information on protected species in the vicinity of the proposed compressor station sites and related work areas. Columbia Gulf conducted surveys at all GXP activity locations in 2015. Surveys were intended to identify sensitive or unique environmental features potentially occurring on project sites, such as wetlands and waterbodies, habitat assessments for rare and listed species, and noxious and invasive vegetation. As noted in section 4.7.3.1, the AMMs required for federally protected species at project sites by proxy extend conservation measures to state-listed species as well.

Species listed in appendix K were identified through a review of information provided by Columbia Gulf and our review of state wildlife management program/NHP online databases. Some of the species in appendix K may have been identified from just one or two observations in the counties where they are listed and are likely not resident. Additionally, some of the state-listed species also have federal protections, such as the gray bat. Those species listed in appendix K that are protected under federal law are discussed in section 4.7.3.2 and are not discussed further in this section.

4.7.10.2.1 Kentucky

Kentucky strives to enhance wildlife diversity and promote sustainable use of wildlife resources. The KDFWR Wildlife Diversity Program works to protect wildlife species through research, management, and education. This includes protection of threatened and endangered species, species of greatest conservation need identified within Kentucky's Wildlife Action Plan and their habitats, and protection of sensitive areas (KDFWR, 2016). Title 301 of the KAR makes it "unlawful for any person to import, transport, possess, process, sell, or offer for sale any endangered species." (301 KAR 3:061). Endangered species are defined as any species or subspecies designated as endangered under the ESA. The law does not provide protection for species listed as threatened under the ESA. We identified 103 Kentucky state-listed threatened and endangered species with records of occurrence in counties where project activities are proposed. Species include reptiles, amphibians, birds, crustaceans, fish, insects, mammals, mussels, and plants. For the majority of these species, as noted in appendix K, required habitat conditions do not exist at the GXP facility locations.

Amphibians

The eastern hellbender was identified as occurring in two counties where the GXP would construct facilities: the Morehead Compressor Station in Rowan County, and the approved Grayson Compressor Station in Carter County. Based on our review of the sites, habitat requirements of the species, and information from Columbia Gulf's June 2015 general biological surveys of the project sites, there is no suitable habitat for the state-listed eastern hellbender at either site; thus, no impacts on this species would be expected. The KDFWR concluded that no further consultation was required for this species (letter dated January 12, 2016). We agree.

Birds

Records of state-listed threatened and endangered bird species were identified in all counties where GXP facilities would be constructed. The majority of the species identified require wetland or open water habitats, although a few are considered forest species. The GXP facilities in Kentucky would be constructed primarily in cleared upland farmed areas, although each of the station sites contain minor ephemeral drainages and small wetland areas. Little natural habitat remains at the sites, except at the fringes where some tree buffers exist. There is no habitat at any of the GXP compressor station sites, or at the Leach C Meter Station, for bird species associated with wetlands and waterbodies or forested habitats. None of the state-listed bird species are expected to occur at the GXP sites in Kentucky, and therefore, no impacts would be expected for these species. In letters dated January 12, 2016 and April 3, 2017, the KDFWR concluded that the GXP would not impact state-listed species and no further consultation was required. We agree.

Fish

State-listed threatened and endangered fish species known to occur in Boyd, Carter, Garrard, Metcalfe, and Rowan Counties are identified in appendix K. Based on our desktop review of the GXP facility sites, which included topographic and aerial mapping, site photographs, review of Columbia Gulf's field survey information, and publicly available species accounts, no suitable habitat exists for state-listed fish species at any of the GXP facility sites. GXP activities would

take place within primarily upland sites with little to no waterbody impacts. To limit indirect impacts on streams in the vicinity of the project, Columbia Gulf would implement measures in its ECS, which meet BMPs for erosion and sediment control in Kentucky. Thus, no impacts on these species would be expected from construction and operation of the GXP in Kentucky. The KDFWR concluded that the GXP would not impact state-listed fish species (letter dated January 12, 2016). We agree.

Crustaceans

No suitable habitat exists at the approved Grayson Compressor Station in Carter County for the amphipod *Crangonyx caecus*, which is found in pools in caves. All project work at this location would be within the fenceline of the station and the original construction footprint. Therefore, no impacts on this species are anticipated from project activities and no further consultation is required.

Insects

As noted in appendix K, field surveys of the GXP sites by Columbia Gulf biologists identified no suitable habitat for the Kentucky stonefly or silphium borer moth at the Morehead Compressor Station site, olethreutine moth or frosted elfin at the Paint Lick Compressor Station site, or the early hairstreak or karst snowfly at the Goodluck Compressor Station site. In its January 12, 2016, response to a request for concurrence that the GXP would not impact state-listed insect species, the KDFWR replied that it did not anticipate impacts on listed species, critical habitat, wildlife management areas, or other critical areas. We agree.

Mammals

State-listed bat species in Kentucky that are federally protected, including the gray bat, Indiana bat, and NLEB, are discussed previously in section 4.7.6.2. Columbia Gulf identified suitable habitat for the small-footed myotis at project sites, and presence of this species is possible. No caves were identified at any of the GXP sites during field surveys in 2015, and Columbia Gulf did not identify suitable winter habitat at any of the new compressor station sites. Columbia Gulf also determined that the new station sites are not within any known “swarming habitat” buffer of hibernacula known to contain federally listed bat species. Based on the lack of suitable roosting caves and the conservation measures to be implemented for federally listed bat species described in section 4.7.6.2, no impacts would be anticipated for state-listed bat species. In correspondence dated January 12, 2016, the KDFWR concurred that no further consultation was required for state-listed bat species.

Mussels

Mussel species listed in appendix K that also are federally protected are discussed in section 4.7.5.2. Field surveys conducted by Columbia Gulf biologists determined that no suitable habitat exists for any of the listed mussel species at the project locations in Kentucky. All GXP activities would take place within primarily upland sites with little to no waterbody impacts. To minimize indirect effects on streams within the vicinity of the project work areas, Columbia Gulf would implement measures from its ECS, which is compliant with Kentucky erosion and sediment control regulations and also with FERC’s Plan and Procedures. Columbia Gulf would not

withdraw water from or discharge water to any streams. In its January 12, 2016, response to Columbia Gulf's request for review of potential project impacts on state-listed species, the KDFWR recommended that Columbia Gulf minimize impacts on the aquatic environment by developing and implementing erosion control measures prior to construction to reduce siltation into waterways in the project area. Recommended erosion control measures include silt fences, staked straw bales, brush barriers, sediment basins, and diversion ditches. The KDFWR further recommended that erosion control measures should be inspected and repaired regularly, as needed. As discussed in section 2.4, Columbia Gulf's ECS outlines the company's BMPs that would be implemented during construction. By abiding by the protocols of its ECS, Columbia Gas would satisfy the KDFWR's recommendation. We would verify compliance with the ECS via our construction monitoring and inspection program.

Plants

Based on surveys of the GXP work areas, Columbia Gulf determined that no suitable habitat exists for the plant species listed in appendix K. Therefore, no impacts would be anticipated from project activities. The KDFWR indicated in correspondence to Columbia Gulf on January 12, 2016, that due to the location and nature of the project, it did not anticipate impacts to listed species identified by Columbia Gulf or any associated critical habitat, wildlife management areas, or other critical areas. We agree.

Reptiles

No suitable habitat exists for the coal skink at the Paint Lick Compressor Station site. Thus, no impacts on the coal skink would be expected and no further consultation is required for this species. A letter from KDFWR dated January 12, 2016, confirmed that no state-listed species or any associated critical habitat occurs near the GXP sites (KDFWR, 2016). We agree.

4.7.10.2.2 Tennessee

Tennessee adopted separate acts for protecting animals and plants in the state. The Tennessee Nongame and Endangered or Threatened Wildlife Species Conservation Act of 1974 makes it unlawful for any person to "take, attempt to take, possess, transport, export, process, sell or offer for sale or ship nongame wildlife." Endangered species may include any species of wildlife whose survival within the state is in jeopardy within the foreseeable future, as determined by the Tennessee Fish and Wildlife Commission. It also includes any species listed as endangered under the federal ESA (State of Tennessee, 1974). The Tennessee Rare Plant Protection and Conservation Act of 1985 requires a person to obtain permission from the appropriate source before removing or destroying a listed plant species. Endangered plant species may include any species of plant "whose continued existence as a viable component of the state's flora is determined by the Commissioner to be in jeopardy," including plants listed as endangered under the federal ESA (State of Tennessee, 1985). We identified 36 state-listed species in Tennessee where project activities would occur. Species included birds, crustaceans, fish, mussels, and plants.

Birds

Based upon desktop review and information obtained from Columbia Gulf's June 2015 general biological surveys of the project sites, there is no suitable habitat for the state-listed Bachman's sparrow or Bewick's wren, and no specific habitat for the peregrine falcon in the project vicinity. Peregrine falcons utilize varied habitats, however, which can sometimes include farmlands such as those occurring at the project area. Any potential impacts on peregrine falcons would be indirect, such as the minor loss of foraging habitat in isolated areas once construction of the project facilities is complete. On June 22, 2015, the TDEC NHP reviewed rare species data for the project area and did not list records for the peregrine falcon. Columbia Gulf contacted the TDEC by telephone on February 9, 2016, to confirm that the GXP would not have direct or major indirect impacts on this species, to which TDEC concurred (TDEC, 2016). We conclude that no further consultation is required for state-listed bird species in Tennessee.

Crustaceans

In its June 22, 2015, response to Columbia Gulf's request for a rare species database review, the TDEC NHP identified the Nashville crayfish as having been observed within 1 mile of the Nolensville (i.e., Cane Ridge) site. As discussed in section 4.7.8.2, no suitable habitat exists for the Nashville crayfish at the Cane Ridge Compressor Station site, and project activities would not directly impact Mill Creek, a stream with suitable habitat for this species. Further, Columbia Gulf would implement its ECS, which complies with the Tennessee Erosion and Sediment Control Handbook, and adopts and incorporates most of the requirements included in FERC's Plan and Procedures. Implementation of Columbia Gulf's ECS and its site-specific E&SC Plan would confine sediment to disturbed areas on the site, and spill control measures would prevent any hazardous materials from contaminating either the site or runoff from the site. Columbia Gulf confirmed with the TDEC in a phone call on February 9, 2016, that no further consultation was required for this species. As discussed in section 2.4, Columbia Gulf's ECS outlines the company's BMPs that would be implemented during construction. By abiding by the protocols of its ECS, Columbia Gas would satisfy the TDEC's recommendation. We would verify compliance with the ECS via our construction monitoring and inspection program.

Fish

The Columbia Gulf field survey report for the Cane Ridge Compressor Station site describes it as hayed in the western portion, while the eastern side includes the Columbia Gulf right-of-way and a degraded mesic hardwood system that is actively grazed. No suitable habitat exists for the state-listed blue sucker or lake sturgeon at the Cane Ridge site, and therefore, no impacts on these species would occur from the GXP activities. The TDEC confirmed on February 9, 2016, that no further consultation was required for fish species. We agree.

Mussels

In its June 22, 2015, response to Columbia Gulf's request for a rare species database review, the TDEC NHP identified the Nashville crayfish and water stitchwort within 1 mile of the Cane Ridge Compressor Station site, and the glade cleft phlox and a cave obligate planarian within 4 miles of the site, but did not identify any mussel species. No suitable habitat exists for the state-

listed Cumberlandian combshell, orangefoot pimpleback, pink mucket, or tan riffleshell at the Cane Ridge site. No instream work is proposed at this site. Columbia Gulf would implement its ECS, which complies with the Tennessee Erosion and Sediment Control Handbook, and is consistent with the environmental protections afforded by FERC's Plan and Procedures. Implementation of Columbia Gulf's ECS and its site-specific E&SC Plan would confine sediment to disturbed areas on the site, and spill control measures would prevent any hazardous materials from contaminating either the site or runoff from the site. As noted previously for the Nashville crayfish, we would verify compliance with the ECS via our construction monitoring and inspection program. We therefore have determined that the GXP will not impact state-listed mussels.

Plants

No suitable habitat exists at the Tennessee project sites for the state-listed plants identified in appendix K. The TDEC NHP identified records for the water stitchwort in Davidson County and Price's potato-bean in Wayne County. The TDEC stated that the "habitat in both project areas has been previously impacted by agricultural use and the habitat for the above state and federal listed plants appears scarce in in the project vicinity. As such, we currently anticipate little if any impact to these species" (TDEC, 2015). No habitat for these species was identified during biological field surveys of the sites. Columbia Gulf confirmed with the TDEC on February 9, 2016, that no further consultation was required for these species. We agree.

4.7.10.2.3 Mississippi

Mississippi's endangered species law, "Nongame and Endangered Species Conservation Act of 1974," declares that "Species or subspecies of wildlife indigenous to the state should be accorded protection to maintain and to the extent possible enhance their numbers." An endangered species or subspecies of wildlife is one whose survival and continued welfare in the state is in jeopardy or is likely to become so in the near future. The law prohibits taking, possessing, transporting, exporting, offering to sell, or offering to ship endangered species. Mississippi's official list of endangered species is reviewed every 2 years by the MDWFP and may be amended by additions or deletions as deemed appropriate. The MDWFP is responsible for management of endangered species and enforcement of the Nongame and Endangered Species Conservation Act (MDWFP, 2014). We identified two species of state-listed birds in Mississippi that could be present in the counties where project activities are proposed.

Based on desktop review of the project sites and information provided from Columbia Gulf's July 2015 general biological surveys of the project sites in Mississippi, there is no suitable habitat for the state-listed Bewick's wren at the New Albany Compressor Station site in Union County. Additionally, there is no suitable habitat for the state-listed wood stork at the Holcomb Compressor Station site in Grenada County. Thus, no impacts on Bewick's wren or the wood stork are expected as a result of the project and no further consultation is required. A letter dated February 8, 2016, from the MDWFP stated that "Based on information provided, we conclude that if best management practices are properly implemented, monitored, and maintained (particularly measures to prevent, or at least, minimize negative impacts to water quality), the proposed project likely poses no threat to listed species or their habitats." (MDWFP, 2016a). Through our construction monitoring and inspection program, we would verify Columbia Gulf's compliance with its ECS, which would satisfy the MDWFP's recommendation.

4.7.11 Conclusion

4.7.11.1 Mountaineer XPress Project

As noted in section 4.7.10.1, West Virginia has no state endangered species legislation, and the only species listed as threatened or endangered in the state are those listed as such by the federal government. However, all native mussel species are protected in West Virginia (60 species). The WVDNR NHP keeps records of state-ranked rare as well as federally listed threatened and endangered species. According to the USFWS, four bat species, one fish species, and eight mussel species protected under the ESA are in the MXP project vicinity. The WVDNR NHP provided electronic shapefiles to Columbia Gas for state-ranked rare as well as federally listed threatened and endangered species found within 10 miles of the MXP, and Columbia Gas is working with federal and state agencies to coordinate surveys and develop suitable protocols to protect sensitive state resources. We have also recommended that Columbia Gas file updated information regarding its consultation with the WVDNR concerning mussel species and stream crossings.

4.7.11.2 Gulf XPress Project

According to the USFWS, there are 4 bat species, 1 fish, 18 species of mussels, 1 insect, 1 crustacean, and 6 plant species that are protected under the ESA which may occur within the GXP project areas. We have determined that the GXP would have either no effect or would not likely to adversely affect any of the federally listed species that could occur in the project vicinity. Consultation with the USFWS under section 7 is complete for these species. Columbia Gulf consulted with KDFWR, TDEC, and MDWFP regarding the presence/absence of state-listed species within the proposed facility site locations. It is unlikely that the GXP would impact state-listed species as a result of construction and operation; and the three state agencies made the same conclusions. Consultations for state-listed species in all three states are complete.

4.8 LAND USE, RECREATION, SPECIAL INTEREST AREAS, AND VISUAL RESOURCES

4.8.1 Land Use

4.8.1.1 Land Use Types within the Project Areas

4.8.1.1.1 Mountaineer XPress Project

Six general land use types would be affected by the MXP. Table 4.8-1 summarizes the acreage of each land use type that would be affected by construction and operation of the project.

The definitions of each land use type are as follows:

- **Agricultural:** cultivated or rotated cropland, orchards, vineyards, or hay fields;
- **Developed Land:** industrial and commercial areas (including manufacturing, landfills, quarries, mines, and retail areas), residential areas (including yards and subdivisions), and transportation corridors (including railroads, highways, and local roads);

- **Forested:** upland forest including evergreen dominant, deciduous dominant, and mixed forests, hedgerows; and forested wetlands from land use cover data where field surveys did not identify a wetland;
- **Open Land:** non-forested upland areas used for open space, pasture, grass and shrubs on previously disturbed areas of land such as mines and utility rights-of-way; and emergent wetlands from land use/land cover data where field surveys did not identify a wetland;
- **Open Water:** delineated surface waters, such as permanently flooded lakes and ponds, perennial rivers and streams, reservoirs, and stormwater retention areas; and
- **Wetland:** delineated emergent herbaceous, scrub shrub, and forested wetlands.

**Table 4.8-1
Summary of Existing Land Uses Affected by Construction and Operation of the MXP (acres) a/**

Project/Facility Type/Facility	Agricultural		Developed		Forested		Open Land		Open Water <u>c/</u>		Wetland		Total	
	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.
NEW PIPELINES														
MXP-100	335.1 <u>b/</u>	140.8	45.3	18.4	1925.4 <u>b/</u>	767.3	130.0	56.3	17.7	7.7	5.9	4.0	2549.4 <u>a/</u> <u>b/</u>	994.4
Cathodic Protection	1.6	1.6	0.1	0.1	1.0	1.0	0.4	0.4	<0.1	<0.1	0.0	0.0	3.0	3.0
MXP-200	7.1	3.5	1.0	0.6	47.3	23.7	3.6	1.8	0.6	0.3	0.2	0.1	59.9	30.1
Cathodic Protection	<0.1	<0.1	0.0	0.0	0.4	0.4	0.0	0.0	<0.1	<0.1	<0.1	<0.1	0.4	0.4
X59M1 Line <u>d/</u>	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
<i>New Pipeline Subtotal</i>	<i>343.8 <u>a/</u> <u>b/</u></i>	<i>145.9</i>	<i>46.5 <u>b/</u></i>	<i>19.1 <u>a/</u></i>	<i>1,974.0 <u>b/</u></i>	<i>792.4 <u>a/</u></i>	<i>133.9 <u>b/</u></i>	<i>58.4</i>	<i>18.4</i>	<i>8.0 <u>a/</u></i>	<i>6.1</i>	<i>4.1 <u>a/</u></i>	<i>2,522.6 <u>a/</u> <u>b/</u></i>	<i>1,027.9 <u>a/</u></i>
PIPELINE REPLACEMENTS														
SM80 Line	0.0	0.0	0.0	0.0	0.8	0.6	2.0	1.3	0.0	0.0	0.0	0.0	2.8	1.9
SM80 Loop Line	0.0	0.0	0.0	0.0	1.3	0.6	1.0	0.8	0.0	0.0	0.0	0.0	2.3	1.4
<i>Replacement Pipeline Subtotal</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>2.1</i>	<i>1.2</i>	<i>3.0</i>	<i>2.1</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>5.1 <u>a/</u></i>	<i>3.3 <u>a/</u></i>
Pipeline Facility Total	343.8 <u>b/</u>	145.9	46.5 <u>b/</u>	19.1	1,976.1 <u>b/</u>	793.6 <u>a/</u>	136.9 <u>b/</u>	60.5	18.4	8.0	6.1	4.1	2,527.7 <u>a/</u> <u>b/</u>	1,031.2 <u>a/</u>
ACCESS ROADS														
MXP-100 Access Roads	15.3	0.2	89.0	1.1	135.8	0.2	31.9	<0.1	1.4	<0.1	0.1	0.0	273.5	1.6
MXP-200 Access Roads	1.0	0.0	6.7	0.0	16.0	0.0	2.1	0.0	0.2	0.0	<0.1	0.0	25.9 <u>a/</u>	0.0
SM80 Line Access Roads	0.0	0.0	<0.1	<0.1	0.1	0.1	0.2	0.2	<0.1	<0.1	0.0	0.0	0.3	0.4
SM80 Loop Line Access Roads	0.0	0.0	0.1	0.1	1.0	0.8	1.0	0.9	<0.1	<0.1	0.0	0.0	2.1	1.8
Access Roads Total	16.3 <u>a/</u>	0.2	95.7 <u>a/</u>	1.2	152.8	1.2	35.1	1.1	1.6	<0.1	0.2	0.0	301.7	3.7 <u>a/</u>
NEW ABOVEGROUND FACILITIES														
LEX Header Tie-in	2.4	0.3	0.1	0.0	0.3	0.0	<0.1	0.0	0.0	0.0	0.0	0.0	2.8	0.3

**Table 4.8-1
Summary of Existing Land Uses Affected by Construction and Operation of the MXP (acres) a/**

Project/Facility Type/Facility	Agricultural		Developed		Forested		Open Land		Open Water <u>c/</u>		Wetland		Total	
	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.
MXP/Line 1983 Tie-in (MXP 200 MP)	0.0	0.0	0.0	<0.1	0.6	0.3	0.3	0.3	<0.1	0.0	0.0	0.0	1.0	1.0
X59M1 Tie-In	0.0	0.0	0.0	0.0	0.0	<0.1	0.0	<0.1	0.0	0.0	0.0	0.0	0.0	<0.1
<i>Tie-in Subtotal</i>	<i>2.4</i>	<i>0.3</i>	<i>0.1</i>	<i><0.1</i>	<i>0.9</i>	<i>0.3</i>	<i>0.4</i>	<i>0.3</i>	<i><0.1</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>3.8</i>	<i>1.4</i>
Ripley Regulator Station	0.1	0.1	0.3	0.3	0.3	0.3	0.2	0.2	<0.1	<0.1	0.0	0.0	0.7 <u>a/</u>	0.7 <u>a/</u>
Saunders Creek Regulator Station	0.2	0.2	0.0	0.0	7.3	4.9	3.2	1.9	0.0	0.0	0.0	0.0	10.7	7.0
<i>Regulator Subtotal</i>	<i>2.7</i>	<i>0.6</i>	<i>0.3</i>	<i>0.2</i>	<i>8.5</i>	<i>5.5</i>	<i>3.5</i>	<i>2.2</i>	<i><0.1</i>	<i><0.1</i>	<i>0.0</i>	<i>0.0</i>	<i>14.9</i>	<i>8.4</i>
MXP-1 Valve Site	0.0	0.0	0.3	0.3	0.3	0.3	1.0 <u>b/</u>	1.0	0.0	0.0	0.0	0.0	1.5 <u>a/ b/</u>	1.6
MXP-2 Valve Site	0.1 <u>b/</u>	0.2	<0.1 <u>b/</u>	<0.1	<0.1	<0.1	<0.1 <u>b/</u>	<0.1	0.0	0.0	0.0	0.0	0.2 <u>a/ b/</u>	0.3 <u>a/</u>
MXP-3 Valve Site	0.0	0.0	<0.1	<0.1	<0.1 <u>b/</u>	<0.1	<0.1 <u>b/</u>	0.1	0.0	0.0	0.0	0.0	0.1 <u>b/</u>	0.2
MXP-4 Valve Site	0.0 <u>b/</u>	0.1	0.0 <u>b/</u>	<0.1	0.0 <u>b/</u>	<0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0 <u>b/</u>	0.1
MXP-5 Valve Site	0.0	0.0	0.0 <u>b/</u>	<0.1	0.0 <u>b/</u>	0.1	0.0 <u>b/</u>	0.1	0.0	0.0	0.0	0.0	0.0 <u>b/</u>	0.2
MXP-6 Valve Site	0.0	0.0	<0.1	<0.1	0.0	0.0	0.1 <u>b/</u>	0.1	0.0	0.0	0.0	0.0	0.1 <u>b/</u>	0.1
MXP-7 Valve Site	0.0 <u>b/</u>	<0.1	0.0 <u>b/</u>	<0.1	0.0 <u>b/</u>	<0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0 <u>b/</u>	0.1
MXP-8 Valve Site	0.0	0.0	0.0 <u>b/</u>	<0.1	0.0	0.0	0.0 <u>b/</u>	0.1	0.0	0.0	0.0	0.0	0.0 <u>b/</u>	0.1
MXP-9 Valve Site	<0.1 <u>b/</u>	0.1	<0.1	<0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<0.1 <u>b/</u>	0.1
MXP-10 Valve Site	0.0	0.0	0.1	0.1	<0.1 <u>b/</u>	0.1	0.1 <u>b/</u>	0.2	0.0	0.0	0.0	0.0	0.2 <u>b/</u>	0.4
<i>MLV Subtotal</i>	<i>0.1</i>	<i>0.4</i>	<i>0.7</i>	<i>0.7</i>	<i>0.4</i>	<i>0.8</i>	<i>1.3</i>	<i>1.6</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>2.1</i>	<i>3.2</i>

**Table 4.8-1
Summary of Existing Land Uses Affected by Construction and Operation of the MXP (acres) a/**

Project/Facility Type/Facility	Agricultural		Developed		Forested		Open Land		Open Water <u>c/</u>		Wetland		Total	
	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.
Sherwood Compressor Station and Sherwood Lateral Tie-in	22.5	9.4	1.4	0.8	5.4	1.5	0.4	<0.1	<0.1	<0.1	0.0	0.0	29.7	11.8 <u>a/</u>
White Oak Compressor Station	10.2	6.3	0.2	0.1	6.3	2.4	0.0	0.0	<0.1	<0.1	<0.1	0.0	16.6 <u>a/</u>	8.7 <u>a/</u>
Mount Olive Compressor Station	0.0	0.0	0.8	0.1	29.8	9.1	0.5	0.1	0.2	<0.1	0.0	0.0	31.3	9.2 <u>a/</u>
<i>New CS Subtotal</i>	<i>32.7</i>	<i>15.7</i>	<i>2.4</i>	<i>1.0</i>	<i>41.6</i>	<i>13.0</i>	<i>0.9</i>	<i>0.1</i>	<i>0.2</i>	<i>0.2</i>	<i><0.1</i>	<i>0.0</i>	<i>77.6</i>	<i>29.7</i>
New Aboveground Facilities Subtotal	35.5	16.6	3.1	1.5	50.4	19.3	5.5 <u>a/</u>	3.8 <u>a/</u>	0.2	<0.1	<0.1	0.0	94.8 <u>a/ b/</u>	41.2 <u>a/</u>
APPROVED, PENDING, OR EXISTING ABOVEGROUND FACILITIES														
Approved <u>e/</u> Lone Oak Compressor Station	3.3	0.0	0.2	0.0	6.1	0.0	0.6	0.0	0.0	0.0	0.0	0.0	10.3	0.0
Existing Ceredo Compressor Station	0.0	0.0	4.0	0.0	4.8	0.0	5.4	0.0	0.0	0.0	0.0	0.0	14.3	0.0
Pending <u>f/</u> Elk River Compressor Station	0.0	0.0	3.8	0.0	1.1	0.0	2.0	0.0	0.5	0.0	0.0	0.0	7.4	0.0
<i>Subtotal</i>	<i>3.3</i>	<i>0.0</i>	<i>8.0</i>	<i>0.0</i>	<i>12.1</i>	<i>0.0</i>	<i>8.0</i>	<i>0.0</i>	<i>0.5</i>	<i>0.0</i>	<i>0.0</i>	<i>0.0</i>	<i>32.0</i>	<i>0.0</i>
All Aboveground Facilities Total	35.5	16.6	35.1	1.5 <u>a/</u>	50.4	19.3 <u>a/</u>	5.5 <u>a/</u>	3.8	0.2 <u>a/</u>	<0.1	<0.1	0.0	126.8 <u>a/ b/</u>	41.2 <u>a/</u>
PIPE YARDS AND STAGING AREAS														
Pipe Yards	82.0	0.0	64.7	0.0	56.3	0.0	88.1	0.0	0.1	0.0	0.6	0.0	291.7	0.0

**Table 4.8-1
Summary of Existing Land Uses Affected by Construction and Operation of the MXP (acres) a/**

Project/Facility Type/Facility	Agricultural		Developed		Forested		Open Land		Open Water <u>c/</u>		Wetland		Total	
	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.	Constr.	Oper.
Staging Areas	152.3	0.0	5.3	0.0	25.6	0.0	20.1	0.0	<0.1	0.0	0.5	0.0	204.0	0.0
Pipe Yard and Staging Area Total	234.3	0.0	70.0	0.0	81.9	0.0	108.3	0.0	0.2 <u>a/</u>	0.0	1.1	0.0	495.7 <u>a/</u>	0.0
ATWS														
MXP-100 ATWS	40.4	0.0	6.0	0.0	124.1	0.0	19.2	0.0	0.1	0.0	0.2	0.0	190.0	0.0
MXP-200 ATWS	0.6	0.0	0.2	0.0	1.8	0.0	0.2	0.0	0.0	0.0	0.0	0.0	2.8	0.0
X59M1 Line ATWS	0.0	0.0	0.1	0.0	<0.1	0.0	0.1	0.0	<0.1	0.0	0.0	0.0	0.2	0.0
SM80 Line ATWS	0.0	0.0	0.0	0.0	0.7	0.0	0.4	0.0	0.0	0.0	0.0	0.0	1.1	0.0
SM80 Loop ATWS	0.0	0.0	0.0	0.0	0.7	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.8	0.0
ATWS Total	41.0	0.0	6.2	0.0	127.4	0.0	20.1	0.0	0.1 <u>a/</u>	0.0	0.2	0.0	195.0	0.00
Project Total	674.2	162.8	229.6	21.8	2400.7	814.0	314.1	65.6	20.9	8.1	7.6 <u>g/</u>	4.1	3647.2 <u>a/</u>	1076.4 <u>a/</u>

Source: Provided by Columbia Gas Transmission, LLC. Land use classifications were based on a GIS review of West Virginia University's Natural Resource Analysis Center's Land Use Land Cover data (2012), as modified according to aerial photography interpretation using USDA Farm Service Agency 2014 aerial photography, Columbia Gas' 2015 project aerial photography, and wetland and waterbody field delineation data.

- a The numbers in this table have been rounded for presentation purposes. As a result, the totals may not reflect the exact sum of the addends in all cases.
- b Acreages for access roads used during construction of mainline valves have been included in the MXP-100 mainline construction acreages.
- c For analysis purposes, acreages of ephemeral, intermittent, and perennial waterbodies; non-delineated waterbodies that have acreages based on the USGS National Hydrography Dataset; and ponds are counted as open water land use.
- d The footprint for the X59M1 Line is located entirely within the MXP-100 right-of-way, so acreages are included in the MXP-100 totals.
- e Approved compressor station proposed by Columbia Gas under the LXP (Docket No. CP15-514-000).
- f Pending compressor station proposed by Columbia Gas under the WBX (Docket No. CP16-38-000).
- g The reported acreage includes wetland wpui001f, which will be crossed as part of the Kanawha River HDD.

Construction of the MXP would impact a total of about 3,647 acres. About 75 percent of this acreage would be utilized for the pipeline facilities, including the construction rights-of-way (70 percent) and ATWS (5 percent). The remaining acreage impacted during construction would be associated with aboveground facilities (4 percent), pipe yards and staging areas (13 percent), and access roads (8 percent). The primary land use types impacted during construction would be forested (65 percent), agricultural (18 percent), open land (8 percent), and developed lands (8 percent). Open water and wetlands would make up less than 1 percent of land types impacted during construction of the MXP.

Following construction, about 1,076 acres of land would be permanently encumbered by operation of the MXP. About 96 percent of this acreage would be for the new pipeline rights-of-way, 4 percent for aboveground facilities, and less than 1 percent for new permanent access roads. The primary land use types that would be permanently encumbered would be forested (75 percent), agricultural (15 percent), open land (6 percent), and developed lands (2 percent). Open water and wetlands would make up less than 2 percent of permanent impacts.

Pipeline Facilities

Table 4.8-2 provides the linear distance (in miles) of each land use type crossed by the pipelines associated with the MXP.

The principal land use type crossed by the pipelines is forested at 131 miles or approximately 77 percent of the combined length of the pipeline facilities. In descending order, the other land uses crossed include agricultural at 25 miles (14 percent), open land at 10 miles (6 percent), developed land at 3 miles (2 percent), open water at 1 mile (1 percent), and wetland at 0.7 mile (<1 percent).

Facility	Agriculture		Developed		Forested		Open Land		Open Water <u>b/</u>		Wetland <u>b/</u>		Total	
	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%	Miles	%
New Pipeline Facilities														
MXP-100	23.6	13.8	2.9	1.7	126.6	74.1	9.5	5.5	1.3	0.7	0.7	0.4	164.5	96.2
MXP-200	1.0	0.6	0.1	0.1	4.4	2.6	0.4	0.2	0.1	<0.1	<0.1	<0.1	6.0	3.5
X59M1 Line	0.0	0.0	0.0	0.0	0.1	<0.1	<0.1	<0.1	<0.1	<0.1	0.0	0.0	0.1	<0.1
Replacement Pipeline Facilities														
SM80 Line	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.1	0.0	0.0	0.0	0.0	0.2	0.1
SM80 Loop	0.0	0.0	0.0	0.0	<0.1	<0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.1
Total	24.6	14.4	3.1	1.8	131.1	76.7	10.1	5.9	1.3	0.8	0.7	0.4	170.9	100
<p>a The numbers in this table have been rounded for presentation purposes. As a result, the totals may not reflect the exact sum of the numbers in all cases.</p> <p>b For analysis purposes, acreages of ephemeral, intermittent, and perennial waterbodies; non-delineated waterbodies that have acreages based on the USGS National Hydrography Dataset; and ponds are counted as open water land use.</p>														

In general, land use-related impacts associated with the MXP would include the disturbance of existing uses within the rights-of-way during construction and maintenance of new permanent rights-of-way for operation of the pipelines. For the MXP-100, Columbia Gas proposes to generally use a 125-foot-wide construction right-of-way, consisting of a 75-foot-wide working side and a 50-foot-wide spoil side, except where site conditions require specific workspace configurations. Of this initial corridor, Columbia Gas would retain a 50-foot-wide permanent right-of-way easement for operation of the pipeline. Columbia Gas' construction workspace size would be greater than the 75-foot-wide nominal construction right-of-way width due to the space needed for spoil storage, topsoil segregation, and establishment a safe travel lane in mountainous terrain that characterizes the vast majority of the MXP route. For the MXP-200, a 100-foot-wide construction right-of-way and 50-foot-wide permanent right-of-way is generally proposed. The M59M1 Line would be installed within the MXP-100 permanent easement and would not require ATWS.

Columbia Gas would replace approximately 0.4 mile of existing pipeline (SM80 and SM80 Loop) in two, approximately 0.2-mile-long segments. The pipe would be replaced within the existing maintained right-of-way at each location on what is currently open land. Pipeline replacement would require a 75-foot-wide construction right-of-way including the existing 50-foot-wide permanent easement. After construction, the existing permanent easement would remain 50 feet wide. Land use impacts, including the permanent right-of-way, TWS, and staging areas for the pipeline replacement segments, are included in the pipeline construction corridor impacts. Following the completion of the project, the land use of the pipeline right-of-way would continue to be maintained as open land. Temporary work areas including TWS, ATWS, and staging areas, would be restored in accordance with the ECS and landowner agreements.

In addition to the construction rights-of-way, various ATWS would be used for project construction. As discussed in section 2.3.1.1, Columbia Gas identified a number of areas where it stated that site-specific conditions would require the use of ATWS beyond the proposed construction right-of-way. Appendix L lists the locations of these ATWS, their dimensions, area affected, justification, and other information.

Specific impacts on agricultural, forested, open land, and developed lands are discussed below. Impacts on residential areas are discussed in section 4.8.1.3. Wetlands and surface waters (open water) are discussed in sections 4.4 and 4.3.2, respectively.

Agricultural lands affected by construction would include cultivated croplands and uncultivated lands, such as hayfields. The primary impacts in these areas would be short-term and limited to the growing season concurrent with construction. Farmers would experience some loss of crop production in areas directly disturbed by construction-related activities. Farmers may have to alter planting patterns in areas where construction activities cause limited access to fields. Grazing animals may also have to be moved to different areas or other fields, and/or be penned with gates. Following construction, agricultural practices within the pipeline rights-of-way would be allowed to resume. Columbia Gas would restore all disturbed agricultural areas associated with construction in accordance with its ECS. In cultivated crop areas with 1 foot of topsoil or more, Columbia Gas would typically segregate the top 12 inches and store it separately from excavated subsoil. In agricultural areas with less than 1 foot of topsoil, Columbia Gas would remove the entire topsoil layer. Columbia Gas did not identify any specialty crops (fruit, vegetables,

Christmas trees, or maple trees for syrup) that would be disturbed by the MXP. Impacts on and mitigation for prime farmlands and statewide important farmlands are discussed in section 4.2.4.1.

Drainage tile systems could potentially be impacted by construction activities. Columbia Gas is currently not aware of any existing drain tile systems within the construction work area; however, Columbia Gas is consulting with landowners in an attempt to locate and flag existing drainage tiles. If drainage tiles are exposed or damaged during construction activities, appropriate measures to repair/replace them would be implemented after communication with the landowner and in accordance with the ECS.

Forested land that would be affected by the pipeline project consists mainly of evergreen-dominated forests and woodlands, deciduous-dominated forest and woodlands, and mixed evergreen/deciduous forests and woodlands (section 4.5.1). The primary effect of construction on forested land would be the removal of trees and shrubs from the construction rights-of-way, TWS, and ATWS. Following construction, trees and shrubs in the TWS and ATWS areas would be allowed to regenerate to pre-construction conditions; however, impacts on forest resources in these areas would last for many years. Following construction, the operational portion of the rights-of-way would be permanently maintained in a non-forested condition (see section 4.5.1.1). Forest lands are discussed in more detail throughout section 4.5.

Open lands that would be affected by the MXP include open space, pasture, and grass and shrubs on previously disturbed areas of land, such as mines and utility rights-of-way. Construction-related impacts on open land would include the removal of vegetation and disturbance of soils. These impacts would be temporary and short-term, and would be minimized by the implementation of Columbia Gas's ECS. After final grading and cleanup, Columbia Gas would reseed open land areas in accordance with recommendations for seed mixes, rates, and dates from soil conservation authorities or as requested by the landowner or land managing agency. Open land areas within the temporary and permanent rights-of-way are expected to revert to their preconstruction condition within a few years after completion of construction. Columbia Gas would maintain vegetation within the permanent rights-of-way by periodic mowing. Following construction, most open land uses would resume. However, some activities, such as the building of new structures, would be prohibited on the permanent rights-of-way. Road and railroad crossings are discussed in sections 2.4.4.3 and 4.9.6. Section 4.8.2 provides discussion on potential effects to special use areas.

Developed lands include industrial and commercial areas, as well as roads and railroads. Industrial and commercial land uses could be temporarily impacted during construction of the pipeline project by increased dust from exposed soils, construction noise, and traffic congestion. Columbia Gas would limit impacts on commercial land uses by coordinating driveway crossings with business owners to provide access across the construction rights-of-way.

Columbia Gas would provide access for emergency vehicles during road crossings by using steel plate bridges across the pipeline trench, as needed. Road surfaces would be restored as soon as practicable so that normal access could resume, and commercial land uses would be restored to pre-construction conditions, or as specified in landowner agreements. Additional discussion of traffic-related impacts is provided in section 4.9.5.

Aboveground Facilities

Table 4.8-1 summarizes the land requirements and land uses for the aboveground facilities. The dominant land use that would be affected by these facilities is forested land, followed by agricultural land.

New Compressor Stations

A total of about 78 acres of land would be disturbed by construction of the three new compressor stations (Sherwood [29.7 ac], White Oak [16.6 ac], and Mount Olive [31.3]). Of this total, about 30 acres would be permanently retained for operation. The current land use at the Sherwood site (Doddridge County) includes agricultural, forested, developed, and open lands (see table 4.8-1). Land use at the White Oak site (Calhoun County) includes agricultural, developed, and forested land, while land use at the Mount Olive site (Jackson County) is developed, forested, and open land. The land use at each of the new compressor stations during project operation would be permanently converted to developed land. Areas used for TWS at each facility would be restored and maintained as open land or allowed to revert to pre-construction land use cover.

New Regulator Stations

Three new regulator stations would also be constructed as part of the MXP. One regulator station would be installed within the Sherwood Compressor Station and would not require any additional land outside of the station site. The Ripley Regulator Station (Jackson County) would be constructed in an area that is agricultural, developed, forested, and open land. The Saunders Creek Regulator Station (Cabell County) would be constructed adjacent to existing Columbia facilities in an area that is agricultural, forested, and open land. The land use at each of the new regulator stations would be permanently converted to developed use following the completion of construction. About 11 acres would be disturbed during construction of the regulator stations, and about 8 acres of land would be retained for operation.

Tie-in Locations

The MXP would include two tie-in sites (LEX Tie-in and Line 1983 Tie-in). The LEX Tie-in (Marshall County) would be constructed in an area that is mostly agricultural land. The Line 1983 Tie-in (Doddridge County) would be constructed in an area that is mostly forested. Both facilities would be sited on land owned by Columbia Gas and adjacent to existing Columbia facilities. The land use at each of the new tie-in sites would be permanently converted to developed use following the completion of construction. A total of almost 4 acres would be utilized during construction of the tie-in sites, and almost 1 acre retained for operation.

Mainline Valves

A total of 10 MLVs would be constructed within the permanent MXP-100 easement, requiring a total of about 3 acres for operation. TWS associated with construction of the MLVs is captured in the pipeline construction corridor impacts. Land use associated with the MLVs includes agricultural, forested, developed, and open land. Following the completion of construction, the current land use would be permanently converted to developed use.

Compressor Station Modifications

Three existing/approved/pending compressor stations (Ceredo, Lone Oak, and Elk River) would be modified as part of the MXP. Impacts associated with MXP activities would require a total of 32 acres for construction, including almost 32 acres of developed land and less than 0.1 acre of open land. No permanent impacts would occur as a result of the modifications at these compressor stations, as the facility footprints would not be expanded.

Staging Areas, Pipe Yards, and Contractor Yards

Columbia Gas identified 90 staging areas and 40 pipe/contractor yards in West Virginia for potential use. These sites would be used for pipe, materials, and equipment storage; employee vehicle parking; and temporary field offices. The size of each yard and/or staging area is dependent upon the amount of material and equipment to be stored or staged at each location and the amount of available land. Impact acreages by land use category are provided in table 4.8-1.

Columbia Gas identified yards that are at convenient locations in relation to each of the pipeline spreads, have been previously developed, and are compatible with the planned use of the yard (e.g., previously cleared and graded areas with access to electrical and telephone service for temporary construction trailers). Where yards are not in previously disturbed areas, Columbia Gas tried to select areas that were relatively level to minimize grading or filling. Columbia Gas is currently negotiating with the respective landowners for temporary use of these locations and would complete environmental surveys on those locations secured for project use.

Within staging areas and pipe/contractor yards, topsoil would be segregated and stored along the edges of the areas, where required. After construction has been completed, all staging areas and pipe/contractor yards would be restored to preconstruction conditions in accordance with Columbia Gas' ECS or per landowner agreements.

Access Roads

Columbia Gas identified roads that would be used to provide access to the pipeline rights-of-way and aboveground facilities during construction and operation of the MXP. The MXP would use existing public and private roads to the extent practicable; however, some new roads would be required to provide access to the construction work area in remote locations and to access new aboveground facilities during project operations. Columbia Gas would use approximately 90 miles of existing private access roads and construct approximately 6 miles of new temporary and permanent access roads. After construction has been completed, fewer than 3 miles of new access roads would be maintained permanently for project operation.

Some modifications or upgrades to existing state, county, and private roads would be required to access the project area for construction. The majority of modifications would include grading and the addition of gravel to stabilize existing unpaved roads, and minor tree trimming along roadways. In some instances, the road would also need to be extended with a gravel pad or apron at the entrance. Existing access roads that are less than 25 feet in width would require widening to accommodate construction vehicles.

See table 4.8-1 for the acres of impact for temporary and permanent access roads associated with the MXP.

4.8.1.1.2 Gulf XPress Project

The project would result in land disturbance at existing facilities and at the new facility locations. All temporary and permanent disturbances related to the modifications at the Grayson Compressor Station would occur within a Columbia Gulf-owned workspace where the station is planned for construction. All disturbances at the existing Leach C Meter Station would be confined to the station footprint and surrounding area previously disturbed by facility construction. Construction of the new compressor facilities would require disturbance at seven discrete sites. Each site would experience temporary and permanent disturbances. All staging, access, and construction would be completed within the permanent and TWS at each site. Once complete, the project would maintain permanent aboveground facilities and access roads at the seven sites.

Seven general land use types would be affected by the GXP. Table 4.8-3 summarizes the acreage of each land use type that would be affected by construction and operation of the project.

**Table 4.8-3
Summary of Existing Land Uses Affected by Construction and Operation of the Gulf XPress Project a/**

Facilities	County/ State	Agriculture		Forest		Residential		Developed		Open Land		Wetlands		Open Water		Total	
		Total Const.	New Perm.	Total Const.	New Perm.	Total Const.	New Perm.	Total Const.	New Perm.	Total Const.	New Perm.	Total Const.	New Perm.	Total Const.	New Perm.	Total Const.	New Perm.
New Compressor Stations																	
Morehead	Rowan Cty, KY	16.5	10.6	0.5	0.5	0.0	0.0	0.0	0.0	<0.01	0.0	<0.01	0.0	0.1	0.1	17.2	11.2
Paint Lick	Garrard Cty, KY	29.5	9.6	0.0	0.0	0.0	0.0	0.0	0.0	0.7	0.0	0.0	0.0	0.0	0.0	30.2	9.6
Goodluck	Metcalfe Cty, KY	19.0	7.3	4.7	4.5	0.0	0.0	0.0	0.0	2.1	2.1	0.0	0.0	<0.001	0.0	25.8	13.9
Cane Ridge	Davidson Cty, TN	10.3	4.2	8.7	5.4	0.6	0.0	0.0	0.0	3.4	0.7	0.0	0.0	0.0	0.0	23.0	10.3
Clifton Junction	Wayne Cty, TN	15.7	10.8	6.4	1.5	0.0	0.0	0.0	0.0	6.1	2.2	0.0	0.0	0.7	0.6	28.9	15.1
New Albany	Union Cty, MS	26.3	10.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<0.1	<0.01	<0.1	<0.1	26.5	10.3
Holcomb	Grenada Cty, MS	31.7	9.0	1.6	0.0	0.0	0.0	<0.1	0.0	0.0	0.0	0.0	0.0	<0.01	0	33.4	9.0
Subtotal		149.0	61.8	21.9	11.9	0.6	0.0	<0.1	0.0	12.3	5.0	<0.1	<0.01	0.9	0.8	185.0	79.4
Pending Compressor Station																	
Grayson <u>b/</u>	Carter Cty, KY	0.0	0.0	0.0	0.0	0.0	0.0	11.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	11.9	0.0
Existing Meter Station																	
Leach C	Boyd Cty, KY	0.0	0.0	0.3	0.0	0.0	0.0	0.6	0.0	0.5	0.0	0.0	0.0	0.0	0.0	1.4	0.0
Aboveground Facility Total		149.0	61.8	22.2	11.9	0.6	0.0	12.5	0.0	12.8	5.0	<0.1	<0.01	0.9	0.8	198.3	79.4
Access Roads		0.0	1.3	0.0	0.2	0.0	0.0	0.1	<0.1	0.0	0.6	0.0	<0.01	0.0	<0.01	0.1	2.2
Project Total		149.0	63.1	22.2	12.1	0.6	0.0	12.6	<0.1	12.8	5.6	<0.1	<0.01	0.9	0.8	198.4	81.6

a The subtotals and totals shown in this table may not equal the sums of the addends due to rounding.

b Pending compressor station proposed by Columbia Gulf under the Rayne XPress Project (Docket No. CP15-539-000).

The definitions of each land use type are described in section 4.8.1.1.1. Construction of the aboveground facilities would temporarily disturb a total of about 198 acres. The primary land use types impacted during construction would be agricultural (75 percent), forested (11 percent), open land (7 percent), and developed lands (6 percent). Residential, open water, and wetlands would make up the remaining 1 percent of land types impacted during GXP construction. Following construction, about 82 acres of land would be permanently converted to developed land for operation of the GXP. The primary land use types that would be permanently changed would be agricultural (77 percent), forested (15 percent), and open land (7 percent). Developed land, open water, and wetlands would make up the remaining 1 percent of permanent impacts.

New Aboveground Facilities

Table 4.8-3 summarizes the land requirements and land uses for the aboveground facilities. The dominant land use that would be affected by these facilities is agricultural land, followed by forested land.

A total of about 185 acres of land would be disturbed by construction of the seven new compressor stations. Of this total, about 79 acres would be permanently retained for operation. The current land use at the Morehead site includes agricultural land, forested land, open water, and open land (see table 4.8-3). There is also an abandoned shed and former residence outside the TWS of Morehead Compressor Station, which is on land purchased by Columbia Gas to be used as a buffer between the compressor station and neighbors in the area. Land use at the Paint Lick site includes agricultural land (specifically tobacco and alfalfa cultivation) (AGES, 2015g) and open land. Land use at the Goodluck site includes agricultural (specifically corn production) (AGES, 2015c), forested land, open land, and open water. At the Cane Ridge site, land use includes agricultural (specifically pasture for cattle) (AGES, 2015a), forested land, open land, and an area of formerly residential land. The formerly residential land is located within TWS on the Cane Ridge site, which is now owned by Columbia Gulf. This residential parcel, which has been vacated, would be converted to open land following construction. Land use at the Clifton Junction site includes agricultural (specifically grassy pasture for cattle) (AGES, 2015b), forested land, open land, and open water. At the New Albany site, land use includes agricultural (specifically soybean cultivation) (AGES, 2015f), open water, and wetlands. Land use at the Holcomb site includes agricultural (specifically corn cultivation) (AGES, 2015d), forested land, developed land, and open water.

The land use at each of the new compressor station sites during project operation would be permanently converted to developed land. Areas used for TWS at each facility would be restored and maintained as open land or allowed to revert to pre-construction land use cover.

Modifications to Aboveground Facilities

The approved Grayson Compressor Station and existing Leach C Meter Station would be modified as part of the GXP. GXP activities would require about 13 acres for construction, comprised of developed land, open land, and forested land. No permanent impacts would occur as a result of the modifications at these stations because the facility footprints would not be expanded.

4.8.1.2 Landownership and Easement Requirements

4.8.1.2.1 Mountaineer XPress Project

Pipeline Facilities

Columbia Gas would need to obtain easements from landowners to construct and operate its pipeline facilities or acquire the land on which the aboveground facilities would be located. Easements can be temporary, granting the operator the use of the land during construction (e.g., extra workspaces, temporary access roads, contractor yards), or permanent, granting the operator the right to operate and maintain the facilities once constructed. These new easements would convey both temporary (for construction) and permanent (no greater than 50 feet wide for pipeline operation) rights-of-way to Columbia Gas.

An easement agreement between an interstate gas transmission company and a landowner typically specifies compensation for losses resulting from construction (including crop losses, reduced productivity, and timber), damages to property during construction, and restrictions on existing or future uses that would not be permitted on the permanent rights-of-way. Compensation would be determined through negotiations between Columbia Gas and the landowner.

If an easement cannot be negotiated with a landowner and if the Commission issues a Certificate to MXP, Columbia Gas may use the right of eminent domain to acquire the property necessary to construct and operate the MXP. This right would apply to all project-related workspace covered by the approval, including the temporary and permanent rights-of-way, aboveground facility sites, contractor yards, access roads, and extra workspaces. Columbia Gas would still be required to compensate the landowner for the right-of-way and damages incurred during construction. However, the level of compensation would be determined by a court according to state or federal law.

Aboveground Facilities

Columbia Gas has purchased all lands required for construction and operation of the proposed MXP compressor stations. Columbia is still in the process of negotiations for some of the other aboveground facilities, such as the Ripley Regulator Station and some main line valve sites.

4.8.1.2.2 Gulf XPress Project

Most of the land that would be required for construction and operation of the Gulf XPress aboveground facilities, including additional properties surrounding compressor station sites that are not part of the construction work areas but would be used to “buffer” or further separate the stations from neighbors in the vicinity, have been purchased by Columbia Gulf. Some of these additional properties include existing residences, which Columbia Gulf now owns. These residences are currently vacant, and Columbia Gulf has no plans to use or rent these structures to other parties.

About 5 acres of land needed for TWS at the Goodluck Compressor Station has not been, nor would be purchased by Columbia Gulf, as it would be temporarily leased during construction.

Further, Columbia Gulf retains an easement for a temporary access road to be used during construction at Leach C Meter Station.

4.8.1.3 Existing Residences

In residential areas, two important impacts associated with construction and operation of a pipeline are temporary disturbances during construction and the encumbrance of a permanent right-of-way, which would restrict the construction of new permanent structures within the right-of-way. Temporary impacts during construction of the pipeline facilities in residential areas could include: inconvenience caused by noise and dust generated by construction equipment; disruption to access of homes by trenching of roads or driveways; increased localized traffic from transporting workers, equipment, and materials to the work site; disturbance of lawns, landscaping, gardens, and visual character caused by the removal of turf, shrubs, trees, and/or other landscaping between residences and adjacent rights-of-way; and potential damage to existing septic systems or water wells.

During public scoping, we received comments regarding concerns with the loss of privacy from clearing mature trees. We believe that the general and site-specific mitigation measures proposed by Columbia Gas and Columbia Gulf, discussed below, would address these concerns.

The Companies would each implement the following general mitigation measures to limit impacts on residential areas:

- Landowners would receive a 2-week notification prior to construction on their respective property.
- In residential areas, construction would be limited to set daylight hours to avoid or mitigate excessive noise during evening and early morning time periods.
- Mature trees and landscaping would not be removed from the edge of the construction right-of-way unless necessary for safe operation of construction equipment, or as specified in landowner agreements.
- Safety fencing would be installed along the edge of the construction right-of-way in residential areas to discourage non-workers from entering the area. At a minimum, fencing would be installed between a residence and a work area for 100 feet on either side of the residence.
- Where the construction corridor crosses roads necessary for access to private residences or commercial buildings and no alternative entrance exists, Columbia Gas would implement measures (e.g., steel plating over the open portion of the trench) to maintain passage for landowners, customers, and emergency vehicles, or for others who require access.
- Temporary repairs to septic systems damaged by construction activities would be completed within 48 hours of damage, and permanent repairs would be made between construction and final restoration.
- Site-specific traffic control plans would be developed to limit heavy construction traffic in sensitive areas to specific times of day and/or limit the types of equipment used in these areas to the extent practicable;

- Any open trenches within residential areas would be secured with safety fencing at the end of each construction day.
- Unless specified by the landowner, or replacement topsoil is imported, topsoil would be segregated from either the full work area or from the trench and subsoil storage to prevent the mixing of topsoil and subsoil.
- After backfilling the trench, all lawn and landscaping would be restored to final restoration conditions, or temporarily restored pending weather and soil conditions or as specified in landowner agreements. If seasonal or other weather conditions prevent compliance within these time frames, then temporary erosion controls (sediment barriers and mulch) would be maintained and monitored until conditions allow final restoration.
- Attempts would be made to prevent the disruption of utilities. In the event utilities are disturbed, efforts would be made to repair them immediately.
- Fugitive dust would be controlled near residential areas using water trucks, tackifiers, or similar dust control methods.

4.8.1.3.1 Mountaineer XPress Project

Residential structures within 50 feet of the construction work areas would experience greater effects of project construction. Table 4.8-4 lists the 66 residences within about 50 feet of construction work areas by milepost and indicates the distance of each from the work areas.

Table 4.8-4 Residences within 50 feet of the Construction Work Area for the MXP			
Project Facility	County	Milepost	Distance from Construction Work Area (feet)
MP-100			
Access Road	Marshall	4.1	28
Access Road	Marshall	7.1	5
Temporary Workspace	Wetzel	14.2	44
Access Road	Wetzel	14.8	49
Access Road	Wetzel	21.2	10
Access Road	Wetzel	22.7	3
Access Road	Wetzel	23.2	2, 22
Temporary Workspace	Wetzel	24.5	24
Temporary Workspace	Wetzel	25.0	17
Pipe Yard	Wetzel	29.0	33
Access Road	Tyler	35.1	32
Access Road	Doddridge	42.8	10
Access Road	Doddridge	43.9	38
Access Road	Doddridge	43.9	36
Temporary Workspace	Doddridge	45.0	17
Temporary Workspace	Doddridge	51.0	22

**Table 4.8-4
Residences within 50 feet of the Construction Work Area for the MXP**

Project Facility	County	Milepost	Distance from Construction Work Area (feet)
Access Road	Doddridge	60.4	49
Temporary Workspace	Ritchie	68.1	33
Access Road	Ritchie	69.8	17
Temporary Workspace	Ritchie	72.3	21
Permanent Right-of-Way	Ritchie	77.6	34
Temporary Workspace	Ritchie	77.6	40
Access Road	Ritchie	77.7	46
Access Road	Ritchie	77.7	15
Staging Area	Ritchie	78.9	14
Temporary Workspace	Wirt	88.1	26
Temporary Workspace	Wirt	91.7	10
Temporary Workspace	Roane	106.1	21
Additional Temporary Workspace	Roane	107.4	29
Access Road	Jackson	111.8	48
Temporary Workspace	Jackson	112.1	32
Temporary Workspace	Jackson	123.9	50
Temporary Workspace	Jackson	123.8	5
Temporary Workspace	Jackson	124.5	1
Temporary Workspace	Jackson	124.8	28
Access Road	Jackson	129.8	4
Access Road	Putnam	132.4	4
Access Road	Putnam	134.9	13
Access Road	Putnam	138.5	4
Access Road	Putnam	139.4	52
Access Road	Putnam	142.1	29
Access Road	Putnam	143.3	5, 2 (2 structures)
Access Road	Putnam	143.5	31
Access Road	Putnam	143.5	27
Access Road	Putnam	143.5	8
Additional Temporary Workspace	Putnam	146.1	52
Additional Temporary Workspace	Putnam	146.8	52
Access Road	Putnam	152.0	50
Access Road	Cabell	156.8	3
Access Road	Cabell	157.7	32
Access Road	Cabell	157.9	32
Additional Temporary Workspace;	Cabell	158.2	19

Table 4.8-4 Residences within 50 feet of the Construction Work Area for the MXP			
Project Facility	County	Milepost	Distance from Construction Work Area (feet)
Access Road			
Access Road	Cabell	160.6	24
Pipe Yard	Cabell	160.6	17
Permanent Right-of-Way	Cabell	161.0	48
Temporary Workspace	Cabell	161.1	33
Temporary Workspace	Cabell	161.2	42
Additional Temporary Workspace	Cabell	161.3	27
Access Road	Cabell	161.9	45
Temporary Workspace	Cabell	162.4	5
Temporary Workspace	Cabell	163.9	28
MXP-200			
Permanent Right-of-Way	Cabell	4.4	33
SM80 Line			
Additional Temporary Workspace	Cabell	21.0	32
SM80 Loop Line			
Access Road	Cabell	20.8	7
Access Road	Cabell	20.7	11
Access Road	Cabell	20.7	23

Columbia Gas has developed site-specific construction plans for residences within 50 feet of the new pipeline and associated workspace areas for the MXP. Appendix B-1 includes site-specific construction plans for residences within 25 feet or less of MXP workspaces. These plans identify the mitigation measures to be implemented by Columbia Gas to further reduce impacts on residents during the construction period.

If any damages to residential property result from construction, Columbia Gas would repair the damaged property or provide appropriate compensation to the landowner. All disturbed areas on residential land would be restored as closely as possible to pre-construction conditions, or as negotiated with the landowner during right-of-way easement discussions.

After construction, the properties would be restored to preconstruction conditions as soon as practicable. Most uses of the land would be able to continue in accordance with easement agreements. However, new buildings, sheds, wells, reservoirs, pools, obstructions, or structures would not be permitted on the permanent pipeline rights-of-way. Construction of features such as lawns, roads or driveways, utility lines, and properly gated fences are generally permissible uses within the permanent easements.

We have reviewed the site-specific plans, mitigation, and associated workspace justifications and note that the distance between a residence and the construction work area is less

than 25 feet for eight tracts (Tract WV-WZ-0429.000 near MP 24.8; Tract WV-WZ-0430.000 near MP 25.0; Tract WV-DO-0278.007 near MP 51.0; Tract WV-RI-0248.000 near MP 72.1; Tract WV-JA-0364.000 near MP 123.8; Tract WV-JA-0424.000 near MP 124.4; Tract WV-CB-0065.000 near MP 157.9; and Tract WV-CB-0208.000 near MP 162.2). In these locations, pipeline construction would be carried out so that the trench does not remain open overnight.

We note that residential driveways are crossed by the construction work area on eight tracts (Tract WV-WZ-0062.000 near MP 14.2; Tract WV-WZ-0429.000 near MP 24.8; Tract WV-RI-0078.000 near MP 68.0; Tract WV-JA-0364.000 near MP 123.8; Tract WV-JA-0364.003 near MP 124.3; Tract WV-JA-0368.000 near MP 124.6; and Tract WV-CB-0208.000 near MP 162.2 of the MXP-100; and Tract WV-CB-0805.000 near MP 21.0 of the SM80 Line). The plans indicate that vehicle access to residences would be maintained at all times, or other accommodations would be made with each respective landowner.

We note a fenced corral and a shed within the construction work area on Tract WV-DO-0278.007 near MP 51.0 and Tract WV-JA-0368.000 near MP 124.6, respectively). The plans generally indicate that these and other physical features that need to be protected would be enclosed in safety fence to avoid disturbance during construction. However, it appears that these structures may need to be removed or relocated to accommodate construction. Given that Columbia Gas has not demonstrated landowner agreement to have these structures removed, we **recommend that:**

- **Prior to construction, Columbia Gas should file with the Secretary, for review and written approval by the Director of OEP, an updated site-specific plan for Tract WV-DO-0278.007 near MP 51.0 and Tract WV-JA-0368.000 near MP 124.6 that includes specific impact avoidance or minimization measures for the fenced corral and shed.**

We note water wells outside of but in proximity to the construction work area on two tracts (Tract WV-WZ-0062.000 near MP 14.4 and Tract WV-RI-0248.000 near MP 72.3). These wells would be subject to Columbia Gas' well protection measures as described in its SPCC Plan.

Based on our review, we have found the site-specific plans and mitigation acceptable, except for the two structures (fenced corral and shed) covered by our recommendation above.

Our experience has shown that when project sponsors maintain communication with landowners during the construction and restoration phases, issues in and near residential areas can be effectively managed and resolved. Columbia Gas would implement an environmental complaint resolution procedure during construction and for a period of at least 2 years following the completion of construction. The procedure would provide landowners with clear and simple directions for identifying and resolving problems or concerns during construction of the MXP and restoration of the rights-of-way. Prior to construction, Columbia Gas would mail a letter describing the procedures to landowners whose properties would be affected by the project. Columbia Gas' letter would:

- Provide the contact information for a local Columbia Gas representative who landowners should call first with their concerns. The letter would indicate how soon landowners should expect a response from Columbia Gas' local representative;

- Instruct landowners that they should call Columbia Gas’ toll-free number if they are not satisfied with the response from the local representative. The letter would indicate how soon landowners should expect a response from Columbia Gas; and
- Instruct landowners that they should contact the Commission’s Landowner Helpline at (877) 337-2237 or by email at LandownerHelp@ferc.gov if they are not satisfied with the response received from Columbia Gas’ toll-free number.

4.8.1.3.2 Gulf XPress Project

Table 4.8-5 lists the three residences and four other structures within 100 feet of GXP construction work areas and indicates the distance of each from the work areas.

Table 4.8-5 Structures within 100 feet of the GXP				
Aboveground Facilities	Distance from Compressor Station Workspace (feet)	Type of Structure	Ownership	Type of Workspace
New Compressor Stations				
Morehead Compressor Station	29	Abandoned barn	Columbia Gulf	Temporary workspace
	100	Former residence	Columbia Gulf	Temporary workspace
Cane Ridge Compressor Station	56	Abandoned shed	Columbia Gulf	Temporary workspace
	95	Former residence	Columbia Gulf	Temporary workspace
	83	Former residence	Columbia Gulf	Temporary workspace
Pending Compressor Station				
Grayson Compressor Station ^{a/}	45	Church	Private	Temporary workspace
Existing Meter Station				
Leach C Meter Station	61	Shed	Private	Temporary workspace
a Pending compressor station proposed by Columbia Gulf under the Rayne XPress Project (Docket No. CP15-539-000).				

Residences within 50 feet of the construction work areas would experience higher effects of project construction. As the distance from the construction work area increases, the impacts on residences decrease. No residences are located within 50 feet of either the temporary or permanent workspace of any of the GXP facilities. Therefore, the development of site-specific residential plans is not necessary. However, the Cane Ridge site is in a suburban area, and several current occupied residences are located within 500 feet of the temporary construction work area. Temporary impacts on residential areas include noise and fugitive dust during construction activities, altered traffic patterns, and increased traffic in the area of the facilities. To minimize any disturbance to residences within the vicinity of the facilities, Columbia Gulf would follow all mitigation measures in its ECS as well as the measures listed at the beginning of this section (where applicable).

4.8.1.4 Planned Developments

4.8.1.4.1 Mountaineer XPress Project

Columbia Gas contacted local officials and reviewed land use plans and zoning restrictions to identify planned residential, commercial, or industrial developments in the project area. Columbia Gas also examined existing land use patterns and developments to determine the types of existing land uses and the possibility for future large-scale developments or subdivisions to be located near project components. To date, no planned developments have been identified that would be affected by the MXP. Columbia Gas would continue to consult with state and local authorities to determine if any planned developments could be affected by the MXP.

4.8.1.4.2 Gulf XPress Project

Columbia Gulf contacted local officials and reviewed land use plans and zoning restrictions to identify planned residential, commercial, or industrial developments in the project areas. Except for the Cane Ridge site, the compressor station sites are in rural areas with no zoning or land use regulations. Columbia Gulf also examined existing land use patterns and developments to determine the types of existing land uses and the possibility for future large-scale developments or subdivisions to be located near project components. To date, no planned developments have been identified that would be affected by construction of the Morehead, Paint Lick, Goodluck, Clifton Junction, New Albany, or Holcomb Compressor Stations or by the modifications to the Grayson Compressor Station and Leach C Meter Station. Columbia Gulf would continue to consult with state and local authorities to determine if any additional planned developments could be affected by these facilities. There is one planned development, the Delvin Downs Subdivision, located about 0.2 mile southwest of the Cane Ridge site across Barnes Road. This subdivision was platted in 2007 and portions have not been developed (Wood, 2016). The Cane Ridge site is owned by Columbia Gulf and is not a part of this subdivision. Construction of the Cane Ridge station would not preclude the future development of the remaining portions of the subdivision.

During public scoping, we received multiple comments regarding a zoning ordinance amendment (Ordinance No. BL2015-1210) enacted in August 2015 by the Metropolitan Government of Nashville and Davidson County requiring that natural gas compressor stations be sited within an industrial zoning district.³⁴ The Cane Ridge site is currently zoned agricultural (Metro Government of Nashville and Davidson County, Tennessee, 2016). Columbia Gulf would consult with the Metropolitan Government to identify recommended site development measures for this property.

4.8.2 Recreation and Special Interest Areas

One of the primary concerns when routing or siting project facilities near recreation or special interest areas is the impact of construction and operation on the purpose for which the area was established (e.g., the recreational activities, public access, and resources the area aims to

³⁴ The Commission's authority under the NGA preempts county zoning ordinances. ... The Commission does, however, encourage cooperation between interstate pipeline companies and local authorities to the maximum extent practical.

protect). Construction could alter visual aesthetics by removing existing vegetation and disturbing soils. It could also generate dust and noise, which could be a nuisance to recreational users. Pipeline construction could interfere with or diminish the quality of the recreational experience by affecting wildlife movements or disturbing hikers while using trails. During operation, the presence of aboveground facilities could alter visual aesthetics and, therefore, interfere with the quality of the recreational experience. These potential visual impacts are discussed in section 4.8.3. On a long-term basis, land management agencies may be precluded from placing new structures over or in proximity to the pipelines.

4.8.2.1 Federally Managed Land

4.8.2.1.1 Mountaineer XPress Project

No federally managed lands would be crossed by or are within 0.25 mile of the MXP.

4.8.2.1.2 Gulf XPress Project

A GXP facility would be located within 0.25 mile of the Daniel Boone National Forest (DBNF). Specifically, a portion of the DBNF is about 600 feet east of the Morehead Compressor Station site in Kentucky. The DBNF is comprised of 708,000 acres in 21 counties in southern and eastern Kentucky. Public recreational uses of the DBNF include camping, horseback riding, swimming, hiking, target shooting, caving, geocaching, wildlife viewing, boating, and fishing (U.S. Forest Service, 2016). The GXP would not affect the recreational use or experience of the DBNF. I-64 is located between the compressor station site and the DBNF, and, therefore, construction and operation of the station would likely not be noticeable from the DBNF. Columbia Gulf contacted representatives from the DBNF, who indicated that they had no concerns regarding the project because the compressor station site is on private lands (Rogers, 2016).

4.8.2.2 State-Managed Land

Both projects could result in impacts on WMAs. The WMAs are generally managed for public recreational use, including fishing, hunting, and camping, and for the protection of local biodiversity. Hunting season varies by species but generally occurs from early fall to early winter.

4.8.2.2.1 Mountaineer XPress Project

The MXP would cross or pass within 0.25 mile of five WMAs managed by the WVDNR and one West Virginia Scenic Byway (see table 4.8-6).

**Table 4.8-6
Publicly Owned or Managed Lands Crossed or within 0.25 mile of the MXP**

Project Facility/ Jurisdiction	Agency	Name	Begin Milepost	End Milepost	Miles Crossed or Distance to Nearest Project Facility	Primary Uses
State						
MXP-100	WVDNR	Cecil H. Underwood WMA	9.2	9.4	0.2	Fishing and hunting
MXP-100	WVDNR	Lewis Wetzel WMA	28.4	33.5	4.1	Fishing, hunting, and camping
MXP-100	WVDNR	Frozen Camp WMA	113.3	114.5	0.9	Fishing and hunting
MXP-100	WVDNR	O'Brien Lake WMA	120.6	121.7	0.6	Fishing and hunting
MXP-100	WVDNR	Lantz Farm and Nature Preserve Easement	N/A a/	N/A	0.2	Farm
MXP-100	WVDNR	Elk Fork Lake WMA	NA a/	N/A	0.2	Fishing and hunting
Elk River Compressor Station	WVDNR	Morris Creek WMA	N/A a/	N/A	<0.1	Fishing and hunting
Local						
MXP-100 Access Road ARPY125.1	WVDNR	Sportsman Park b/	NA a/	N/A	<0.1	Fishing and recreation
MXP-100	Putnam County Development Authority Inc.	Unnamed	147.6	148.7	1.1	Open space
MXP-100	City of Milton	Unnamed	160.8	161.4	0.6	Open space
MXP-100	Wetzel County Board of Education	Valley High School Athletic Field	N/A a/	N/A	0.2	High School Athletics
MXP-100	Jackson County Board of Education	Roana Jackson Technical Center	N/A a/	N/A	<0.1	Education
MXP-100 Proposed Yard 130	Jackson County Board of Education	Fairplain Elementary School	N/A a/	N/A	<0.1	Education
Sherwood Compressor Station	Doddridge County	Doddridge County Park	N/A a/	N/A	<0.1	Day recreation

a Not crossed by pipeline or workspaces, but within 0.25 mile of project.
b Sportsman Park is operated by the Wirt County Commission. WVDNR has a Public Access Site at the park for boating and fishing on the Little Kanawha River.

During public scoping, we received comments regarding concerns with impacts on recreational areas used for hunting. Columbia Gas would work with WVDNR officials to maintain the continued public recreational use of affected WMAs during construction of the MXP. Columbia Gas would adhere to its ECS and WVDNR requirements when constructing facilities within the WMA. Once construction is complete, the MXP is not expected to have permanent impacts on the WMAs' ability to continue to serve as a public recreational resource and to protect biodiversity. Following construction, WMA activities such as hunting, would be able to continue. Columbia Gas would enter into an agreement with the WVDNR to obtain easement rights through the WMAs for a term of 15 years, which would be renewable. Columbia Gas is continuing discussions about the MXP with the WVDNR for each of the WMAs.

The MXP would cross the western unit of the Cecil H. Underwood WMA in southern Marshall County. The WMA is on 2,072 acres comprising mixed hardwood forest in steep-to-moderate terrain (WVDNR, 2016b). Temporary impacts would include disturbance of approximately 1.8 acres of forested lands during construction. Permanent impacts would include the conversion of 1.2 acres of forested lands to permanently maintained open lands for the right-of-way.

The Lewis Wetzel WMA consists of 14,023 acres of steep forested woodlands dominated by oak-hickory and cove hardwood in Wetzel County (WVDNR, 2016c). Columbia Gas anticipates temporary and permanent impacts on the WMA, including impacts on forested lands disturbed during construction and the conversion of forested lands to permanently maintained open lands for the right-of-way. A portion of the Lewis Wetzel WMA was acquired with USFWS Wildlife and Sport Fish Restoration funds. To date, the WVDNR has not made a determination of interference in the purpose of Federal Aid Grant W-35L from the USFWS, Division of Wildlife and Sport Fish Restoration for MXP. The WVDNR will provide a statement of determination and supporting documentation to the USFWS for consideration. The USFWS will review the documentation provided and subsequently respond to the WVDNR with a conclusion of support, or denial, with respect to a determination of interference for the purpose of the grant.

The Frozen Camp WMA, located in Jackson County, consists of 2,587 acres of hilly forested woodlands and open bottomland (WVDNR, 2016d). The MXP would cross this WMA and would temporarily affect 12 acres of forested and open lands associated with construction workspace. The new permanent right-of-way for the MXP would include the conversion of 5.2 acres of forested and open lands to permanently maintained right-of-way. Because this WMA was acquired with funding from the sale of hunting and fishing licenses, it is afforded protection under the Wildlife and Sport Fish Restoration programs administered by the USFWS and assent legislation in Article VI, Section 55 of the West Virginian Constitution. An opinion of non-interference from the USFWS under the authority established in 50 CFR 80 is necessary prior to the WVDNR approving the pipeline easement across the WMA.³⁵ The WVDNR would provide summary information to the USFWS to aid in determination of interference.

The O'Brien Lake WMA is composed of 217 acres of hilly forested woodlands in Jackson County (WVDNR, 2016e). The MXP would cross the WMA, disturbing 9 acres of forested lands

³⁵ The opinion of non-interference from the USFWS would be obtained by the WVDNR, and is not a permit or approval that Columbia Gas must receive.

during construction. Permanent impacts would include the conversion of 3.7 acres of forested lands to permanently maintained open lands for the right-of-way.

The Elk Fork Lake WMA is located in Jackson County about 0.2 mile north of the MXP near MP 119.0. This WMA is 1,418 acres and contains Elk Fork Lake and adjacent hilly oak-hickory forests (WVDNR, 2016b). The WMA is owned by the West Virginia State Soil Conservation Committee and is managed by the WVDNR for fishing and hunting. The MXP would not cross or directly affect the Elk Fork WMA.

Sportsman Park is a community park located north of State Route 14 on the Little Kanawha River in Elizabeth, Wirt County, West Virginia. It has shelters, walking trails, a playground, basketball court, tennis court, pavilion, restrooms, horseshoe pitching, volleyball court, boat ramp and electrical lighting and outlets (West Virginia University, 2016b). The MXP Pipe Yard 125 is located within 0.25 mile to the southeast of Sportsman Park. No direct impacts on Sportsman Park are anticipated from the use of Pipe Yard 125.

The MXP-100 pipeline crosses property administered by the Putnam County Development Authority between MP 147.4 and MP 148.6 in Putnam County. The Putnam County Development Authority's mission is to attract businesses to Putnam County, and Columbia Gas would contract for use of properties southwest of Highway 35 as project staging contractor yards. The pipeline also crosses property owned by the City of Milton between MPs 160.8 and 161.4.

At approximately MP 112.8, the pipeline passes approximately 0.6 mile east of the Roane-Jackson Technical Center in LeRoy. Additionally, the Fairplain Elementary School is approximately 0.6 mile north of the MXP-100 pipeline and Mount Olive Compressor Station at MP 124. No project impacts are anticipated on the technical center or the elementary school.

The Morris Creek WMA is approximately 0.1 mile south of the pending Elk River Compressor Station in Kanawha County. This WMA consists of 9,847 acres of steep forested woodlands and is leased by the WVDNR from a private landowner, the Bruce B. Cameron Foundation, Inc. and B.B. and Louise W. Cameron Charitable Trust (WVDNR, 2016f). The WVDNR manages this WMA for biodiversity and the suppression of disturbance events in the WMA. The MXP would not directly affect the Morris Creek WMA, because modifications of the pending Elk River station associated with the MXP would not expand the footprint of the facility, and construction activities would be restricted to previously disturbed areas.

The Little Kanawha Parkway is designated as a West Virginia Scenic Byway. The MXP crosses the Little Kanawha Parkway at approximately MP 94.1, in an area that is forested on the north side of the road and open land on the south side. After crossing the parkway, the pipeline route turns and runs adjacent to the parkway for approximately 0.3 mile through the forested area. A corridor would be cleared through the forest for pipeline construction, resulting in a change in the visual appearance of these adjacent lands, as viewed from the parkway. After construction, the disturbed areas closest to the parkway would be outside of the permanent right-of-way and would be allowed to return to pre-construction conditions. However, because these areas are forested, comparable vegetation would take many years to regenerate. Although these changes in the visual landscape would be noticeable to travelers along the parkway for a very brief period as they drive by, the visual impact on the overall viewshed along the parkway would be negligible.

The overall viewshed contains a variety of land uses, vegetation cover, and development that create visual breaks in the forested land, and the addition of a cleared pipeline corridor to the overall viewshed would be consistent with the existing visual features. The parkway would be crossed by boring beneath it, thus no road surface disturbance is anticipated. Columbia Gas would work with West Virginia Department of Transportation (WVDOT) officials to avoid or minimize potential impacts on the parkway and would establish safety protocols at the crossing. These protocols may include installation of safety fencing, a traffic management plan, protection of the road surface during equipment crossings, and public notification of construction. Columbia Gas would coordinate with the WVDOT to publish construction alerts on information websites and in local newspapers providing schedules of the anticipated time and duration of disruptions associated with construction.

The proposed Sherwood Compressor Station site is about 250 feet from the Doddridge County Park. The park includes a playground, swimming pool, volleyball courts, basketball courts, multi-purpose building, picnic shelter, a baseball field, and access to the Meathouse Fork Creek for fishing. Construction and operation of the station could result in temporary visual impacts on the park. However, Columbia Gas intends to maintain the approximately 225 feet of existing forested buffer area between the station site and the park, which would provide visual screening. Visual impacts for MXP are discussed in section 4.8.3. Noise would also be generated by operation of the Sherwood Compressor Station. However, as discussed in section 4.11.2, the noise levels would remain below applicable noise criteria.

4.8.2.2.2 Gulf XPress Project

A GXP facility would be located within 0.25 mile of the Malmaison WMA. Specifically, a portion of the Malmaison WMA is about 1,000 feet west of the proposed Holcomb Compressor Station site in Mississippi. The 9,483-acre WMA is in Grenada, Carroll, and Leflore Counties, and is used for hunting, fishing, wildlife viewing and hiking. The WMA has forested areas, swamps, wetlands, hiking trails, rivers, lakes, former agricultural fields, and managed wildlife openings, and is popular with residents from the surrounding towns as well as visitors from the rest of the state (MDWFP, 2016b). Construction and operation of the Holcomb station could result in temporary and permanent visual impacts on the WMA. However, the presence of about 1,500 feet of forested area buffer between the compressor station site and the WMA, as well as the forest within the WMA itself, would provide visual screening. Noise would also be generated by operation of the Holcomb station. As discussed in section 4.11.2, the noise levels would remain below the applicable criterion. Columbia Gulf attempted to contact representatives of the WMA; however, no responses were received.

We received numerous comments throughout public scoping regarding impacts on the Mill Creek Greenway from the proposed Cane Ridge Compressor Station. The Cane Ridge station would not be within or adjacent to any parks. The Mill Creek Park and Mill Creek Greenway are approximately 0.4 mile south of the station site. Due to the distance, existing tree cover, existing roadways, and existing residential developments that abut the park, any visual and/or noise impacts on trail- and park-users of the Mill Creek Park and Greenway would be negligible.

4.8.2.3 Conservation Easements

Conservation easements are legally binding agreements between landowners and government agencies that limit certain types of use and prevent development from occurring on the land in perpetuity.

4.8.2.3.1 Mountaineer XPress Project

About 0.2 mile of an MXP access road would cross a conservation easement on the Lantz Farm and Nature Preserve, in the vicinity of MP 29.0 in Wetzel County. The property is owned by the Wheeling Jesuit University and cooperatively managed by the WVDNR as a WMA. The property is composed of 555 acres of gently rolling to moderately steep forested woodlands dominated by old growth oak-hickory, cove hardwood forests, and large open fields (WVDNR, 2016g). The property has multiple natural gas developments recently constructed or proposed to be constructed, including gas wells, gathering/production pipelines, and other transmission lines. The conservation easement that binds the property does not specifically restrict a natural gas pipeline. Columbia Gas proposes to use an existing road (National Conservation Easement Database, 2016) to access the construction area. Columbia Gas met with the WVDNR on September 7, 2016, to discuss the project and the current proposed route. Based on the meeting, it appears that Columbia Gas and the WVDNR can successfully execute a license agreement for the current proposed route or the route with slight modifications. Columbia Gas would continue to work with the WVDNR to finalize the route. Once finalized, Columbia Gas would provide us with an update and summarize the associated impacts.

4.8.2.3.2 Gulf XPress Project

No conservation easements are in place on lands affected by the GXP.

4.8.2.4 Natural, Recreational, or Scenic Rivers and Trails

4.8.2.4.1 Mountaineer XPress Project

The MXP would not cross any current or proposed candidate state or federal wild or scenic rivers or be located within the Coastal Zone as established in the CZMA. The project would, however, cross the Little Kanawha River and the Mud River, which are both listed in the NRI. Columbia Gas consulted with the NPS regarding these crossings.

The MXP would cross the Little Kanawha River within a 30-mile segment of the waterway listed on the NRI as having historic value (NPS, 2011). This river segment includes the Burning Springs Complex, a historic district listed on the NRHP. The Burnings Springs Complex was the site of the world's second oil field. The Little Kanawha River crossing point (MP 94.8 in Wirt County) is approximately 5 river miles upstream of the Burning Springs Complex historic district. The MXP would not be expected to significantly impact the downstream historic district or other historic values associated with the Little Kanawha River. Additional details regarding cultural investigations are included in section 4.10.1.

The crossing of the Mud River (approximate MP 163.4 in Cabell County) is within a segment of the river designated as having historic value associated with the Mud River Covered

Bridge, a National Historic Landmark (NPS, 2011). Since being listed as a National Historic Landmark, the bridge has been moved from its original location on the Mud River to an isolated pond within the Cabell County Fairgrounds in Milton, West Virginia. The current location of the bridge is approximately 1.5 miles north of the proposed Mud River crossing (WVDOT, 2016a). The MXP would not be expected to significantly impact the historic values associated with the Mud River. Additional details regarding architectural investigations are included in section 4.10.1.1.2.

The MXP would cross several recreational trails managed by state, local, and private entities (see table 4.8-7). The WVDNR manages trails throughout the state, including trails located within WMAs. Within the Lewis Wetzel WMA, the MXP would cross four designated trails and is within 0.25 mile of two additional trails. These trails are consistent with the aforementioned purposes of the WMAs to promote recreational activities. The MXP would also cross the North Bend Trail, which is a 72-mile-long rail-trail managed by the WVDNR for multi-use recreational activities (North Bend Rails to Trails Foundation Inc., 2016).

**Table 4.8-7
Trails Crossed or within 0.25 mile of the Mountaineer XPress Project a/**

Trail Name	Ownership	Begin Milepost or Nearest Milepost	End Milepost	Miles Crossed	Primary Use	Trail Surface
Project Facilities						
MXP-100						
Warrior Trail	Warrior Trail Association	2.1	2.3	0.1	Unknown	Dirt/grass
Locust Ridge Trail	WVDNR	30.2	30.3	0.3	Unknown	Dirt/grass
Eckleberry Trail	WVDNR	30.3	30.3	<0.1	Recreation	Dirt/grass
Cale Run Trail	WVDNR	32.1	N/A	N/A	Recreation	Dirt/grass
North Bend Rail Trail	WVDNR	48.7	48.7	<0.1	Recreation	Asphalt/gravel
Log Haul Road Trail	Roane-Jackson Technical Center	114.3	N/A	0	Recreation	Gravel
Bryant Trail	Roane-Jackson Technical Center	114.2	N/A	0	Recreation	Dirt/grass
Groscup Trail	Roane-Jackson Technical Center	114.3	N/A	0	Recreation	Dirt/grass
Davisson Trail and Loop Trail	West Virginia Division of Natural Resources	114.3	114.3	0	Recreation	Dirt/grass
Subtotal				0.3	--	--
Contractor Yards/Pipe Yards						
Sportsman Park Walking Trail	Wirt County Commission	<0.1 mile NE of Yard 125	N/A	0	Unknown	Asphalt
Elk River Compressor Station						
Elk River Water Trail	Elk River Water Trail Group	<0.1 mile S of Elk River CS	N/A	0	Unknown	Water
Clendenin Walking Trail	Unknown	<0.1 mile S of Elk River CS	N/A	0	Unknown	Gravel
Subtotal				0	--	--
Access Roads						
Hickory Ridge Trail	WVDNR	28.2	28.2	0.5	Recreation	Dirt/grass
Oak Ridge Trail	WVDNR	28.9	28.9	1.0	Recreation	Dirt/grass
Sees Run Trail	WVDNR	29.0	29.0	<0.1	Unknown	Dirt/grass
Locust Ridge Trail	WVDNR	29.9	29.9	0.6	Unknown	Dirt/grass
Unnamed Trail	WVDNR	29.9	29.9	0.6	Unknown	Dirt/grass
Laurel Run Trail	WVDNR	30.1	30.1	<0.1	Recreation	Dirt/grass
Huss Pen Run Trail	WVDNR	30.8	30.8	0	Unknown	Dirt/grass
Eckleberry Trail	WVDNR	30.8	30.8	<0.1	Recreation	Dirt/grass
Laurel Patch Trail	WVDNR	30.8	30.8	<0.1	Unknown	Dirt/grass
North Bend Rail Trail	WVDNR	69.0	69.0	<0.1	Recreation	Asphalt/gravel
Subtotal				2.3	--	--
Total				2.6	--	--
a N/A = within 0.25 mile but not crossed by the project.						

In addition to the state-maintained trails, the MXP-100 would cross a 2-mile-long nature trail owned by the Roane-Jackson Technical Center and used for outdoor learning associated with the technical center and general recreation (Roane-Jackson Technical Center, 2016). In Marshall County, the MXP would also cross the 67-mile-long Warrior Trail, which is managed by the River Town Program to promote outdoor recreation and sustainability (River Town Program, 2016).

Construction of the MXP could temporarily impact the quality of trail user's recreational experience, as well as affect visual elements for trail users hiking in areas near project construction activities. These impacts would be limited to the active construction periods. Columbia Gas would work with the respective trail management agencies to develop site-specific crossing methods and restoration plans for each trail crossing. Site-specific restoration plans may include installation of visual screening, such as special plantings.

Columbia Gas would work with the respective trail management agency to establish safety protocols at each crossing. These protocols may include installation of safety fencing, informational signs/placards, and stationing of personnel at each side of the trail crossing to assist trail users through the construction work area during active construction periods. Columbia Gas would make efforts to alert recreational users of trails and other recreation areas of the anticipated time and duration of disruptions associated with construction. Columbia Gas would work with the agency or trail steward to determine the most efficient method for notification. Such notifications could include mailings, an informational notice posted on the management agency's website, advertisements in local media, and/or notices posted in public areas.

4.8.2.4.2 Gulf XPress Project

The GXP would not affect any current or proposed candidate state or federal wild and scenic rivers or be located within the Coastal Zone as established in the CZMA.

4.8.3 Visual Resources

“Visual resources” refers to the composite of basic terrain features, geologic features, hydrologic features, vegetation patterns, and anthropogenic features that influence the visual appeal of an area for residents or visitors. The visual quality or character of the landscape is the baseline against which the visual effects of a proposed action or its alternative are measured. Existing visual character is used as a point of reference to determine if a proposed project would be compatible or inconsistent with the existing visual character of an area.

The MXP would cross state and privately owned lands. No federal lands or national- or state-designated wild or scenic rivers would be crossed. The GXP facilities are all located on private lands and, except for the Cane Ridge Compressor Station site, within rural, agricultural areas. The Cane Ridge site is in a rural-residential and suburban area.

4.8.3.1 Mountaineer XPress Project

The MXP facilities would cross a range of visual landscapes, including mountainous areas, mosaics of forest and farmland, and low-density residential development. Surface mining activities are common in the northern portions of the project area, resulting in sections of highly modified landscapes with original contours often leveled and deforested or partially reforested.

4.8.3.1.1 Pipeline Facilities

A portion of the pipeline (about 22 percent) would be co-located with existing utility rights-of-way. As a result, the visual resources along this portion of the project have been previously affected by other similar activities. Visual impacts associated with the construction right-of-way and extra workspaces include the removal of existing vegetation and the exposure of bare soils, as well as earthwork and grading scars associated with heavy equipment tracks, trenching, blasting (if required), and temporary machinery and tool storage. Other visual effects could result from the removal of large individual trees that have intrinsic aesthetic value; the removal or alteration of vegetation that may currently provide a visual barrier; or landform changes that introduce contrasts in visual scale, spatial characteristics, form, line, color, or texture.

Visual impacts would be greatest where the pipeline route parallels or crosses roads and the pipeline right-of-way may be seen by passing motorists; from residences where vegetation used for visual screening or for ornamental value is removed; and where the pipeline is routed through forested areas. The duration of visual impacts would depend on the type of vegetation that is cleared or altered. The duration of impact from clearing would be shortest in open areas where the re-establishment of vegetation following construction would be relatively rapid (generally less than 5 years). The duration would be greater in forested land, which would take many years to regenerate. The greatest potential visual impact would result from the removal of large specimen trees, which would take longer than other vegetation to regenerate and would be prevented from re-establishing on the permanent right-of-way.

Approximately 130 miles of the 170 miles of the proposed pipelines would pass through forested areas. There would be a permanent change in the visual appearance to forested lands within the permanent easement (50 feet wide for the pipelines), because the permanent easement would be maintained in an herbaceous state for pipeline surveillance and operations purposes. After construction, all disturbed areas would be revegetated in accordance with the ECS, and areas outside of the permanent right-of-way would be allowed to return to pre-construction conditions in compliance with federal, state, and local permits; landowner agreements; and Columbia Gas's easement requirements. Completion of the project would result in a permanent visual corridor through forested areas.

4.8.3.1.2 Aboveground Facilities

The visual effects of constructing the aboveground facilities would be similar to the construction impacts discussed above, and the new aboveground structures would result in a permanent visual impact throughout the operational life of the project. The impacts on visual resources from each individual facility would depend on the preconstruction condition and the visibility from the surrounding area. The compressor stations, in general, would include a paved access road, control building, auxiliary building, and compressor building, as well as a stack. Additionally, all facilities include a security chain link fence around the perimeter of the permanent facility, which is typically about 8 feet high. The lighting system for compressor stations, in general, include lighting around the compressor station operations, security lighting around the periphery, and emergency lighting, used as backup in the event of a power outage from weather events or interrupted service from the electricity provider.

New aboveground facilities for the MXP include the Sherwood Compressor Station in Doddridge County, the White Oak Compressor Station in Calhoun County, and the Mount Olive Compressor Station in Jackson County. As new facilities, these stations would have the highest potential to result in visual impacts. Columbia Gas conducted a viewshed analysis of the three compressor station sites. Appendix M-1 includes maps depicting where the tallest portion of each compressor station would be visible from the ground, assuming no vegetative cover would hinder the view.

The Sherwood site is near a cluster of low-density residential development. The nearest residential structure to the station property is approximately 412 feet west and is part of the property Columbia Gas has acquired. This additional acreage would act and be maintained as a visual buffer between the neighboring parcels and the compressor stations, and would lessen the impact on the viewsheds of the adjacent residential structures.

In addition to nearby residences, the Sherwood Station is about 250 feet from the Doddridge County Park. Columbia Gas intends to maintain the approximately 225 feet of existing forested buffer area between the Sherwood station and the park, which would largely mitigate visual concerns. Additionally, Columbia Gas would work with the park to address visual concerns regarding the proximity of the station to the park.

The White Oak Compressor Station site is in a rural area of Calhoun County on a forested parcel. The closest residential structures to the site are between 500 and 700 feet away. Similar to the Sherwood station site, mature vegetation surrounds the White Oak site, mitigating potential visual impacts. Due to the rural nature of the area and the existing natural screening, it is unlikely that the White Oak station would significantly alter the visual landscape of the area around which the facility is proposed.

The Mount Olive Compressor Station site is on a wooded parcel between Parkersburg Road and I-77. A residential area is within 950 feet of the station property. This site, similar to the other compressor station sites, has significant mature vegetation, which would provide visual screening between the facility and the residential development. Due to the location of I-77 on the eastern property line, the facility can be placed away from residential structures, providing a minimum of 100 feet of vegetation buffer. Given the ability to screen the facility from the adjacent residential development, it is unlikely that the station would have a significant visual impact on nearby residences.

Modifications to the existing Ceredo and pending Elk River stations would not expand the facilities beyond their existing footprint, and, therefore, only minor incremental additional visual impact would result from the modifications. Additionally, the Ceredo and Elk River stations are located near existing natural gas and other existing public utility facilities, which would limit the visual impact of the construction and operation of these facilities.

4.8.3.2 Gulf XPress Project

During construction, the visual impacts associated with the GXP would be from the presence of construction equipment and clearing, grading, and facility erection activities at the compressor station sites. Following the completion of construction, an aboveground facility

consisting of structures, lighting, fencing, valves, and piping would become a permanent part of the landscape. Columbia Gulf would develop site-specific landscape plans for all the new stations to provide visual screening where visual impacts would be more prominent. Modifications to the approved Grayson Compressor Station and the existing Leach C Meter Station would not expand the facilities beyond their existing footprint and, therefore, only incremental additional visual impact would result from the modifications.

Nighttime lighting could also contribute to visual impacts. Outdoor lighting would be installed at the seven compressor stations to provide adequate illumination for personnel safety and facility security. Outdoor lighting would be designed and constructed in accordance with applicable codes and Columbia Gulf requirements. During public scoping, we received a comment about existing light issues at the Leach C Meter Station. There would be no additional light installations at the facility. As noted in Columbia Gulf's April 21, 2017, comments on the draft EIS, the existing facility lights are operated with a switch that is only turned on when personnel are on site (with the exception of emergency lighting that is activated during loss of power).

During public scoping, we received comments regarding concerns with visual impacts at the Morehead, Paint Lick, and Cane Ridge Compressor Stations.

For the Cane Ridge site, Columbia Gulf conducted a viewshed analysis and developed a visual simulation as seen from various locations along Barnes Road, including views from Stanford Village and Black Pool Drive. The visual simulation includes conceptual buildings and landscaping. The simulation is available via the internet and can be viewed at <https://vimeo.com/157226097>. Columbia Gulf would incorporate design aspects similar to those included in the simulation to reduce visual impacts from the Cane Ridge station. Columbia Gulf intends to use its standard colors (primarily Columbia green) and architectural designs, supplemented by landscaping. Columbia Gulf also intends to maintain the natural vegetative buffer between the facility and the surrounding community to the extent practicable.

Columbia Gulf conducted a viewshed analysis to evaluate current conditions and potential visual impacts on nearby residences at the Morehead, Paint Lick, and Cane Ridge Compressor Stations. Appendix M-2 includes maps depicting where the tallest portion of each compressor station would be visible from the ground, taking existing topography, vegetation, and residences into account.

Columbia Gulf also conducted a visual assessment for the Morehead, Paint Lick, and Cane Ridge Compressor Stations, which was filed to the docket (CP16-361) on November 3, 2016. For all three compressor stations, Columbia Gulf assessed the current conditions and potential visual impacts on sensitive features near the compressor stations. Sensitive features include residential and recreational land use areas. Transportation corridors, agricultural fields, and commercial use areas were not considered sensitive areas. The assessments took into account a 2-mile-wide buffer around each station to capture the areas in which a visual impact could occur. Visual impacts on sensitive features would occur at each of the three compressor stations. Additionally, night-time lighting would increase the visibility of the compressor stations from sensitive views.

Columbia Gulf proposed the following mitigation in its visual assessment:

- Maintain the exterior color of proposed buildings in “Columbia Green” which would help the facilities blend into the existing vegetation color.
- Paint the exhaust stack of the turbine a non-reflective neutral gray, which, when viewed against the background sky, would minimize the visual contrast.
- Implement a landscape plan to screen the facility along its boundary to sensitive features. The landscape plan would include plantings of native evergreen shrubs and trees in certain areas.
- Establish a lighting plan that conforms to applicable regulatory requirements, but also minimizes light pollution in the surrounding environment.

The Cane Ridge Compressor Station visual assessment identified residences along Barnes Road, residences within the Mill Run subdivision, and residences along Hidden Creek Drive that may have a view of the compressor station. Based on the analysis, the most visible part of the compressor station would be the exhaust stack; however, portions of compressor station buildings may be visible above the trees, through gaps in vegetation, or during winter months when leaves have fallen. As previously stated, the facilities and buildings would be painted “Columbia Green” to help blend into the background. The stack would be painted a neutral gray to help blend in to the sky. Landscaping would be established along Barnes Road to shield the security fencing. Outdoor lighting at the facility would be aimed inward to reduce light pollution beyond the facility fencing. Additionally, dark-sky compliant lighting would be installed to further reduce light pollution. We find this plan acceptable.

In order to address existing lighting issues at the Leach C Meter Station, **we recommend that:**

- **Prior to construction, Columbia Gulf should perform a nighttime site visit to the Leach C Meter Station to evaluate stray lighting that may be disruptive to its neighbors. If existing lighting can be angled in a direction that it is no longer a nuisance to the adjacent residence, Columbia Gulf should consider making an adjustment, provided it does not jeopardize the safety and security of the facility operations, and file a report with the Secretary identifying proposed lighting modifications.**

4.8.3.3 Conclusion

4.8.3.3.1 Mountaineer XPress Project

Land use-related impacts associated with the MXP would include the disturbance of existing uses within the rights-of-way during construction and maintenance of new permanent rights-of-way for operation of the pipelines. Additional land would be disturbed by construction of the aboveground facilities, and land within the facility footprints would be permanently retained for operation. The primary land use types impacted would be forested, agricultural land, and open lands. In forested areas, trees and shrubs would be removed from the construction work areas, and the maintained portion of the rights-of-way would be permanently converted to a non-forested condition. Land outside of the permanent pipeline easement would be allowed to revert to its prior condition, although this process would take many years. Impacts on agricultural lands would be

short-term and limited to the growing season concurrent with construction. Following construction, agricultural practices within the pipeline rights-of-way would be allowed to resume. Impacts on open land areas would be temporary and short-term, and would be minimized by the implementation of Columbia Gas's ECS. Open land areas within the temporary and permanent rights-of-way are expected to revert to their preconstruction land use after completion of construction. However, some activities, such as the building of new structures, would be prohibited on the permanent rights-of-way.

Columbia Gas' proposed construction work areas would be located within about 50 feet of almost 70 houses. To address impacts on residences, Columbia Gas developed site-specific construction plans for each of the residences. These plans identify the mitigation measures to be implemented by Columbia Gas to promote safe and efficient installation of the pipelines with limited impacts on landowners. We have also added a recommendation to ensure impacts on two structures within the MXP work area are avoided or minimized.

In general, project impacts on recreational and special interest areas would be temporary and limited to the period of active construction. These impacts would be minimized by implementation of Columbia Gas' ECS.

The primary visual effects of constructing the MXP facilities would include the removal of existing vegetation and the temporary storage of machinery and tools. After construction, disturbed areas would be revegetated in accordance with Columbia Gas' ECS. There would be a permanent change in the visual appearance to forested lands within the permanent easement, because they would be maintained in an herbaceous state for pipeline surveillance and operations purposes. The new aboveground structures would result in a permanent visual impact throughout the operational life of the project, although this impact is not expected to be significant due to the visual buffering provided by wooded areas at each location. The impacts on visual resources from each individual facility would depend on the preconstruction condition and the visibility from the surrounding area.

4.8.3.3.2 Gulf XPress

Land use-related impacts associated with the GXP would include temporary and permanent disturbance at new and existing aboveground facilities. Once construction is complete, land within the facility footprints would be permanently retained for operation. The primary land use types impacted during construction would be agricultural, forested, open land, and developed land. Areas used for TWS at each facility would be restored and maintained as open land or allowed to revert to pre-construction land use cover. No permanent impacts would occur as a result of the modifications at the approved and existing stations, as the facility footprints would not be expanded and the present visual character would not be changed. No residences are within 50 feet of either the temporary or permanent workspace of any of the facilities.

The GXP facilities would be within 0.25 mile of two publicly owned lands, the DBNF and the Malmaison WMA. The GXP would not affect the recreational use or experience of the DBNF. The GXP could result in temporary and visual impacts on the Malmaison WMA. However, the presence of forested areas between the compressor station site and the WMA would provide visual screening.

The new aboveground structures would result in a permanent visual impact throughout the operational life of the project. Columbia Gulf's Visual Impact Assessment is available in appendix M-2 (public version; i.e., without critical energy infrastructure information included).

4.9 SOCIOECONOMICS

Construction and operation of the MXP and GXP could result in socioeconomic effects in the communities where the facilities would be located. These effects could be negative or positive and may include increased demand for housing or public services; increased employment; localized transportation congestion; and changes in state and local property, sales, and payroll tax collections. We have generally defined the region of influence for this analysis to include the counties containing project facilities. The socioeconomic conditions and effects associated with construction and operation of the MXP in West Virginia and the GXP in Kentucky, Tennessee, and Mississippi are discussed below. Section 4.9.9 contains an evaluation of the potential impact on environmental justice communities.

The MXP facilities would be constructed in 13 counties in West Virginia (listed from north to south): Marshall, Wetzell, Tyler, Doddridge, Ritchie, Calhoun, Wirt, Roane, Jackson, Putnam, Mason, Cabell, and Kanawha.

The GXP would be constructed in Kentucky, Tennessee, and Mississippi. New aboveground compressor facilities in Kentucky would consist of the Paint Lick station in Garrard County, the Goodluck station in Metcalfe County, and the Morehead station in Rowan County. In Tennessee, new compressor facilities would consist of the Cane Ridge station in Davidson County and the Clifton Junction station in Wayne County. New compressor facilities in Mississippi would consist of the New Albany station in Union County and the Holcomb station in Grenada County. The two aboveground facilities to be modified are in Kentucky and consist of the approved Grayson Compressor Station in Carter County and the existing Leach C Meter Station in Boyd County.

4.9.1 Population and Employment

4.9.1.1 Mountaineer XPress Project

Table 4.9-1 provides a summary of relevant demographic and socioeconomic conditions for the communities that would be affected by the MXP. The major occupations throughout the project area are in education and health services; manufacturing; natural resource mining and agriculture; retail trade; and construction. Counties with larger populations have more diverse ranges of labor categories represented. Kanawha, Putnam, and Cabell Counties have the largest populations and the highest percentages of the labor force in the professional and business services category. Additionally, manufacturing represents a large percentage of the labor force in Jackson, Tyler, and Ritchie Counties.

**Table 4.9-1
Existing Socioeconomic Conditions by Geographic Area for the MXP**

Geographic Area	Population Estimate (2015) <u>a/</u>	Population Density (persons / sq. mile) <u>b/</u>	Median Household Income (2010-2014) <u>c/</u>	Unemployment Rate (percent) (2015) <u>d/</u>	Civilian Workforce (2015) <u>d/</u>	Top Three Industries (2010-2014) <u>c/, e/</u>
West Virginia	1,844,128	77.1	\$41,576	6.7	785,049	E,W,A
Marshall County	31,978	108.4	\$41,978	8.4	14,218	E,R,A
Wetzel County	15,816	46.3	\$38,066	10.0	7,193	E,C,R
Tyler County	8,975	35.9	\$39,974	9.4	3,647	E,M,R
Doddridge County	8,176	25.7	\$40,329	5.7	3,638	E,N,R
Ritchie County	9,982	23.1	\$39,118	7.0	4,481	E,M,R
Calhoun County	7,470	27.3	\$31,017	12.5	2,772	E,N,C
Wirt County	5,880	24.6	\$37,117	10.3	2,278	M,E,C
Roane County	14,435	30.9	\$30,104	11.5	5,247	E,N,C
Jackson County	29,237	62.9	\$40,733	7.2	11,962	E,M,R
Mason County	27,037	63.4	\$38,297	8.5	9,966	E,M,R
Putnam County	56,848	160.5	\$55,939	5.5	25,693	E,R,M
Cabell County	96,844	342.8	\$37,716	5.4	41,710	E,R,A
Kanawha County	188,332	214.1	\$46,583	6.0	87,425	E,R,P

Sources:

- a U.S. Census Bureau, 2015.
- b U.S. Census Bureau, 2010.
- c U.S. Census Bureau, 2014.
- d Bureau of Labor Statistics (BLS), 2015.
- e Industries: A = Arts, Entertainment & Recreation; C = Construction; E = Education & Health Services; M = Manufacturing; N = Natural Resource Mining & Agriculture; P = Professional & Business Services; R = Retail Trade; W = Wholesale Trade

The population of the impacted counties range from approximately 5,880 to 188,332 (U.S. Census Bureau, 2015). Population densities vary from approximately 23.1 to 342.8 persons per square mile (U.S. Census Bureau, 2010), and the county-level civilian workforces range from 2,278 in Wirt County to 87,425 people in Kanawha County (Bureau of Labor Statistics [BLS], 2015). Based on the 2010-2014 data, the median household incomes within the affected counties range from \$30,104 to \$55,939, while the median household income for the State of West Virginia is \$41,576. The state unemployment rate in 2015 was 6.7 percent (BLS, 2015). The unemployment rates ranged from 5.4 to 12.5 percent for the affected counties, and four counties (Doddridge, Putnam, Cabell, and Kanawha) had unemployment rates lower than the state average.

The primary population centers in the project area include the Charleston Metropolitan Statistical Area (MSA), Wheeling MSA, and Huntington-Ashland MSA. In addition to the aforementioned, Wirt County is in the Parkersburg-Marietta-Vienna MSA. An MSA is a geographical region with a relatively high population density at its core and close economic ties throughout the area. The Charleston, Huntington-Ashland, Parkersburg-Marietta-Vienna, and Wheeling MSAs are the top four most populated MSAs in the state, with the Charleston metro area having the largest population.

The impacted counties have a diverse range of employers representing both the public and private sector. The Marcellus shale gas industry has a significant presence in the area, particularly in Wetzel County, where 17 percent of West Virginia's shale gas is produced (West Virginia Center on Budget & Policy, 2014). According to the West Virginia Center on Budget & Policy's *Impacts of Gas Drilling in Wetzel County*, the upstream drilling industry represents a major industry, but there has not been a notable increase in regional employment from drilling activities. Thus, despite the pronounced interest and investment in the shale gas industry in the area, it has not had a major impact on the unemployment rates of the counties where the activities are located (West Virginia Center on Budget & Policy, 2014).

In addition to upstream natural gas development, the area is also experiencing growth in the midstream natural gas transmission industry. Within the 12 impacted counties, there are 7 new natural gas transmission pipeline projects, including the MXP, proposed to be completed before the end of 2020. These projects collectively represent a major economic investment in the affected counties.

Despite the reduction of coal mining output statewide, the industry still maintains a large presence in the northern part of the state (West Virginia University, 2015). Coal's primary use is for electric power generation; however, as electric utilities have diversified their generation portfolios away from coal-fired facilities, national consumption of the commodity has continued to decline (West Virginia University, 2015). As a result of the drop in coal mining demand and minimal employment requirements of the shale gas industry, employment levels within this region have declined. The decline has resulted in median household incomes and employment rates generally lower than state averages. The reduction in the importance of coal in electric power generation may contribute to conditions in the project area economy, including population loss, and subsequent loss of available civilian labor force (West Virginia University, 2015).

The three compressor stations to be modified (Ceredo, Elk River, and Lone Oak) are in Wayne, Kanawha, and Marshall Counties, West Virginia. The Ceredo Compressor Station is an existing facility, and the proposed improvements would require a limited construction workforce and would not require additional permanent operations personnel. The impacts from the pending construction of the Elk River Compressor Station were evaluated in conjunction with Columbia Gas's WBX (Docket No. CP16-38-000). For WBX, Elk River would require a peak construction workforce of about 55 to 60 workers with 1 or 2 inspection personnel and an operational workforce of about 4 new employees. For MXP, Columbia Gas would add compression but not enlarge the Elk River facility beyond the proposed footprint associated with WBX, nor would additional permanent staff be required to operate the facility. The approved Lone Oak Compressor Station is associated with Columbia's LXP project (Docket No. CP15-514-000), and impacts were evaluated in conjunction with that project. For LXP, Lone Oak would require a peak construction workforce of about 70 workers with 1 or 2 inspection personnel and an operational workforce of about 4 new employees. Columbia Gas would neither enlarge the Lone Oak facility beyond the proposed footprint associated with LXP, nor require additional permanent staff to operate the facility.

Construction of the MXP would temporarily increase the population in the general vicinity of the project. The peak construction workforce planned for the MXP would be approximately 4,200 workers (see table 4.9-2). The peak construction period would last about 2 to 3 months, and

the total duration of construction would be about 9 to 12 months. The average number of workers per construction spread is estimated to be about 250 to 300 personnel for the duration of construction, and there would be a total of nine spreads. The new compressor stations would require a construction peak workforce of about 400 per station, and work at existing facilities would require a construction workforce of about 50. Construction is currently scheduled by Columbia Gas to begin in November 2017 and be completed by November 2018, although this depends on several important factors, such as receiving a FERC Certificate and other required permits and authorizations. Construction of project facilities would be performed in a phased sequence, with some facility construction occurring concurrently. Once project construction is complete, Columbia Gas anticipates hiring approximately 29 new employees for operation and maintenance of the new aboveground facilities.

Phase / Facility	Total Workforce (number)	Total Duration	Workforce Local / Non-local (percent)
Construction			
Pipeline System	--	9-10 months	50 / 50
Initial	900		
Average	2,500		
Peak	2,900		
Aboveground Facilities		9-12 months	50 / 50
Initial	300		
Average	1,100		
Peak	1,300		
Operations			
Pipeline System	Not applicable	Not applicable	Not applicable
Aboveground Facilities	29	30 years (minimum)	65 / 35

Columbia Gas estimates that total worker payroll would average about \$3.6 million per week per spread. The total for nine pipeline spreads would be \$28.8 million per week.

Columbia Gas estimates that about 50 percent of the construction workforce and 50 to 85 percent of the permanent workforce would be sourced locally. It is Columbia Gas' intent that its contractors employ local union labor; however, if the local workforce is constrained by other commitments, Columbia Gas and its contractors will seek to fill construction positions with others who may not be affiliated with unions or based in West Virginia. Given the rural nature and low population density of the project area, there would be a temporary impact on employment rates in the affected counties as a result of project construction workforce requirements. The southern end of the affected area is better suited to support large projects because the two largest MSAs in the state, Charleston and Huntington, have more labor resources than the rural areas such as Tyler, Calhoun, and Wirt Counties. Given the location of these population centers, it is likely that many local hires for the MXP would come from the Charleston and Huntington MSA areas.

Western West Virginia has experienced higher unemployment and sluggish population growth when compared to the rest of the state. The MXP would temporarily boost employment in this area. The total population change would equal the total number of non-local construction workers plus any family members accompanying them. However, given the brief construction period and based on experience from previous Columbia Gas projects, most non-local construction workers would not be expected to be accompanied by their families. Based on the county populations within the project area, the additional people that might temporarily relocate to the area would not result in a significant change. Additionally, this temporary increase in population would be distributed along the length of the project and would not have a permanent impact on the population. A brief (1-year) decrease in the unemployment rate could occur as a result of hiring local workers for construction and increased demands on the local economy for goods and services.

As listed in table 4.9-2, the MXP would require a substantial construction workforce which would contribute favorably to the region by consuming goods and services offered by local businesses. During construction, the project area economy may see a temporary boost, as short-term construction personnel contribute to the local economy by purchasing consumer goods and food and paying for living expenses. After the roughly yearlong construction duration, however, operational impacts on the local economy would be much smaller, as only 29 permanent employees are anticipated for project operation. These 29 employees likely would have a positive but negligible impact on the local economy.

4.9.1.2 Gulf XPress Project

Table 4.9-3 provides a summary of selected demographic and socioeconomic conditions for the counties that would be affected by the GXP in Kentucky, Tennessee, and Mississippi. The major occupations throughout the project areas are in education and health services, manufacturing, and retail trade.

State / County	Population Estimate (2015) <u>a/</u>	Population Density (Persons / sq. mile) <u>b/</u>	Median Household Income (2010- 2014) <u>c/</u>	Unemployment Rate 2015 (percent) <u>d/</u>	Civilian Workforce (2015) <u>d/</u>	Top Three Industries (2010-2014) <u>c/, e/</u>
Kentucky	4,425,092	109.9	\$43,342	5.4	1,953,393	E,M,R
Boyd	48,325	309.9	\$41,739	7.0	18,211	E,R,A
Carter	27,158	67.7	\$37,139	10.0	10,118	E,R,M
Garrard	17,237	73.5	\$44,304	5.2	7,492	E,M,C
Metcalfe	9,909	34.9	\$30,453	5.3	4,004	M,E,R
Rowan	23,892	83.4	\$40,697	6.0	10,279	E,R,M
Tennessee	6,600,299	153.9	\$44,621	5.8	3,062,775	E,M,R
Davidson	678,889	1,243.3	\$47,434	4.5	364,254	E,A,P
Wayne	16,748	23.2	\$31,225	7.4	6,311	E,M,R
Mississippi	2,992,333	63.2	\$39,464	6.5	1,272,657	E,M,R
Grenada	21,578	51.9	\$33,067	6.1	9,549	M,E,R
Union	28,429	65.3	\$35,389	5.2	13,347	M,E,R
Sources:						
a U.S. Census Bureau, 2015.						
b U.S. Census Bureau, 2010.						
c U.S. Census Bureau, 2014.						
d BLS, 2015.						
e Industries: A = Arts, Entertainment & Recreation; C = Construction; E = Education & Health Services; M = Manufacturing; P = Professional & Business Services; R = Retail Trade						

The GXP station sites are geographically separated from one another; therefore, nine unique localities were analyzed. Generally, the station sites are in rural areas with population densities less than the statewide averages, except for the Cane Ridge site in Davidson County, Tennessee, near Nashville, the largest metropolitan area in the state.

The populations of the five counties in Kentucky affected by project construction range from 9,909 to 48,325 (U.S. Census Bureau, 2015). Population densities in these counties vary from approximately 35 to 310 people per square mile (U.S. Census Bureau, 2010), and the county-level civilian workforces range from 4,004 to 18,211 people (BLS, 2015). Unemployment rates within the affected Kentucky counties range from 5.2 to 10.0 percent (BLS, 2015). Based on the 2010-2014 data, the median household incomes for these counties range from \$30,453 to \$44,304.

In Tennessee, two counties would be affected by project construction: Davidson and Wayne Counties. Davidson is the second largest population center in the state and is part of the Nashville-Davidson-Murfreesboro-Franklin MSA, the largest MSA in the state and with more than 1,700,00 residents. Davidson County has a population of 678,889, a population density of 1,243 people per square mile, an unemployment rate of 4.5 percent, and a median household income of \$47,434 (U.S. Census Bureau, 2010, 2014, 2015; BLS, 2015). Wayne County is considerably more rural with a population of 16,748, a population density of 23.2 people per square mile, an unemployment rate of 7.4 percent, and a median household income of \$31,225 (U.S. Census Bureau, 2010, 2014, 2015; BLS, 2015).

Grenada County and Union County would be affected by project construction in Mississippi. Grenada County has a population of 21,578, a population density of 51.9 people per square mile, an unemployment rate of 6.1 percent, and a median household income of \$33,069 (U.S. Census Bureau, 2010, 2014, 2015; BLS, 2015). Union County has a population of 28,429, a population density of 65.3 people per square mile, an unemployment rate of 5.2 percent, and a median household income of \$35,389 (U.S. Census Bureau, 2010, 2014, 2015; BLS, 2015).

Construction of the GXP would temporarily increase the population in the general vicinity of each compressor or meter station site. Columbia Gulf anticipates that there would be a peak workforce of approximately 120 contractor personnel and approximately 20 inspection personnel for a total peak workforce of approximately 140 temporary workers for construction at each new station site (see table 4.9-4). There would be a peak workforce of 24 to 30 workers for the modifications at the approved Grayson Compressor Station and a peak workforce of 16 to 24 workers for the modifications at the existing Leach C Meter Station. The workforce would fluctuate from the commencement of the project to completion (see table 4.9-5). Construction is currently scheduled by Columbia Gulf to begin in October 2017 and be completed by November 2018, with activities conducted concurrently. However, we note that this depends on several important factors, such as receiving a FERC Certificate and other required permits and authorizations. Once construction of the project is complete, Columbia Gulf anticipates hiring approximately 14 new employees (2 persons for each new compressor station) for operation and maintenance of the new GXP aboveground facilities.

Table 4.9-4 Estimated Workforce and Work Schedule for the GXP			
Aboveground Facilities	County	Duration	Peak Workforce
New Compressor Stations			
Kentucky			
Morehead	Rowan	10 months	140
Paint Lick	Garrard	10 months	140
Goodluck	Metcalfe	10 months	140
Tennessee			
Cane Ridge	Davidson	10 months	140
Clifton Junction	Wayne	10 months	140
Mississippi			
New Albany	Union	10 months	140
Holcomb	Grenada	10 months	140
Modifications to Facilities			
Kentucky			
Approved Grayson Compressor Station	Carter	3 to 3.5 months	24 to 30
Existing Leach C Meter Station	Boyd	2 to 3 months	16 to 24

**Table 4.9-5
GXP Estimated Workforce**

Months	Construction Site													
	Morehead Compressor Station		Pant Lick Compressor Station		Goodluck Compressor Station		Cane Ridge Compressor Station		Clifton Junction Compressor Station		New Albany Compressor Station		Holcomb Compressor Station	
	Non-local	Local	Non-local	Local	Non-local	Local	Non-local	Local	Non-local	Local	Non-local	Local	Non-local	Local
Construction														
Month 1	18	2	18	2	18	2	18	2	18	2	18	2	18	2
Month 2	108	12	108	12	108	12	108	12	108	12	108	12	108	12
Month 3	126	14	126	14	126	14	126	14	126	14	126	14	126	14
Month 4	126	14	126	14	126	14	126	14	126	14	126	14	126	14
Month 5	126	14	126	14	126	14	126	14	126	14	126	14	126	14
Month 6	126	14	126	14	126	14	126	14	126	14	126	14	126	14
Month 7	107	13	107	13	107	13	107	13	107	13	107	13	107	13
Month 8	72	8	72	8	72	8	72	8	72	8	72	8	72	8
Month 9	45	5	45	5	45	5	45	5	45	5	45	5	45	5
Month 10	27	3	27	3	27	3	27	3	27	3	27	3	27	3
Operation	2	--	2	--	2	--	2	--	2	--	2	--	2	--

Based on recent experience on other projects, Columbia Gulf estimates that about 10 percent of the construction workforce at each compressor station site would be local hires, while the remaining 90 percent would be workers with specialized skills who would temporarily relocate to the project area. Given the geographic distance between each of the stations, the peak workforce planned for each of the facilities is unlikely to have a significant impact on the population of each area.

The total population change would equal the total number of non-local construction workers plus any family members accompanying them. Given the brief construction period and based on experience from previous Columbia Gulf projects, most non-local workers would not be expected to be accompanied by their families. The temporary relocation of 140 workers to each of the affected counties is unlikely to result in a significant change in the population level of any given project area. The estimated two new full-time workers per facility that would be hired to operate the facilities would likely not be local. However, the relocation of these workers and their families to the project area would have a negligible impact on the population of the affected counties.

4.9.2 Housing

4.9.2.1 Mountaineer XPress Project

The workforce required to construct the MXP would temporarily decrease the availability of housing in the area. The project could have a short-term positive impact on the area rental industry through increased demand and higher rates of occupancy; however, no significant long-term impacts on the local housing markets would be expected. About half of the construction personnel would be transient and need accommodations to satisfy temporary work assignments. Therefore, temporary housing would be needed during the approximately 1-year construction phase of the project. These housing types include rental units, hotels and motels, campgrounds, and recreational vehicle (RV) parks.

Housing statistics for the counties affected by the MXP are presented in table 4.9-6. The 5-year average (2010-2014) number of vacant housing units across the potentially affected counties ranged from a high of 9,907 vacant units in Kanawha County to a low of 695 vacant units in Calhoun County (U.S. Census Bureau, 2016c). Rental vacancy rates varied from 3.4 percent in Wirt County to 8.7 percent in Wetzel County. Kanawha and Cabell Counties, which contain the two largest cities in the state (Charleston and Huntington), have the largest number of hotels in the project area.

For non-local construction workers, the existing temporary housing stock available for the project would be sufficient. Assuming that about 50 percent of the construction workforce would be non-local, temporary housing for 2,100 workers would be needed during peak construction. Given the rental vacancy rates (3.4 to 8.7 percent) and the number of vacant housing units in the counties that would be affected by the project (33,090 units), construction crews should not encounter difficulty in finding temporary housing. At a maximum, the workforce would utilize about 6.3 percent of the vacant housing units. In addition, 68 hotels/motels and 15 RV parks/campgrounds are in the affected counties and could house some of the temporary workforce. The exclusive use of the hotels/motels and RV parks/campgrounds could strain these businesses' ability to cater to tourists in the area. Given that there is a significant inventory of rental properties

available, Columbia Gas would work with construction contractors to encourage the temporary workforce to use the diverse availability of housing across the project area.

Based on the availability of housing, the demand from the estimated 29 new permanent employees required for the MXP would have no measurable impact on housing stocks in the project area.

**Table 4.9-6
Housing Statistics by County in the Vicinity of the MXP**

County	Owner Occupied <u>a/</u>	Renter Occupied <u>a/</u>	Median Monthly Owner Occupied Housing Costs <u>a/</u>	Median Monthly Renter Occupied Housing Costs <u>a/</u>	Vacant Housing Units <u>a/</u>	Rental Vacancy Rate (percent) <u>a/</u>	Number of Hotels/ Motels <u>b/</u>	Extended Stay RV Parks / Campgrounds (number) <u>b/</u>
Marshall	10,691	3,156	\$846	\$513	2,019	7.4	4	0
Wetzel	5,724	1,460	\$827	\$509	1,414	8.7	5	0
Tyler	2,996	754	\$786	\$484	1,243	5.2	1	1
Doddridge	2,339	422	\$817	\$537	1,179	7.5	0	0
Ritchie	3,175	848	\$741	\$554	1,806	7.1	2	1
Calhoun	2,466	646	\$647	\$500	695	6.6	1	1
Wirt	1,999	426	\$748	\$481	840	3.4	0	0
Roane	4,471	1,431	\$876	\$487	1,483	7.9	3	0
Jackson	8,674	2,568	\$907	\$558	2,046	6.4	5	3
Mason	8,686	2,043	\$788	\$493	2,261	8.4	2	4
Putnam	17,807	3,646	\$1,159	\$744	2,155	5.6	6	0
Cabell	24,380	15,840	\$985	\$647	6,042	6.2	14	3
Kanawha	58,104	24,427	\$988	\$688	9,907	6.3	25	2

a U.S. Census Bureau, 2014.

b Cabell Huntington Convention and Visitors Bureau, 2016; RVParking.com, 2016; West Virginia Department of Commerce, 2016; Charleston Convention and Visitors Bureau, 2016.

4.9.2.2 Gulf XPress Project

Housing statistics for the counties affected by the GXP are presented in table 4.9-7. Temporary housing availability varies geographically within the counties near the station sites. Temporary housing is available in the form of daily, weekly, or monthly rentals in hotels and motels. In 2014, the number of vacant housing units across the nine affected counties in Kentucky, Tennessee, and Mississippi ranged from a high of 28,267 units in Davidson County, Tennessee, to a low of 753 vacant units in Metcalfe County, Kentucky. Rental vacancy rates varied from 38.9 percent in Grenada County, Mississippi, to 2.5 percent in Metcalfe County, Kentucky.

In addition to vacant housing, numerous hotels/motels and campgrounds/RV parks are in the project areas. Tennessee has the highest number of hotels/motels and campgrounds/RV parks at a combined total of 334, compared to Kentucky with a combined total of 31 and Mississippi with a total of 17. Davidson County in Tennessee has the highest number of hotels/motels at 320 units, compared to Garrard County in Kentucky, which doesn't have any.

Construction of the GXP could temporarily decrease the availability of housing in the station site areas. The project could have a short-term positive impact on the area rental industry through increased demand and higher rates of occupancy; however, no long-term negative impacts on the local housing markets would be expected. A portion of the construction personnel would be transient and may need accommodations to satisfy temporary work assignments. Therefore, temporary housing would be needed during the construction phase of the project. These housing types include rental units, hotels and motels, campgrounds, and RV parks.

For non-local construction workers, the existing temporary housing stock available in the nine affected counties would be sufficient to meet demand. Assuming that about 90 percent of the construction workforce would be non-local, temporary housing for 126 workers would be needed during peak construction at each station site. Given the rental vacancy rates (2.5 to 38.9 percent) and the number of vacant housing units in the counties that would be affected by the project (7,308 in Kentucky, 29,521 in Tennessee, and 3,932 in Mississippi), construction crews should not encounter difficulty in finding temporary housing. In a worst-case, the GXP workforce would utilize about 17 percent of the vacant housing units (126 of the 753 vacant units) in Metcalfe County, Kentucky. In addition, there are 358 hotels/motels and 24 RV parks/campgrounds combined in the affected counties that could house the temporary workforce. The exclusive use of the hotels/motels and RV parks/campgrounds could strain these businesses ability to cater to tourists in the area. Given that there is a significant inventory of rental properties available, Columbia Gulf would work with construction contractors to encourage the temporary workforce to use the diverse availability of housing across the project area.

The estimated 14 new permanent employees required for the GXP would not have a substantial impact on housing stocks in the project area spread across three states.

**Table 4.9-7
Housing Statistics by County in the Vicinity of the GXP**

County	Owner Occupied Housing Units 2014 (number) <u>a/</u>	Occupied Rental Units 2014 (number) <u>a/</u>	Median Owner Occupied Housing Costs (\$/month) <u>a/</u>	Median Renter Occupied Housing Costs (\$/month) <u>a/</u>	Total Vacant Housing Units 2014 (number) <u>a/</u>	Rental Vacancy Rate (percent) <u>a/</u>	Number of Hotels/ Motels (number) <u>b/</u>	Extended Stay RV Parks / Campgrounds (number) <u>c/</u>
Kentucky								
Boyd	13,497	6,036	982	602	2,195	6.8	12	1
Carter	8,160	2,365	916	559	1,762	3.0	4	1
Garrard	5,036	1,531	1,121	632	893	6.9	0	1
Metcalfe	2,974	944	803	512	753	2.5	1	0
Rowan	5,494	2,913	979	635	1,705	12.7	7	4
Tennessee								
Davidson	140,219	119,338	1,371	859	28,267	6.2	320	11
Wayne	4,938	1,080	799	470	1,254	6.0	2	1
Mississippi								
Grenada	5,704	1,877	896	535	2,592	38.9	8	5
Union	7,394	2,898	940	676	1,340	11.8	4	0

Sources:

a U.S. Census Bureau, 2014.

b Kentucky Department of Travel and Tourism, 2016; HVS Global Hospitality Service, 2016; Tennessee Department of Tourism Development, 2016; Visit Mississippi, 2016.

c RVParking.com, 2016.

4.9.3 Public Services

4.9.3.1 Mountaineer XPress Project

Public services and facilities in each county in the project area include full-service law enforcement, paid and volunteer fire departments, schools, and hospitals. Table 4.9-8 provides an overview of selected public services available in the affected counties.

County	Number of Fire Departments <u>a/</u>	Number of Police Precincts / Departments <u>b/</u>	Number of Schools (students enrolled) <u>c/</u>	Number of Hospitals (number of beds) <u>d/</u>
Marshall	12	7	13 (4,821)	1 (99)
Wetzel	10	3	8 (2,864)	1 (44)
Tyler	4	3	4 (1,482)	1 (12)
Doddridge	4	2	3 (1,169)	0
Ritchie	5	4	6 (1,626)	0
Calhoun	2	3	3 (1,104)	0
Wirt	1	2	3 (967)	0
Roane	4	3	6 (2,554)	1 (60)
Jackson	4	4	12 (5,040)	1 (36)
Mason	6	5	10 (4,308)	1 (201)
Putnam	9	6	22 (9,517)	1 (70)
Cabell	9	5	26 (13,732)	2 (693)
Kanawha	30	18	68 (28,130)	4 (1,172)

a U.S. Fire Administration, 2016.
 b USACops, 2016; West Virginia State Police, 2016.
 c Public Schools K12, 2016.
 d U.S. News and World Report, 2016; WVDHHR, 2016b.

Based on the number of police and fire stations, schools, and hospitals, public service infrastructure in the project vicinity appears adequate to accommodate the temporary needs of the 2,100 non-local construction workers and their families.

All the counties in the project area have a County Sheriff's Department. In addition, 43 cities and towns within the project area have municipal police departments. The West Virginia State Police also maintains detachments throughout the state, including 11 detachments in the potentially impacted counties that provide extra patrol efforts to supplement county and municipal law enforcement agencies. Fire protection within the region is administered by local governments. The majority of the project area is covered by volunteer fire departments, but four full-time career fire departments are in the large population areas.

Columbia Gas has developed and implemented a liaison program with public safety and emergency response organizations throughout West Virginia. Operations personnel advise emergency response, government, and public safety officials on how to prevent damage to company facilities and how to recognize and report a gas pipeline emergency to the company or the appropriate public safety officials. (More information on this topic is presented in section

4.12). In addition, prior to construction, all construction contractors would be required to develop and submit individual emergency services coordination plans specific to the project to the local areas involved. These plans would contain communication and coordination processes developed with local emergency service organizations and address traffic control, medical emergencies, fires, inclement weather emergencies, etc. Columbia Gas anticipates that coordination would commence several months prior to contractor mobilization and would be on-going throughout the duration of construction.

Existing healthcare resources are adequate to meet the anticipated needs of the construction and operational workforce for the MXP and to provide emergency medical care, if needed. The study area has 13 hospitals providing about 2,390 hospital beds combined. The largest hospitals are in Cabell and Kanawha Counties, in the southern end of the study area. In addition, adjacent to Marshall County in the northern end of the study area, Ohio County (West Virginia) has two hospitals providing about 390 hospital beds, combined. Columbia Gas would coordinate with local emergency medical service departments during construction. Coordination would allow the departments to sustain current levels of service through the duration of construction and support the construction staff along the entire route, including counties that do not have medical facilities. Given the available health care resources, we do not anticipate the MXP would have an adverse impact on health care facilities or services.

The 2014-2015 public school system enrollment for the project area was 77,314 students. There is a total of 184 schools serving students from pre-kindergarten through 12th grade. Many of the non-local workers are not typically accompanied by their families or their children because of the short-term nature of the work. Those students that are relocated would reside throughout the project area and would be dispersed among multiple schools and school districts. Based on the number and size of schools in the affected counties, the project area appears to have sufficient educational resources to accommodate school age children of workers during temporary relocation.

The impacts on public services due to the addition of 29 operational employees would be negligible, but permanent. In summary, ample public services are available in the area to meet the needs of the MXP. Short-term impacts on certain other public services are possible, including the need for localized police assistance or certified flaggers to control traffic flow during construction activities. Additional discussion of these topics is provided in section 4.9.5.1.

4.9.3.2 Gulf XPress Project

Public services and facilities present in each county where project facilities would be constructed include full-service law enforcement, paid and volunteer fire departments, schools, and hospitals. Table 4.9-9 provides an overview of selected public services available in the affected counties.

Table 4.9-9 Public Service Infrastructure for the GXP				
County	Number of Fire Departments <u>a/</u>	Number of Police Precincts / Departments <u>b/</u>	Number of Schools (students enrolled) <u>c/</u>	Number of Hospitals (number of beds) <u>d/</u>
Kentucky				
Boyd	8	4	23 (7,044)	2 (679)
Carter	5	3	11 (5,009)	0
Garrard	4	2	6 (2,687)	0
Metcalfe	3	2	7 (1,700)	0
Rowan	5	3	9 (3,393)	1 (133)
Tennessee				
Davidson	4	6	134 (75,227)	9 (3,539)
Wayne	6	3	7 (2,564)	1 (78)
Mississippi				
Grenada	5	2	5 (4,419)	1 (140)
Union	8	3	7 / (4891)	1 (153)
a U.S. Fire Administration, 2016. b USACops, 2016; Kentucky State Police, 2016; Tennessee Highway Patrol, 2016; Mississippi Highway Patrol, 2016. c Public Schools K12, 2016. d U.S. News and World Report, 2016.				

Based on the number of police and fire stations, schools, and hospitals, public service infrastructure in the project vicinity appears adequate to accommodate the temporary needs of the 126 non-local construction workers and their families for each compressor station site.

All the counties in the project area have a County Sheriff's Department. In addition, cities and towns may also have local municipal police departments. The respective state police departments also have patrol jurisdiction over the project sites. In Rowan County, Kentucky, and Davidson County, Tennessee, the state police maintain posts that increase the local presence of law enforcement. Fire protection within the affected counties is administered by local governments and volunteer fire departments. The majority of the compressor station sites are covered by volunteer fire departments. These departments may include both career firefighting staff and volunteers serving together in the same station. There are 12 full-time career fire departments located in the larger localities, the largest being the Nashville Fire Department.

Columbia Gulf's operations staff developed and continues to improve and maintain a liaison program with emergency response, government, and public safety officials in their responsible areas. These officials include local fire and law enforcement officials, emergency management services, ambulance services, HAZMAT groups, state police officials, local emergency planning coordinators, and town/city government representatives. Further discussion of Columbia Gulf's safety standards is included in section 4.12.

Healthcare infrastructure in the project localities varies by the size and population of the locality. Carter, Garrard, and Metcalfe Counties do not have hospitals within their jurisdictions; however, there are nearby (generally within 20 miles) hospitals in neighboring counties. Those

counties with larger population bases have at least one hospital, and Davidson County (the center of a major metropolitan area) has many hospitals serving its population. The healthcare resources are adequate to meet the needs of the local population. Columbia Gulf would coordinate with local emergency medical service departments during construction. Coordination would allow for the departments to sustain current levels of service through construction and support the construction staff, including counties that do not have medical facilities. Given the health care resources, a significant impact from the project on health care availability is not anticipated.

The public school system enrollment for the project localities was 106,934 students combined. A total of 205 schools serve students from kindergarten through 12th grade. Many of the non-local workers are not typically accompanied by their families or their children due to the transient nature of the work. Those students that are relocated would reside throughout the nine counties and would be dispersed among multiple schools and school districts. Based on the number and size of schools in the affected counties, the project area appears to have sufficient educational resources to accommodate school age children of workers during temporary relocation.

The impacts on public services due to the addition of 14 permanent employees throughout the 12 affected counties would be negligible. In summary, there are ample public services available in the area to meet the needs of the project. Short-term impacts on certain other public services are possible, which would include the need for localized police assistance or certified flaggers to control traffic flow during construction activities. Additional discussion of these topics is provided in section 4.9.5.2.

4.9.4 Public Utilities and Related Infrastructure

4.9.4.1 Mountaineer XPress Project

Electricity is provided by two investor-owned utilities, American Electric Power (Marshall, Jackson, Cabell, Roane, Mason, and Putnam Counties) and FirstEnergy's Mon Power subsidiary (Wetzel, Tyler, Doddridge, Ritchie, Wirt, and Jackson Counties). The compressor stations included in the MXP are proposed to be natural gas-powered, and as such, would not require significant electricity for operation. (Gas-powered emergency electric generators would be available at each compressor station.) Without significant demand for electricity at the compressor stations, the project would have little impact on electrical capacity in the area. Pending approval of the MXP, Mon Power would extend three-phase electrical power service about 13 miles to the White Oak Compressor Station. Service extensions are a typical activity of local electric power companies and are generally conducted by in-house and/or contractor staff. No significant impact on the ability of public utilities to provide service would result.

Water and sewer systems located in the project area are maintained by county or municipal local government entities. The project is not proposing any facilities that would require the substantial use of water and sewer resources. Columbia Gas is in the process of designing the respective compressor stations and would work with county health departments and other applicable agencies to design and permit onsite septic systems/water wells, or establish connections to existing water and sewer facilities, where available.

4.9.4.2 Gulf XPress Project

Electricity in the vicinity of the new compressor stations is provided by the following utilities:

- Holcomb Compressor Station – Delta Electric Power Association
- New Albany Compressor Station – New Albany Light, Gas & Water
- Clifton Junction Compressor Station – Tennessee Valley Electric Cooperative
- Cane Ridge Compressor Station – Nashville Electric Service
- Goodluck Compressor Station – Tri-County Electric Co-Op Inc.
- Paint Lick Compressor Station – Inter-County Energy Cooperative
- Morehead Compressor Station – Fleming-Mason Energy Cooperative

All the new compressor stations would be natural gas-powered, and as such, would not require significant electricity for operation. (Gas-powered emergency electric generators would be available at each compressor station.) Without the need for significant electricity at the compressor stations, the project would have little impact on electrical capacity in the area. Pending approval of the GXP, Tri-County Electric Co-Op Inc., Nashville Electric Service, and Tennessee Valley Electric Cooperative would extend electrical powerlines to the Goodluck, Cane Ridge, and Clifton Junction stations, respectively. Short spans (fewer than 400 feet) of new overhead powerline would be installed at the Goodluck and Cane Ridge stations. At Clifton Junction, about 3,500 feet of new poles would be required to extend service from U.S. 64/SR 15 to the station. Again, these activities are relatively routine for local electric power companies. No significant impact on the ability of public utilities to provide service would result.

Water and sewer systems located in the project area are maintained by county or municipal local government entities. The project is not proposing any facilities that would require the substantial use of water and sewer resources. Columbia Gulf is in the process of designing the respective compressor stations and would work with county health departments and other applicable agencies to design and permit onsite septic systems/water wells, or establish connections to existing water and sewer where available.

4.9.5 Transportation and Traffic

4.9.5.1 Mountaineer XPress Project

The MXP would use road transportation corridors in the project area during construction and operation. Two interstate highways are in the project area; I-77 runs from north to south through Jackson County, and I-64 runs from east to west through Cabell and Putnam Counties. Other major roads in the project area include: U.S. 35 in Putnam County; U.S. 33 in Jackson, Roane, and Calhoun Counties; and U.S. 50 in Ritchie and Doddridge Counties. In addition to these larger arterial roadways, state and county roads serve project area localities. Ingress/egress to pipeline construction areas and construction access roads would more commonly occur from county and minor state roads that cross the pipeline routes.

Staging and delivery of pipeline construction personnel, equipment, and materials to project sites may temporarily impact the transportation system in the project area, but no long-term impacts would be anticipated. Materials and equipment would initially be brought to nearby contractor yards/staging areas and then delivered to their destinations along the rights-of-way. Construction traffic would primarily consist of vehicles traveling from staging areas to the individual work site locations delivering workers and material.

Before construction begins, Columbia Gas would work with local transportation officials to limit the effect of the project's construction to local roadways. Columbia Gas contractors would be made aware of road limitations, including weight limits and restrictions, and would comply with the WVDOT standards for road usage. Columbia Gas would also work with local transportation department offices to obtain necessary permits that may be required for construction entrances and maintenance of traffic.

The WVDOT has in place an Oil and Gas Road Policy, which addresses pipeline operations that would impact State roadways (WVDOT, 2012 and 2013). Columbia Gas is coordinating with the WVDOT to determine the current condition of public roads in and around the project area and to determine the adequacy of these roads to support construction and operation of the MXP. Columbia Gas assessed the anticipated use and potential impacts on the most likely public routes from interstate highways to the various state and county roads that would be traveled to access the project. Based on this assessment, portions of these public roads may require upgrades and/or improvements to safely allow both local general use and the additional construction and operations traffic. Improvements needed may include culvert replacements, turning radii improvements, widening, re-enforcement, and/or replacement.

Additionally, Columbia Gas and WVDOT have reached an agreement to undertake the public road improvements pursuant to WVDOT's Oil and Gas Road Policy. The public road improvements would be conducted by a third-party contractor under the authority, jurisdiction, and pursuant to a permit issued by the WVDOT. The improvements would be subject to a traffic management plan and schedule reached in agreement with the WVDOT. Columbia Gas would direct and pay for the public road improvements, which would exclusively utilize WVDOT rights-of-way. The work would be consistent with WVDOT standards, specifications, and regulatory requirements and approvals and would be subject to WVDOT final approval and inspection.

Columbia Gas estimates approximately 250 to 300 daily trips would occur during peak construction traffic, or when pipe stringing trucks are most active. Daily construction traffic would taper off after pipe has been delivered to the construction rights-of-way. Parking would be available for daily commuters at many of the contractor yards located along the project. Columbia Gas anticipates that buses may transport some workers from central locations to work sites during construction. These central locations would be determined by the contractors upon mobilization to the project area. Bussing would help reduce impacts on the roadways and the need for parking at the job sites.

The existing traffic volumes vary widely across the project setting. On developed roads near the project, including major highways, the additional construction traffic would likely have a negligible impact on overall traffic volumes. On smaller roads in isolated areas, the increase could

disrupt local travel. Appropriate measures and notifications would be implemented to minimize these impacts on residents or businesses along these local roads.

The Sherwood Compressor Station site would have access from SR 18, which is classified as a feeder road. The WVDOT estimated that an average of 2,039 vehicle trips per day traveled on SR 18 near the station site in 2014. Feeder roads have a design volume of 5,000 to 15,000 vehicle trips per day, and SR 18 is currently operating well below this design capacity (WVDOT, 2016b; Federal Highway Administration [FHWA], 2016).

Similarly, the Mount Olive Compressor Station site is on County Highway 21, which is also classified as a feeder road. Traffic counts in the vicinity of the Mount Olive site are 2,219 average vehicle trips per day in 2014, which is also well below the 5,000 to 15,000 vehicle trips per day design volume for feeder roads (WVDOT, 2016b).

The White Oak Compressor Station site, in Calhoun County, would have ingress/egress from a local road. Local roads have a design capacity of 3,000 vehicle trips per day. The WVDOT estimates that County Road 2 and County Road 2/4 have averages of 142 and 132 vehicle trips per day, respectively, in the vicinity of the compressor station site (WVDOT, 2016b). These averages are well below the design capacity of these local roads.

Though there may be short-term traffic impacts during construction of the compressor stations, these would be temporary. To mitigate short-term construction impacts, Columbia Gas would coordinate with the WVDOT and county highway departments. Columbia Gas estimates approximately 70 to 90 daily trips would occur during peak construction traffic at each of the three compressor stations. Once the compressor stations are constructed, they would require a total of 29 permanent staff to operate the facilities. This would result in approximately 87 trips per day on roads accessing these three sites. This would not exceed the design capacity of the roads serving these facilities.

During pipeline operation, MXP-related vehicle traffic would be insignificant in counties without compressor stations.

4.9.5.2 Gulf XPress Project

The project would use public roads in the nine affected project counties during construction and operation of the stations. Before construction begins, Columbia Gulf would work with local transportation officials to develop plans to minimize the effect of the project's construction to local roadways. Columbia Gulf contractors would be made aware of road limitations, including weight limits and restrictions, and would comply with each state's department of transportation standards for road usage. Columbia Gulf would also work with local department of transportation offices to obtain necessary permits that may be required for construction entrances and maintenance of traffic, including the development of maintenance of traffic plans, as necessary.

The existing Leach C Meter Station has direct ingress/egress access to Bethel Lane, which in turn has access to Dog Fork Laurel Road. The Kentucky Transportation Cabinet identifies these roads as local roads, which are designed for 3,000 or fewer vehicle trips per day (FHWA, 2016). Vehicle trips to this site would increase during the 2- to 3-month construction period; however, after construction, the improved facility would not create more traffic than it currently generates.

The approved Grayson Compressor Station site has access to Beckwith Branch Road, which is classified as a local road, capable of a recommended traffic volume of 3,000 vehicle trips per day. The Kentucky Transportation Cabinet has measured 17 vehicle trips per day near the station site, which is well below the design traffic volume for Beckwith Branch Road. Similar to the Leach C station, traffic levels would increase during the 3- to 3.5-month construction period. Once the new compression is added, it is anticipated that traffic counts would go back to around 17 trips per day.

The Morehead Compressor Station site has direct ingress/egress to Kentucky SR 377. SR 377 is classified as a major collector and runs northeast-to-southwest. At its southwestern terminus, SR 377 meets SR 32, a principal arterial accessing the City of Morehead and I-64 (Kentucky Transportation Cabinet, 2016a). Collector roads are designed to accommodate traffic volumes of 5,000 to 15,000 vehicle trips per day. Within the vicinity of the compressor station site, SR 377 has an average of 3,502 vehicle trips per day, which is well within the design volume for collector roads (Kentucky Transportation Cabinet, 2016b). Taking into account workers commuting to the site and the regular delivery of materials and supplies, Columbia estimates between 200 and 300 vehicle trips per day. When this temporary increase of vehicles is factored with the existing traffic along SR 377, the estimated daily traffic volume would still be less than the FHWA-recommended traffic volume for this roadway. The project would not create enough vehicle traffic to affect the capacity of SR 377. Short-term construction activities could result in congestion and delays at the Morehead station driveway entrance on SR 377. Permanent operations would only require a few vehicle trips per day and would not impact the design capacity or require long-term improvements to SR 377.

The Paint Lick Compressor Station site has access to Kentucky SR 52. SR 52 is classified as a minor arterial and travels east to west across the county serving as a connection between Lancaster in Garrard County and Richmond in neighboring Madison County. Minor arterial roads have a design volume of 5,000 to 25,000 average vehicle trips per day (FHWA, 2016). SR 52 in the vicinity of the station site has an average of 2,730 vehicle trips per day, which is less than the design volume for a minor arterial highway (Kentucky Transportation Cabinet, 2016b). Taking into account workers commuting to the site and the regular delivery of materials and supplies, Columbia Gulf estimates between 200 and 300 vehicle trips per day. When this temporary increase of vehicles is factored with the existing traffic along SR 52, the estimated daily traffic volume would still be less than the FHWA recommended traffic volume for this roadway. Construction vehicles entering and exiting the site could result in congestion and delays at the compressor station site entrance on SR 52. Given the measured traffic levels along SR 52 near the facility and the functional classification and design capacity of SR 52, it is not expected that the station construction or operation would have substantial negative impacts on traffic in the area.

The Goodluck Compressor Station site has access to Kentucky SR 163, which travels north-to-south through the county, connecting Edmonton (the county seat) with Tompkinsville in neighboring Monroe County. The Kentucky Transportation Cabinet classifies SR 163 as a major collector. Major collectors have recommended traffic volumes of 5,000 to 15,000 vehicle trips per day (FHWA, 2016). SR 163 has average daily traffic counts of 2,652 vehicles per day north of the site and 1,784 vehicles south of the site (Kentucky Transportation Cabinet, 2016b). Taking into account workers commuting to the site and the regular delivery of materials and supplies, Columbia Gulf estimates between 200 and 300 vehicle trips per day. When this temporary increase

of vehicles is factored with the existing traffic along SR 163, the estimated daily traffic volume would still be less than the FHWA recommended traffic volume for this roadway. Therefore, construction of the compressor station should not substantially increase traffic volumes in the vicinity. Short-term construction activities would likely result in congestion and delays at the site driveway entrance on SR 163 during the 10-month construction period. Columbia would work with the KYTC to develop measures to minimize traffic impacts at this location. We do not anticipate that station construction or operation would have a significant impact on traffic or transportation in Metcalfe County.

Unlike the other proposed compressor stations that are in rural settings, the Cane Ridge station would be in an urban area, suburban Nashville. The site is on Barnes Road, approximately 0.5 mile west of Old Hickory Boulevard. The Tennessee Department of Transportation (TDOT) classifies Old Hickory Boulevard as an urban collector but does not have a designation for Barnes Road (TDOT, 2016). Without a TDOT classification, Columbia Gulf assumed that the road was classified as a local road, designed for a daily average of 3,000 vehicle trips per day (FHWA, 2016). Traffic volume data are not available within the vicinity of the station site. Columbia Gulf estimates that, at most, construction would result in approximately 280 to 300 vehicular trips per day to and from the site. This estimate is based on a planned construction workforce of 140 workers with 75 percent of those workers driving individual vehicles. The estimate also includes occasional deliveries to the site.

Given the urban setting of the area and the proximity of residential areas to the site, an increase in traffic volume along Barnes Road and turning movements from Old Hickory Boulevard onto Barnes Road and into and out of the compressor site on Barnes Road could result in delays to local commuters, especially during peak traffic hours. Given the possibility of traffic delays, Columbia Gulf would work with local transportation officials to mitigate transportation and traffic impacts on Barnes Road during the 10-month station construction period. Columbia Gulf does not anticipate a significant change in traffic patterns during the construction and eventual operation of the compressor station. Impacts on the local transportation network would be temporary, as the facility would employ only two permanent workers, resulting in about four vehicle trips per day on average during operation.

The Clifton Junction Compressor Station site has ingress/egress onto U.S. 64. This federal highway is a major transportation corridor in the county and the State of Tennessee. The highway is classified as a principal rural arterial, which has a recommended volume of 10,000 to 40,000 average vehicle trips per day (FHWA, 2016). TDOT data show that in the vicinity of the Clifton Junction site, U.S. 64 has an average daily trip count of 2,061 vehicles per day, which is well below the threshold for the functional classification of the roadway (TDOT, 2016). Taking into account workers commuting to the site and the regular delivery of materials and supplies, Columbia Gulf estimates between 200 and 300 vehicle trips per day. When this temporary increase of vehicles is factored with the existing traffic along U.S. 64, the estimated daily traffic volume would still be less than the FHWA recommended traffic volume for this roadway.

Short-term construction activities would likely result in congestion and delays at the site driveway entrance on U.S. 64 during the 10-month construction period. Columbia would work with the TDOT to design the site access driveway entrance and to develop measures to control vehicle traffic into and out of the site, thereby minimizing traffic impacts at this location. With

the low traffic volume in the area of the site, it is unlikely that there would be either short- or long-term transportation or traffic impacts in Wayne County.

The New Albany Compressor Station site is located off County Road 137. The Mississippi Department of Transportation (MDOT) does not have a functional classification, or average daily vehicle data, for this roadway. There would not be a significant change in traffic patterns during the construction and eventual operation of the compressor station. Impacts on the local transportation network would be temporary, as the facility would employ only two permanent workers, resulting in about four vehicle trips per day on average during operation.. Short-term construction activities may result in delays at the site driveway entrance on CR137 during the 10-month construction period. Columbia would work with the MDOT to develop measures to minimize traffic impacts at this location.

The Holcomb Compressor Station site is located off Mississippi SR 7. The MDOT has classified Mississippi SR 7 as a major arterial, which, using FHWA guidelines, is designed for 5,000 to 25,000 average vehicle trips per day (FHWA, 2016). SR 7 in the vicinity of the station site registered 3,500 average daily vehicle trips in 2014, well below the minimum threshold for a major arterial (MDOT, 2016). Taking into account workers commuting to the site and the regular delivery of materials and supplies, Columbia Gulf estimates between 200 and 300 vehicle trips per day. When this temporary increase of vehicles is factored with the existing traffic along SR 7, the estimated daily traffic volume would still be less than the FHWA recommended traffic volume for this roadway. Construction vehicles entering and exiting the site could result in congestion and delays at the site entrance on SR 7. Given the modest traffic counts in the vicinity of the site, we do not anticipate that construction and operation of the Holcomb Compressor Station would have negative impacts on the SR 7 transportation corridor or local traffic in the station's vicinity.

4.9.6 Roadway and Railroad Crossings

4.9.6.1 Mountaineer XPress Project

The MXP would require approximately 130 public road crossings and 4 railroad crossings. The crossings would be accomplished using one of several possible methods. Railroads would be bored, and roads would either be open-cut, bored, or crossed by the Direct Pipe method. A summary of each of these crossing techniques is provided in section 2.4.4.3. The use of boring or Direct Pipe techniques would avoid road and rail surface impacts, while the use of the open-cut crossing method would not. Road crossing permits would be obtained from the railroads and applicable federal, state, and local agencies. These permits would dictate the specific requirements for the day-to-day construction activities at each crossing, and the restoration and repair of the areas after construction.

The majority of two-lane (or wider) paved roads, highways, and railroads would be crossed by boring methods. The open-cut crossing method would primarily be used to cross driveways, parking lots, and roads with low traffic volumes. The first step for an open-cut crossing would be to install traffic control devices and signage. Traffic would be detoured around the open trench during the installation process. The pipeline crossing would be installed one lane at a time, and, as the pipe is installed, successive lanes would alternately be taken out of service until the crossing is completed. Another option would be to temporarily close a portion of the road and detour traffic

around the work area and onto an adjacent roadway. In order to confirm that impacts from construction across and within roadways would be minor and temporary, **we recommend that:**

- **Prior to construction, Columbia Gas should file with the Secretary, for review and written approval by the Director of OEP, a final traffic management plan for the MXP which includes:**
 - **proposed measures for implementing any detours on public roadways;**
 - **timing shifts and worker commutes as to avoid heavy traffic periods; and**
 - **proposed measures for restoration of roadways damaged by project-related activities upon completion of construction.**

4.9.6.2 Gulf XPress Project

Since the GXP involves only construction and operation activities at new and existing discreet facilities, there would not be any roadway crossings or railroad crossings associated with the project.

4.9.7 Property Values and Mortgages

During public scoping for the MXP and GXP, we received multiple comments regarding concerns with reductions in property values that could result from the construction and operation of natural gas facilities near homes, residential areas, or areas identified for future residential or commercial developments. The following sections discuss potential impacts on property values for homes and businesses within the project areas.

Landowners typically have the following concerns regarding potential impacts on property values:

- devaluation of property if encumbered by a pipeline easement;
- being the responsible party for property taxes on land containing a pipeline easement;
- paying landowner insurance premiums for project-related effects; and
- negative economic effects resulting from changes in land use.

The effect that a pipeline easement may have on property value is a damage-related issue that would be negotiated between the parties during the easement acquisition process, which is designed to provide fair compensation to the landowner for the right to use the property for pipeline construction and operation. Appraisal methods used to value land are typically based on objective characteristics of the property and any improvements. The impact a pipeline could have on a property's value would depend on many factors including the size of the tract, the values of adjacent properties, the presence of other utilities, the current value of the land, and the current land use. Subjective valuation is generally not considered in appraisals. A potential purchaser of property may decide to purchase land based on his or her planned use. An industrial user might find the pipeline (i.e., a potential source of energy for an industrial plant) preferable; a farmer looking for land for grazing or cropland may or may not find it objectionable; while a developer seeking to acquire the land for a residential subdivision may either use the open nature of a pipeline right-of-way as an advantage in subdivision design or rule out the parcel based on the pipeline's

presence. Based on the presence of a pipeline, it is possible that a potential purchaser would decide not to purchase the property; however, each potential purchaser has different criteria and differing capabilities for purchasing land.

Property taxes for a land parcel are generally based on the actual use of the land. Construction of the pipeline would not change the general use of the land but would preclude construction of aboveground structures on the permanent right-of-way. If a landowner believes that the presence of a pipeline easement impacts the value of his or her land, resulting in an overpayment of property taxes, he or she could appeal the issue of the assessment and subsequent property taxation to the local property tax agency. Pipelines are typically assessed as real property, and the pipeline company is the entity that would pay that tax. See section 4.9.8 for a discussion of potential effects to local tax revenue that could result from reductions in property values.

Several studies examined the effects of pipeline easements on sales and property values, and evaluated the impact of natural gas pipelines on real estate. The first study, *Pipeline Impact Study: Study of a Williams Natural Gas Pipeline on Residential Real Estate: Saddle Ridge Subdivision, Dallas Township, Luzerne County, Pennsylvania*, assessed the impact on the sale price of undeveloped lots and single-family residences that are crossed by a natural gas transmission pipeline easement (Allen, Williford & Seale, Inc., 2014). The report compared units in a subdivision in Luzerne County that had an existing natural gas transmission line located within it. Differences between the sale prices of undeveloped lots and houses with the pipeline easement and those that did not have an easement were analyzed. The report found that, when the sales prices of the encumbered residences were compared with the sales prices of the unencumbered residences, there was no indication that the pipeline easement had any effect on the sales prices of homes in Saddle Ridge. Likewise, when the sales prices of encumbered undeveloped lots were compared with the sales prices of unencumbered undeveloped lots, the differential in price could be explained by the reduction in lot size associated with the easement area.

Another study, by Diskin, et al. in 2011, looked at the effects of natural gas transmission pipelines on residential values in Arizona. The study concluded that there was no identifiable systemic relationship between proximity to a pipeline and residential sale price or value.

Studies conducted in 2008 by PGP Valuation Inc. (PGP, 2008) for Palomar Gas Transmission, Inc. and by ECONorthwest for the Oregon LNG Project (Fruits, 2008) reached similar conclusions. Both studies evaluated the potential effect on property values of a natural gas pipeline that was constructed in 2003-2004 in northwestern Oregon, including along the western edge of the Portland metro area. The PGP study found that:

- there was no measurable long-term impact on property values resulting from high-pressure natural gas pipelines for the particular pipeline project studied;
- interviews with buyers and brokers indicated no measurable impact on value or price; and
- there was no trend in the data to suggest an extension of marketing periods (i.e., time while the property is on sale) for properties with gas pipeline easements.

The ECONorthwest study concluded that the pipeline had no statistically significant or economically significant impact on residential properties. The study also concluded that there was no relationship between proximity to the pipeline and sale price (Fruits, 2008).

Yet another study (Hansen et al., 2006) analyzed property sales near a pipeline accident location in Washington State, using methodologies that considered proximity and persistence over time. This study noted a decline in property values following the incident; however, the effect was very localized and declined as the distance from the affected pipeline increased. The effect also diminished over time in the years following the incident.

In another EIS analysis we conducted and published in 2014 (with a project area in Pennsylvania and New York), several appraisers were contacted about the potential impacts on property values due to the presence of a natural gas pipeline easement (FERC, 2014). One appraiser who teaches seminars for appraisers and realtors, including discussions of mineral rights and pipeline easements, provided information on the subject. According to the appraiser, “the empirical evidence indicates no difference in value attributable to the existence of the pipeline easement.” The appraiser further noted that he was not aware of appraisers making adjustments in the appraiser reports for the existence of a pipeline easement. He stated that the large number of variables that impact home values make it difficult to determine the incremental effect that any one variable may have on a home’s value. Regardless, it is possible that the perceived safety issues or the limitations on land use within the permanent easement could reduce the number of potential buyers for a property, which may extend the number of days a property is on the market.

Based on the research we reviewed, we find no conclusive evidence indicating that natural gas pipeline easements would have a negative impact on property values in general; however, there is always the possibility that any given property may experience some value-related impacts (e.g., price at sale lower than owner believes is warranted; longer time on the market).

On other projects, we have examined concerns that insurance premiums would increase and/or insurance companies would not insure properties due to pipeline proximity. These concerns were examined by contacting insurance offices to pose the question. We asked whether the presence of a utility crossing would change the terms of an existing or new residential insurance policy, which types of utilities may cause a change, how a policy might change, and what factors would influence a change in the policy terms, including the potential for a policy to be dropped completely. Results of this initial investigation suggested that the potential for a residential insurance policy to be affected could exist, but the extent of any action and corresponding corrective action would depend upon several factors, including the terms of the individual landowner’s policy and the terms of the pipeline company’s own policy. Insurance company contacts were not able to speak directly to the potential factors that could cause a change in a policy (e.g., type of utility, proximity of residence to utility), or provide quantitative information on the potential change in a policy premium (in dollars or percent). Further, we have requested in some previous projects that the pipeline company notify us of any landowner-reported instances where property insurance was either dropped, denied, or had rates affected due to the presence of a pipeline. To date, there have been no such reports. As such, there is no conclusive evidence indicating that insurance premiums would be affected by the presence of a natural gas pipeline easement.

4.9.7.1 Mountaineer XPress Project

As described in section 4.8.1.2, Columbia Gas would acquire easements for both the temporary (construction) and permanent rights-of-way, where applicable. Columbia Gas would compensate landowners for the acquisition of new property for aboveground facilities and for easements, including compensation for construction related damages and for damages associated with residential properties, crops, pasture, and timber. The total acreage of cropland and timbered areas disturbed by the project can be found in section 4.8.1.1. If the landowner observes damage after the project is complete and the land is rehabilitated, Columbia Gas would work with the landowner to rectify the damage. Columbia Gas would implement an environmental complaint resolution procedure during construction and for a period of at least 2 years following the completion of construction. This procedure is discussed further in section 4.8.1.3. Because damaged land would be rehabilitated and/or the landowners compensated for damages, the fiscal impact of productivity loss resulting from direct or indirect effects from the project is expected to be negligible.

4.9.7.2 Gulf XPress Project

Columbia Gulf would compensate landowners for the acquisition of new property for aboveground facilities. For the work planned at the existing and approved facilities, Columbia Gulf would not increase the permanent footprint of these stations as part of the GXP. Existing station components that require upgrades or modifications at these facilities would be unlikely to have an adverse effect to property values of nearby residences, as the existing footprint would not be expanded.

4.9.8 Economy and Tax Revenues

Construction and operation of the MXP and GXP would have a beneficial impact on local tax revenues and local sales tax.

4.9.8.1 Mountaineer XPress Project

Construction and operation of the MXP would have a beneficial impact on local sales tax revenue. Table 4.9-10 provides the estimated payroll, cost of materials purchased locally, and projected sales tax revenues associated with project construction. Payroll taxes would also be collected from the workers employed on the projects. Columbia Gas anticipates that its total payroll would be approximately \$644 million during the construction phase. Economic impacts due to construction of the MXP may be beneficial at the local and county level in the form of increased sales and payroll taxes. However, these impacts would be limited to the duration of the construction period.

County	Construction (in millions)		Operation (in millions)
	Construction Payroll	Cost of Materials Purchased	Tax Revenue Paid by Columbia Gas a/
Marshall	\$43.6	\$24.6	\$1.7
Wetzel	\$71.2	\$14.9	\$2.4
Tyler	\$13.4	\$2.8	\$0.4
Doddridge	\$122.7	\$73.4	\$5.6
Ritchie	\$66.5	\$14.0	\$2.3
Wirt	\$48.9	\$10.3	\$1.7
Calhoun	\$31.3	\$41.8	\$1.3
Roane	\$33.9	\$7.1	\$0.9
Jackson	\$87.4	\$63.1	\$4.0
Mason	\$1.6	\$0.3	<\$0.1
Putnam	\$79.2	\$16.6	\$3.1
Kanawha	\$2.2	\$9.7	\$0.1
Cabell	\$30.9	\$9.5	\$1.3
Wayne	\$11.5	\$26.5	\$1.1
Total for Project Area	\$644.4	\$314.8	\$26.1
a Estimated tax revenue for 2019, the first full year of operation of the project.			

Construction of the MXP would have a short-term, beneficial effect in terms of increased payroll and local material purchases. Because about 50 percent of the workers are expected to be local, and non-local workers would temporarily relocate to the project vicinity, a substantial portion of the payroll likely would be spent with local vendors and businesses. About half of non-specialized construction materials (i.e., aggregate, concrete, asphalt, clean fill, paint, coatings, etc.) are expected to be locally sourced. Construction of the MXP would also result in increased state and local sales tax revenues associated with the purchase of some construction materials, as well as the construction workforce's purchase of goods and services.

During public scoping, we received comments regarding concerns with local tax losses due to diminished property values. As discussed in section 4.9.7, we find no conclusive evidence indicating that natural gas pipeline easements would have a negative impact on property values. The long-term positive economic impacts from the MXP include an increase in annual tax revenue paid by Columbia Gas ranging from \$50,000 per year in Mason County to \$5.6 million in Doddridge County (see table 4.9-5). This increase in taxes paid would benefit the local governments and their budgets annually for the life of the MXP.

We do not expect the project to have any long-term negative economic impact. The pipeline would be installed underground, and any surface impacts, such as damaged roads, would be repaired. Once installed, the pipeline would not impede normal surface traffic or access to businesses, and most pre-construction property uses would be allowed.

4.9.8.2 Gulf XPress Project

Construction and operation of the GXP would have a beneficial impact on local tax revenue. Table 4.9-11 provides the estimated property tax impact for the years 2016 through 2019 for the project.

Table 4.9-11 Estimated Property Tax Revenues by County per Year for the GXP <u>a/</u>					
State/County	2016	2017	2018	2019	Total by County
Kentucky					
Boyd <u>b/</u>	\$0	\$0	\$6,255	\$24,644	\$30,899
Carter	\$0	\$0	\$122,380	\$80,363	\$202,743
Garrard	\$32,701	\$107,447	\$664,782	\$904,009	\$1,705,939
Metcalfe	\$28,701	\$94,305	\$583,569	\$793,434	\$1,500,009
Rowan	\$29,881	\$98,181	\$607,453	\$826,050	\$1,433,503
Kentucky Total	\$91,283	\$299,993	\$1,984,439	\$2,628,500	\$4,873,093
Tennessee					
Davidson	\$11,555	\$37,967	\$234,904	\$2,129,577	\$2,414,003
Wayne	\$5,436	\$17,860	\$110,501	\$1,001,767	\$1,135,564
Tennessee Total	\$16,991	\$55,827	\$345,405	\$3,131,344	\$3,549,567
Mississippi					
Grenada	\$92,410	\$303,636	\$1,878,612	\$2,554,644	\$4,829,302
Union	\$116,770	\$383,678	\$2,373,835	\$3,228,077	\$6,102,360
Mississippi Total	\$209,180	\$687,314	\$4,252,447	\$5,782,721	\$10,931,662
Project Total	\$317,454	\$1,043,134	\$6,582,291	\$11,542,565	\$19,354,322
<p>a Estimates are based on current levy rates as of March 10, 2015.</p> <p>b Only rights-of-way would be purchased for the properties in Boyd and Carter Counties, and property taxes would be subject to a 1-year lag. Therefore, no property taxes would be owed in Boyd or Carter Counties for the years 2016 and 2017.</p>					

In addition to expected property tax benefit that the project would provide, GXP would also result in millions of dollars of project spending in the area of influence through materials purchase and construction payroll. Total outlays expected for all seven new aboveground facilities is estimated at approximately \$704 million. Table 4.9-12 provides the total estimated expenses, including construction materials, facility components, labor costs including payroll, and real estate purchases, for the GXP.

Table 4.9-12 Estimated Construction Expenses for the GXP <u>a/</u>					
State	2016	2017	2018	2019	Total Estimated Investment
Kentucky	\$24,567,255	\$221,563,352	\$90,304,341	\$1,139,509	\$337,574,457
Tennessee	\$15,063,762	\$125,113,717	\$48,210,722	\$698,706	\$189,086,907
Mississippi	\$14,091,387	\$117,037,546	\$45,098,689	\$653,604	\$176,881,226
Project Total	\$53,722,404	\$463,714,615	\$183,613,752	\$2,491,819	\$703,542,590
<p>a Estimated construction costs include: facility components for existing and new aboveground facilities, construction materials, construction labor, contract labor, right-of-way and real estate costs, and other project-related costs.</p>					

4.9.9 Environmental Justice

EO 12898, *Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations*, requires federal agencies to identify and address, as appropriate, the potential for disproportionately high and adverse health or environmental effects of federal programs, policies, and activities on minority and low-income populations. Consistent with EO 12898, the CEQ called on federal agencies to actively scrutinize the following issues with respect to environmental justice (CEQ, 1997a):

- the racial and economic composition of affected communities;
- health-related issues that may amplify project effects to minority or low-income individuals; and
- public participation strategies, including community or tribal participation in the process.

The EPA's Environmental Justice Policies focus on enhancing opportunities for residents to participate in decision-making. The EPA states that Environmental Justice requires meaningful involvement so that:

- “potentially affected community residents have an appropriate opportunity to participate in decisions about a proposed activity that will affect their environment and/or health;
- the public's contributions can influence the regulatory agency's decision;
- the concerns of all participants involved will be considered in the decision-making process; and
- the decision-makers seek out and facilitate the involvement of those potentially affected” (EPA, 2011b).

Guidance from the CEQ states that “minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent, or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis” (CEQ, 1997). “Minority” is defined as individuals who are Black or African American; Asian; American Indian or Alaskan Native; Native Hawaiian or Pacific Islander; or Hispanic. The CEQ guidance also states that the low-income populations should be identified based on poverty thresholds as reported by the U.S. Census Bureau.

For both the MXP and the GXP, environmental justice communities are defined according to the following thresholds:

- communities where minorities comprise more than 50 percent of the population within a given census tract (for pipeline facilities) or census block group (for aboveground facilities);
- communities where the percentage of minorities within a given census tract (for pipeline facilities) or census block group (for aboveground facilities) exceeds the comparative county level by 10 percent or more; or

- communities where the percentage of persons below the poverty level within a given census tract (for pipeline facilities) or census block group (for aboveground facilities) exceeds the comparative county level by 10 percent or more.

As discussed in section 1.3, there have been many opportunities for the public to comment on and provide input about the projects. The Companies met with many different stakeholders, including residents and affected landowners, during the initial development of the projects. These efforts included Columbia Gas and Columbia Gulf holding a number of open houses in the project areas for the affected communities and local authorities. The Companies also established, and are maintaining, websites for the MXP and GXP to share information about the projects with the public.

4.9.9.1 Mountaineer XPress Project

Columbia Gas used our PF review process (discussed in section 1.3.1). One of the goals of this process is to increase public awareness and encourage public input regarding the project before an application is filed. As part of this process, we participated in all of Columbia Gas' open houses to explain the FERC environmental review process and receive input from the public about the MXP. Interested parties have had, and will continue to be given, opportunities to participate in the NEPA review process. Indeed, Columbia Gas revised its planned and proposed pipeline route in numerous locations based in a large part on public input. Further, stakeholders have been afforded the opportunity to participate in our public scoping meetings within the project area to identify concerns and issues that should be covered in the EIS, to submit written comments about the project during the scoping period, and to comment on the draft EIS either electronically, in writing, or at draft EIS comment meetings to be held within the project area.

Table 4.9-13 shows minority and income information for the state, counties, and census tracts crossed by the MXP pipeline facilities, and table 4.9-14 shows this information for MXP aboveground facilities.

Table 4.9-13
Minority Populations and Low-Income Population Information for the Census Tracts Crossed by MXP Pipeline Facilities

State / County / Census Tract	Minority Percentages		Poverty Levels		Income
	Percent Minority <u>a/</u>	Greater than 10% of County Level (yes/no)	Percent Below Poverty Level <u>b/</u>	Greater than 10% of County Level (yes/no)	Median Household Income <u>b/</u>
State of West Virginia	7.3	n/a	18.1	n/a	\$41,576
Marshall County	3.0	10%=3.3	15.1	10%=16.6	\$41,978
Census Tract 208	2.2	no	12.7	no	\$47,50
Census Tract 209	1.9	no	11.4	no	\$46,583
Wetzel County	2.1	10%=2.3	20.0	10%=22.0	\$38,066
Census Tract 304	1.1	no	24.6	yes	\$36,285
Census Tract 305	1.4	no	23.6	yes	\$32,260
Tyler County	1.8	10%=2.1	18.0	10%=19.8	\$39,974
Census Tract 9620	0.7	no	16.8	no	\$36,154
Doddridge County	3.9	10%=4.3	15.3	10%=16.8	\$40,329
Census Tract 9650	2.8	no	11.0	no	\$40,329
Census Tract 9651	4.8	no	19.3	yes	\$38,607
Ritchie County	2.0	10%=2.2	18.6	10%=20.5	\$39,118
Census Tract 9623	2.0	no	21.0	yes	\$36,741
Census Tract 9625	1.8	no	23.9	yes	\$37,219
Census Tract 9624	2.3	yes	8.4	no	\$43,724
Calhoun County	2.6	10%=2.9	22.9	10%=25.2	\$31,017
Census Tract 9626	3.1	no	26.6	yes	\$32,314
Wirt County	2.5	10%=2.8	19.1	10%=21.0	\$37,117
Census Tract 301.1	3.7	yes	19.3	no	\$41,684
Census Tract 301.2	0.9	no	18.8	no	\$34,055
Roane County	2.5	10%=2.8	24.5	10%=27.0	\$30,104
Census Tract 9628	1.7	no	17.6	no	\$36,293
Jackson County	2.5	10%=2.8	18.9	10%=20.8	\$40,733
Census Tract 9637	2.3	no	20.0	no	\$42,030
Mason County	2.9	10%=3.2	18.0	10%=19.8	\$38,297
Census Tract 9551.02	0.9	no	20.5	yes	\$41,953
Putnam County	4.2	10%=4.6	10.1	10%=11.1	\$55,939
Census Tract 201	0.4	no	17.7	yes	\$40,452
Census Tract 202	3.6	no	12.4	yes	\$45,152
Census Tract 203	2.1	no	4.6	no	\$65,980
Cabell County	9.5	10%=10.4	22.6	10%=24.9	\$37,716
Census Tract 106	3.2	no	17.7	no	\$46,424
Census Tract 108	1.2	no	10.3	no	\$48,898

Sources:

a U.S. Census Bureau, 2014; total minority population calculated by subtracting the percentage of the population identified as "not Hispanic or Latino – white alone" from the total.

b U.S. Census Bureau, 2014.

**Table 4.9-14
Minority and Low-Income Population Information for MXP Aboveground Facilities**

State / County / Census Tract / Census Block Group	Minority Percentages		Poverty Levels		Median Household Income <u>b/</u>
	Percent Minority <u>a/</u>	Greater than 10% of County Level (yes/no)	Percent Below Poverty <u>b/</u>	Greater than 10% of County Level (yes/no)	
West Virginia	7.3	n/a	18.1	n/a	\$41,576
Sherwood Compressor Station					
Doddridge County	3.9	10% = 4.3	15.3	10% = 16.8	\$40,329
Census Tract 9651	2.8	no	19.3	yes	\$38,607
Census Block Group 9651004	2.8	no	1.5	no	\$53,194
White Oak Compressor Station					
Calhoun County	2.6	10% = 2.9	22.9	10% = 25.2	\$31,017
Census Tract 9626	3.1	yes	26.6	yes	\$32,314
Census Block Group 9626002	6.5	yes	23.2	no	\$32,222
Mount Olive Compressor Station					
Jackson County	2.5	10% = 2.8	18.9	10% = 20.8	\$40,733
Census Tract 9637	2.3	no	20.0	no	\$42,030
Census Block Group 9637002	14.2	yes	29.5	yes	\$31,838
Sources:					
a U.S. Census Bureau, 2014; total minority population calculated by subtracting the percentage of the population identified as "not Hispanic or Latino – white alone" from the total.					
b U.S. Census Bureau, 2014.					

None of the census tracts or census block groups that are crossed by or contain MXP facilities have minority populations that are greater than 50 percent of the population in those tracts or block groups. Of the 21 census tracts crossed by the MXP pipeline facilities, there are 11 census tracts that have a minority and/or low-income population that exceeds the county level by more than 10 percent and are, therefore, identified as environmental justice communities. Census tracts 304 and 305 in Wetzel County have low-income populations of 24.6 percent and 23.6 percent, respectively, compared to 20.0 percent for the county. Census tract 9651 in Doddridge County has a minority population of 4.8 percent and a low-income population of 19.3 percent, compared to 3.9 percent and 15.3 percent, respectively, for the county. Census tracts 9623 and 9625 in Ritchie County have low-income populations of 21.0 percent and 23.9 percent, respectively, compared to 18.6 percent for the county, and census tract 9624, also in Ritchie County, has a minority population of 2.3 percent, compared to 2.0 percent for the county. Census tract 9626 in Calhoun County has a minority population of 3.1 percent and a low-income population of 26.6 percent, compared to 2.6 percent and 22.9 percent, respectively, for the county. Census tract 301.1 in Wirt County has a minority population of 3.7 percent, compared to 2.5 percent for the county. Census tract 9551.02 in Mason County has a low-income population of 20.5 percent, compared to 18.0 percent for the county. Census tracts 201 and 202 in Putnam County have low-income populations of 17.7 percent and 12.4 percent, respectively, compared to 10.1 percent for the county.

There are two census block groups containing MXP aboveground facilities that have a minority and/or low-income population that exceeds the county level by more than 10 percent and are, therefore, also identified as environmental justice communities. Census block group 9637002 in Jackson County, which would contain the Mount Olive Compressor Station, has a minority population of 14.2 percent and a low-income population of 29.5 percent, compared to 2.5 percent and 18.9 percent, respectively, for the county. Census block group 9626002 in Calhoun County, which would contain the White Oak Compressor Station, has a minority population of 6.5 percent, compared to 2.6 percent for the county.

Construction and operation of the MXP would not cause impacts (in terms of air quality, water quality, or noise) that are expected to adversely affect the health or welfare of the population living in the project area. Nor would the project generate air emissions at levels constituting either nuisance or human health hazards off-site. The project is generally planned to be in remote areas and avoids urban and high-density residential areas. The project has been routed substantially around or away from residential structures, and, therefore, potential negative impacts that could occur during construction, such as noise and traffic, would be located away from residents and residential areas. The yearlong duration of construction may cause temporary impacts on the project area; however, impacts would be distributed along the length of the entire project and would not disproportionately affect the identified environmental justice communities. Once the pipeline is operational, it would be buried, and thus would not constitute a visual impact on nearby residences. Maintenance of the pipeline would be infrequent and would not cause significant negative impacts.

The Mount Olive Compressor Station site (in census block group 9637002, identified as an environmental justice community) is within a low density semi-rural area. The site is vacant with mature vegetation. I-77 is adjacent to the eastern boundary of the site, and some residences are along Parkersburg Road in the site vicinity. As discussed in section 4.11.1, models of air quality impacts indicate potential air emissions would be below applicable thresholds and would not have significant impacts on local or regional air quality. Also discussed in section 4.11.1, although construction and operation of the MXP compressor stations would result in a noticeable increase in noise levels, the noise levels would remain below our noise criterion. With the incorporation of our noise recommendations and the mitigation measures proposed by Columbia Gas, construction and operation of the compressor station would not result in a significant noise impact on residents and the surrounding community. As discussed in section 4.9.7, we do not anticipate any measurable impact on property values of residential properties crossed by or adjacent to the project facilities. Residential development is located within 100 feet of the Mount Olive Compressor Station site. This site, similar to the other compressor station sites, has significant mature vegetation, which would provide visual screening between the facility and the residential development. Due to the location of I-77 on the eastern property line, the facility can be placed away from residential structures, and existing mature vegetation can be maintained to provide a substantial vegetative buffer between the facility and residences along Parkersburg Road. Given the ability to screen the facility from the adjacent residential development, it is unlikely that the station would have a significant visual impact on nearby residences.

The White Oak Compressor Station site (in census block group 9626002, identified as an environmental justice community) is in a rural area of Calhoun County on a forested parcel. The closest residential structures to the site are between 500 and 700 feet away. Mature vegetation

surrounds the White Oak site, mitigating potential visual impacts on nearby residences. As discussed in section 4.11.1, air modeling indicates potential air emissions would be below applicable thresholds and would not have significant impacts on local or regional air quality. We note in section 4.11.2 that projected noise levels for White Oak would remain below our noise criterion but would nevertheless be equivalent to almost a doubling of the perceived noise in this quiet rural environment. We recommend a mitigation measure in section 4.11.2 that would reduce these impacts to acceptable levels.

In sum, the MXP is not anticipated to cause disproportionately high and adverse environmental or socioeconomic effects to any minority or low-income populations.

4.9.9.2 Gulf XPress Project

For the GXP, environmental justice communities are defined as they were for the MXP (see section 4.9.9.1). Table 4.9-15 shows minority and low-income population information for the counties, census tracts, and census block groups that contain the GXP facilities.

Table 4.9-15 Minority and Low-Income Population Information for the GXP					
County/Census Tract/ Census Block Group	Minority Percentages		Poverty Levels		Median Household Income <u>b/</u>
	Percent Minority <u>a/</u>	Greater than 10% of County Level (yes/no)	Percent Below Poverty <u>b/</u>	Greater than 10% of County Level (yes/no)	
Kentucky					
Leach C Meter Station (Existing)					
Boyd County	6.4	10% = 7.1	19.7	10% = 21.7	\$41,739
Census Tract 311	1.5	no	10.8	no	\$57,318
Census Block Group 311-003	2.9	no	5.4	no	\$57,500
Grayson Compressor Station (Existing)					
Carter County	3.1	10% = 3.4	18.7	10% = 20.6	\$37,139
Census Tract 9606	5.4	yes	14.3	no	\$36,293
Census Block Group 9606-001	0.8	no	6.4	no	\$42,800
Morehead Compressor Station					
Rowan County	5.3	10% = 5.8	26.0	10% = 28.6	\$40,697
Census Tract 9501	2.0	no	16.1	no	\$58,372
Census Block Group 9501-001	0	no	19.4	no	\$40,370
Paint Lick Compressor Station					
Garrard County	5.7	10% = 6.3	20.7	10% = 22.8	\$44,304
Census Tract 9704	4.7	no	13.9	no	\$39,167
Census Block Group 9704-001	4.0	no	6.2	no	\$27,750
Good Luck Compressor Station					
Metcalfe County	5.4	10% = 5.9	21.7	10% = 23.9	\$30,453

**Table 4.9-15
Minority and Low-Income Population Information for the GXP**

County/Census Tract/ Census Block Group	Minority Percentages		Poverty Levels		Median Household Income <u>b/</u>
	Percent Minority <u>a/</u>	Greater than 10% of County Level (yes/no)	Percent Below Poverty <u>b/</u>	Greater than 10% of County Level (yes/no)	
Census Tract 9602	7.7	yes	22.8	no	\$32,188
Census Block Group 9602-002	14.4	yes	27.5	yes	\$34,792
Tennessee					
Cane Ridge Compressor Station					
Davidson County	42.9	10% =47.2	18.8	10% = 20.7	\$47,434
Census Tract 191.12	61.4	yes	21.4	yes	\$55,769
Census Block Group 019112-1 <u>c/</u>	61.4	yes	21.4	yes	\$55,769
Clifton Junction Compressor Station					
Wayne County	9.1	10% =10.0	21.3	10% = 23.4	\$31,225
Census Tract 9501	23.9	yes	17.0	no	\$33,292
Census Block Group 9501-002	39.4	yes	3.6	no	\$34,500
Mississippi					
New Albany Compressor Station					
Union County	20.8	10% = 22.9	24.0	10% = 26.4	\$35,389
Census Tract 9504	42.6	yes	32.8	yes	\$35,242
Census Block Group 9504-001	23.2	yes	18.9	no	\$39,219
Holcomb Compressor Station					
Grenada County	44.2	10% = 48.6	22.7	10% = 25.0	\$33,067
Census Tract 9502	27.2	no	14.4	no	\$37,660
Census Block Group 9502-003	10.2	no	25.8	yes	\$27,469
Sources:					
a U.S. Census Bureau, 2014; total minority population calculated by subtracting the percentage of the population identified as "not Hispanic or Latino – white alone" from the total.					
b U.S. Census Bureau, 2014.					
c Census Tract 191.12 only has one Census Block Group: 019112-1.					

One census block group that contains GXP facilities has a minority population that is greater than 50 percent, and four other census block groups have a minority and/or low-income population that exceeds the county level by more than 10 percent. Therefore, these five census block groups are identified as environmental justice communities. Census block group 019112-1 in Davidson County, Tennessee, which would contain the Cane Ridge Compressor Station, has a minority population of 61.4 percent. Census block group 9602-002 in Metcalfe County, Kentucky, which would contain the Good Luck Road Compressor Station, has a minority population of 14.4 percent, compared to 5.4 percent for the county, and a low-income population of 27.5 percent, compared to 21.7 percent for the county. Census block group 9501-002 in Wayne County, Tennessee, which would contain the Clifton Junction Compressor Station, has a minority population of 39.4 percent, compared to 9.1 percent for the county. Census block group 9504-001

in Union County, Mississippi, which would contain the New Albany Compressor Station, has a minority population of 23.2 percent, compared to 20.8 percent for the county. Census block group 9502-003 in Grenada County, Mississippi, which would contain the Holcomb Compressor Station, has a low-income population of 25.8 percent, compared to 22.7 percent for the county.

Construction and operation of the project would not cause impacts (in terms of air quality, water quality, or noise) that are expected to adversely affect the health or welfare of the population living in the project area. The GXP would not generate air emissions at levels constituting either nuisance or human health hazards off-site.

The proposed Cane Ridge Compressor Station site is in a suburban area on a large parcel with surrounding mature vegetation. As discussed in section 4.11.1, models of air quality impacts indicate potential air emissions would be below applicable standards and would not have significant impacts on local or regional air quality. Also, discussed in section 4.11.2, although construction and operation of the GXP compressor stations would result in a noticeable increase in noise levels, the noise levels would remain below our noise criterion. With the incorporation of our noise recommendation and the mitigation measures proposed by Columbia Gulf, construction and operation of the station would not result in a significant noise impact on residents and the surrounding community. As discussed in section 4.9.7, we do not anticipate any measurable impact on property values of residential properties adjacent to the station facilities. As discussed in section 4.8.1.2, Columbia Gulf purchased the residential land located within the TWS for the Cane Ridge site and would convert it to open land following construction. As discussed in section 4.8.3.2, Columbia Gulf developed a visual screening plan for the Cane Ridge station. Given the ability to screen the facility from the adjacent residential development, the station would not have a significant visual impact on nearby residences.

The Goodluck Compressor Station would be located on a large parcel with very few residences located nearby. The nearest residential structure to the site has a substantial buffer of mature vegetation providing natural screening of the facility. Given the rural nature of the site, noise, air quality, visual, or property value impacts on the identified minority environmental justice community from construction and operation of the compressor station would not be anticipated.

The Clifton Junction, New Albany, and Holcomb Compressor Stations would all be located on large tracts in rural areas. Given the low population density in the area of these sites, it is unlikely that construction and operation noise, air quality, visual, or property value effects from of these facilities would adversely impact the identified environmental justice communities.

For these reasons, the GXP would be unlikely to cause disproportionately high and adverse environmental or socioeconomic effects to any minority or low-income populations.

4.9.10 Conclusion

Construction of the MXP and GXP would temporarily increase the population in the general vicinity of these projects. No significant impacts on the local housing markets would be expected from this temporary population increase. Existing public services are adequate to meet the anticipated needs of the construction and operational workforce for the MXP and GXP.

Staging and delivery of construction personnel, equipment, and materials to project sites may temporarily impact traffic on roads where construction site access is provided, but no long-term impacts in the project area would be anticipated. The Companies would implement appropriate measures and notifications to minimize these impacts on residents or businesses along these local roads.

The Companies would compensate landowners for the acquisition of new property for aboveground facilities and for easements, including compensation for construction-related damages and for damages from loss of crops, pasture, and timber.

Construction of the MXP and GXP would result in minor beneficial socioeconomic impacts due to increases in construction jobs, payroll taxes, local purchases made by the workforce, and expenses associated with the local acquisition of material, goods, and equipment. Operation of the projects would have a minor-to-moderate positive effect to the local governments' tax revenues due to the increase in real property taxes that would be collected from the Companies.

Construction and operation of the MXP and GXP would not cause impacts that are expected to adversely affect the health or welfare of the population living in the project area. Thus, the projects are not anticipated to cause disproportionately high and adverse environmental or socioeconomic effects to any minority or low-income populations.

4.10 CULTURAL RESOURCES

Section 106 of the NHPA, as amended, requires FERC to consider the effects of its undertakings on properties listed or eligible for listing on the NRHP, and to provide the ACHP an opportunity to comment on the undertaking. Columbia Gas and Columbia Gulf are assisting FERC in meeting our obligations under section 106, by preparing the necessary information, analyses, and recommendations as authorized by 36 CFR 800.2(a)(3).

Construction and operation of the projects could affect historic properties (i.e., cultural resources listed or eligible for listing on the NRHP). These properties could include pre-contact or historic archaeological sites, districts, buildings, structures, and objects, or locations with traditional value to Native Americans or other groups. Such historic properties must generally possess integrity of location, design, setting, materials, workmanship, feeling, and association, and must meet one or more of the criteria specified in 36 CFR 60.4. Direct effects could include destruction or damage to all, or a portion of, an archaeological site, or alteration or removal of a historic property. Indirect effects could include the introduction of visual, atmospheric, or audible elements that affect the setting or character of a historic property.

4.10.1 Cultural Resources Surveys

Columbia Gas and Columbia Gulf conducted Phase I archaeological and historic architectural resource surveys of the proposed construction areas to identify cultural resources that could be affected by construction and operation of the MXP and the GXP.

4.10.1.1 Mountaineer XPress Project

The archaeological survey included a 300-foot-wide survey corridor centered on the pipeline centerline for the MXP-100, MXP-200, and SM80 Loop Line and SM80 Line replacement segments. The survey also included a 50-foot-wide survey corridor for existing access roads, a 100-foot-wide survey corridor for new access roads, the total acreage for off right-of-way use areas (staging areas and contractor yards), extra workspaces, and aboveground facility footprints. Some areas could not be surveyed due to safety concerns associated with the rugged and steep terrain of the project area. In such cases, the areas were documented as inaccessible, and archaeologists recorded visual observations of the locations. A total of 10,577 acres were surveyed. For architectural resources, the surveyed area included the 300-foot-wide corridor, the footprint of the associated pipeline facilities, and areas of potential visual effects to historic structures from changes in the setting (from construction of new facilities), clearing of vegetation, and/or modifications to the landscape. In a letter dated August 3, 2015, the West Virginia SHPO concurred with Columbia Gas' proposed survey methodology and study area.

Columbia Gas completed archaeological survey of 99.9 percent of the MXP-100 and the entirety of the SM80 Loop Line, the MXP-200, and SM80 Line replacements, and all of the aboveground facility sites (MXP-200 Tie-in with Line 1983). Archaeological survey is completed for 95.0 percent of the ATWS, 98.9 percent of access roads, 99.9 percent of staging areas, and 78.3 percent of pipe yards. All architectural resource surveys have been completed. Columbia Gas provided a *Phase I Archaeological Survey Report* (Stanyard et al., 2016a), *Phase I Historic Resource Survey Report* (Voisin-George et al., 2016), and a *draft Phase I Archaeological Survey Addendum 1 Report* (Stanyard et al., 2016b) to FERC and the West Virginia SHPO. Subsequently, Columbia Gas submitted a *draft Phase I Historic Resource Survey – Addendum Report 2* and *draft Phase I Archaeological Survey Report – Addendum Report 2* to the FERC and SHPO. Columbia Gas would provide the results of outstanding surveys in a subsequent addendum report(s).

4.10.1.1.1 Archaeological Resources

As of March 2017, Columbia Gas documented and assessed 56 archaeological resources within the surveyed area. Of these, 53 resources were newly recorded and 3 (46PU159, 46PU96, and 46PU208) were previously recorded. Site 46PU159 was previously determined eligible for the NRHP. It would be avoided by HDD. Sites 46PU96 and 46PU208 are pre-contact mound remnant sites which are no longer NRHP eligible. The previously and newly recorded resources include 11 historic-era cemeteries, 29 pre-contact sites, 4 isolated finds of pre-contact artifacts, 11 historic-period sites, and 1 multicomponent site.

The MXP-100 survey corridor passes through the eastern portion of the Burning Springs Civil War battlefield, approximately 1.2 miles east of the Burning Springs Complex NRHP boundary. The portion of the pipeline that crosses the Little Kanawha River is listed on the NRI due in part to its association with the Burning Springs Complex Site. Columbia Gas' cultural resource surveys in this area and at this crossing did not identify any surface features within the project area overlapping the general location of Civil War activity, nor did they recover any artifacts possibly related to the military engagement. No further cultural investigations are recommended for this area.

Project construction would avoid all 11 historic-era cemeteries recorded during the survey. Because cemetery 46MR246 is fewer than 20 meters from the project centerline, Columbia Gas would also install construction fencing and/or flagging or signage at the edge of the construction workspace to protect the cemetery from impacts associated with construction of the project.

Columbia Gas recommended that 51 of the 53 newly recorded sites were not eligible for the NRHP. Two sites (46PU368 and 46RT155) were recommended for avoidance or further work to assess their NRHP-eligibility status. Columbia Gas indicated it would avoid sites 46PU368 and 46RT155 through corridor adjustments and would install protective fencing at the edge of the construction workspace to protect the sites from impacts associated with project construction.

In a letter dated June 14, 2016, the West Virginia SHPO concurred with the eligibility recommendations for 43 of the 50 non-eligible sites; that the HDD would not adversely affect site 46PU159; and that sites 46PU368 and 46RT155 should be avoided or tested, and requested to be advised whether the two sites would be avoided. The SHPO also requested additional information for three sites and the Burnings Springs Civil War battle area be provided in a final version of the Phase I report. Columbia Gas provided a final Phase I report to the FERC and SHPO. In a letter dated August 29, 2016, the SHPO indicated the project would have no effect to sites 46PU159, 46PU368, and 46RT155, and remained in concurrence with its previous eligibility determinations. We concur with the SHPO.

Columbia Gas provided a draft Phase I Archaeological Survey Addendum 1 Report to the FERC and SHPO. The addendum report presents the results of survey efforts conducted subsequent to the initial field effort and includes areas that were previously inaccessible or are new modifications to the proposed project. This effort resulted in the identification of 7 of the 52 newly recorded sites; 6 pre-contact archaeological sites 46CB218, 46CB520, 46DO115, 46PU377, 46PU378, and 46PU379 and 1 historic-period site 46CB217. Columbia Gas recommended that all seven newly recorded sites were not eligible for the NRHP. Columbia Gas' cultural resource surveys did not identify any surface features in the location of the two previously recorded mound sites (46PU96 and 46PU208), nor did they recover any artifacts possibly related to those resources. No further cultural investigations are recommended for this area. In a letter dated December 9, 2016, the SHPO indicated the project would have no effect to sites 46PU96 and 46PU208 and concurred with Columbia's determination that sites 46CB217, 46CB218, 46CB520, 46DO115, 46PU377, 46PU378, and 46PU379 are not eligible for inclusion in the NRHP. We concur with the SHPO.

Columbia Gas provided a draft Phase I Archaeological Survey Addendum Report 2 to the FERC and SHPO. The addendum report presents the results of survey efforts conducted between September 2016 and January 2017. This effort resulted in the identification of one newly-recorded pre-contact archaeological site (46CB222). Columbia Gas recommended that this newly identified site was not eligible for the NRHP. No evidence of a mound or other traces of pre-contact human activity were identified within the proposed right-of-way of sites 46PU96 and 46PU208. No further cultural investigations are recommended for this area. In a letter dated April 4, 2017, the SHPO concurred that site 46CB222 is not eligible for inclusion in the NRHP. The SHPO also noted that no other cultural materials were identified in the remainder of sites 46PU96 and 46PU208 and civil war battlefield areas associated with Burning Springs and Hurricane Bridge; and concurred that no further work is necessary. We concur with the SHPO.

Archaeological investigations still need to be completed on 0.12 mile of the MXP-100 pipeline corridor. Columbia Gas has not yet provided an addendum report for the outstanding survey.

The NPS provided information about a National Coal Heritage Area where the pipeline route terminates and provided the Heritage Area's Executive Director's contact information to Columbia Gas. Columbia Gas contacted the Executive Director, and no response has been received to date.

4.10.1.1.2 Architectural Resources

To date, Columbia Gas has documented and assessed 188 historic-age architectural resources and 4 cemeteries within the surveyed area. Twenty-five of these were previously recorded, and 163 were newly identified. The previously and newly recorded resources within the project survey area include 169 residential properties, 5 farmstead complexes with residences, 8 churches, 2 commercial buildings, a bridge (Mud River Covered Bridge), a school, a hospital complex, and a rail line that has been converted to a recreational trail. Columbia Gas submitted its Phase I Historic Architectural Survey Report and Phase I Historic Resource Survey Addendum Report 1 to the West Virginia SHPO in April 2016 and November 2016 (respectively). The SHPO provided comments on both reports in a letter dated February 7, 2017, wherein it concurred that 184 of the 192 resources were not eligible for or included in the NRHP. The SHPO did not concur on the remaining eight resources, and requested additional information.

In response to the SHPO's February 7, 2017 comments, Columbia Gas submitted its Phase I Historic Resource Survey Addendum Report 2. The Addendum Report 2 provided more detailed information on the eight outstanding resources. Columbia Gas recommended six of the eight resources are NRHP eligible and two are "contributing."

One of these resources, the 1930s-era Morris Memorial Children's Hospital complex, is NRHP-listed. The hospital complex occupies a hilltop approximately 0.3 mile west of the project. Columbia Gas indicated that while the pipeline corridor would be visible as a tree cut within the overall landscape on the opposite side of the valley, construction was not expected to have a significant negative impact on the viewshed due to the modern infrastructure already present, and that the visual effects would not be adverse. For the other seven resources, Columbia Gas recommended that there would be no effect on two (Pleasant Ridge United Methodist Church and Pleasant Ridge United Methodist Church Cemetery), and no adverse effect on five (Baltimore and Ohio rail corridor, Fraziers Bottom United Methodist Church, William A. Alexander Farmstead, Alexander Farm Cottage, and Fraziers Bottom United Methodist Church Cemetery) due to topographical or vegetation screening, distance, and/or restoration after construction. The SHPO has not yet concurred with Columbia's recommendations.

In addition, the MXP crossing point at Mud River in Cabell County (MP 161.4) is within a segment listed on the NRI as having historic value (NPS, 2011) based in part on the Mud River Covered Bridge. The original location of the bridge is about 1.7 miles north-northwest of the proposed MXP-100 crossing of the Mud River. This bridge, listed on the NRHP, was subsequently moved off the river to an isolated pond within the Cabell County Fairgrounds approximately 1.5 miles north of the Mud River crossing site (WVDOT, 2016). No further cultural investigations are recommended for this area.

In a letter dated April 6, 2017, the West Virginia SHPO requested further assessment of two resources (Morris Memorial Children's Hospital and William A. Alexander Farmstead) and recommended additional outreach to the property owners/managers of four properties which would provide those affected further opportunity to comment on the potential for the MXP to affect their properties. Columbia Gas has not yet provided a response addressing the SHPO's comments.

4.10.1.2 Gulf XPress Project

Columbia Gulf completed archaeological and historic architectural resource surveys of the existing Leach C Meter Station extra workspace and proposed Morehead, Paint Lick, and Goodluck Compressor Stations in Kentucky; Cane Ridge and Clifton Junction Compressor Stations in Tennessee; and New Albany and Holcomb Compressor Stations in Mississippi, to identify cultural resources that could be affected by the GXP.

At the time of the field investigations, the temporary and permanent workspace had not yet been identified at the compressor station sites, and field surveys were conducted for the entire parcel of land on which each station would be located. Further, compressor station site alternatives were surveyed for the Morehead, Paint Lick, Goodluck, Clifton Junction, New Albany, and Holcomb stations. Surveys were not conducted at the approved Grayson Compressor Station because most of the workspace would be sited within the station fence line. Some TWS would be required outside the station fence line; however, this workspace was previously surveyed as part of the authorization process for this facility. The modifications to the Leach C Meter Station also would require workspace outside of the station fence line; therefore, survey was completed for the TWS outside the fence line. Surveys totaled 244.3 acres in Kentucky, 110.8 acres in Tennessee, and 139.2 acres in Mississippi.

The Phase I archaeological investigation consisted of pedestrian survey augmented by shovel testing to identify sites and to define site boundaries. For archaeological resources, the Phase I surveys covered the boundaries of the station sites. For historic architectural properties, the boundaries of the proposed compressor and meter stations and the viewsheds to and from historic sites near the stations were surveyed. The linear extent of the viewsheds varied by site depending on changes in topography, vegetation cover, and the presence of structures or other obstructions in sight lines to and from historic architectural properties. Columbia Gulf provided the resulting reports to FERC and the Kentucky, Tennessee, and Mississippi SHPOs for their respective states. The Tennessee and Mississippi reports (McKee, et al., 2016a and 2016b) documented both archaeological and architectural resources, while for Kentucky, separate reports were provided for archaeological (McKee, et al., 2016c) and architectural (Peckler, et al., 2016) resources.

4.10.1.2.1 Archaeological Resources

Kentucky

Columbia Gulf's Phase I archaeological survey identified two new pre-contact archaeological sites (15GD157 and 15GD158) and an isolated find. Columbia Gulf recommended that site 15GD157 and the isolated find were not eligible for the NRHP. Following Phase II evaluation testing, the portion of site 15GD158 in the project area was recommended as not eligible

for the NRHP, and Columbia Gulf recommended no further work for site 15GD158. In a letter dated June 9, 2016, the Kentucky SHPO concurred with these recommendations. We concur also.

Tennessee

Columbia Gulf's Phase I survey for archaeological resources identified one newly recorded pre-contact archaeological site (40WY114) and one previously recorded pre-contact archaeological site (40WY108). Columbia Gulf recommended that neither of these resources was eligible for the NRHP and no further work would be required. In a May 16, 2016 letter, the Tennessee SHPO found that "the project area contains no historic properties eligible for listing in the National Register of Historic Places." We agree with the SHPO.

The NPS communicated concerns over the potential for impacts on the Trail of Tears at the Clifton Junction station site. To address the NPS's concerns, Columbia Gulf provided a detailed discussion of the trail, its location, a map, and potential project-related effects to the trail. Columbia Gulf recommended that no direct impacts on the Trail of Tears would result from the construction and operation of the station, and that limited indirect impacts on the Trail of Tears are anticipated as a result of the project. The station exhaust stack would potentially be visible to motorists from points along U.S. Highway 64; however, as the highway is used for vehicle traffic, the stack would be seen only briefly, and distinct features would be difficult to distinguish given the prevalence of forested lands and rolling topography surrounding the proposed compressor station. Overall, Columbia Gulf recommended that the level of visual impact from the project was considered negligible.

Mississippi

Columbia Gulf's Phase I survey for archaeological and historic architectural resources resulted in the identification of no archaeological sites. In a May 23, 2016 letter, the Mississippi SHPO concurred with the findings of Columbia Gulf. We concur also.

4.10.1.2.2 Architectural Resources

Kentucky

Columbia Gulf's Phase I Architectural survey identified seven previously recorded resources (a cemetery, two residences, two barns, and two farms), and eight newly recorded resources (a bridge, a farmstead, three residences, and three barns). Four of the previously recorded resources had been previously determined not eligible for the NRHP and were not revisited. The remaining 11 resources were recommended as not eligible for the NRHP. The previously recorded cemetery is approximately 500 feet outside the work area for the Morehead station and would be avoided. In a letter dated June 21, 2016, the SHPO requested the architectural survey report be revised to include additional information regarding modifications to the existing Leach C and approved Grayson stations, and NRHP eligibility assessments of both stations, as well as additional information regarding the area of potential effects. Columbia Gulf provided a revised architectural survey report in September 2016. In a letter dated September 22, 2016, the Kentucky SHPO concurred with the revised report and indicated no historic properties would be affected by the project. We agree with the SHPO.

Tennessee

Columbia Gulf's Phase I survey for historic architectural resources identified eight newly recorded historic architectural properties (all residences), and four previously recorded historic architectural properties (three residences and a church/cemetery). Columbia Gulf recommended that none of these resources were eligible for the NRHP and no further work would be required. The previously recorded church/cemetery is approximately 1,200 feet outside the work area for the Clifton Junction station and would be avoided. In a May 16, 2016 letter, the Tennessee SHPO found that "the project area contains no historic properties eligible for listing in the National Register of Historic Places." We agree with the SHPO.

Mississippi

Columbia Gulf's Phase I survey for historic architectural resources identified nine newly recorded historic architectural properties (seven residences, a radio tower, and a church/cemetery). Columbia Gulf recommended that none of the historic architectural properties were eligible for the NRHP, and no further work would be required. In a May 23, 2016 letter, the Mississippi SHPO concurred with the findings and recommendations of Columbia Gulf. We concur also.

4.10.2 Native American Consultation

Columbia Gulf and Columbia Gas requested information from federally recognized Native American tribes regarding the locations of archaeological sites, burials, or traditional cultural properties within or near the project areas.

4.10.2.1 Mountaineer XPress Project

Columbia Gas requested information from 11 federally recognized Native American tribes:

- Absentee-Shawnee Tribe of Oklahoma
- Cherokee Nation of Oklahoma
- Delaware Nation
- Delaware Tribe of Indians
- Eastern Band of the Cherokee Indians
- Eastern Shawnee Tribe of Oklahoma
- Seneca Nation of Indians
- Seneca-Cayuga Tribe of Oklahoma
- United Keetoowah Band of Cherokee Indians of Oklahoma
- Tonawanda Band of Seneca Indians of New York
- Shawnee Tribe of Oklahoma

Columbia Gas sent introductory project letters to the 11 tribes on July 14, 2015. The letters contained a project description and location maps and invited each tribe to comment on the project.

The Seneca Nation of Indians replied on July 21, 2015, requesting to be informed of any findings. On July 21, 2015, the Delaware Tribe of Indians replied with a letter detailing its fee structure for responding to consultation requests. The Delaware Nation replied on September 9, 2015, requesting a copy of the cultural resources survey report upon completion. Columbia Gas indicated it would provide the Seneca Nation and Delaware Nation with the survey report. No other responses have been received to date.

We sent our MXP Notice of Intent and follow-up letters to these same tribes. The United Keetoowah Band of Cherokee Indians of Oklahoma responded on April 8, 2016, and recommended a survey be completed. Columbia Gas will provide the tribe with the survey report. In a letter dated April 19, 2017, the Eastern Band of Cherokee Indians indicated that “no cultural resources important to the Cherokee people should be adversely impacted” by the project, and requested to be notified of inadvertent discoveries. No other responses have been received to date.

4.10.2.2 Gulf XPress Project

Columbia Gulf requested information from 23 federally recognized Native American tribes:

- Absentee-Shawnee Tribe of Oklahoma
- Alabama-Coushatta Tribe of Texas
- Alabama-Quassarte Tribal Town
- Cherokee Nation of Oklahoma
- Choctaw Nation of Oklahoma
- The Chickasaw Nation
- Chitimacha Tribe of Louisiana
- Coushatta Tribe of Louisiana
- Delaware Nation
- Eastern Band of the Cherokee Indians
- Eastern Shawnee Tribe of Oklahoma
- Jena Band of Choctaw Indians
- Kialegee Tribal Town
- Miami Tribe of Oklahoma
- Mississippi Band of Choctaw Indians
- Muscogee (Creek) Nation
- Peoria Tribe of Indians of Oklahoma
- Poarch Band of Creek Indians
- Quapaw Tribe of Oklahoma

- Shawnee Tribe
- Thlopthlocco Tribal Town
- Tunic- Biloxi Indians of Louisiana
- United Keetoowah Band of Cherokee Indians

Columbia Gulf sent introductory project letters to 21 of the 23 tribes on July 17, 2015. Columbia Gulf sent introductory project letters to the Chitimacha Tribe of Louisiana and the Poarch Band of Creek Indians on June 1, 2016. All the letters contained a project description and location maps, and invited each tribe to comment on the project. Columbia Gulf also conducted follow-up phone calls with the tribes.

In a letter dated August 27, 2015, the Alabama-Coushatta Tribe of Texas indicated the Tribe has ancestral homelands in Tennessee and Mississippi and requested to be notified of inadvertent discoveries during construction in these two states. The project Unanticipated Discover Plans provides for notification of the Alabama-Coushatta Tribe of Texas in the event of such a discovery.

In a letter dated September 8, 2015, the Chickasaw Nation indicated it was unaware of any specific historic properties, including those of traditional, religious, and cultural significance in the project area.

On August 28, 2015, the Peoria Tribe of Indians in Oklahoma indicated the tribe may have an interest in the portion of the project located in Kentucky and requested a copy of the survey report for Kentucky. Columbia Gulf provided the tribe with the report.

On September 8, 2015, the Chickasaw Nation sent a letter to FERC. The letter stated that no known properties of concern to the Tribe are located within the project area.

On August 25, 2015, the Choctaw Nation indicated portions of the project were located within the Choctaw Nation's area of historic interest, and requested shapefiles of the project locations in Mississippi. Columbia Gulf provided the shapefiles to the Choctaw Nation. On September 11, 2015, the Choctaw Nation requested a copy of the Phase I cultural resources survey report for Mississippi, which Columbia Gulf provided.

On August 26 and 28, 2015, respectively, the Delaware Nation and Eastern Shawnee Tribe of Oklahoma indicated they had no concerns regarding the project.

On August 28, 2015, the Muscogee (Creek) Nation expressed possible interest in portions of the project in Mississippi and Tennessee.

On September 1, 2015, the United Keetoowah Band of Cherokee Indians indicated it had no concerns regarding the project, but requested to be notified of unanticipated discoveries during construction in Kentucky or Tennessee. The project Unanticipated Discovery Plans provide for notification of the United Keetoowah Band of Cherokee Indians in the event of such a discovery.

In a letter dated August 1, 2016, the Quapaw Tribe of Oklahoma indicated that it did not anticipate the project would adversely impact any cultural resources, but requested to be contacted

in the event of unanticipated discoveries. The project Unanticipated Discovery Plans provide for notification of the interested tribes in the event of such a discovery.

We sent our GXP Notice of Intent and follow-up letters to these same tribes. The United Keetoowah Band of Cherokee Indians responded on June 22, 2016, and recommended a survey be completed. Columbia Gulf provided the tribe with the survey reports. In a June 23, 2016, letter, the Quapaw Tribe of Oklahoma expressed interest in the project and requested copies of all SHPO correspondence. Columbia Gulf provided the tribe with the requested information and the survey reports. In a letter dated April 19, 2017, the Eastern Band of Cherokee Indians indicated that “no cultural resources important to the Cherokee people should be adversely impacted” by the project, and requested to be notified of inadvertent discoveries. No other responses have been received to date.

4.10.3 Unanticipated Discovery Plan

The Companies have developed project-specific plans which outline procedures to follow, in accordance with state and federal laws, if archaeological materials or human remains are discovered during construction of the projects.

4.10.3.1 Mountaineer XPress Project

Columbia Gas has prepared an Unanticipated Discovery Plan for the project, and provided the plan to FERC and the West Virginia SHPO. The plan outlines procedures to follow, in accordance with state and federal laws, if archaeological materials or human remains are discovered during construction. We requested minor revisions to the plan. Columbia Gas provided a revised plan which we find acceptable.

4.10.3.2 Gulf XPress Project

Columbia Gulf prepared an Unanticipated Discovery Plan for each of the states in which facilities would be located, and provided the plans to FERC and the SHPOs for the respective states. The plans define procedures to be implemented if previously unreported historic properties or human remains are discovered during construction. The Tennessee SHPO found the plan met state standards. The Mississippi SHPO accepted the plan. We requested minor revisions to the plans. Columbia Gulf provided revised plans, which we find acceptable.

4.10.4 Compliance with the National Historic Preservation Act

4.10.4.1 Mountaineer XPress Project

Compliance with section 106 of the NHPA has not been completed for the MXP. Cultural resources surveys of portions of the project and consultation with the West Virginia SHPO have not been completed. If FERC, in consultation with the SHPO, determines that an historic property would be adversely affected, Columbia Gas would be required to either (a) avoid the historic property, or (b) prepare a treatment plan, in consultation with the appropriate parties, to mitigate adverse effects. FERC would provide the ACHP an opportunity to comment in accordance with 36 CFR 800.6. Implementation of a treatment plan would occur only after FERC issued a

Certificate authorizing the project and we issued written notification to Columbia Gas regarding plan implementation.

So that FERC's responsibilities under the NHPA and its implementing regulations are met, we recommend that:

- Columbia Gas should **not begin implementation** of any treatment plans/measures (including archaeological data recovery), **construction** of facilities, or **use** of staging, storage, or temporary work areas and new or to-be-improved access roads **until**:
 - a. Columbia Gas files a response to the West Virginia SHPO's April 6, 2017 comments, and the SHPO's comments on the response;
 - b. Columbia Gas files all remaining archaeological resources survey report(s) and any required evaluation reports and treatment plans, and the SHPO's comments on the reports and plans;
 - c. the ACHP is provided an opportunity to comment on the undertaking if historic properties would be adversely affected; and
 - d. the Commission staff reviews and the Director of OEP approves all cultural resources survey reports and plans and notifies Columbia Gas in writing that treatment plans/mitigation measures may be implemented or construction may proceed.

All material filed with the Secretary that contains **location, character, and ownership information** about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: "**“CUI/PRIV– DO NOT RELEASE.”**"

4.10.4.2 Gulf XPress Project

Compliance with section 106 of the NHPA is complete for all the GXP components in Tennessee, Mississippi, and Kentucky.

4.10.5 Conclusion

Columbia Gas completed cultural resources surveys for all the accessible project areas. To date, of the 56 archaeological sites identified, only 1 is eligible for the NRHP. Columbia Gas would avoid this site. Of 188 architectural resources identified, 1 is listed on the NRHP, 7 are recommended eligible or contributing, and the remainder are recommended as not eligible for the NRHP. Columbia Gas has recommended that the project would have no effect or no adverse effect on the eligible properties. The West Virginia SHPO has requested additional information for the architectural resources, which Columbia Gas has not yet provided. Portions of the MXP still require survey; therefore, compliance with section 106 is not complete. Once cultural resources surveys and evaluations are complete, a treatment plan would be prepared if any historic properties would be adversely affected by the MXP.

Columbia Gulf has completed cultural resources surveys for the project and did not document any historic (NRHP-eligible or listed) properties. FERC and the Tennessee, Mississippi, and Kentucky SHPOs agree that no historic properties would be affected by the GXP.

4.11 AIR QUALITY AND NOISE

4.11.1 Air Quality

Ambient air quality is protected by federal and state regulations. The EPA established NAAQS to protect human health and welfare. Primary standards protect human health, including the health of defined sensitive populations, such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility and damage to animals, crops, vegetation, and buildings. NAAQS have been developed for sulfur dioxide (SO₂), particulate matter (PM) with a diameter of 10 microns or less (PM₁₀), PM with a diameter of 2.5 microns or less (PM_{2.5}), nitrogen dioxide (NO₂), carbon monoxide (CO), O₃, and lead, and include levels for short-term (acute) and long-term (chronic) exposures. Note O₃ is not a pollutant emitted into the air. It is formed from a chemical reaction between nitrogen oxides (NO_x) and volatile organic compounds (VOC) in the presence of sunlight. Consequently, emissions of NO_x and VOCs are regulated by the EPA as “precursors” to the formation of O₃. VOC means any compound of carbon (excluding CO, carbon dioxide [CO₂], carbonic acid, metallic carbides or carbonates, and ammonium carbonate) which participates in atmospheric photochemical reactions [40 CFR 51.100s]). The current NAAQS are listed on the EPA’s website (EPA, 2016c).

The EPA now defines air pollution to include the mix of six long-lived and directly emitted GHG, finding that the presence of these GHGs in the atmosphere may endanger public health and welfare through climate change. These six GHG are: CO₂, methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. As with any fossil-fuel-fired activity, the MXP would contribute GHG emissions. The principal GHGs that would be produced are CO₂, CH₄, and N₂O. No fluorinated gases would be emitted by the MXP. GHG emissions are quantified and regulated in units of CO₂e. CO₂e considers the global warming potential (GWP) of each GHG. The GWP is a ratio relative to CO₂ of a particular GHG’s ability to absorb solar radiation as well its residence time within the atmosphere. CO₂ has a GWP of 1; CH₄ has a GWP of 25; and N₂O has a GWP of 298 (EPA, 2014a).³⁶

The EPA also regulates hazardous air pollutants (HAP). The CAA established a list of 189 HAPs and requires the EPA to regulate toxic air pollutants. The EPA assesses health risks from HAPs to determine whether the standards that have been set protect public health with an ample margin of safety, and protect against adverse environmental effects.

Air quality control regions (AQCR) are areas established by the EPA and local agencies for air quality planning purposes, in which SIPs describe how NAAQS would be achieved and maintained. The AQCRs are intra- and interstate regions such as large metropolitan areas where improvement of the air quality in one portion of the AQCR requires emission reductions throughout the AQCR. Each AQCR, or smaller portion within an AQCR (such as a county or multiple counties), is designated, based on compliance with NAAQS, as attainment, unclassifiable,

³⁶ These GWPs are based on a 100-year period. We have selected their use over other published GWPs for other timeframes because these are the GWPs that the EPA has established for reporting of GHG emissions and air permitting requirements. This allows for a consistent comparison with these regulatory requirements.

maintenance, or nonattainment, on a pollutant-by-pollutant basis. Areas in compliance or below NAAQS are designated as “attainment,” while areas not in compliance or above NAAQS are designated as “nonattainment.” Areas previously designated as nonattainment that have since demonstrated compliance with NAAQS are designated as “maintenance” for that pollutant. Maintenance areas may be subject to more stringent regulatory requirements for continued attainment of NAAQS. Areas that lack sufficient data to determine attainment status are designated “unclassifiable” and treated as attainment areas.

4.11.1.1 Air Quality Regulations

Projects that emit regulated air pollutants are subject to federal and state regulations.

4.11.1.1.1 Federal Regulations

Air quality in the United States is regulated by federal statutes in the CAA and its amendments.

Prevention of Significant Deterioration

New Source Review (NSR) is a pre-construction permitting program designed to protect air quality when air pollutant emissions are increased either through the modification of existing sources or through the construction of a new source of air pollution. In areas with good air quality, NSR ensures that the new emissions do not degrade the air quality; this is achieved through the implementation of the Prevention of Significant Deterioration (PSD) permitting program or state minor permit programs. In areas with poor air quality, Nonattainment NSR ensures that the new emissions do not inhibit progress toward cleaner air. In addition, NSR ensures that any large, new, or modified industrial source uses air pollution control technology. Air permitting of stationary sources has been delegated to each state and/or local permitting authority.

Title V

Title V is an operating permit program run by each state. There are Title V permitting thresholds for criteria pollutants, and if potential emissions exceed these thresholds, sources must apply for a Title V operating permit through the state program and/or local permitting authority.

Mandatory Greenhouse Gas Reporting Rule

The EPA established the final Mandatory GHG Reporting Rule (Federal Register dated October 30, 2009, 40 CFR Parts 86, 87, 89, et al.). This rule requires applicable sources of GHG emissions to report their actual GHG operating emissions, if they exceed 25,000 metric tons of CO₂e in 1 year. This rule is not a permit and does not limit or control emissions. Although this rule does not apply to construction emissions, we have provided GHG construction emission estimates, as CO₂e, in sections 4.11.1.2 and 4.11.1.3 for accounting and disclosure purposes.

National Emissions Standards for Hazardous Air Pollutants

The CAA Amendments established a list of 189 HAPs, resulting in the promulgation of National Emission Standards for Hazardous Air Pollutants (NESHAP), codified in 40 CFR 61 and

63. Part 63 regulates HAPs from major sources of HAPs and specific source categories emitting HAPs. Some NESHAP may apply to non-major sources (area sources) of HAPs. Major source thresholds for NESHAP are 10 tons per year (tpy) of any single HAP or 25 tpy of total HAPs. NESHAP regulates HAP emissions from stationary sources by setting emission limits, monitoring, testing, record keeping, and notification requirements.

New Source Performance Standards

The EPA promulgates New Source Performance Standards (NSPS) to establish emission limits and fuel, monitoring, notification, reporting, and recordkeeping requirements for stationary source types or categories that cause or contribute significantly to air pollution.

General Conformity

The General Conformity Rule was developed to ensure that federal actions in nonattainment and maintenance areas do not impede states' attainment of NAAQS. The lead federal agency must conduct a conformity determination if a federal action's construction and operational activities is likely to result in generating direct and indirect emissions that would exceed the General Conformity Applicability threshold levels of the pollutant(s) for which an air basin is designated nonattainment or maintenance. Conforming activities or actions should not, through additional air pollutant emissions, do any of the following:

- cause or contribute to new violations of NAAQS in any area;
- increase the frequency or severity of any existing violation of any NAAQS; or
- delay timely attainment of any NAAQS or interim emission reductions.

The General Conformity Rule entails both an applicability analysis and a subsequent conformity determination, if applicable. According to the General Conformity regulations, emissions from sources that are subject to any NSR permitting and/or licensing (major or minor) are exempt and are deemed to have conformed. A General Conformity Determination must be completed when the total direct and indirect emissions of a project would equal or exceed the specified pollutant thresholds on a calendar year basis for each nonattainment or maintenance area.

4.11.1.1.2 State Regulations

Applicable State regulations are detailed separately for each project in the following sections.

4.11.1.2 Mountaineer XPress Project

Air quality would be affected by construction and operation of the MXP. Construction activities would temporarily generate air emissions over the area of pipeline construction and at the site of aboveground facilities.

4.11.1.2.1 Existing Air Quality

The regional climate of western West Virginia, including all of the project area, is generally warm during summer and cold during winter, and precipitation is generally well-distributed throughout the year. The MXP areas are designated as attainment or unclassifiable for all pollutants, except as shown in table 4.11-1.

Table 4.11-1 Nonattainment and Maintenance Areas within the MXP Area(s), by Project Component			
Project Component	Designation(s)	County, State	Nonattainment / Maintenance Area
Lone Oak Compressor Station, MXP-100 Tie-in with LEX, MXP-1 Valve Site, MXP-100 (MPs 0.0-11.1)	SO ₂ Nonattainment	Marshall, WV	Marshall, WV
	O ₃ Maintenance	Marshall, WV	Wheeling, WV-OH
	PM _{2.5} Maintenance	Marshall, WV	Wheeling, WV-OH
MXP-9 Valve Site, MXP-10 Valve Site, MXP-100 (MPs 130.9-154.7)	PM _{2.5} Maintenance	Putnam, WV	Charleston, WV
	O ₃ Maintenance	Putnam, WV	Charleston, WV
Saunders Creek Regulator Station, MXP-100 (MPs 155.5-163.9), SM80 Replacement (MP 0.0-0.2), SM80 Loop Replacement (MP 0.0-0.2)	PM _{2.5} Maintenance	Cabell, WV	Huntington-Ashland, WV-KY
	O ₃ Maintenance	Cabell, WV	Huntington-Ashland, WV-KY
Ceredo Compressor Station	PM _{2.5} Maintenance	Wayne, WV	Huntington-Ashland, WV-KY-OH
	O ₃ Maintenance	Wayne, WV	Huntington-Ashland, WV-KY
Elk River Compressor Station	PM _{2.5} Maintenance	Kanawha, WV	Charleston, WV
	O ₃ Maintenance	Kanawha, WV	Charleston, WV

Most of the operational emissions from the MXP would result from the compressor stations. The EPA, along with state and local agencies, collects data on ambient air quality at monitoring stations across the United States. To characterize existing ambient air quality conditions for the MXP, air quality data at the monitoring stations that were most representative of each new and modified compressor station site were collected and are presented in section 4.11.1.2.4 (reference tables 4.11-10 and 4.11-11), in combination with the overall impact for comparison with NAAQS.

4.11.1.2.2 Air Permitting and Regulatory Applicability

The provisions of the CAA that are applicable to the MXP are discussed below.

Federal Regulations

The applicability of federal regulations is summarized for the MXP. The applicability is based on the potential-to-emit (PTE) for each compressor station and comparison to applicable permitting thresholds in tons per year. (The PTE are shown in tables 4.11-4 through 4.11-9, presented in sections 4.11.1.2.3 and 4.11.1.2.4.)

Prevention of Significant Deterioration Applicability

The PTE of each new MXP compressor station (Sherwood, White Oak, and Mount Olive) is below the PSD new major source threshold; therefore, PSD is not applicable at the new compressor stations. The permitting of the approved Lone Oak Compressor Station was completed in 2015 for the entire facility and was not subject to PSD. The air permit for the pending Elk River Compressor Station would be for the entire facility and is not subject to PSD. The Ceredo Compressor Station is an existing PSD major source; therefore, the project emissions are compared to the PSD significant emission rate (SER) level for a respective pollutant. The Ceredo Compressor Station project emissions are less than the SER levels for all pollutants.

Title V Applicability

The new compressor stations (Sherwood, White Oak, and Mount Olive) have a PTE greater than Title V thresholds and would be subject to Title V permitting. Therefore, Columbia Gas would need to apply for a Title V permit for each of these sources within 12 months of commencing operation. Columbia Gas was issued a Permit to Construct for the Lone Oak Compressor Station on December 7, 2015, as part of Columbia's LXP, and would apply for a Title V permit within 12 months after the start of operations. Columbia Gas submitted a construction permit application for the Elk River Compressor Station on January 15, 2016, as a Title V major source associated with the WBX. The additional turbine associated with the MXP was included in the construction permit application. As such, the changes at Elk River would not require any additional permit modifications. Columbia Gas' Ceredo Compressor Station is a Title V major source and changes made to the facility as part of the MXP must be incorporated into the current Title V permit.

Mandatory Greenhouse Gas Reporting Rule

Operational GHG emission estimates for the MXP are presented, as CO₂e, in tables 4.11-4 through 4.11-9. Based on the emission estimates presented, actual GHG emissions from operation of each MXP compressor station have the potential to exceed the 25,000-metric-ton reporting threshold. Therefore, if the actual emissions during operations from any of the compressor stations are equal to or greater than 25,000 metric tpy, Columbia Gas would need to report GHG emissions for that facility. A more detailed discussion on impacts from Project GHG emissions and climate change is included in section 4.13.

National Emissions Standards for Hazardous Air Pollutants

The new compressor stations would be considered area sources of HAPs. The Ceredo Compressor Station is an existing major source of HAPs and would remain major after the modification. Subpart YYYYY (*National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines*) applies to new turbines at major sources of HAPs. Except for the initial notification, the requirements of Subpart YYYYY have been stayed for lean premix natural-gas-fired stationary combustion turbines; therefore, the only requirement for the new combustion turbine at the Ceredo Compressor Station is the initial notification.

Subpart ZZZZ (*National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*) applies to new emergency generators at both major and area sources of HAPs. The new emergency generators at the White Oak, Mount Olive, and Sherwood Compressor Stations would be area sources of HAPs. As such, the engines would be required to comply with the requirements of Subpart ZZZZ by meeting the requirements of the

NSPS Subpart JJJJ. The new emergency generator at the Ceredo Compressor Station would be classified as a new emergency generator and a major source of HAPs and must comply with all applicable Subpart ZZZZ requirements.

New Source Performance Standards

NSPS Subpart JJJJ (*Standards of Performance for Stationary Spark Ignition Internal Combustion Engines*) sets emission standards for NO_x, CO, and VOC. Subpart JJJJ would apply to the new emergency generators being installed at the new Sherwood, White Oak, and Mount Olive Compressor Stations and the existing Ceredo Compressor Station. NSPS Subpart KKKK (*Standards of Performance for Stationary Combustion Turbines*) sets emission standards for NO_x and SO₂ and would apply to the new turbines at the Sherwood, Lone Oak, White Oak, Mount Olive, Elk River, and Ceredo Compressor Stations. The stations would be subject to NSPS Subpart OOOOa and must comply with all applicable requirements of the rule.³⁷

General Conformity

Because some of the MXP facilities would operate in nonattainment and/or maintenance areas, a general conformity applicability analysis is required to determine if a conformity determination is necessary. Emissions reviewed for the conformity applicability analysis include construction and operational emissions not included in an air permit (i.e., fugitive emissions from equipment leaks and pigging operations). Operational emissions not included in air permits consist of fugitive emissions which are quantified in the air permit applications for all compressor stations that are part of the project. All projected fugitive emissions fall below the *de minimis* thresholds. Emissions associated with commuter vehicles and delivery trucks during operation of each facility were considered trivial and were not quantified. All MXP compressor stations would obtain a major or minor NSR Permit. Therefore, these emissions are exempt from applicability.

Table 4.11-2 shows the nonattainment and maintenance areas for the MXP and compares the associated direct and indirect emissions to the applicability thresholds. Emissions reviewed for the conformity applicability analysis include construction and operational emissions not included in an air permit. Construction emissions from the MXP in the nonattainment and maintenance areas, including all phases of construction and worker commuting, were assumed to span from October 2017, to November 2018. Emissions from construction were calculated for years 2017 and 2018.

³⁷ At the time of this document publication, new NSPS rules for the Oil and Natural Gas Sector have been stayed for reconsideration by the EPA. Federal Register / Vol. 82, No. 115 / Friday, June 16, 2017 / Proposed Rules

Table 4.11-2 Summary of MXP Construction Emissions Subject to General Conformity Review					
Designated Pollutant	County/Designated Area	Pollutant or Precursor	Applicability Threshold (tpy)	2017 Emissions (tons)	2018 Emissions (tons)
SO ₂	Marshall, WV/Marshall, WV	SO ₂	100	0.10	0.74
O ₃	Marshall, WV/Wheeling, WV-OH	VOC	100	0.43	5.38
		NO _x	100	4.17	34.44
	Putnam, WV/Charleston, WV	VOC	100	0.42	3.83
		NO _x	100	3.96	32.87
	Cabell, WV/Huntington-Ashland, WV-KY	VOC	100	0.43	3.86
		NO _x	100	4.02	31.89
	Wayne, WV/ Huntington-Ashland, WV-KY	VOC	100	0.14	2.69
		NO _x	100	0.76	6.78
	Kanawha, WV/Charleston, WV	VOC	100	0.04	2.79
		NO _x	100	0.21	7.53
PM _{2.5}	Marshall, WV/Wheeling, WV-OH	PM _{2.5}	100	1.97	9.12
		NO _x	100	4.17	34.44
		SO ₂	100	0.10	0.74
	Putnam, WV/Charleston, WV	PM _{2.5}	100	4.77	21.77
		NO _x	100	3.96	32.87
		SO ₂	100	0.09	0.71
	Cabell, WV/Huntington-Ashland, WV-KY	PM _{2.5}	100	1.96	9.78
		NO _x	100	4.02	31.89
		SO ₂	100	0.09	0.68
	Wayne, WV/Huntington-Ashland, WV-KY-OH	PM _{2.5}	100	0.12	0.52
		NO _x	100	0.76	6.78
		SO ₂	100	0.01	0.06
	Kanawha, WV/Charleston, WV	PM _{2.5}	100	0.03	0.45
		NO _x	100	0.21	7.53
		SO ₂	100	0.00	0.07

Sources: EPA, 2016a; 2016b

As shown in table 4.11-2, emissions during construction of the MXP would not exceed General Conformity thresholds for any nonattainment or maintenance area. Therefore, a general conformity determination is not required.

West Virginia Regulations

The MXP compressor stations and pipeline would be subject to West Virginia state regulations including, but not limited to, the following:

- 45 Code of State Regulations (CSR) 2 (To Prevent and Control Particulate Air Pollution from Combustion of Fuel in Indirect Heat Exchangers) establishes smoke and PM limits on fuel-burning equipment. This rule applies to the combustion turbines and generators;
- 45 CSR 4 (*Discharge of Air Pollutants that Cause Objectionable Odors*) for prevention and control of air emissions that cause objectionable odors. This rule applies to both the pipeline construction, compressor station construction, and compressor station operation;
- 45 CSR 7 (To Prevent and Control Particulate Matter Air Pollution for Manufacturing Process and Associated Operations) controls PM emissions from manufacturing processes. This rule applies to the operation of compressor stations;
- 45 CSR 10 (To Prevent and Control Air Pollution from the Emission of Sulfur Oxides) prevents sulfur oxide pollution. This rule applies to the operation of compressor stations;
- 45 CSR 13 (Permits for Construction, Modification, Relocation and Operation of Stationary Sources, Notification Requirements, Administrative Updates, Temporary Permits, General Permits, Permission to Commence Construction, and Procedure for Evaluation) establishes permitting requirements for non-major stationary sources. This rule applies to the operation of compressor stations;
- 45 CSR 16 (*Standards of Performance for New Stationary Sources*) adopts federal procedures and criteria for new stationary sources. This rule applies to the operation of compressor stations;
- 40 CSR 17 (To Prevent and Control PM Air Pollution from Materials Handling, Preparation, Storage, and Other Sources of Fugitive PM) establishes requirements for prevention and control of PM from fugitive sources. This would apply to fugitive emissions from construction of the pipeline and compressor stations;
- 40 CSR 20 (*Good Engineering Practices as Applicable to Stack Heights*) ensures that stack heights exceeding good engineering practice are not used for the control of air pollution. This rule applies to the operation of compressor stations;
- 45 CSR 22 (*Air Quality Management Fee Program*) establishes fees for operating and construction permits. This rule applies to the operation of compressor stations;
- 45 CSR 30 (*Requirements for Operating Permits*) specifies requirements for Title V operating permits. This rule applies to the operation of compressor stations; and
- 45 CSR 34 (*Emissions Standards for Hazardous Air Pollutants*) adopts federal procedures and criteria for HAPs. This rule applies to the operation of compressor stations.

4.11.1.2.3 Construction Air Emission Impacts and Mitigation

Construction of the MXP would result in temporary and localized increases of tailpipe emissions from mobile diesel- and gas-fueled equipment. In addition, temporary increases in fugitive dust emissions would result from construction-related surface disturbances and

construction vehicle travel on unpaved roads. Open burning is not currently planned for this project.

A summary of the estimated construction emissions is presented in table 4.11-3 for years 2017 and 2018 (duration of the MXP construction). Construction emissions were based on an operating schedule of 12 hours per day, 6 days per week, from the commencement of clearing through restoration. The emissions identified include construction emissions from the Sherwood, Lone Oak, White Oak, Mount Olive, Ceredo, and Elk River Compressor Stations; MXP-100 Tie-in with LEX and MXP-200 Tie-in and Line 1983 sites; the Ripley and Saunders Creek Regulator Stations; MLV sites; and pipeline-associated appurtenances. Table 4.11-3 shows emissions estimates for the following categories of emissions: diesel non-road equipment, diesel and gas on-road equipment, and construction-related and roadway fugitive dust.

Table 4.11-3 Estimated Construction Emissions for the MXP								
Construction Activity	Estimated Emissions (tons)							
	NO_x	VOC	CO	PM₁₀	PM_{2.5}	SO₂	CO_{2e}	HAPs
2017 Emissions								
Diesel non-road equipment	19.69	13.62	1.60	2.23	2.23	0.78	3,645	0.21
Diesel and gas on-road equipment	5.38	2.97	0.61	0.25	0.25	0.01	2,005	0.09
Construction activity fugitive dust	--	--	--	46.55	6.98	--	--	--
Roadway fugitive dust	--	--	--	62.46	6.25	--	--	--
Total 2017 Construction Emissions	25.07	16.59	2.21	111.49	15.71	0.79	5,650	0.30
2018 Emissions								
Diesel non-road equipment	131.53	87.17	11.70	14.32	14.32	5.23	24,340	1.54
Diesel and gas on-road equipment	45.05	32.70	5.30	2.03	2.03	0.13	17,102	0.84
Construction activity fugitive dust	--	--	--	288.56	40.58	--	--	--
Roadway fugitive dust	--	--	--	543.20	54.32	--	--	--
Total 2018 Construction Emissions	176.58	119.87	17.00	848.11	111.25	5.36	41,442	2.38

Tailpipe emissions of NO_x, CO, PM₁₀, PM_{2.5}, SO₂, VOC, and GHGs from mobile construction equipment, worker commuter vehicles, construction, and delivery/removal vehicles were calculated based on the EPA MOVES2014 Model emission factors and vehicle assumptions.

The volume of fugitive dust generated by surface disturbance and vehicle travel on unpaved roads would be dependent upon the area disturbed and the type of construction activity, along with the soil's silt and moisture content, wind speed, and the nature of vehicular/equipment traffic. Fugitive PM₁₀ and PM_{2.5} emissions from excavation and backfilling were calculated using EPA's *Compilation of Air Pollutant Emission Factors (AP-42)*, Section 11.9 (EPA, 1998a), to calculate total PM. The following assumptions were used for the excavation and backfilling fugitive emissions calculations:

- PM₁₀ is equal to total suspended particulate;

- PM_{2.5} is 10 percent of PM₁₀ for construction and demolition; and
- PM_{2.5} is 15 percent of PM₁₀ for industrial wind erosion.

These assumptions were based on the EPA's AP-42, Chapter 13.2.2, *Background Document for Revisions to Fine Fraction Ratios Used for AP-42 Fugitive Dust Emission Factors* (EPA, 2006a). Windblown dust emissions were calculated using the EPA's AP-42, Chapter 11.9, *Western Surface Coal Mining*, Table 11.9-3 (EPA, 1998a), assuming dust control efficiency of 50 percent (achieved primarily by using water trucks to apply water to the right-of-way), based on EPA's *Control of Open Fugitive Dust Sources* (EPA, 1988). Fugitive PM₁₀ and PM_{2.5} from construction equipment on unpaved roads were calculated using the EPA's *Compilation of Air Pollutant Emission Factors (AP-42)*, Section 13.2.2 (EPA, 2006b).

Fugitive dust would result from land clearing, grading, excavation, concrete work, and vehicle traffic on paved and unpaved roads. The amount of dust generated would be a function of construction activity, soil type, soil moisture content, wind speed, precipitation, vehicle traffic, vehicle types, and roadway characteristics. Emissions would be greater during dry periods and in areas of fine-textured soils subject to surface activity. Columbia Gas has prepared a Fugitive Dust Control Plan³⁸ that describes the mitigation measures that would be implemented to control fugitive dust during project construction. We have reviewed the Fugitive Dust Control Plan and find it acceptable.

4.11.1.2.4 Operational Air Emission Impacts and Mitigation

Operational Air Emissions

Tables 4.11-4 through 4.11-9 show operational emission estimates from the compressor stations. Emissions of NO_x, CO, and VOC from operation of the combustion turbines were calculated using vendor data. Maximum hourly emission rates were based on normal operation at 32 °F. Columbia Gas has proposed to equip the new turbines with advanced dry-low-NO_x combustion controls, known by the manufacturer as SoLoNO_x, to mitigate air quality impacts by reducing NO_x emissions. Potential emissions were estimated from each combustion turbine accounting for normal operation for 8,760 hours per year (i.e., continuous operation) plus additional emissions to account for non-SoLoNO_x operation during planned startups and shutdowns. Emission estimates of PM₁₀ and PM_{2.5} from operation of the combustion turbines were based on EPA's AP-24 factors (EPA, 2000 [Table 3.1-2a]).

Potential emissions from the new emergency generators are based on operation of up to 500 hours per year. Emissions of NO_x, CO, and VOC are based on NSPS Subpart JJJJ limitations. Formaldehyde (a HAP) emissions are based on vendor data.

The heaters proposed for each compressor station would operate up to 8,760 hours per year.

³⁸ Columbia Gas' Fugitive Dust Control Plan was included as appendix 9D to Resource Report 9 in its April 2016 application. The Dust Control Plan can be viewed on the FERC website at <http://www.ferc.gov>. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20160429-5286 in the "Numbers: Accession Number" field.

Except as indicated above, potential emissions for each combustion unit are based on the following emission factors:

- Potential CO_{2e} emissions are based on emission factors and GWPs specified in 40 CFR 98.
- Annual SO₂ emissions are based on 0.25 grains of sulfur per 100 standard cubic feet of natural gas, and maximum hourly emissions are based on 20 grains of sulfur per 100 standard cubic feet.
- Emissions of formaldehyde and total HAPs are based on the EPA's AP-42 emission factors (except for emergency generators).
- All heater emissions are based on AP-42 emission factors.

Table 4.11-4 Potential Emissions from Expansion of the Lone Oak Compressor Station								
Emissions Source	NO _x (tpy)	CO (tpy)	VOC (tpy)	PM ₁₀ /PM _{2.5} (tpy)	SO ₂ (tpy)	CO _{2e} (tpy)	Formaldehyde (Single HAP) (tpy)	Total HAPs (tpy)
Emission Sources under the LXP								
Solar Mars 100 Turbine #1	31.24	46.62	3.75	3.75	0.41	66,609	0.40	0.58
Solar Mars 100 Turbine #2	31.24	46.62	3.75	3.75	0.41	66,609	0.40	0.58
Solar Mars 100 Turbine #3	31.24	46.62	3.75	3.75	0.41	66,609	0.40	0.58
Waukesha Emergency Generator	1.30	0.84	0.03	0.02	0.00	266	0.12	0.16
Catalytic Heaters (40)	1.24	1.04	0.07	0.09	0.01	1,477	0.00	0.02
Solar Mars 100 Turbine Venting <u>a</u> /	--	--	9.31	--	--	6,025	--	--
Equipment Leaks	--	--	0.60	--	--	387	--	--
Total Emissions – LXP <u>b</u>/	96.26	141.74	21.26	11.36	1.24	207,982	1.32	1.92
Proposed Emission Sources under MXP								
Solar Mars 100 Turbine #4	31.24	46.62	3.75	3.75	0.41	66,609	0.40	0.58
Solar Mars 100 Turbine Venting <u>a</u> /	--	--	3.10	--	--	2,008	--	--
Equipment Leaks	--	--	0.20	--	--	129	--	--
Total Proposed Emissions – MXP <u>b</u>/	31.24	46.62	7.05	3.75	0.41	68,746	0.40	0.58
Total Station Emissions	127.50	188.36	28.31	15.11	1.65	276,728	1.72	2.50
Title V Threshold	100	100	100	100	100	N/A	10	25
PSD Major Source Threshold	250	250	250	250	250	N/A	N/A	N/A
<p>a This includes emissions from the pneumatic actuators, blowdowns from shutdowns, and compressor unit dry seals.</p> <p>b The MXP involves installing one turbine (#4). Turbine engines #1 – #3 are approved for installation under the LXP (Docket No. CP16-38-000).</p>								

All the combustion units at the Lone Oak Compressor Station would be natural gas-fired. Potential emissions were calculated based on operating 8,760 hours per year. The only exception is the emergency generator (part of the LXP). Potential emissions for the emergency generator were based on 500 operating hours per year.

Emissions Source	NO_x (tpy)	CO (tpy)	VOC (tpy)	PM₁₀/PM_{2.5} (tpy)	SO₂ (tpy)	CO_{2e} (tpy)	Formalde- hyde (Single HAP) (tpy)	Total HAPs (tpy)
Solar Taurus 60 Turbine #1 (T01)	16.78	38.95	2.13	1.97	0.21	35,001	0.21	0.31
Solar Taurus 60 Turbine #2 (T02)	16.78	38.95	2.13	1.97	0.21	35,001	0.21	0.31
Solar Mars 100 Turbine #3 (T03)	32.51	78.89	4.16	3.82	0.41	67,713	0.41	0.59
Solar Mars 100 Turbine #4 (T04)	32.51	78.89	4.16	3.82	0.41	67,713	0.41	0.59
Waukesha Emergency Generator (G1)	1.30	2.59	0.65	0.02	0.00	266	0.12	0.17
Line Heater (H1)	0.47	0.40	0.03	0.04	0.00	564	0.00	0.01
Line Heater (H2)	0.26	0.22	0.01	0.02	0.00	308	0.00	0.00
Catalytic Heaters (40) (SH1)	1.24	1.04	0.07	0.09	0.01	1,477	0.00	0.02
Solar Mars 100 Turbine Venting <u>a/</u>	--	--	0.40	--	--	653	--	--
Solar Taurus 60 Turbine Venting <u>a/</u>	--	--	0.52	--	--	846	--	--
Blowdowns <u>b/</u>	--	--	9.15	--	--	14,954	--	--
Equipment Leaks	--	--	0.29	--	--	481	--	--
Total Station Emissions	101.85	239.93	23.70	11.75	1.25	224,976	1.36	2.00
Title V Threshold	100	100	100	100	100	N/A	10	25
PSD Major Source Threshold	250	250	250	250	250	N/A	N/A	N/A
<p>a This includes emissions from the pneumatic actuators and compressor unit dry seals. b This includes emissions from turbine shutdown blowdowns and one full station blowdown.</p>								

All combustion units at the Sherwood Compressor Station would be natural gas-fired. Potential emissions were calculated based on operating 8,760 hours per year (except for the emergency generator, which was based on 500 operating hours per year).

**Table 4.11-6
Potential Emissions from the White Oak Compressor Station**

Emissions Source	NO_x (tpy)	CO (tpy)	VOC (tpy)	PM₁₀/PM_{2.5} (tpy)	SO₂ (tpy)	CO_{2e} (tpy)	Formalde- hyde (Single HAP) (tpy)	Total HAPs (tpy)
Solar Titan 130E Turbine #1 (T01)	43.10	104.84	5.52	5.08	0.55	90,042	0.55	0.79
Solar Titan 130E Turbine #2 (T02)	43.10	104.84	5.52	5.08	0.55	90,042	0.55	0.79
Waukesha Emergency Generator (G1)	1.30	2.59	0.65	0.02	0.00	266	0.12	0.17
Line Heater (H1)	0.61	0.51	0.03	0.05	0.00	723	0.00	0.01
Catalytic Heaters (40) (SH1)	1.24	1.04	0.07	0.09	0.01	1,477	0.00	0.02
Solar Titan 130E Turbine Venting <u>a/</u>	--	--	0.40	--	--	653	--	--
Blowdowns <u>b/</u>	--	--	6.12	--	--	9,992	--	--
Equipment Leaks	--	--	0.15	--	--	241	--	--
Total Station Emissions	89.35	213.82	18.46	10.32	1.11	193,436	1.22	1.78
Title V Threshold	100	100	100	100	100	N/A	10	25
PSD Major Source Threshold	250	250	250	250	250	N/A	N/A	N/A

a This includes emissions from the pneumatic actuators and compressor unit dry seals.
b This includes emissions from turbine shutdown blowdowns and one full station blowdown.

All combustion units at the White Oak Compressor Station would be natural gas-fired. Potential emissions were calculated based on operating 8,760 hours per year (except for the emergency generator, which was based on 500 operating hours per year).

**Table 4.11-7
Potential Emissions from the Mount Olive Compressor Station**

Emissions Source	NO_x (tpy)	CO (tpy)	VOC (tpy)	PM₁₀/PM_{2.5} (tpy)	SO₂ (tpy)	CO_{2e} (tpy)	Formalde- hyde (Single HAP) (tpy)	Total HAPs (tpy)
Solar Titan 130 Turbine #1 (T01)	38.98	79.87	4.87	4.62	0.50	81,923	0.50	0.72
Solar Titan 130 Turbine #2 (T02)	38.98	79.87	4.87	4.62	0.50	81,923	0.50	0.72
Solar Titan 130 Turbine #3 (T03)	38.98	79.87	4.87	4.62	0.50	81,923	0.50	0.72
Waukesha Emergency Generator (G1)	1.30	2.59	0.65	0.02	0.00	266	0.12	0.17
Line Heater (H1)	0.61	0.51	0.03	0.05	0.00	723	0.00	0.01
Line Heater (H2)	0.30	0.25	0.02	0.02	0.00	359	0.00	0.01
Catalytic Heaters (40) (SH1)	1.24	1.04	0.07	0.09	0.01	1,477	0.00	0.02
Solar Titan 130 Turbine Venting <u>a/</u>	--	--	0.60	--	--	979	--	--
Blowdowns <u>b/</u>	--	--	8.73	--	--	14,266	--	--
Equipment Leaks	--	--	0.22	--	--	361	--	--
Total Station Emissions	120.39	244.00	24.93	14.04	1.51	264,200	1.62	2.37
Title V Threshold	100	100	100	100	100	N/A	10	25
PSD Major Source Threshold	250	250	250	250	250	N/A	N/A	N/A

a This includes emissions from the pneumatic actuators and compressor unit dry seals.

b This includes emissions from turbine shutdown blowdowns and one full station blowdown.

All combustion units at the Mount Olive Compressor Station would be natural gas-fired. Potential emissions were calculated based on operating 8,760 hours per year (except for the emergency generator, which was based on 500 operating hours per year).

**Table 4.11-8
Potential Emissions from Expansion of the Ceredo Compressor Station**

Emissions Source	NO_x (tpy)	CO (tpy)	VOC (tpy)	PM₁₀/PM_{2.5} (tpy)	SO₂ (tpy)	CO_{2e} (tpy)	Formalde- hyde (Single HAP) (tpy)	Total HAPs (tpy)
Existing Emission Sources at Ceredo Compressor Station								
Cooper-Bessemer GMWH-8 Engine (E01)	491.79	35.08	12.36	4.98	0.07	12,063	5.69	8.19
Cooper-Bessemer GMWH-8 Engine (E02)	491.79	35.08	12.36	4.98	0.07	12,063	5.69	8.19
Cooper-Bessemer GMWH-8 Engine (E03)	491.79	35.08	12.36	4.98	0.07	12,063	5.69	8.19
Cooper-Bessemer GMWH-8 Engine (E04)	491.79	35.08	12.36	4.98	0.07	12,063	5.69	8.19
Cooper-Bessemer GMWH-8 Engine (E05)	491.79	35.08	12.36	4.98	0.07	12,063	5.69	8.19
Cooper-Bessemer GMWH-8 Engine (E06)	491.79	35.08	12.36	4.98	0.07	12,063	5.69	8.19
Cooper-Bessemer 8V-250 Engine (E07)	591.30	39.03	11.07	4.46	0.07	10,801	5.09	7.34
GE 3912R Turbine (E08)	265.82	19.70	0.86	2.71	0.29	48,130	0.29	0.42
GE 3112R Turbine (E09)	265.54	41.28	1.06	3.32	0.36	58,982	0.36	0.52
Waukesha Emergency Generator (G3)	0.61	1.08	0.41	0.01	0.00	173	0.08	0.11
Fuel Gas Heater (H1)	0.15	0.13	0.01	0.01	0.00	180	0.00	0.00
Heating System Boiler (BL2)	2.69	2.26	0.15	0.20	0.02	3,219	0.00	0.05
Existing Station Equipment a/	4,076.85	313.96	87.72	40.59	1.16	193,863	39.96	57.58
Proposed Changes and New Emission Sources under MXP								
Removal of GE3912R Turbine (E08) b/	-265.82	-19.70	-0.86	-2.71	-0.29	-48,130	-0.29	-0.42
Removal of GE3112R Turbine (E09) c/	-265.54	-41.28	-1.06	-3.32	-0.36	-58,982	-0.36	-0.52
Solar Titan 250 Turbine (E10)	35.67	54.65	6.03	6.44	0.70	114,203	0.69	1.00
Waukesha Emergency Generator (G5)	1.30	2.59	0.65	0.02	0.00	266	0.12	0.17
Line Heater (H2)	0.43	0.36	0.02	0.03	0.00	513	0.00	0.01
Solar Titan 250 Turbine Venting d/	--	--	0.20	--	--	326	--	--
Blowdowns e/	--	--	4.10	--	--	6,692	--	--
Equipment Leaks	--	--	0.07	--	--	120	--	--
Proposed Emission Changes under MXP	-493.96	-3.38	9.08	0.46	0.05	14,888	0.16	0.24
Total Station Emissions	3,582.89	310.58	96.80	41.05	1.21	208,751	40.12	57.82
Title V Threshold	100	100	100	100	100	N/A	10	25
PSD Significance Threshold	40	100	40	15 / 10	40	N/A	N/A	N/A

- a Excludes fugitive emissions (equipment leaks) because compressor stations are not one of the 28 listed source categories.
- b Would be taken out of service as part of the LXP and removed as part of MXP. It is identified in this table for reference only, given that it would be removed as part of the air permit application.
- c Would be taken out of service and removed as part of the MXP.
- d This includes emissions from the pneumatic actuators and compressor unit dry seals.
- e This includes emissions from turbine shutdown blowdowns and one full station blowdown.

As part of the MXP, Columbia Gas is proposing to retire and remove one GE 3112R compressor turbine, rated at 12,500 hp. Columbia Gas is also proposing to remove one GE 3912R compressor turbine, rated at 10,200 hp, which was previously retired.

The existing emission units at Ceredo Compressor Station that would not change with the MXP include the following:

- three Solar Turbines compressors driven by Siemens electric motors, each rated at 13,000 hp;
- six Cooper-Bessemer GMWH-8 compressor engines, each rated at 2,800 hp;
- one Cooper-Bessemer 8V-250 compressor engine, rated at 2,700 hp;
- one Waukesha emergency generator, rated at 738 hp;
- one fuel gas heater, rated at 0.35 MMBtu/hr; and
- one heating system boiler, rated at 6.28 MMBtu/hr.

Emissions from the new equipment at the Ceredo Compressor Station are based on operating 8,760 hours per year (except for the emergency generator, which was based on 500 operating hours per year).

Table 4.11-9 Potential Emissions from Expansion of the Elk River Compressor Station								
Emissions Source	NO _x (tpy)	CO (tpy)	VOC (tpy)	PM ₁₀ /PM _{2.5} (tpy)	SO ₂ (tpy)	CO _{2e} (tpy)	Formaldehyde (Single HAP) (tpy)	Total HAPs (tpy)
Pending Emission Sources under WBX								
Solar Mars 100 Turbine (T01)	32.29	80.63	4.19	3.85	0.42	68,362	0.41	0.60
Solar Mars 100 Turbine (T02)	32.29	80.63	4.19	3.85	0.42	68,362	0.41	0.60
Waukesha VGF-L36GL Emergency Generator (G1)	0.19	0.39	0.10	0.00	0.00	40	0.02	0.03
Line Heaters (H1 & H2)	0.28	0.23	0.02	0.02	0.00	333	0.00	0.01
Catalytic Heaters (49) (SH1)	1.03	0.87	0.06	0.08	0.01	1,233	0.00	0.02
Solar Mars 100 Turbine Venting (T01 & T02) <u>a/</u>	--	--	21.57	--	--	13,964	--	--
Equipment leaks	--	--	0.40	--	--	258	--	--
Total Pending Station Emissions – WBX <u>b/</u>	66.08	162.75	30.53	7.80	0.85	152,552	0.84	1.26
Proposed Emission Sources under MXP								
Solar Mars 100 Turbine (T03)	32.29	80.63	4.19	3.85	0.42	68,362	0.41	0.60
Solar Mars 100 Turbine Venting (T03) <u>a/</u>	--	--	10.78	--	--	6,982	--	--
Equipment leaks	--	--	0.20	--	--	129	--	--
Total Proposed Station Emissions – MXP <u>b/</u>	32.29	80.63	15.17	3.85	0.42	75,473	0.41	0.60
Total Station Emissions	98.37	243.38	76.15	11.65	1.27	228,025	1.25	1.86
Title V Threshold	100	100	100	100	100	N/A	10	25
PSD Major Source Threshold	250	250	250	250	250	N/A	N/A	N/A
<p>a This includes emissions from the pneumatic actuators, blowdowns from shutdowns, and compressor unit dry seals.</p> <p>b The MXP involves installing one turbine (T03). Turbine engines T01 & T02 are proposed for installation under the WBX (Docket No. CP16-38-000).</p>								

All combustion units at the Elk River Compressor Station would be natural gas-fired. Potential emissions were calculated based on operating 8,760 hours per year (except for the emergency generator, which was based on 500 operating hours per year).

Emissions generated during operation of the Ripley Regulator Station would be minimal and limited to one process gas heater, rated at 11.1 MMBtu/hr, and fugitive emissions. The modified Saunders Creek Regulator Station would have emissions associated with one Generac Guardian #006730-1 emergency generator (rated at 24 hp), two process gas heaters (each rated at 32.12 MMBtu/hr, pigging operations, and fugitive emissions. Both the Ripley and Saunders Creek Regulator Stations would require a State Only Minor Permit, which would be issued by the WVDEP, Division of Air Quality. Operational emissions for these two regulator stations are shown in table 4.11-10.

Table 4.11-10 Potential Emissions from the Ripley and Saunders Creek Regulator Stations								
Emissions Source	NO _x (tpy)	CO (tpy)	VOC (tpy)	PM ₁₀ /PM _{2.5} (tpy)	SO ₂ (tpy)	CO _{2e} (tpy)	Formaldehyde (Single HAP) (tpy)	Total HAPs (tpy)
Ripley Regulator Station								
Process Gas Heater	5.61	4.00	1.40	0.36	0.03	5,681	0.00	0.09
Equipment Leaks	--	--	--	--	--	10	--	--
Total Ripley RS Emissions	5.61	4.00	1.40	0.36	0.03	5,691	0.00	0.09
Saunders Creek Regulator Station								
Emergency Generator	0.17	0.28	0.00	0.00	0.00	9	0.00	0.00
Process Gas Heaters (2)	34.21	23.17	1.52	2.10	0.20	32,879	0.02	0.52
Equipment Leaks	--	--	--	--	--	31	--	--
Pigging Operations	--	--	0.02	--	--	16	--	--
Total Saunders Creek RS Emissions	34.38	23.45	1.54	2.10	0.20	32,935	0.02	0.52
Title V Threshold	100	100	100	100	100	N/A	10	25
PSD Major Source Threshold	250	250	250	250	250	N/A	N/A	N/A

Emissions generated during operation of the pipeline portion of the MXP would be minimal and limited to equipment leaks and maintenance-type pigging operations. Total pipeline emissions are shown in table 4.11-11.

Table 4.11-11 Operational Pipeline Emissions for the MXP		
Emission Category	Operational Pipeline Emissions (tpy)	
	CH ₄	CO _{2e}
Equipment leaks	3.10	77.39
Pigging operations	0.08	1.98
Total Pipeline Emissions	3.17	79.36

Air Dispersion Modeling

Air dispersion modeling was completed using the EPA-preferred AERMOD dispersion model for each compressor station to show compliance with NAAQS. Appropriate pound-per-hour (lb/hr) emission rates were determined for each pollutant and averaging period. Both existing/pending and new sources at each compressor station were modeled (as part of MXP and other related proposed projects) to determine the additive impact on ambient air quality from each compressor station.

Columbia Gas provided modeling protocols for each compressor station.³⁹ Updated modeling for the Lone Oak, Ceredo, and Elk River Compressor Stations was provided on October 12, 2016.⁴⁰ The AERMOD model was run using default, conservative methodologies for the Sherwood, White Oak, Mount Olive, Lone Oak, and Elk River Compressor Stations. Modeling protocols were submitted to the public docket (CP16-357) in September 2016. The non-default, Plume Volume Molar Ratio Method was used in AERMOD for the 1-hour and annual NO₂ modeled impacts for the Ceredo Compressor Station. The low wind speed condition (LOWWIND3) and surface friction adjustment under low wind and stable conditions (ADJ_U*) beta options were also used in the Ceredo Compressor Station 1-hour and annual NO₂ modeling.⁴¹

Tables 4.11-11 and 4.11-12 summarize the modeling results and provide the current ambient monitored data, the facility impact, the combined concentration, and a comparison with NAAQS for each pollutant and averaging period (except for the 3-hour SO₂ and annual NO₂ standards where 1-hour averaging periods show compliance with the lengthier averaging times). All pollutant concentrations are in micrograms per cubic meter (µg/m³). Table 4.11-12 shows modeled impacts from new MXP compressor stations, and table 4.11-13 shows modeled impacts from compressor stations being modified as part of the MXP.

Table 4.11-12 Air-Dispersion Modeling Results for New MXP Compressor Stations					
Pollutant	Averaging Period	Background (µg/m³)	Facility Impact (µg/m³)	Facility Impact + Background (µg/m³)	NAAQS (µg/m³)
Sherwood Compressor Station					
NO ₂	1-hour <u>a</u> /	38.9	62.4	101.2	188
PM _{2.5}	24-hour	19.0	1.58	20.6	35
PM _{2.5}	Annual	9.1	0.11	9.2	12
PM ₁₀	24-hour	47.0	2.30	49.3	150
CO	1-hour	1,832	102.0	1,934	40,000
CO	8-hour	801	48.2	850	10,000
SO ₂	1-hour <u>b</u> /	43.6	4.47	48.1	196.5
White Oak Compressor Station					
NO ₂	1-hour <u>a</u> /	38.9	5.1	44.0	188
PM _{2.5}	24-hour	19.7	0.26	19.9	35
PM _{2.5}	Annual	9.8	0.02	9.8	12
PM ₁₀	24-hour	30.0	0.35	30.4	150

³⁹ Appendix 9A to Resource Report 9 can be viewed on our website at <http://www.ferc.gov>. Using the “eLibrary” link, select “Advanced Search” from the eLibrary menu and enter 20160429-5286 in the “Numbers: Accession Number” field.

⁴⁰ Air modeling for the Lone Oak, Ceredo, and Elk River Compressor Stations can be viewed on our website at <http://www.ferc.gov>. Using the “eLibrary” link, select “Advanced Search” from the eLibrary menu and enter 20161012-5160 in the “Numbers: Accession Number” field.

⁴¹ The EPA has proposed to incorporate these beta options as regulatory options within AERMOD/AERMET under the Revision to the Guideline on Air Quality Models Notice of Proposed Rulemaking, dated July 29, 2015, but this has not yet been approved. These options are expected to be incorporated into AERMOD, but would still require formal approval by the EPA region as an alternative model. The EPA Memo “Clarification on the Approval Process for Regulatory Application of the AERMOD Modeling System Beta Options,” published on December 10, 2015, clarifies the approval process for AERMOD beta options.

Pollutant	Averaging Period	Background (µg/m³)	Facility Impact (µg/m³)	Facility Impact + Background (µg/m³)	NAAQS (µg/m³)
CO	1-hour	1,832	18.3	1,850	40,000
CO	8-hour	801	7.8	809	10,000
SO ₂	1-hour <u>b/</u>	69.8	0.45	70.3	196.5
Mount Olive Compressor Station					
NO ₂	1-hour <u>a/</u>	57.7	12.2	69.9	188
PM _{2.5}	24-hour	18.3	0.71	19.0	35
PM _{2.5}	Annual	9.1	0.06	9.2	12
PM ₁₀	24-hour	30.0	1.25	31.2	150
CO	1-hour	2,976	45.2	3,022	40,000
CO	8-hour	1,832	19.3	1,851	10,000
SO ₂	1-hour <u>b/</u>	110.8	0.98	111.8	196.5
<p>a The annual NO₂ NAAQS is 100 µg/m³, which is at or below all modeled 1-hour NO₂ maximum values. Therefore, annual estimates would be even less than these maximum hourly estimates.</p> <p>b The 3-hour SO₂ NAAQS is 1,300 µg/m³, which is at or below all modeled 1-hour SO₂ maximum values. Therefore, 3-hour estimates would be even less than these maximum hourly estimates.</p>					

Pollutant	Averaging Period	Background (µg/m³)	Facility Impact <u>a/</u> (µg/m³)	Facility Impact + Background (µg/m³)	NAAQS (µg/m³)
Lone Oak Compressor Station					
NO ₂	1-hour	66.4	31.6	98.0	188
NO ₂	Annual	6.6	1.1	7.7	100
PM _{2.5}	24-hour	25.3	2.83	27.7	35
PM _{2.5}	Annual	11.6	0.17	11.8	12
PM ₁₀	24-hour	47.0	3.61	50.6	150
CO	1-hour	1,259	186.4	1,446	40,000
CO	8-hour	1,145	70.6	1,215	10,000
SO ₂	1-hour	108.2	2.38	110.6	196.5
SO ₂	3-hour	108.2	2.77	111.0	1,300
Ceredo Compressor Station <u>b/</u>					
NO ₂	1-hour	--	--	186.9	188
NO ₂	Annual	11.3	12.3	11.3	100
PM _{2.5}	24-hour	21.0	10.1	21.5	35
PM _{2.5}	Annual	9.1	1.4	9.1	12
PM ₁₀	24-hour	74.0	18.1	74.9	150
CO	1-hour	1,725.0	1,956.8	2,131.4	40,000
CO	8-hour	1,035.0	810.3	1,227.7	10,000
SO ₂	1-hour	48.0	137.0	69.1	196.5
SO ₂	3-hour	57.6	96.8	75.9	1,300

Table 4.11-13 Air-Dispersion Modeling Results for Modified MXP Compressor Stations					
Pollutant	Averaging Period	Background (µg/m³)	Facility Impact a/ (µg/m³)	Facility Impact + Background (µg/m³)	NAAQS (µg/m³)
Elk River Compressor Station					
NO ₂	1-hour	57.7	53.9	111.6	188
NO ₂	Annual	5.8	1.6	7.4	100
PM _{2.5}	24-hour	18.3	1.48	19.8	35
PM _{2.5}	Annual	9.1	0.26	9.4	12
PM ₁₀	24-hour	30.0	1.79	31.8	150
CO	1-hour	2,862	178.5	3,040	40,000
CO	8-hour	1,374	98.3	1,472	10,000
SO ₂	1-hour	110.8	3.75	114.6	196.5
SO ₂	3-hour	110.8	3.20	114.0	1,300
a Facility impact includes existing/approved/pending sources and new sources planned as part of the MXP. b Seasonal hour-of-day NO ₂ background concentrations were summed with the modeled 1-hour NO ₂ concentrations within AERMOD for the Ceredo Compressor Station.					

These modeling results demonstrate that the MXP compressor stations would not exceed NAAQS, and the project area would continue to remain protective of human health and public welfare for all listed pollutants.

4.11.1.3 Gulf XPress Project

Air quality would be affected by construction and operation of the GXP. Construction activities would generate air emissions at the compressor stations both temporarily during construction and throughout the operation of the GXP.

4.11.1.3.1 Existing Air Quality

The GXP would be in Kentucky, Tennessee, and Mississippi. The regional climate of Kentucky and Tennessee is classified as humid continental, characterized by frequent changes in the weather with large ranges in temperature. The climate of Mississippi is classified as humid subtropical. Although the potential exists for drought and flood, rainfall is typically consistent throughout the year. The winters are temperate, and the summers are long and hot.

The GXP areas are all designated as attainment or unclassifiable for all pollutants.

To characterize existing ambient air quality conditions for the GXP, air quality data at the monitoring stations that were most representative of each new and modified compressor station were collected and are presented in section 4.11.1.3.4 (reference table 4.11-23) in combination with the project impact for comparison with NAAQS.

4.11.1.3.2 Air Permitting and Regulatory Applicability

The provisions of the CAA that are applicable to the GXP are discussed below.

Federal Regulations

The applicability of federal regulations is summarized for each project element. Tables 4.11-14 through 4.11-21 show the PTE for each compressor station and comparison to applicable permitting thresholds in tpy.

Prevention of Significant Deterioration Applicability

The PTE of each new compressor station (Morehead, Paint Lick, Goodluck, Cane Ridge, Clifton Junction, New Albany, and Holcomb) is below the PSD new major source threshold; therefore, PSD is not applicable. The approved Grayson Compressor Station is a minor source with respect to PSD permitting, and the additional equipment proposed as part of the GXP would not trigger any PSD requirements.

Title V Applicability

The new compressor stations would be subject to Title V permitting. Therefore, Columbia Gulf would need to apply for a Title V permit for each of these sources within 12 months of commencing operation. The Grayson Compressor Station would also need to obtain a Title V permit.

Mandatory Greenhouse Gas Reporting Rule

Operational GHG emission estimates for the GXP are presented, as CO₂e, in tables 4.11-14 through 4.11-21. Based on the emission estimates presented, actual GHG emissions from operation of each GXP compressor station have the potential to exceed the 25,000 metric tpy reporting threshold. Therefore, if the actual emissions during operations from any of the compressor stations are equal to or greater than 25,000 metric tpy, Columbia Gulf would need to report GHG emissions for that facility. A more detailed discussion on impacts from the GXP GHG emissions and climate change is included in section 4.13.

National Emissions Standards for Hazardous Air Pollutants

The new emergency generators at the Morehead, Paint Lick, Goodluck, Cane Ridge, Clifton Junction, New Albany, and Holcomb stations would be new emergency generators and area sources of HAPs. As such, the engines would comply with the requirements of Subpart ZZZZ by meeting the requirements of NSPS Subpart JJJJ.

New Source Performance Standards

Subpart JJJJ would apply to the new emergency generators at Morehead, Paint Lick, Goodluck, Cane Ridge, Clifton Junction, New Albany, and Holcomb stations. NSPS Subpart KKKK would apply to the new turbines at Morehead, Paint Lick, Goodluck, Cane Ridge, Clifton Junction, New Albany, Holcomb, and Grayson stations.

General Conformity

Because all the GXP facilities would operate in attainment and/or unclassified areas, a general conformity applicability analysis is not required.

Kentucky, Tennessee, and Mississippi Regulations

The GXP compressor stations would be subject to Kentucky, Mississippi, and Tennessee state regulations.

In Kentucky, the Morehead, Paint Lick, and Goodluck stations would be required to comply with all applicable state regulations, including but not limited to the following:

- 401 KAR Chapter 50 (*General Administrative Procedures*) establishes procedures for general applications, fees, modeling, good engineering stack height, testing and monitoring, etc.;
- 401 KAR Chapter 51 (*Attainment and Maintenance of NAAQS*) establishes standards and requirements for the attainment and maintenance of NAAQS;
- 401 KAR Chapter 52 (*Permits, Registrations and Prohibitory Rules*) establishes rules for the Title V operating permit program and other permitting programs;
- 401 KAR Chapter 53 (*Ambient Air Quality*) sets the ambient air quality standards;
- 401 KAR Chapter 55 (*Emergency Episodes*) establishes emergency episode provisions;
- 401 KAR Chapter 57 (*Hazardous Pollutants*) establishes requirements for hazardous pollutants;
- 401 KAR Chapter 59 (*New Source Standards*) establishes new source standards; and
- 401 KAR Chapter 60 (*New Source Standards*) adopts federal new source performance standards.

In Tennessee, the Cane Ridge and Clifton Junction stations would be required to comply with all applicable state regulations, including, but not limited to the following:

- Chapter 1200-03-03 (*Ambient Air Quality Standards*) establishes primary ambient air quality standards;
- Chapter 1200-03-08 (*Fugitive Dust*) covers fugitive dust requirements and controls;
- Chapter 1200-03-09 (*Construction and Operating Permits*) establishes requirements for construction and operating permits;
- Chapter 1200-03-11 (*Hazardous Air Contaminants*) establishes emission limits and other standards for hazardous air contaminants;
- Chapter 1200-03-14 (*Control of Sulfur Dioxide Emission*) establishes emission limits and standards for SO₂;
- Chapter 1200-03-18 (*Volatile Organic Compounds*) establishes emission limits and standards for VOCs;
- Chapter 1200-03-24 (*Good Engineering Practice Stack Height Regulations*) establishes good engineering stack height standards; and

- Chapter 1200-03-27 (*Nitrogen Oxides*) establishes good engineering stack height standards.

The Metro Government of Nashville & Davidson County has local permitting authority over stationary sources located in Davidson County. The applicable Metro Government of Nashville & Davidson County regulations that are applicable to the Cane Ridge Compressor Station include, but are not limited to, the following:

- Regulation No. 1 – Prevention, Abatement and Control of Air Contaminants from Open Burning
- Regulation No. 2 – Prevention, Abatement and Control of Air Contaminants from Materials Subject to Become Wind-Borne
- Regulation No. 3 – New Source Review
- Regulation No. 4 – Regulation for Control of Hazardous Air Pollutants
- Regulation No. 5 – Standards of Performance for New Stationary Sources
- Regulation No. 7 – Regulations for Control of Volatile Organic Compounds
- Regulation No. 11 – Emergency Episode Regulation
- Regulations No. 13 – Part 70 Operating Permit Program
- Regulation No. 14 – Regulation for Control of Nitrogen Oxides

In Mississippi, the New Albany and Holcomb stations would be required to comply with all applicable state regulations, including, but not limited to the following:

- 11 Mississippi Administrative Code (MAC) Part 2, Chapter 1 (*Air Emission Regulations for the Prevention, Abatement, and Control of Air Contaminants*) covers criteria for PM (smoke, opacity, and nuisances) and HAP provisions;
- 11 MAC Part 2, Chapter 4 (*Ambient Air Quality Standards*) establishes ambient air quality standards;
- 11 MAC Part 2, Chapter 6 (*Air Emissions Operating Permit Regulations for Purposes of Title V of the Federal Clean Air Act*) establishes requirements for the Title V program; and
- 11 MAC Part 2, Chapter 6 (*Air Toxics Regulations*) establishes regulations for air toxics.

4.11.1.3.3 Construction Air Emission Impacts and Mitigation

Construction of the GXP would result in temporary, localized increases of tailpipe emissions from mobile diesel- and gas-fueled equipment. In addition, temporary increases in

fugitive dust emissions would occur due to construction-related surface disturbances and construction vehicle travel on unpaved roads. Open burning is not currently planned for this project.

A summary of the estimated project construction emissions is presented in table 4.11-14 for years 2017 and 2018 (duration of project construction). Construction emissions were based on an operating schedule of 12 hours per day, 6 days per week, from the commencement of clearing through restoration. The emissions identified include construction emissions from the Morehead, Paint Lick, Goodluck, Cane Ridge, Clifton Junction, New Albany, Holcomb stations, and modifications at the approved Grayson Compressor Station. Table 4.11-14 shows emissions estimates for the following categories of emissions: diesel non-road equipment, diesel and gas on-road equipment, and construction activity and roadway fugitive dust.

Table 4.11-14 Estimated Construction Emissions for the GXP								
Construction Activity	Estimated Emissions (tons)							
	NO_x	VOC	CO	PM₁₀	PM_{2.5}	SO₂	CO_{2e}	HAPs
2017 Emissions								
Diesel non-road equipment	1.32	0.14	1.07	0.16	0.16	0.05	212	0.02
Diesel and gas on-road equipment	5.58	0.45	11.23	0.18	0.17	0.02	2,529	0.06
Construction activity fugitive dust	--	--	--	1.91	0.29	--	--	--
Roadway fugitive dust	--	--	--	3.18	0.25	--	--	--
Total 2017 Construction Emissions	6.90	0.59	12.30	5.43	0.86	0.07	2,741	0.08
2018 Emissions								
Diesel non-road equipment	5.89	0.61	4.83	0.74	0.74	0.21	975	0.08
Diesel and gas on-road equipment	22.72	1.84	50.34	0.70	0.64	0.09	11,822	0.24
Construction activity fugitive dust	--	--	--	9.47	1.42	--	--	--
Roadway fugitive dust	--	--	--	12.41	1.24	--	--	--
Total 2018 Construction Emissions	28.61	2.45	55.17	23.32	4.04	0.30	12,797	0.32

Tailpipe emissions of NO_x, CO, PM₁₀, PM_{2.5}, SO₂, VOC, and GHGs from mobile construction equipment, worker commuter vehicles, construction, and delivery/removal vehicles were calculated based on the EPA MOVES2014 Model emission factors and vehicle assumptions.

The volume of fugitive dust generated by surface disturbance and vehicle travel on unpaved roads would be dependent upon the area disturbed and the type of construction activity, along with the soil's silt and moisture content, wind speed, and the nature of vehicular/equipment traffic. Fugitive PM₁₀ and PM_{2.5} emissions from excavation and backfilling were calculated using EPA's *Compilation of Air Pollutant Emission Factors (AP-42)* Section 11.9 (EPA, 1998a) to calculate total PM. The following assumptions were used for the excavation and backfilling fugitive emissions calculations:

- PM₁₀ is equal to total suspended particulate;
- PM_{2.5} is 10 percent of PM₁₀ for construction and demolition; and

- PM_{2.5} is 15 percent of PM₁₀ for industrial wind erosion.

These assumptions were based on the EPA's AP-42, Chapter 13.2.2, *Background Document for Revisions to Fine Fraction Ratios Used for AP-42 Fugitive Dust Emission Factors* (EPA, 2006a). Windblown dust emissions were calculated using the EPA's AP-42, Chapter 11.9, *Western Surface Coal Mining*, Table 11.9-4 (EPA, 1998a), assuming dust control efficiency of 50 percent (achieved primarily by using water trucks to apply water to the right-of-way), based on EPA's *Control of Open Fugitive Dust Sources* (EPA, 1988). Fugitive PM₁₀ and PM_{2.5} from construction equipment on unpaved roads were calculated using the EPA's *Compilation of Air Pollutant Emission Factors (AP-42)*, Section 13.2.2 (EPA, 2006b).

Fugitive dust would result from land clearing, grading, excavation, concrete work, and vehicle traffic on paved and unpaved roads. The amount of dust generated would be a function of construction activity, soil type, soil moisture content, wind speed, precipitation, vehicle traffic, vehicle types, and roadway characteristics. Emissions would be greater during dry periods and in areas of fine-textured soils subject to surface activity. Columbia Gulf has prepared a Fugitive Dust Control Plan⁴² that describes the mitigation measures that would be implemented to control fugitive dust during project construction. We have reviewed the Fugitive Dust Control Plan and find it acceptable.

These construction emissions would occur over the duration of construction activity and would be emitted at different times and at discrete locations across three states. With the mitigation measures proposed by the Columbia Gulf, air quality impacts from construction equipment would be temporary and would not result in a significant impact on regional air quality.

4.11.1.3.4 Operational Air Emission Impacts and Mitigation

Operational Air Emissions

Tables 4.11-15 through 4.11-22 show operational emission estimates from the compressor stations. Emissions of NO_x, CO, and VOC from operation of the combustion turbines were calculated using vendor data. Maximum hourly emission rates were based on normal operation at 32 °F. Columbia Gulf has proposed to equip the new turbines with SoLoNO_x to mitigate air quality impacts by reducing NO_x emissions. Potential emissions were estimated from each combustion turbine accounting for normal operation for 8,760 hours per year (i.e., continuous operation) plus additional emissions to account for non-SoLoNO_x operation during planned startups and shutdowns. Emission estimates of PM₁₀ and PM_{2.5} from operation of the combustion turbines were based on EPA's AP-24 factors (EPA, 2000 [Table 3.1-2a]).

Potential emissions from the new emergency generators are based on operation of up to 100 hours per year. Emissions of NO_x, CO, and VOC are based on NSPS Subpart JJJJ limitations. Formaldehyde emissions are based on vendor data.

⁴² Columbia Gulf's Fugitive Dust Control Plan was included as appendix 1D to Resource Report 1 in its April 2016 application. The Dust Control Plan can be viewed on the FERC website at <http://www.ferc.gov>. Using the "eLibrary" link, select "Advanced Search" from the eLibrary menu and enter 20160429-5339 in the "Numbers: Accession Number" field.

The heaters proposed for each compressor station would operate up to 8,760 hours per year.

Except as indicated above, potential emissions for each combustion unit are based on the following emission factors:

- Potential CO_{2e} emissions are based on emission factors and GWPs specified in 40 CFR 98.
- Annual SO₂ emissions are based on 0.25 grains of sulfur per 100 standard cubic feet of natural gas, and maximum hourly emissions are based on 20 grains of sulfur per 100 standard cubic feet.
- Emissions of formaldehyde and total HAPs are based on the EPA's AP-42 emission factors (except for emergency generators).
- All heater emissions are based on AP-42 emission factors.

A 2,000-gallon condensate storage tank would be installed at each compressor station. Emissions estimates were determined using the EPA's TANKS emissions model.

Emissions Source	NO_x (tpy)	CO (tpy)	VOC (tpy)	PM₁₀/PM_{2.5} (tpy)	SO₂ (tpy)	CO_{2e} (tpy)	Formaldehyde (Single HAP) (tpy)	Total HAPs (tpy)
Solar Titan 130E Turbine	43.2	104.5	5.6	5.1	0.6	91,294	0.6	0.8
Solar Titan 130E Turbine	43.2	104.5	5.6	5.1	0.6	91,294	0.6	0.8
Waukesha Emergency Generator	0.3	0.5	0.1	0.0	0.0	53	0.0	0.0
Process Heater	0.6	0.5	0.0	0.0	0.0	723	0.0	0.0
(40) Catalytic Heaters	1.2	1.0	0.1	0.1	0.0	1,477	0.0	0.0
Condensate Tank	N/A	N/A	0.0	N/A	N/A	N/A	N/A	N/A
Equipment Leaks	N/A	N/A	0.1	N/A	N/A	241	N/A	N/A
Venting <u>a</u> /	N/A	N/A	0.4	N/A	N/A	653	N/A	N/A
Blowdowns <u>b</u> /	N/A	N/A	5.3	N/A	N/A	8,709	N/A	N/A
Total Station Emissions	88.5	211.0	17.2	10.3	1.2	194,444	1.2	1.6
Title V Threshold	100	100	100	100	100	N/A	10	25
PSD Major Source Threshold	250	250	250	250	250	N/A	N/A	N/A
<p>a This includes emissions from the pneumatic actuators and compressor unit dry seals.</p> <p>b This includes emissions from turbine shutdown blowdowns and one full station blowdown.</p>								

All the combustion units at the Morehead station would be natural gas-fired. Potential emissions were calculated based on operating 8,760 hours per year (except for the emergency generator, which was based on 100 operating hours per year).

Emissions Source	NO_x (tpy)	CO (tpy)	VOC (tpy)	PM₁₀/PM_{2.5} (tpy)	SO₂ (tpy)	CO_{2e} (tpy)	Formaldehyde (Single HAP) (tpy)	Total HAPs (tpy)
Solar Titan 130 Turbine	38.6	99.9	5.0	4.6	0.5	81,570	0.5	0.7
Solar Titan 130 Turbine	38.6	99.9	5.0	4.6	0.5	81,570	0.5	0.7
Waukesha Emergency Generator	0.3	0.5	0.1	0.0	0.0	53	0.0	0.0
Process Heater	0.6	0.5	0.0	0.0	0.0	723	0.0	0.0
40 Catalytic Heaters	1.2	1.0	0.1	0.1	0.0	1,477	0.0	0.0
Condensate Tank	N/A	N/A	0.0	N/A	N/A	N/A	N/A	N/A
Equipment Leaks	N/A	N/A	0.2	N/A	N/A	244	N/A	N/A
Venting <u>a</u> /	N/A	N/A	0.5	N/A	N/A	661	N/A	N/A
Blowdowns <u>b</u> /	N/A	N/A	5.0	N/A	N/A	6,448	N/A	N/A
Total Station Emissions	38.6	201.8	15.9	9.3	1.0	172,746	1.0	1.4
Title V Threshold	100	100	100	100	100	N/A	10	25
PSD Major Source Threshold	250	250	250	250	250	N/A	N/A	N/A
a This includes emissions from the pneumatic actuators and compressor unit dry seals. b This includes emissions from turbine shutdown blowdowns and one full station blowdown.								

All the combustion units at the Paint Lick Compressor Station would be natural gas-fired. Potential emissions were calculated based on operating 8,760 hours per year (except for the emergency generator, which was based on 100 operating hours per year).

Table 4.11-17 Potential Emissions from the Proposed Goodluck Compressor Station								
Emissions Source	NO_x (tpy)	CO (tpy)	VOC (tpy)	PM₁₀/PM_{2.5} (tpy)	SO₂ (tpy)	CO_{2e} (tpy)	Formaldehyde (Single HAP) (tpy)	Total HAPs (tpy)
Solar Mars 100 Turbine	31.8	77.8	4.1	3.8	0.4	67,155	0.4	0.6
Solar Mars 100 Turbine	31.8	77.8	4.1	3.8	0.4	67,155	0.4	0.6
Waukesha Emergency Generator	0.3	0.5	0.1	0.0	0.0	53	0.0	0.0
Process Heater	0.5	0.4	0.0	0.0	0.0	564	0.0	0.0
40 Catalytic Heaters	1.2	1.0	0.1	0.1	0.0	1,477	0.0	0.0
Condensate Tank	N/A	N/A	0.0	N/A	N/A	N/A	N/A	N/A
Equipment Leaks	N/A	N/A	0.2	N/A	N/A	244	N/A	N/A
Venting <u>a</u> /	N/A	N/A	0.5	N/A	N/A	662	N/A	N/A
Blowdowns <u>b</u> /	N/A	N/A	5.8	N/A	N/A	7,487	N/A	N/A
Total Station Emissions	65.6	157.5	14.9	7.7	0.8	144,597	0.8	1.2
Title V Threshold	100	100	100	100	100	N/A	10	25
PSD Major Source Threshold	250	250	250	250	250	N/A	N/A	N/A
a This includes emissions from the pneumatic actuators and compressor unit dry seals. b This includes emissions from turbine shutdown blowdowns and one full station blowdown.								

All the combustion units at the Goodluck Compressor Station would be natural gas-fired. Potential emissions were calculated based on operating 8,760 hours per year (except for the emergency generator, which was based on 100 operating hours per year).

Table 4.11-18 Potential Emissions from the Proposed Expansion of the Grayson Compressor Station								
Emissions Source	NO _x (tpy)	CO (tpy)	VOC (tpy)	PM ₁₀ /PM _{2.5} (tpy)	SO ₂ (tpy)	CO _{2e} (tpy)	Formaldehyde (Single HAP) (tpy)	Total HAPs (tpy)
Pending Emission Sources under RXP								
Solar Mars 100 Turbine #1 (T01)	33.5	57.9	4.0	3.9	0.4	68,340	0.4	0.6
Solar Titan 130 Turbine (T02)	40.7	72.9	4.9	4.7	0.5	82,806	0.5	0.7
Emergency Generator	1.0	0.6	0.0	0.0	0.0	200	0.1	0.1
Indirect-fired Heat Exchanger	0.5	0.4	0.0	0.0	0.0	564	0.0	0.0
Catalytic Space Heaters	1.2	1.0	0.1	0.1	0.0	1,477	0.0	0.0
Equipment Leaks	N/A	N/A	0.7	N/A	N/A	433	N/A	N/A
Venting <u>a/</u>	N/A	N/A	7.4	N/A	N/A	4,792	N/A	N/A
Total Emissions – RXP <u>b/</u>	76.9	132.8	17.1	8.7	0.9	158,612	1.0	1.4
Proposed Emission Sources under GXP								
Solar Mars 100 Turbine #2 (T03) <u>a/</u>	33.5	57.9	4.0	3.9	0.4	68,340	0.4	0.6
Equipment Leaks	N/A	N/A	0.1	N/A	N/A	67	N/A	N/A
Venting <u>a/</u>	N/A	N/A	3.7	N/A	N/A	2,396	N/A	N/A
Total Proposed Emissions – GXP <u>b/</u>	33.5	57.9	7.8	3.9	0.4	70,803	0.4	0.6
Total Station Emissions	110.4	190.7	24.9	12.6	1.3	229,415	1.4	2.0
Title V Threshold	100	100	100	100	100	N/A	10	25
PSD Major Source Threshold	250	250	250	250	250	N/A	N/A	N/A
<p>a This includes emissions from the pneumatic actuators, blowdowns from shutdowns, and compressor unit dry seals.</p> <p>b The GXP involves installing one turbine (T03). The station is proposed to be built with turbine engines T01 and T02 under the RXP Certificated Capacity Increase Project (Docket No. CP15-539-000).</p>								

All the combustion units at the Grayson Compressor Station would be natural gas-fired. Potential emissions were calculated based on operating 8,760 hours per year (except for the emergency generator, which was based on 100 operating hours per year).

**Table 4.11-19
Potential Emissions from the Proposed Cane Ridge Compressor Station**

Emissions Source	NO _x (tpy)	CO (tpy)	VOC (tpy)	PM ₁₀ /PM _{2.5} (tpy)	SO ₂ (tpy)	CO _{2e} (tpy)	Formaldehyde (Single HAP) (tpy)	Total HAPs (tpy)
Solar Titan 130 Turbine	39.1	100.4	5.1	4.7	0.5	82,567	0.5	0.7
Solar Titan 130 Turbine	39.1	100.4	5.1	4.7	0.5	82,567	0.5	0.7
Waukesha Emergency Generator	0.3	0.5	0.1	0.0	0.0	53	0.0	0.0
Process Heater	0.6	0.5	0.0	0.0	0.0	723	0.0	0.0
40 Catalytic Heaters	1.2	1.0	0.1	0.1	0.0	1,477	0.0	0.0
Condensate Tank	N/A	N/A	0.0	N/A	N/A	N/A	N/A	N/A
Equipment Leaks	N/A	N/A	0.2	N/A	N/A	244	N/A	N/A
Venting <u>a</u> /	N/A	N/A	0.5	N/A	N/A	662	N/A	N/A
Blowdowns <u>b</u> /	N/A	N/A	6.2	N/A	N/A	8,001	N/A	N/A
Total Station Emissions	80.3	202.8	17.3	9.5	1.0	176,294	1.0	1.4
Title V Threshold	100	100	100	100	100	N/A	10	25
PSD Major Source Threshold	250	250	250	250	250	N/A	N/A	N/A

a This includes emissions from the pneumatic actuators and compressor unit dry seals.

b This includes emissions from turbine shutdown blowdowns and one full station blowdown.

All the combustion units at the Cane Ridge Compressor Station would be natural gas-fired. Potential emissions were calculated based on operating 8,760 hours per year (except for the emergency generator, which was based on 100 operating hours per year).

**Table 4.11-20
Potential Emissions from the Clifton Junction Compressor Station**

Emissions Source	NO _x (tpy)	CO (tpy)	VOC (tpy)	PM ₁₀ /PM _{2.5} (tpy)	SO ₂ (tpy)	CO _{2e} (tpy)	Formaldehyde (Single HAP) (tpy)	Total HAPs (tpy)
Solar Mars 100 Turbine	32.3	78.3	4.2	3.9	0.4	68,442	0.4	0.6
Solar Mars 100 Turbine	32.3	78.3	4.2	3.9	0.4	68,442	0.4	0.6
Waukesha Emergency Generator	0.3	0.5	0.1	0.0	0.0	53	0.0	0.0
Process Heater	0.5	0.4	0.0	0.0	0.0	564	0.0	0.0
40 Catalytic Heaters	1.2	1.0	0.1	0.1	0.0	1,477	0.0	0.0
Condensate Tank	N/A	N/A	0.0	N/A	N/A	N/A	N/A	N/A
Equipment Leaks	N/A	N/A	0.2	N/A	N/A	244	N/A	N/A
Venting <u>a</u> /	N/A	N/A	0.5	N/A	N/A	662	N/A	N/A
Blowdowns <u>b</u> /	N/A	N/A	5.6	N/A	N/A	7,130	N/A	N/A
Total Station Emissions	66.6	158.5	14.9	7.9	0.8	147,014	0.8	1.2
Title V Threshold	100	100	100	100	100	N/A	10	25
PSD Major Source Threshold	250	250	250	250	250	N/A	N/A	N/A

a This includes emissions from the pneumatic actuators and compressor unit dry seals.

b This includes emissions from turbine shutdown blowdowns and one full station blowdown.

All the combustion units at the Clifton Junction Compressor Station would be natural gas-fired. Potential emissions were calculated based on operating 8,760 hours per year (except for the emergency generator, which was based on 100 operating hours per year).

Emissions Source	NO_x (tpy)	CO (tpy)	VOC (tpy)	PM₁₀/PM_{2.5} (tpy)	SO₂ (tpy)	CO_{2e} (tpy)	Formaldehyde (Single HAP) (tpy)	Total HAPs (tpy)
Solar Mars 100 Turbine	32.5	78.6	4.2	3.9	0.4	68,869	0.4	0.6
Solar Mars 100 Turbine	32.5	78.6	4.2	3.9	0.4	68,869	0.4	0.6
Waukesha Emergency Generator	0.3	0.5	0.1	0.0	0.0	53	0.0	0.0
Process Heater	0.5	0.4	0.0	0.0	0.0	564	0.0	0.0
40 Catalytic Heaters	1.2	1.0	0.1	0.1	0.0	1,477	0.0	0.0
Condensate Tank	N/A	N/A	0.0	N/A	N/A	N/A	N/A	N/A
Equipment Leaks	N/A	N/A	0.2	N/A	N/A	244	N/A	N/A
Venting <u>a</u> /	N/A	N/A	0.5	N/A	N/A	662	N/A	N/A
Blowdowns <u>b</u> /	N/A	N/A	5.8	N/A	N/A	7,495	N/A	N/A
Total Station Emissions	67.0	159.1	15.1	7.9	0.8	148,233	0.8	1.2
Title V Threshold	100	100	100	100	100	N/A	10	25
PSD Major Source Threshold	250	250	250	250	250	N/A	N/A	N/A
<p>a This includes emissions from the pneumatic actuators and compressor unit dry seals.</p> <p>b This includes emissions from turbine shutdown blowdowns and one full station blowdown.</p>								

All the combustion units at the New Albany Compressor Station would be natural gas-fired. Potential emissions were calculated based on operating 8,760 hours per year (except for the emergency generator, which was based on 100 operating hours per year).

Emissions Source	NO _x (tpy)	CO (tpy)	VOC (tpy)	PM ₁₀ /PM _{2.5} (tpy)	SO ₂ (tpy)	CO _{2e} (tpy)	Formaldehyde (Single HAP) (tpy)	Total HAPs (tpy)
Solar Mars 100 Turbine	32.8	78.8	4.2	3.9	0.4	69,484	0.4	0.6
Solar Mars 100 Turbine	32.8	78.8	4.2	3.9	0.4	69,484	0.4	0.6
Waukesha Emergency Generator	0.3	0.5	0.1	0.0	0.0	53	0.0	0.0
Process Heater	0.5	0.4	0.0	0.0	0.0	564	0.0	0.0
40 Catalytic Heaters	1.2	1.0	0.1	0.1	0.0	1,477	0.0	0.0
Condensate Tank	N/A	N/A	0.0	N/A	N/A	N/A	N/A	N/A
Equipment Leaks	N/A	N/A	0.2	N/A	N/A	244	N/A	N/A
Venting <u>a</u> /	N/A	N/A	0.5	N/A	N/A	662	N/A	N/A
Blowdowns <u>b</u> /	N/A	N/A	5.5	N/A	N/A	7,038	N/A	N/A
Total Station Emissions	67.6	159.5	14.8	7.9	0.8	149,006	0.8	1.2
Title V Threshold	100	100	100	100	100	N/A	10	25
PSD Major Source Threshold	250	250	250	250	250	N/A	N/A	N/A
<p>a This includes emissions from the pneumatic actuators and compressor unit dry seals.</p> <p>b This includes emissions from turbine shutdown blowdowns and one full station blowdown.</p>								

All the combustion units at Holcomb Compressor Station would be natural gas-fired. Potential emissions were calculated based on operating 8,760 hours per year (except for the emergency generator, which was based on 100 operating hours per year).

Air Dispersion Modeling

Air dispersion modeling was completed using the EPA-preferred AERMOD dispersion model for each compressor station to show compliance with NAAQS. Appropriate pound-per-hour emission rates were determined for each pollutant and averaging period. Existing and new sources at each station were modeled to determine the cumulative impact on ambient air quality. The AERMOD model was run using standard parameters for all GXP compressor stations. Columbia Gulf provided detailed modeling protocols for each compressor station.⁴³ Table 4.11-23 summarizes the modeling results and provides the current ambient monitored data, the project impact, existing sources impact, the combined concentration, and a comparison with NAAQS for each pollutant and averaging period (except for the 3-hour SO₂ NAAQS and annual NO₂ where 1-hour averaging periods show compliance with the lengthier averaging times).

⁴³ Appendix 9C to Resource Report 9 can be viewed on the FERC website at <http://www.ferc.gov>. Using the “eLibrary” link, select “Advanced Search” from the eLibrary menu and enter 20160429-5339 in the “Numbers: Accession Number” field.

Table 4.11-23 Air-Dispersion Modeling Results for GXP Compressor Stations Compared to NAAQS					
Pollutant	Averaging Period	Background ($\mu\text{g}/\text{m}^3$)	Facility Impact ($\mu\text{g}/\text{m}^3$)	Facility Impact + Background ($\mu\text{g}/\text{m}^3$)	NAAQS ($\mu\text{g}/\text{m}^3$)
Morehead Compressor Station					
NO ₂	1-hour <u>a</u> /	57.7	40.1	97.8	188
PM _{2.5}	24-hour	17.3	0.81	18.1	35
PM _{2.5}	Annual	7.9	0.06	8.0	12
PM ₁₀	24-hour	23.0	1.36	24.4	150
CO	1-hour	1,717	78.2	1,795	40,000
CO	8-hour	1,145	30.1	1,175	10,000
SO ₂	1-hour <u>b</u> /	36.7	3.09	39.7	196.5
Paint Lick Compressor Station					
NO ₂	1-hour a/	80.2	5.9	86.1	188
PM _{2.5}	24-hour	17.3	0.40	17.7	35
PM _{2.5}	Annual	8.5	0.02	8.5	12
PM ₁₀	24-hour	30.0	0.75	30.7	150
CO	1-hour	3,320	24.5	3,344	40,000
CO	8-hour	1,946	14.5	1,961	10,000
SO ₂	1-hour <u>b</u> /	40.1	0.64	40.8	196.5
Goodluck Compressor Station					
NO ₂	1-hour <u>a</u> /	77.7	6.9	84.6	188
PM _{2.5}	24-hour	19.7	0.6	20.2	35
PM _{2.5}	Annual	9.9	0.0	9.9	12
PM ₁₀	24-hour	30.0	0.6	30.6	150
CO	1-hour	229.0	18.3	247.3	40,000
CO	8-hour	343.4	9.7	353.2	10,000
SO ₂	1-hour <u>b</u> /	27.1	0.5	27.6	196.5
Grayson Compressor Station <u>c</u>/					
NO ₂	1-hour <u>a</u> /	57.7	38.0	95.6	188
PM _{2.5}	24-hour	20.7	2.5	23.2	35
PM _{2.5}	Annual	10.2	0.2	10.3	12
PM ₁₀	24-hour	23.0	3.2	26.2	150
CO	1-hour	1,717	175.0	1,892	40,000
CO	8-hour	1,145	117.2	1,262	10,000
SO ₂	1-hour <u>b</u> /	13.1	1.4	14.5	196.5
Cane Ridge Compressor Station					
NO ₂	1-hour <u>a</u> /	77.7	7.7	85.4	188
PM _{2.5}	24-hour	21.7	0.4	22.0	35
PM _{2.5}	Annual	9.9	0.0	10.0	12
PM ₁₀	24-hour	30.0	0.4	30.4	150
CO	1-hour	229	23.3	252	40,000
CO	8-hour	343	9.5	353	10,000
SO ₂	1-hour <u>b</u> /	29.7	0.7	30.4	196.5

Table 4.11-23 Air-Dispersion Modeling Results for GXP Compressor Stations Compared to NAAQS					
Pollutant	Averaging Period	Background (µg/m ³)	Facility Impact (µg/m ³)	Facility Impact + Background (µg/m ³)	NAAQS (µg/m ³)
Clifton Junction Compressor Station					
NO ₂	1-hour <u>a/</u>	77.7	21.0	98.7	188
PM _{2.5}	24-hour	18.7	0.7	19.4	35
PM _{2.5}	Annual	8.9	0.1	9.0	12
PM ₁₀	24-hour	35.0	0.9	35.9	150
CO	1-hour	1,374	33.4	1,407	40,000
CO	8-hour	916	16.2	932	10,000
SO ₂	1-hour <u>b/</u>	53.2	1.6	54.8	196.5
New Albany Compressor Station					
NO ₂	1-hour <u>a/</u>	77.1	4.0	81.1	188
PM _{2.5}	24-hour	20.3	0.2	20.6	35
PM _{2.5}	Annual	9.6	0.0	9.6	12
PM ₁₀	24-hour	49.0	0.3	49.3	150
CO	1-hour	1,374	10.1	1,384	40,000
CO	8-hour	916	5.9	922	10,000
SO ₂	1-hour <u>b/</u>	24.4	0.3	24.7	196.5
Holcomb Compressor Station					
NO ₂	1-hour <u>a/</u>	77.1	7.1	84.2	188
PM _{2.5}	24-hour	20.0	0.4	20.4	35
PM _{2.5}	Annual	9.0	0.0	9.1	12
PM ₁₀	24-hour	49.0	0.7	49.7	150
CO	1-hour	2,519	18.8	2,537	40,000
CO	8-hour	1,717	14.0	1,731	10,000
SO ₂	1-hour <u>b/</u>	24.4	0.6	25.0	196.5
<p>a The annual NO₂ NAAQS is 100 µg/m³ which is below all modeled 1-hour NO₂ maximum values. Therefore, any annual estimates would be even less than these maximum hourly estimates.</p> <p>b The 3-hour SO₂ NAAQS is 1,300 µg/m³ which is at or below all modeled 1-hour SO₂ maximum values. Therefore 3-hour estimates would be even less than these maximum hourly estimates.</p> <p>c Pending and new sources at Grayson Compressor Station were modeled for this analysis and results demonstrate cumulative facility impact.</p>					

These modeling results demonstrate that the GXP compressor stations would not exceed NAAQS and the project areas would continue to remain protective of human health and public welfare for all listed pollutants.

4.11.1.3.5 Responses to Comments Regarding Air Quality and Health

Commenters expressed concern about exposure to chemicals from the construction and operation of gas compressor stations and the impacts on human health. We address concerns about radon, fugitive gas, and HAPs below.

During public scoping, we received several comments concerning the risk of radon exposure associated with the burning of natural gas sourced from Pennsylvania Marcellus Shale. We have recently evaluated general background information, studies, and literature on radon in natural gas in several past environmental assessments and EISs. These studies include samples taken at well sites, pre-processing, post-processing, and transmission pipelines; and the recent Pennsylvania Department of Environmental Protection (PADEP) Technologically Enhanced Naturally Occurring Radioactive Materials Study Report issued in January 2015 (PADEP, 2015). This PADEP report is consistent with past studies, which identify indoor radon concentrations from naturally occurring sources ranging from 0.0042 picocuries per liter (pCi/L) to 0.13 pCi/L.

In the United States, the EPA has set the indoor action level for radon at 4 pCi/L. If concentrations of radon are high enough to exceed these activity levels, the EPA recommends remedial actions, such as improved ventilation, be implemented to reduce levels below this threshold. Further, the Indoor Radon Abatement Act established the long-term goal that indoor air radon levels be equal to or better than outdoor air radon levels. The average home in the United States has a radon activity level of 1.3 pCi/L, while outdoor levels average approximately 0.4 pCi/L. Indoor radon typically originates from naturally occurring sources rather than from natural gas combustion. Past studies demonstrate that indoor radon concentrations from Pennsylvania Marcellus Shale-sourced gas would remain below the EPA action level and the Indoor Radon Abatement Act long-term goal. Therefore, we conclude that the risk of exposure to radon from natural gas would not be significant.

Other pollutants of concern (from public scoping) include CH₄, formaldehyde, methylene chloride, BTEX (benzene, toluene, ethylbenzene, and xylene) compounds, and chromium. While the term “VOC” can under specific circumstances refer to highly toxic compounds (such as BTEX), VOCs in transmission quality natural gas are limited to butane, propane, pentane, and hexane.

Fugitive gas emissions can occur because of leaks from gas pipeline equipment such as tie-ins, valves, and regulator stations. Fugitive gas can also be emitted from blowdowns at compressor stations. These emissions have been estimated for each GXP compressor station as shown in tables 4.11-15 through 4.11-22. Fugitive emissions from equipment leaks are estimated to be less than 1 tpy for each compressor station. Blowdown emissions are estimated to be in the range of 5 to 7 tpy at each compressor station. These fugitive gas emissions would be pipeline quality gas that is primarily comprised of CH₄, ethane, and propane (hydrocarbons) and not highly toxic compounds. The GXP gas composition is shown below in table 4.11-24. Hexane is the only gas component that is a listed HAP and is present in only trace amounts.

Component	Mole Percent
Methane	87.9993
Ethane	10.3101
Carbon dioxide	0.5650
Nitrogen	0.5635
Propane	0.4334
n-Butane	0.0515
Isobutane	0.0318
Hexane	0.0217
Isopentane	0.0130
Neopentane	0.0107
Gas composition numbers provided by Columbia Gulf.	

Emissions of VOCs and HAPs would also occur as a result of natural gas combustion. Combustion emissions were estimated for each compressor station and are shown in tables 4.11-15 through 4.11-22. The HAP emissions from each compressor station were estimated using emission factors from AP-42 *Chapter 1.4 Natural Gas Combustion* (EPA, 1998b). Some of the pollutant concerns expressed during public scoping, such as chromium and methylene chloride, are not listed in the AP-42 table of speciated organic compounds from natural gas combustion (AP-42 Table 1.4-3). All GXP compressor station emissions are below the major source HAP thresholds (10 tpy for each individual HAP and 25 tpy for combined HAPs). The compressor stations would be considered area sources of HAPs and would be required to meet all applicable NESHAP regulations.

Finally, one commenter raised a concern regarding unpleasant odors being emitted from the Cane Ridge Compressor Station. CH₄, the primary component of natural gas, is colorless, odorless, and tasteless. Odorization is commonly added to natural gas being delivered to homes and businesses and other local distribution use, and not typically to interstate systems. Columbia Gulf has indicated that odorization would not be added at the Cane Ridge Compressor Station.

4.11.2 Noise

4.11.2.1 Noise Environment

The magnitude and frequency of environmental noise may vary considerably over the course of the day, throughout the week, and across seasons, in part due to changing weather conditions and the effects of seasonal vegetation cover. Two measures that relate the time-varying quality of environmental noise to its known effect to people are the 24-hour equivalent sound level (L_{eq}) and day-night sound level (L_{dn}). The L_{eq} is the level of steady sound with the same total (equivalent) energy as the time-varying sound of interest, averaged over a 24-hour period. The L_{dn} is the L_{eq} plus 10 dBA added to account for people's greater sensitivity to nighttime sound levels (typically considered between the hours of 10:00 p.m. and 7:00 a.m.). The A-weighted scale is

used to assess noise impacts because human hearing is less sensitive to low and high frequencies than mid-range frequencies. The human ear's threshold of perception for noise change is considered 3 A-weighted decibels (dBA); 6 dBA is clearly noticeable to the human ear, and 10 dBA is perceived as a doubling of noise (or halving, if the noise is decreasing).

In 1974, the EPA published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin on Safety*, which evaluated the effects of environmental noise on public health and welfare (EPA, 1974). In this document, the EPA indicated that an L_{dn} of 55 dBA is the noise threshold that would prevent outdoor activity interference or annoyance from continuous noise. We have adopted this criterion and use it to evaluate potential noise impacts from FERC projects at NSAs such as residences, schools, or hospitals. An L_{dn} of 55 dBA is equivalent to a continuous sound level of 48.6 dBA for facilities that generate constant sound levels.

A list of typical sound levels for common sound sources is presented in table 4.11-25.

Sound Pressure Level (dBA)	Subjective Evaluation	Environment	
		Outdoor	Indoor
140	Deafening	Jet aircraft at 75 feet	--
130	Threshold of pain	Jet aircraft during takeoff at a distance of 300 feet	--
120	Threshold of feeling	Elevated train	Hard rock band
110	--	Jet flyover at 1,000 feet	Inside propeller plane
100	Very loud	Power mower, motorcycle at 25 feet, auto horn at 10 feet, crowd sound at football game	--
90	--	Propeller plane flyover at 1,000 feet, noisy urban street	Full symphony or band, food blender, noisy factory
80	Moderately loud	Diesel truck (40 miles per hour) at 50 feet	Inside auto at high speed, garbage disposal, dishwasher
70	Loud	B-757 cabin during flight	Close conversation, vacuum cleaner
60	Moderate	Air-conditioner condenser at 15 feet, near highway traffic	General office
50	Quiet	--	Private office
40	--	Farm field with light breeze, birdcalls	Soft stereo music in residence
30	Very quiet	Quiet residential neighborhood	Inside average residence (without TV and stereo)
20	--	Rustling leaves	Quiet theater, whisper
10	Just audible	--	Human breathing
0	Threshold of hearing	--	--

Sources: Egan, 1988; Ramsey and Sleeper, 1994

4.11.2.2 Mountaineer XPress Project

Construction and operation of the MXP may affect overall noise levels in project activity areas. There are no applicable statewide noise regulations in West Virginia; further, no applicable county or local construction or operation noise ordinances were identified. Therefore, the only applicable threshold for evaluating noise is the 55 dBA L_{dn} adopted by the Commission, as described above.

4.11.2.2.1 Construction Noise Impacts and Mitigation

Noise would be generated during construction of the pipeline and aboveground facilities. In general, the majority of construction noise is minor, temporary, of short duration, and varies considerably from day-to-day as activities progress along the pipeline corridor. At aboveground facility locations, construction activities could last from several weeks to several months. Generally, nighttime noise is not expected to increase during construction because most construction activities would be limited to daytime hours. An exception to this would be certain HDD activities, which are expected to continue into the nighttime hours and can continue in one area for weeks to months depending on the length of the drill and the hardness of the substrate being drilled. Because of the potential for nighttime construction and for extended time periods with stationary equipment, HDD/Direct Pipe activities have a greater potential for a prolonged noise impact. Columbia Gas proposes to use trenchless methods (i.e., HDD and Direct Pipe) at two locations (the Kanawha River and U.S. Highway 50 crossings, respectively). Columbia Gas performed ambient noise surveys and acoustical assessments of NSAs within 0.5 mile of these two sites to determine background noise levels and the predicted project-generated noise levels at the nearby NSAs.

The results of the Columbia Gas's noise assessments, including the distance and direction of the nearest NSAs from the two sites, the duration of the drilling, and the predicted noise resulting from each activity (with and without implementation of noise mitigation measures) are summarized in table 4.11-26. Additional NSAs are further from each site; the noise impact at these more distant locations would be less than the results presented in table 4.11-26 due to additional noise attenuation with increased distance. The locations of all NSAs within 0.5 mile of the drill entry and exit locations are shown in appendix N-1.

Table 4.11-26 Noise Estimates for the Noise-Sensitive Areas Closest to each MXP Drilling Site							
Feature Crossed	Entry or Exit Point	Distance and Direction to NSA (feet and direction)	Estimated Peak L _{dn} due to Drilling (Unmitigated)	Estimated Peak L _{dn} due to Drilling (With Proposed Noise Control Measures)	Ambient L _{dn} (dBA)	Total L _{dn} (Drilling + Ambient) (dBA)	Potential Increase Above Ambient (dB)
Highway 50 (Direct Pipe drilling potentially to take place 24 hours per day for 42 days)							
NSA #1 (Residence)	Entry	550 feet west	54.9	NA	50.7	56.3	5.6
NSA #2 (Residence)	Exit	200 feet west	65.3 <u>a</u> /	51.8	62.9	63.2	0.3
Kanawha River (HDD drilling potentially to take place 24 hours per day for 56 days)							
NSA #1 (Residence)	Entry	200 feet east	77.3 <u>a</u> /	63.3 <u>a</u> /	50.1	63.5	13.2
NSA #3 (Residence)	Exit	900 feet southwest	50.9	NA	49.7	53.3	3.6
a Indicates that drill-related noise contribution is an L _{dn} of 55 dBA or greater. NA = No noise controls required (peak L _{dn} estimated to be below 55 dBA). L _{dn} = day-night sound level. dBA = A-weighted decibels.							

As shown in table 4.11-26, sound from Direct Pipe/HDD drilling operations, with proposed noise control measures where required, would be greater than 55 dBA at two of the NSAs and would result in potential increase above ambient levels (dB) of at least 3.6 dB at three out of four of the NSAs listed in the table.

Noise mitigation measures that would be employed during construction include checking that the sound muffling devices, which are provided as standard equipment by the construction equipment manufacturer, are kept in good working order. In addition, for drill entry and exit points at which the predicted noise levels at a NSA are greater than 55 dBA L_{dn}, Columbia Gas would install residential-grade exhaust mufflers on engines and install acoustic barriers between the drill site and the affected NSA to mitigate noise impacts. Depending on the equipment used and site layout, Columbia Gas would provide additional noise control treatments as necessary to limit noise from drilling activities. Columbia Gas indicates that even with the additional mitigation measures, noise attributable to the drilling operations for crossing Kanawha River would still be above 55 dBA L_{dn} at the nearest NSA. Alternatively, to mitigate noise impact on the NSA, Columbia Gas indicates it may offer compensation or the option of temporary relocation during nighttime drilling activities. However, we generally prefer that companies make all reasonable efforts to reduce noise as the primary mitigation effort before offering compensation or relocation for effects that cannot be reasonably mitigated. Therefore, **we recommend that:**

- Prior to the construction of the U.S. Highway 50 and Kanawha River crossings, Columbia Gas should file with the Secretary, for the review and written approval by the Director of OEP, a drilling noise mitigation plan to reduce the projected noise level attributable to the proposed drilling operations at nearby NSAs. During drilling operations, Columbia Gas should implement the approved plan, monitor noise levels, and make all reasonable efforts to restrict the noise attributable to the drilling operations to no more than a L_{dn} of 55 dBA at the NSAs.**

Construction of compressor and regulator stations would also generate noise. Construction of these facilities would occur during daylight hours (typically from 7:00 a.m. to 7:00 p.m.). In general, construction activities would be conducted using typical construction equipment (i.e., backhoes, bulldozers, cranes, front-end loaders, trucks). Columbia Gas has also stated that controlled blasting could occur if shallow bedrock is encountered during construction activities. Blasting activities would be conducted in accordance with the measures outlined in Columbia Gas' Blasting Plan. In comparison with other construction noise, the sound resulting from blasting would be brief and infrequent.

Table 4.11-27 shows predicted construction noise levels at the nearest NSA for each MXP compressor and regulator station. Increased noise levels during construction would occur for the duration of the construction period, estimated to extend from 9 to 12 months. As the distance between the construction activity and the noise receptor increase, sound levels would decrease. While construction activities could produce noise levels that would be perceptible above ambient noise conditions, the noise increment would be short-term, localized, and limited to daylight hours only.

Compressor Station	Estimated L_{dn} of Peak Construction Noise at NSA (dBA)
Lone Oak Compressor Station	58
Sherwood Compressor Station	48
White Oak Compressor Station	45
Mount Olive Compressor Station	50
Ripley Regulator Station	58
Saunders Regulator Station	46
Ceredo Compressor Station	63
Elk River Compressor Station	62
L _{dn} = day-night sound level dBA = A-weighted decibels Note: The estimated duration of construction for each compressor station is 9-12 months.	

Because of the temporary nature of construction activities, and our noise recommendation, we conclude that no significant noise impacts are anticipated from construction of the proposed MXP pipelines, compressor stations, and regulator stations.

4.11.2.2.2 Operational Noise Impacts and Mitigation

The new and modified MXP compressor stations would generate noise on a continuous basis (i.e., up to 24 hours per day) when operating, although the pipeline itself is not expected to produce any noise. Noise would also be generated by the operation of the new regulator stations. The noise impact associated with these facilities would be limited to the vicinity of the facilities. The specific operational noise sources associated with these facilities and their estimated impact at the nearest NSAs are described below.

Columbia Gas provided ambient noise surveys and acoustical analyses for the MXP aboveground facilities, including modifications of one existing compressor stations, expansion of one approved and one pending compressor station, construction of three new compressor stations,

and construction of two new regulator stations. The acoustical analyses identified impacts on NSAs within 1 mile of the compressor stations and 0.5 mile of the regulator stations. The distances and directions to the nearest NSAs from the existing, approved, pending, or proposed station buildings are presented in tables 4.11-27 and 4.11-28, respectively. The locations of all NSAs within 1 mile of the compressor and regulator stations are shown in appendix N-1.

Table 4.11-28 Noise Analyses for NSAs Closest to the MXP New, Approved, and Pending Compressor Stations					
NSA <u>a</u>/	Distance and Direction to NSA (feet)	Estimated Ambient L_{dn} Before Modification (dBA)	Estimated L_{dn} Attributable to Compressor Station Modification (dBA)	Estimated Total L_{dn} for Modified or New Station (dBA)	Potential Noise Increase (dB)
Approved Lone Oak Compressor Station <u>b</u>/					
NSA #1	1,000 feet W	48.2	44.4	49.7	1.5
NSA #2	1,400 feet NW	45.5	41.1	46.8	1.3
NSA #3	2,100 feet SE to SW	41.9	37.0	43.1	1.2
Sherwood Compressor and Regulator Station					
NSA #1	1,050 feet N	39.7	48.4	48.9	9.2
NSA #2	1,150 feet SSE	42.5	47.4	48.6	6.1
NSA #3	1,550 feet E	45.2	44.2	47.8	2.6
White Oak Compressor Station					
NSA #1	1,250 feet SE	34.2	45.6	45.9	11.7
NSA #2	1,700 feet ESE	34.2	42.1	42.8	8.6
Mount Olive Compressor Station					
NSA #1	950 feet WSW	49.0	50.0	52.5	3.5
NSA #2	1,000 feet W	49.0	49.4	52.2	3.2
NSA #3	1,150 feet SW	49.0	48.0	51.5	2.5
NSA #4	1,050 feet NE	57.5	49.0	58.1	0.6
NSA #5	1,250 feet N	53.6	47.2	54.5	0.9
Existing Ceredo Compressor Station <u>c</u>/					
NSA #1	600 feet SE	73.5	50.3	69.2	-4.3
NSA #1A	850 feet ESE	62.2	47.3	58.1	-9.1
NSA #2	1,000 feet S	62.9	43.8	59.3	-3.6
NSA #3	1,650 feet NNW	57.7	39.2	50.2	-7.5
NSA #4	1,600 feet NE	57.9	40.5	50.6	-7.3
Pending Elk River Compressor Station <u>d</u>/					
NSA #1	700 feet NW	52.3	47.6	53.6	1.3
NSA #2	650 feet ESE	53.6	48.4	54.7	1.1
NSA #3	875 feet NW	50.0	54.4	51.3	1.3
NSA #4	2,050 feet WNW	40.5	36.7	42.0	1.5
NSA #5	1,975 feet NNE	42.2	37.1	43.3	1.2
<p>a NSA #1 north of the Sherwood Compressor Station represents a residence and Doddridge County Park. All other NSAs within 1 mile of the compressor stations are residences.</p> <p>b The approved Lone Oak station consists of Units 1 – 3; the proposed MXP expansion would add a Unit 4.</p> <p>c The existing Ceredo station consists of Units 1 – 7 and planned Units 10 – 12. The proposed modification for the MXP would add Units 13 and 14, and the retirement of Unit 9. Modification of this facility is estimated to decrease noise levels at nearby NSAs due to the retirement of Unit 9.</p> <p>d The pending Elk River station would consist of Units 1 and 2, and the existing adjacent Cobb Compressor Station. MXP's proposed Elk River expansion would add a Unit 3.</p>					

Table 4.11-29 Noise Analyses for NSAs Closest to the MXP New Regulator Stations					
NSA <u>a/</u>	Distance and Direction to NSA (feet)	Calculated Ambient L _{dn} (dBA)	Estimated L _{dn} for Station at Full Capacity (dBA)	Estimated Total L _{dn} (Station + Ambient) (dBA)	Potential Noise Increase (dB)
Ripley Regulator Station					
NSA #1	750 feet ESE	45.3	43.2	47.4	2.1
NSA #2	1,150 feet NW	51.9	38.5	52.1	0.2
Saunders Creek Regulator Station					
NSA #1	1,600 feet N	40.5	42.6	44.7	4.2
NSA #2	2,000 feet SE	40.1	40.0	43.0	2.9
NSA #3	2,500 feet SW	36.2	37.2	39.8	3.6
a All NSAs within 0.5 mile of regulator stations are residences.					

The Lone Oak and Elk River Compressor Stations are approved and pending (respectively) as parts of separate projects, the LXP (Docket No. CP15-514-000) and WBX (Docket No. CP16-038-000), respectively. The MXP expansions of these stations would add a Unit 4 to the three-unit Lone Oak station and a Unit 3 to the two-unit Elk River station. The existing Ceredo Compressor Station would be modified as part of the LXP with the addition of Units 10, 11, and 12. The MXP expansion of the Ceredo station would add Units 13 and 14. The combined noise levels from existing, approved, and pending equipment associated with these stations were estimated in noise impact analysis reports filed for the MXP and available on the MXP public docket.⁴⁴

As shown in tables 4.11-27 and 4.11-28, noise levels from each station (except for the existing Ceredo station) are projected to be below an L_{dn} of 55 dBA. The modifications associated with the Ceredo station are predicted to decrease noise levels at nearby NSAs.

We note that noise attributable to operation of the Sherwood Compressor Station is projected to increase ambient levels at NSA #1 (adjacent to the Doddridge County Park) to 48.9 dBA (see appendix N-1, Sherwood Compressor Station figure 2). While the projected level would meet our 55 dBA L_{dn} standard, a 9.2-dBA increase over present ambient levels would nevertheless be equivalent to almost a doubling of the perceived noise in this quiet rural environment. Comparable increases are also projected to occur at NSAs near the White Oak Compression Station. To minimize station operations noise levels to the extent practical, **we recommend that:**

- **Columbia Gas should make all reasonable efforts to ensure its predicted noise levels from the Sherwood and White Oak Compressor Stations are not exceeded at nearby NSAs, and file noise surveys showing this with the Secretary no later than 60 days after placing these stations in service. However, if the noise attributable to the**

⁴⁴ See filing by Columbia Gas dated April 29, 2016, in Docket No. CP16-357; eLibrary accession #20160429-5286(31429033); Resource Report 9, appendix 9G (beginning on page 9G-186).

operation of the Sherwood and White Oak Compressor Stations at full load exceeds an L_{dn} of 55 dBA, at any nearby NSAs, Columbia Gas should file a report on what changes are needed and shall install additional noise controls to meet the level within 1 year of the in-service date. Columbia Gas should demonstrate compliance with this requirement by filing a second noise survey with the Secretary no later than 60 days after it installs the additional noise controls.

Operation of the Mount Olive, Ripley, and Saunders Creek stations would result in a noticeable increase in noise levels, but total noise levels would remain below an L_{dn} of 55 dBA. However, to confirm that the actual noise levels attributable to these facilities are not significant, we recommend that:

- **Columbia Gas should file a noise survey with the Secretary no later than 60 days after placing the Mount Olive Compressor Station, and the Ripley and Saunders Creek Regulator Stations in service. If a full-load-condition noise survey of the entire station is not possible, Columbia Gas should instead file an interim survey at the maximum possible horsepower load and file the full-load survey within 6 months. If the noise attributable to the operation of all the equipment at any of these facilities under interim or full-horsepower-load conditions exceeds 55 dBA L_{dn} at any nearby NSAs, Columbia Gas should file a report on what changes are needed and should install the additional noise controls to meet the level within 1 year of the in-service date. Columbia Gas should confirm compliance with the 55 dBA L_{dn} requirement by filing a second noise survey with the Secretary no later than 60 days after it installs the additional noise controls.**

In addition to the operational noise discussed above, pipeline blowdown events would also generate noise impacts at the MLV sites, and station blowdown events would generate noise at the compressor stations. Planned pipeline blowdown events can happen during inspections or maintenance and are conducted on the segment of pipeline between MLVs, requiring a segment of pipeline to be evacuated of natural gas. The duration of a blowdown depends on factors such as the extent of the maintenance activity and the gas pressure, and would generally last between 20 minutes and 2 hours. Estimated noise impacts during these times range between 43 and 49 dBA L_{eq} at the NSA closest to each compressor station. Planned events could allow for slower gas release and be scheduled for daytime hours, thus reducing the noise impacts. Unplanned pipeline blowdowns occur only in emergency situations. Unplanned events could occur at any time, but are typically infrequent and of short duration.

Based on the analyses conducted and our recommendations, we conclude that the MXP would not result in significant noise impacts on residents or the surrounding communities.

4.11.2.3 Gulf XPress Project

Construction and operation of the GXP may affect overall noise levels in the activity areas. No state noise regulations have been identified in Kentucky, Tennessee, or Mississippi that would apply to the GXP during construction or operations. Two county or local noise regulations would apply to construction and operation of components of the GXP: Ordinance 0-07-08-31-1 in Garrard County, Kentucky, would apply to the Paint Lick and Goodluck stations, and Chapter 16.44 of the Code of the Metropolitan Government of Nashville and Davidson County, Tennessee,

would apply to the Cane Ridge station. The Garrard County noise ordinance does not provide any specific numerical noise limits. The Metropolitan Government of Nashville and Davidson County code limits noise from industrial noise sources on non-agricultural or industrial land to 65 dBA during daytime (7:00 a.m. to 7:00 p.m.) and 60 dBA during nighttime hours (7:00 p.m. to 7:00 a.m.); this limit is less restrictive than the FERC L_{dn} threshold of 55 dBA.

4.11.2.3.1 Construction Noise Impacts and Mitigation

Noise would be generated during construction of the GXP suction/discharge pipelines and aboveground facilities. In general, construction noise is minor, temporary, of short duration, and varies considerably from day-to-day as activities progress. The GXP does not have any planned HDD drilling operations.

Construction activities at compressor and meter stations would also generate noise. Construction would occur in daylight hours (from 7:00 a.m. to 7:00 p.m.). In general, activities would be conducted using typical construction equipment (i.e., backhoes, bulldozers, cranes, front-end loaders, trucks). In comparison with other construction noise, the sound resulting from blasting would be brief and infrequent.

Table 4.11-30 shows predicted construction noise levels at the nearest NSA for each GXP compressor station. Increased noise levels during construction would occur for the duration of the construction period at each location (estimated to be 10 months). As the distance between the construction activity and the noise receptor increases, sound levels would decrease. While construction activities could produce noise levels that would be perceptible above the ambient noise conditions, the noise increment would be short-term, localized, and limited to daytime hours. To mitigate noise impacts during construction, Columbia Gulf would use effective engine exhaust mufflers; check that engines are properly maintained; and install temporary noise barriers, as necessary, where noise complaints are made.

Compressor Station – NSA	Estimated L_{dn} of Peak Construction Noise (dBA)
Morehead	47
Paint Lick	42
Goodluck	49
Grayson	78 <u>a/</u>
Cane Ridge	54
Clifton Junction	53
New Albany	43
Holcomb	39
<p>a Estimated daytime sound levels for short durations when all construction equipment is working simultaneously during earth moving phase of construction.</p> <p>Note: The estimated duration of construction for each compressor station is 10 months.</p>	

During public scoping, we received comments from residents living near the Cane Ridge Compressor Station site regarding impacts from construction-generated noise. Peak daytime noise levels resulting from the construction of the Cane Ridge station are predicted to be 56 dBA L_{eq} , which equates to an L_{dn} of 54 dBA and is below the Metropolitan Government of Nashville and Davidson County daytime and nighttime limits.

Because of the temporary nature of construction activities, we conclude that no significant noise impacts are anticipated from construction of the GXP.

4.11.2.3.2 Operational Noise Impacts and Mitigation

The new and modified compressor stations would generate noise on a continuous basis (i.e., up to 24 hours per day) when operating. Noise would also be generated by operation of the modified meter station. The noise impact associated with these facilities would be limited to the vicinity of the facilities. The specific operational noise sources associated with these facilities and their estimated impact at the nearest NSAs are described below.

Columbia Gulf provided ambient noise surveys and acoustical analyses for the GXP aboveground facilities, including expansion of one approved compressor station, construction of seven new compressor stations, and modification of one existing meter station. The acoustical analyses identified impacts on NSAs within 1 mile of the compressor stations and 0.5 mile of the meter station. The distances and directions to the nearest NSAs from the approved or proposed compressor and meter station buildings are presented in table 4.11-31 and table 4.11-32, respectively. The locations of all NSAs within 1 mile of the compressor stations and 0.5 mile of the regulator stations are provided in the figures provided in appendix N-2.

**Table 4.11-31
Noise Analyses for NSAs Closest to the GXP New and Approved Compressor Stations**

NSA <u>a/</u>	Distance and Direction to NSA (feet)	Ambient L_{dn} (dBA)	Estimated L_{dn} Attributable to Compressor Station (dBA)	Estimated Total L_{dn} (Station + Ambient) (dBA)	Potential Noise Increase over Ambient (dB)
Morehead Compressor Station					
NSA #1	1,150 feet SW	53.4	47.9	54.5	1.1
NSA #2	1,400 feet NW	51.2	46.5	52.5	1.3
Paint Lick Compressor Station					
NSA #1	1,740 feet N	38.5	43.5	44.7	6.2
NSA #2	2,080 feet NW	40.4	41.5	44.0	3.6
NSA #3	1,960 feet NE	39.1	42.2	44.0	4.9
NSA #4	2,430 feet ENE	39.1	39.8	42.5	3.4
NSA #5	2,710 feet W	36.5	38.5	40.6	4.1
Goodluck Compressor Station					
NSA #1	980 feet NE	39.8	48.2	48.8	9.0
NSA #2	1,370 feet W	38.3	44.7	45.6	7.3
NSA #3	1,520 feet S	39.9	43.6	45.2	5.3
Approved Grayson Compressor Station <u>b/</u>					
NSA #1	760 feet SE	60.3	53.3	61.1	0.8
NSA #2	1,450 feet SSW	58.3	33.1	58.3	0.0
NSA #3	3,220 feet SW	59.0	36.8	59.0	0.0
NSA #4	1,580 feet N	51.1	31.3	51.1	0.0
NSA #5	4,000 feet E	52.4	25.9	52.4	0.0
NSA #6	3,400 feet SE	53.0	24.2	53.0	0.0
Cane Ridge Compressor Station					
NSA #1	760 feet W	42.5	50.8	51.4	8.9
NSA #2	690 feet S	44.5	51.7	52.5	8.0
NSA #3	1,550 feet N	42.5	43.5	46.1	3.6
Clifton Junction Compressor Station					
NSA #1	1,760 feet NW	52.1	41.1	52.4	0.3
NSA #2	670 feet SE	51.3	50.9	54.1	2.8
New Albany Compressor Station					
NSA #1	1,660 feet WSW	42.9	42.4	45.7	2.8
NSA #2	1,790 feet E	42.6	41.5	45.1	2.5
Holcomb Compressor Station					
NSA #1	2,770 feet S	49.6	36.8	49.8	0.2
NSA #2	2,750 feet N	39.4	36.9	41.3	1.9

N, S, E, W = North, South, East, West, respectively.

a All NSAs within 1 mile of the compressor stations are residences.

b The Grayson Compressor Station is an approved station. The proposed GXP expansion includes the addition of a single turbine. Ambient L_{dn} includes impacts from the approved two-unit station.

Table 4.11-32 Noise Analyses for the NSAs Closest to the GXP Existing Meter Station					
NSA <u>a</u> /	Distance and Direction to NSA (feet)	Ambient L _{dn} (dBA)	Estimated L _{dn} for Proposed Meter Station (dBA)	Estimated Total L _{dn} (Station + Ambient) (dBA)	Potential Noise Increase (dB)
Leach C Meter Station <u>b</u>/					
NSA #1	300 feet W	46.0	47.8	50.0	4.0
NSA #2	500 feet N	41.4	42.3	44.9	3.5
N, S, E, W = North, South, East, West, respectively. a All NSAs within 0.5 mile of meter station are residences. b Modifications to the existing Leach C Meter Station would include a new regulator run with a flow control valve and new flow control valves for the two existing runs; all regulator runs would be installed inside a new regulator building.					

The Grayson Compressor Station is approved as part of a separate project (RXP, Docket No. CP15-539-000), which was granted a Certificate on January 19, 2017. The expansion associated with the GXP includes the addition of Unit 3 to the approved two-unit Grayson station. Station noise levels attributable to the RXP are incorporated into the noise impact analysis report filled for the GXP and are available on the Commission’s website.⁴⁶

As shown in table 4.11-31 and table 4.11-32, noise levels from each compressor and meter station are projected to be below an L_{dn} of 55 dBA. Operation of the Paint Lick, Goodluck, Leach C, and Cane Ridge stations would result in a noticeable increase in noise levels, but total noise levels would remain below our 55 dBA L_{dn} criterion. The increase in noise level at the Cane Ridge compressor station has been an issue of public concern. The predicted noise levels attributable to operation of the Cane Ridge Station at the closest NSA is 45.3 dBA L_{eq}, which is below the Metropolitan Government of Nashville and Davidson County daytime and nighttime limits. However, to confirm that actual noise levels attributable to the GXP compressor and meter stations are not significant, **we recommend that:**

- Columbia Gulf should file a noise survey with the Secretary no later than 60 days after placing each of the GXP compressor stations in service. If a full-load-condition noise survey of the entire station is not possible, Columbia Gulf should instead file an interim survey at the maximum possible horsepower load and file the full-load survey within 6 months. If noise attributable to operation of all the equipment at any compressor station under interim- or full-horsepower-load conditions, or any meter station, exceeds 55 dBA L_{dn} at any nearby NSAs, Columbia Gulf should file a report on what changes are needed and should install the additional noise controls to meet the level within 1 year of the in-service date. Columbia Gulf should confirm compliance with the 55 dBA L_{dn} requirement by filing a second noise survey with the Secretary no later than 60 days after it installs the additional noise controls.**

During the draft EIS comment period, we received numerous comments from residents in the vicinity of the proposed Cane Ridge Compressor Station regarding noise impacts in the surrounding neighborhoods; which vary greatly topographically. For these reasons, we performed

⁴⁶ See filing by Columbia Gulf dated April 29, 2016, in Docket No. CP16-361; eLibrary accession #20160429-5339(31429480); Resource Report 9, appendix 9D (beginning on page 9D-78).

independent noise modeling using an industry-accepted sound modeling software called CadnaA. The model calculates sound propagation based on ISO 9613-2:1996, General Method of Calculation (ISO, 2010). Under this method, the sound levels are assessed on the octave band center frequency range from 31.5 to 8,000 Hz. This modeling software takes into account the anticipated sound-pressure levels of the compressor station, as well as how terrain/contours in the surrounding area would affect sound propagation. Further, this model takes into account a “worst-case scenario” such as calm atmospheric conditions and downwind sound propagation in all directions; therefore, the results are likely to be over-predicted. Based on the CadnaA model, the estimated sound levels at the closest NSAs associated with operation of the Cane Ridge Compressor Station would be lower than the levels predicted through Columbia Gulf’s modeling analysis, which does not include significant reduction for the topography in the area. As shown in table 4.11-31, Columbia Gulf estimated the total L_{dn} at NSA#1 (residence) at 51.4 dBA; our CadnaA model estimates it to be about 45 dBA. Columbia Gulf estimated the total L_{dn} at NSA#2 (residence) at 52.5 dBA; our CadnaA model estimates it to be about 45 dBA. Columbia Gulf estimated the total L_{dn} at NSA#3 (residence) at 46.1 dBA; our CadnaA model also estimates it to be about 45 dBA. We have provided visual representations of our CadnaA estimated L_{dn} dBA sound level contours in figures 4.11-1 and 4.11-2 below.