APPENDIX Q

Revised Cumulative Impact Assessment Report - Hydrology

REVISED CUMULATIVE IMPACT ASSESSMENT REPORT - HYDROLOGY

Mountain Valley Pipeline

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TABLE OF CONTENTS

APPENDICES

REVISED CUMULATIVE IMPACT ASSESSMENT REPORT – HYDROLOGY

Mountain Valley Pipeline

1.0 INTRODUCTION

Mountain Valley Pipeline, LLC (Mountain Valley) is seeking an Individual Permit (IP) for the Mountain Valley Pipeline Project (the Project) from the United States Army Corps of Engineers (USACE) Pittsburgh, Huntington, and Norfolk Districts to conduct regulated activities in navigable waters under Section 10 of the Rivers and Harbors Act of 1899 and for the discharge of dredged and fill material into "Waters of the United States" (WOTUS) under Section 404 of the Clean Water Act (CWA). In addition to the USACE IP application, Mountain Valley is seeking, and has now received, CWA Section 401 Water Quality Certification from the West Virginia Department of Environmental Protection (WVDEP) and the Virginia Department of Environmental Quality (VADEQ) for portions of the Project within their respective jurisdictions.

On August 31, 2021, Mountain Valley received a letter from the USACE Pittsburgh, Huntington, and Norfolk Districts requesting additional information (RFI) that is considered necessary by the USACE to continue its evaluation of the Project. This document addresses Item No. 4 in the August 31 RFI, an assessment of cumulative effects (40 CFR § 230.11(g)) to the aquatic environment associated with the completed and proposed discharge of dredged and/or fill material into WOTUS for each 12-digit Hydrological Unit Code (HUC). The Project impacts include those proposed as part of the Project's IP application and work that was completed under Mountain Valley's previous Nationwide Permit (NWP) 12 authorization. The Project Area in this document is defined as the limits of disturbance (LOD) along the length of the pipeline and its associated facilities (**Figures 1 and 2, Appendix A**), and both terms are used interchangeably herein.

On October 22, 2021, Mountain Valley received a second RFI from the USACE that requested the following additional information at the HUC-12 level to help assess potential cumulative impacts associated with the Project's construction:

- National Wetland Inventory (NWI) Wetlands
- Land Use/Land Cover Comparison[1]
- Hydric Soils

[1] The USACE requested a comparison of land use/land cover information from the most recent version (2019) of the U.S. Geological Survey's National Land Cover Database (NLCD) to the previous 2016 and 2011 versions in order to see the percent change overtime in the watersheds. As noted in Section 2.4 below, due to the inability to find consistent information in NLCD 2019, this report provides a comparison between NLCD 2011 and NLCD 2016 for each HUC-12 watershed.

These additional data have been incorporated into the original response to Item No. 4 in the August 31 RFI.[2]

2.0 METHODS

Each of the assessment methodologies is provided below.

2.1 Project Stream Impacts

The Project's stream impacts are generally limited in both duration and area. The primary effects associated with temporary instream work—increases in suspended particulates and turbidity levels—should dissipate within one to four days. Suspended particulate and turbidity levels in the water column attenuate not only with time but also with distance. Elevated suspended particulate and turbidity levels in the water column tend to approach background levels within a few hundred feet downstream of a crossing. Stream morphology and habitat will be restored through the measures outlined in the *Stream and Wetland Restoration, Monitoring, and Mitigation Framework* (*Mitigation Framework*). The small number of permanent stream impacts are generally associated with the installation or repair of existing culverts, which is expected to have a negligible long-term effect on streams due to appropriate countersinking and restoration measures. To cause an additive, cumulative effect with any given Project-related stream impact, other aquatic impacts would have to occur roughly contemporaneously with and in close proximity to a Project impact. Mountain Valley does not have relevant and useful information about other nearby activities, if any, that may occur during Project construction in close proximity to the Project in a manner that may result in cumulative impacts to streams. Accordingly, Mountain Valley's cumulative impacts assessment methodology for stream impacts focuses on the potential cumulative impacts of the Project.

ArcGIS Spatial Analyst was used to delineate the 12-digit HUC watersheds that are intersected by the Project area utilizing available digital elevation models (DEMs). DEMs are an array of evenly-spaced grid cells that have elevation values for each cell. ArcGIS utilizes the DEM to compute the direction of flow down a slope and in how many cells flow accumulates. Before the DEMs were delineated as watersheds, the boundaries of the focus areas were delimited. Once the study watershed areas were defined, a depressionless surface was created for each watershed utilizing the hydrologic modeling "Fill" tool. This tool fills sinks in a surface raster to remove small imperfections in the data.

To calculate a drainage network or watersheds, a grid must exist that is coded for the direction in which each cell in the surface drains. The "flow direction" hydrologic modeling tool was used to determine where a landscape drains and is necessary to determine the direction of flow for each cell in the watershed. For every cell in the surface grid, the ArcGIS grid processor finds the direction of steepest downward descent.

[2] A version of this report was provided to the USACE on October 11, 2021, in response to the first RFI. This revised report replaces the prior version.

Flow accumulation was the next step in hydrologic modeling. Watersheds are defined spatially by the geomorphological property of drainage. In order to generate a drainage network, it is necessary to determine the ultimate flow path of every cell on the landscape grid. Flow accumulation was used to generate a drainage network based on the direction of flow of each cell. By selecting cells with the greatest accumulated flow, a network of high-flow cells was generated. These high-flow cells lie on stream channels and at valley bottoms. In order to visualize the drainage network, the symbology method was changed to "classified" to utilize two classes. The threshold was then adjusted to be as consistent as possible with known delineation or verified delineation data.

The "flow length" tool was then used to show flow length to the closest downstream high-flow pathway. Using flow length with a weighted grid, a new raster was generated showing the drainage network for the appropriate threshold as determined by the known delineation data. Raster calculations made a new grid where the flow accumulation cells have a value greater than or equal to the threshold value, making those output cells null; where the flow accumulation cells are less than the threshold values, the output cells have a value of 1. The new grid was used as a weighted grid in the flow length tool. The output grid values represent the flow length distance to the closest high-flow pathway. The raster was then converted to a stream network as line shape. After the raster was converted to a polyline format, the lines were reviewed for redundancy and adjusted in the footprint of lakes and large rivers based on aerial mapping.

As noted above, this evaluation used existing delineations to determine the effectiveness of the model and its prediction of streamlines in these watersheds. While the goal is to create streamlines that overlap, the vast majority of data runs utilized in this report did not extend to the extreme headwater reaches where small ephemeral drains were identified in the Project's delineations. Achieving streamlines that extend to the extreme headwaters to what is sometimes referred to as the zero order, or the end of the linear ordinary high water mark, resulted in the model distorting and splintering streamlines in an unrealistic fashion. As a result, this modeling effort may not include the last few feet of ephemeral channels that transition into swales and no longer exhibit bed and bank at the top of ridges in the delineated watersheds. This results in fewer feet being included in the watershed estimate than likely exist in the drain, which means that the percentages associated with the impacts from the Project are conservative, i.e., a slight overestimate of cumulative impacts associated with the Project.

A summary of total stream impacts in each 12-digit HUC is also provided in this document. These impacts include those proposed as part of the Project's IP application and work that was completed under Mountain Valley's previous NWP 12 authorization. They may be found in Table 2, Table A-1, and Table B-1 in Mountain Valleys IP application submitted to the USACE on November 5 and May 14 (respectively), and from the All Streams Crossings table submitted to the USACE on November 15. Please note that proposed impacts in this document are those that are not identified as "Complete" in the All Streams Crossings table.

2.2 Project Wetland Impacts

The Project's wetland impacts are overwhelmingly temporary, and impacted sites will be restored in accordance with the *Mitigation Framework*. There will be no net loss of wetland acreage or long-term impacts to wetland functions and values. Accordingly, the potential cumulative impacts are primarily for impacts to similarly situated wetlands in the same watersheds as the Project during the period of construction and for a post-restoration period thereafter as the impacted resources return to preconstruction conditions. Similar to stream impacts, the wetland impacts most likely to fit those criteria are other impacts related to the Project. Accordingly, Mountain Valley's cumulative impacts assessment methodology for wetland impacts focuses on the potential cumulative impacts of the Project.

ArcMap was the primary tool used to generate the information necessary to evaluate wetland impacts and the presence of NWI features in each watershed. During Project development, Mountain Valley completed wetland delineations in the field in each of the HUC-12 watersheds[3]. These delineations occurred in 2015, 2016, and 2018. During these field exercises, data points were collected using GPS units to determine the bounds of wetland areas. These data were uploaded to create delineation shapefiles.

The Project's delineation shapefiles and the Project Area were imported into ArcMap. Additionally, shapefiles for West Virginia and Virginia HUC-12 watersheds were uploaded and then clipped for each of the Project's HUC-12 watershed areas. Utilizing these files, wetland features were sorted based on HUC-12 attributes and then used to calculate delineation acreage for each watershed.

Wetland impacts in this report are from the Table 3, Table A-2, and Table B-2 in Mountain Valley's IP application submitted to the USACE on March 1st and May 14th and from the All Wetlands Crossings table submitted to the USACE on November 15, 2021. Please note that proposed impacts in this document are those that are not identified as "Complete" in the All Wetland Crossings table.

- To determine the NWI types and acreage for each HUC-12 watershed, the most recent NWI datafiles were downloaded from the U.S. Fish and Wildlife Service (USFWS) on November 19, 2021[4] (updated by USFWS in May 2021). Please note that these files are now routinely updated with new information and may not reflect the same information that was previously provided for this Project.

Because these are environmental data, they are not static. Therefore, it is anticipated that the NWI shapefiles will continue to evolve over time as additional data are uploaded by the USFWS.

[3] The delineations were completed in areas being considered for access roads, pipeline ROW, laydown yards, and other Project features.

[4] https://www.fws.gov/wetlands/Data/State-Downloads.html.

Using the files downloaded from the USFWS and the HUC-12 shapefiles, ArcMap tools created an intersection shapefile of the NWI and HUC-12. Features were then dissolved to generate NWI features based on the HUC-12 attributes and NWI categories (Freshwater Emergent Wetland, Freshwater Forested/Scrub Wetland, Freshwater Pond, Lake, Riverine, and Other). Using ArcMap, the NWI acreage for each category was then generated for the HUC-12 watersheds. To determine if there were NWI features in the Project Area, the NWI file was clipped with the Project Area file.

Mapping and tables for NWI features and wetland impacts have been generated for each HUC-12. The NWI feature descriptions, including Cowardin classification, are as follows:

- Freshwater Emergent Wetland (palustrine emergent) – Herbaceous marsh, fen, swale, and wet meadow
- Freshwater Forested/Scrub Wetland (palustrine forested and/or palustrine shrub) – Forested swamp or wetland shrub bog
- Freshwater Pond (palustrine unconsolidated bottom, palustrine aquatic bed) – Pond
- Riverine (riverine wetland and deepwater) – River or stream channel
- Other – Farmed wetland, saline seep, or other miscellaneous types

As per the USFWS website, the NWI data's objective is to produce reconnaissance-level information on the location, type, and size of the mapped aquatic resources. Therefore, a margin of error is inherent in the use of the imagery, and detailed on-the-ground inspection of any particular site may result in differing information.

In this report, the NWI evaluations focus on the two described wetland types: Freshwater Emergent Wetland and Freshwater Forested/Scrub Wetland. Additional aquatic resources types are provided as they are part of the NWI resources found in the database, i.e., they are part of the USFWS inventory. The NWI files downloaded used for this Project have also greatly expanded the Riverine category compared to NWI files used earlier in the permitting process. This feature is essentially the same as the National Hydrography Dataset (NHD) streamlines, and the impacts associated with this feature are assessed with the stream impacts.

2.3 Hydric Soils

As documented in the application and *Mitigation Framework*, upland and wetland topsoils will be segregated during construction and restored to their previous conditions and contours following construction. In wetlands, the *Mitigation Framework* includes performance standards and monitoring to ensure that hydric soils are successfully restored. There is no reasonable potential for impacts to hydric soils outside of Mountain Valley's LOD. Because these impacts will be temporary and confined to the Project area, Mountain Valley's cumulative impacts assessment methodology identifies Project-related impacts to hydric soils.

- Data for the hydric soil evaluation were obtained from the U.S. Department of Agriculture (USDA), National Resource Conservation Service (NRCS) web soil survey site. Like the USFWS NWI files, the soil survey files are also updated at

regular intervals. Similar to the NWI files previously-submitted information containing soil information, the current NRCS data may not be consistent with previously submitted information.

To obtain soil information, shapefiles were generated for each HUC-12. Each of these shapefiles was then uploaded to the NRCS web soil survey site. The NRCS web soil survey site then generated a soil shapefile and a soil report for each HUC-12. Mapping for each HUC-12 watershed was developed utilizing the NRCS-generated shapefiles. This process—creating a shapefile, uploading the shapefile to the NRCS soil survey site, and generating both a shapefile and a soil report—was repeated for the Project Area in each HUC-12 watershed. This resulted in having both hydric soils for the entire watershed as well has hydric soils that may occur in the Project Area. Please note that the watershed area and the Project Area acreage generated by soils mapping may vary slightly as compared to other information generated in this report due to how files are clipped and/or interpolated.

When evaluating soil data, it is important to consider where the soil is located. Soil types vary from county to county, and similar soil may be named differently. Additionally, hydric soil types are based on the county soil survey determination. Often the HUC-12 watersheds overlap several counties. Each NRCS-generated shapefile and report provides these data by county and leave it to the researcher to interpret the map symbols. For example, the map symbol CIB in the Harrison and Taylor County Soil Survey is Clarksburg silt loam, 3 to 8 percent, while in the Webster County soil survey CIB refers to Cliftop Channery silt loam, 3 to 8 percent slopes. To minimize confusion, this report provides soil tables in **Appendix B** for each HUC-12 in the Project Area as well as the entire Project Area tables summarize the relevant hydric soils information for each HUC and the Project Area that can be found in each NRCS web soil survey report including hydric ratings and hydric components.

2.4 Land Use/Land Cover (LULC)

Construction and operation of the Project will, in some locations, result in changes to the land use and cover. In agricultural use areas (e.g., pastures, cropland), meadows, and existing roadways, the preexisting LULC will be restored after construction. Within the permanent right-of-way, forested areas will be converted to meadow or scrub-shrub condition after construction. There also will be marginal increases in impervious surface associated with new access roads, mainline valve sites, and compressor stations. These long-term changes to LULC can be evaluated against other changes occurring over time in the vicinity of the Project using available LULC databases. Accordingly, Mountain Valley has summarized the cumulative impacts to LULC evaluating the Project's relative contribution to changes over time within the relevant watersheds.

The NLCD 2019 files were not utilized in the January 2022 evaluation. When this evaluation was initiated, there was difficulty in finding files that would allow for a consistent comparison from 2019 to 2016 or from 2019 to 2011 in both states. Instead, files from NLCD 2011 and 2016 were utilized to complete LULC comparisons within each HUC-12; however, even these comparisons were not perfect with difference in some of the LULC types utilized during different years and in different states. It is assumed that there would not be a substantial difference in the 2016 and 2019

files as both mining and oil and gas development slowed in both states. However, NLCD 2019 files have been utilized to provide the updated content presented herein. NLCD recategorized LULC types in 2019 and retrofitted the previous 2011 and 2016 data to account for those changes. This accounts for slight variations between what was presented in the January 2022 versus this version of the CIA.

To simplify results, some LULC categories were combined. For example, all forest types were combined under the Forest use, and all development was combined under Mixed Development (MD). In Virginia, roads and barren area were also combined under MD. The LULC files were then clipped using the previously-mentioned HUC-12 shapefiles. Once clipped, areas for each LULC were generated and available for comparison. Mapping for each watershed for the 2011, 2016 and 2019 LULC files were generated in ArcMap. As noted with the soil data, minor differences in watershed acreage may occur. These are minimal and do not affect the results found in this document.[5] A summary of LULC types is provided in **Appendix C**.

3.0 RESULTS

The Project extends 304 miles across 11 HUC-8 watersheds (**Figures 1 and 2, Appendix A**), which contain 62 HUC-12 watersheds with associated impacts to water resources. The 11 HUC-8 watersheds are listed in **Table 1**. Please note that the Upper New in West Virginia and the Middle New in Virginia are the same HUC-8 watershed. To better facilitate the discussion herein, the data are grouped by HUC-8 watershed. **Table 1** also provides the counties where each watershed is located; however, the Project Area does not fall in each of these counties. The Project Area is located in Wetzel, Harrison, Doddridge, Lewis, Braxton, Webster, Nicholas, Greenbrier, Fayette, Summers, and Monroe Counties in West Virginia and in Giles, Craig, Montgomery, Roanoke, Franklin, and Pittsylvania Counties in Virginia.

Table 1
HUC-8 Watersheds Within the Project Area

HUC-8 Watershed	Counties	State
Middle Ohio-North (05030201)	Pleasants, Tyler, Wetzel, Marion, Harrison, Lewis	West Virginia
West Fork (05020002)	Marion, Harrison, Taylor, Barbour, Wetzel, Doddridge	West Virginia
Little Kanawha (05030203)	Wood, Writ, Richie, Roan, Calhoun, Gilmer, Lewis, Braxton	West Virginia

[5] Refer to Section 4.8.1 of the Final Environmental Impact Statement for an additional analysis of the Project's cumulative impacts on land use and cover.

HUC-8 Watershed	Counties	State
Elk (05050007)	Kanawha, Roane, Clay, Braxton, Nicholas, Webster, Randolph, Pocahontas	West Virginia
Gauley (05050005)	Pocahontas, Fayette, Webster, Nicholas, Greenbrier	West Virginia
Lower New (05050004)	Fayette, Raleigh, Summers	West Virginia
Greenbrier (05050003)	Pocahontas, Greenbrier, Summers, Monroe	West Virginia
Upper/Middle New (05050002)	Mercer (WV), Summers (WV), Monroe (WV), Bland (VA), Pulaski (VA), Giles (VA), Craig (VA)	West Virginia, Virginia
Upper James (02080201)	Monroe (WV), Highland (VA), Bath (VA), Alleghany (VA), Craig (VA), Botetourt (VA), Roanoke (VA), Montgomery (VA)	West Virginia, Virginia
Upper Roanoke (03010101)	Montgomery, Roanoke, Floyd, Bedford, Botetourt, Campbell, Henry, Franklin Pittsylvania	Virginia
Banister (03010105)	Halifax, Pittsylvania	Virginia

3.1 Middle Ohio-North

The Project crosses four 12-digit HUC watersheds in the Middle Ohio-North HUC-8 watershed (**Figure 3, Appendix A**). These include North Fork Fishing Creek (050302010202), Headwaters South Fork Fishing Creek (050302010201), Buckeye Creek (050302010402), and Meathouse Fork (050302010403). The Middle Ohio-North watershed is approximately 1,813.5 square miles (mi^2). These four HUC-12 watersheds have a combined drainage area of 171.1 mi^2, which is less than 10 percent of the HUC-8 watershed.

3.1.1 North Fork Fishing Creek

Project Stream Impacts. There are 13 stream crossings in the North Fork Fishing Creek watershed. Six of the crossings are complete. Proposed crossings include one permanent access road, a temporary work area, two pipeline right-of-way (ROW) crossings, and a timber mat crossing with temporary impacts as well as two permanent crossings associated with the Mobley Interconnect. Completed crossings include five crossings associated with the Mobley Interconnect (four permanent and one temporary) and one temporary pipeline ROW crossing. Stream impacts, both temporary (419 linear feet) and permanent (518 linear feet), total 937 linear feet, which represent less than 0.0591% of the linear feet of modeled streams found in this HUC-12 watershed (**Table 2**) (**Figure 4, Appendix A**). Of these impacts, 197 linear feet of temporary impacts and 412 linear feet of permanent impacts are complete.

Project Wetland Impacts. Approximately 0.79 acre of wetland was delineated by Mountain Valley contractors in the North Fork Fishing Creek watershed (**Table 3**) (**Figure 5, Appendix A**). There are six proposed wetland crossings and one completed wetland crossing in the Project Area. Approximately 0.3045 acre of wetland will be temporarily impacted in the Project Area, with no permanent impacts. NWI data identify 225.23 acres of aquatic resources in the North Fork Fishing Creek watershed. Of this total, 0.35 acre is Freshwater Emergent Wetland with no Freshwater Forested/Scrub Wetland. None of the NWI wetlands are in the Project Area.

Soils. According to soil surveys for both Wetzel County, West Virginia and Marion and Monongalia Counties, West Virginia, there are no soils in the North Fork Fishing Creek watershed that are on West Virginia's hydric soil lists. (**Figure 6, Appendix A**).

LULC. LULC changes in the North Fork Fishing Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 4** and **Figures 7, 8 and 8a (Appendix A)**. Overall, there are approximately 27,189 acres in this watershed. The dominant LULC in this area is Forested (over 91%), followed by Stream Riparian Corridor Floodplain (approximately 2.3%). The LOD is approximately 68.6 acres, which represents less than 0.3% of the entire watershed.

3.1.2 Headwaters South Fork Fishing Creek

Project Stream Impacts. There are 24 stream crossings in the Headwaters South Fork Fishing Creek watershed. Five of these crossings, all pipeline ROW crossings, are complete. Proposed crossings include seven timber mat crossing, two pipeline ROW crossings, five temporary access roads, and five permanent access roads. Proposed stream impacts, both temporary (974 linear feet) and permanent (199 linear feet), in the Headwaters South Fork Fishing Creek watershed total 1,173 linear feet, which represent less than 0.0770% of the modeled streams found in this HUC-12 watershed (**Table 2**) (**Figure 9, Appendix A**). Of these impacts, 447 linear feet of temporary impacts are complete.

Project Wetland Impacts. Approximately 3.90 acres of wetland were delineated by Mountain Valley contractors in the Headwaters South Fork Fishing Creek watershed (**Table 4**) (**Figure 10, Appendix A**). There are ten wetland crossings in the Project Area that impact approximately 0.2736 acre. Two of the crossings are complete. The Project will result in 0.2127 acre of temporary impacts, 0.0547 acre of conversion impacts, and 0.0082 acre of permanent impacts in this watershed. The NWI identifies 110.06 acres of aquatic resources in the watershed. There are no Freshwater Emergent Wetlands in the inventory; however, approximately 1.61 acres of Forested/Scrub Wetland are identified. None of the NWI wetlands are in the Project Area.

Soils. Soils surveys relevant to the Headwaters South Fork Fishing Creek watershed include those for Pleasants and Tyler Counties, Wetzel County, Doddridge County, Harrison and Taylor Counties, and Marion and Monongalia Counties. Based on these soil surveys, there are no hydric soils in the Headwaters South Fork Fishing Creek watershed. (**Figure 11, Appendix A**) (**Appendix B**).

LULC. LULC changes in the Headwaters South Fork Fishing Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 5** and **Figures 12, 13 and 13a (Appendix A)**. Overall, there are approximately 25,818 acres in this watershed. The dominant LULC in this area is Forested (over 94%), followed by Roads and Impervious Surfaces (approximately 2.5%). The LOD is approximately 236.1 acres, which represents less than 0.9% of the entire watershed.

3.1.3 Buckeye Creek Watershed

Project Stream Impacts. There are two stream crossings, both pipeline ROW, in the Buckeye Creek watershed. Stream impacts, all of which are temporary, total 130 linear feet, which represent less than 0.0081% of the modeled streams found in this HUC-12 watershed (**Table 2**) (**Figure 14, Appendix A**).

Project Wetland Impacts. Approximately 0.38 acre of wetland was delineated by Mountain Valley contractors in the Buckeye Creek watershed. The Project Area has three proposed wetland crossings that impact approximately 0.0537 acre, of which 0.0422 acre is temporary. The remaining impacts are associated with a permanent access road (0.0115 acre) and will be mitigated using mitigation banking. The NWI identifies 119.33 acres of aquatic resources in the watershed, including 2.18 acres of Freshwater Emergent Wetland and 0.14 acre of Forested/Scrub Wetland (**Table 3**) (**Figure 15, Appendix A**). None of the NWI wetlands are in the Project Area.

Soils. Based on the Harrison and Taylor Counties and the Doddridge County soil surveys, the hydric soil silt loam (Me) can be found in the Buckeye Creek watershed (15.7 acres, less than 0.1%) but not in the Project Area. (**Figure 16, Appendix A**) (**Appendix B**). According to these soil surveys, no other hydric soils or partially hydric soils are present in the watershed.

LULC. LULC changes in the Buckeye Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 4** and **Figures 17, 18 and 18a (Appendix A)**. Overall, there are approximately 25,016 acres in this watershed. The dominant LULC in this area is Forested (over 86%), followed by Stream Riparian Corridor Floodplain (approximately 4.1%). The LOD is approximately 28.9 acres, which represents less than 0.1% of the entire watershed.

3.1.4 Meathouse Fork

Project Stream Impacts. Meathouse Fork is the last HUC-12 watershed that the Project crosses in the Middle Ohio-North drain. There are 13 stream crossings in this watershed. There are four completed pipeline ROW crossing, one permanent access road that will result in permanent impacts, four timber mat crossings and four pipeline ROW crossings that will result in temporary stream impacts. Stream impacts, both temporary (713 linear feet) and permanent (25 linear feet), in the Meathouse Fork watershed total 738 linear feet, which represent less than 0.0351% of the streams found in this HUC-12 watershed (**Table 2**) (**Figure 19, Appendix A**). Of these impacts, 330 linear feet of temporary impacts are complete.

Project Wetland Impacts. Approximately 1.42 acres of wetland were delineated by Mountain Valley contractors in the Meathouse Fork watershed. The Project Area has three proposed wetland

crossings and one completed crossing. The total wetland impacts in the watershed are approximately 0.3549 acre. Permanent Project impacts in the watershed, which total 0.0579 acre, are associated with a permanent access road and will be mitigated using mitigation banking. The NWI identifies 158.82 acres of aquatic resources in the watershed, which include 0.85 acre of Freshwater Emergent Wetland, none of which falls within the Project Area (**Table 3**) (**Figure 20, Appendix A**).

Soils. According to the Doddridge County, Lewis County, and Harrison and Taylor Counties soil surveys, the hydric soil Me will be found in the Meathouse Fork watershed (23 acres, less than 0.1%). Approximately 0.8 acre of Me soils may be found in the Project Area (**Figure 21, Appendix A**) (**Appendix B)**.

LULC. LULC changes in the Meathouse Fork watershed between 2011, 2016 and 2019 are illustrated in **Table 4** and **Figures 22, 23 and 23a (Appendix A)**. Overall, there are approximately 31,467 acres in this watershed. The dominant LULC in this area is Forested (over 88%), followed by Pasture, Hay, Agriculture (PHA) (approximately 4.5%). The LOD is approximately 64.9 acres, which represents less than 0.2% of the entire watershed.

Table 2
Cumulative Project-Related Stream Impacts in the HUC-12 Watersheds that Fall Within the Middle Ohio-North Watershed

HUC-12 Watershed	Total Number of Stream Crossings	Proposed Impacts in Application (feet)		Total Project-Related Impacts (feet)		Estimated Linear Feet of Streams in Watershed	Project-Related Cumulative Impacts (feet)	Percentage of Impacted Linear Stream Feet Estimated in the Watershed
		Perm	Temp	Perm	Temp			
North Fork Fishing Creek	13	106	222	518	419	1,586,148	937	0.0591%
Headwaters South Fork Fishing Creek	24	199	527	199	974	1,523,728	1,173	0.0770%
Buckeye Creek	2	0	130	0	130	1,609,870	130	0.0081%
Meathouse Fork	13	25	383	25	713	1,990,839	738	0.0351%

Table 3
Cumulative Project-Related Wetland Impacts and National Wetland Inventory Data in the HUC-12 Watersheds that Fall Within the Middle Ohio-North Watershed

HUC-12 Watershed	Delineated Acres[1]	Total Number of Wetland Crossings	Temporary Impacts (acres)	Permanent Conversion Impacts (Acres)	Permanent Fill Impacts (acres)	Total Wetland Impacts	National Wetland Inventory Data (acres)						
							Riverine	Freshwater Emergent	Freshwater Forested/Scrub Wetland	Freshwater Pond	Lake	Other	Total
North Fork Fishing Creek	0.79	7	0.3045	0	0	0.3045	223.97	0.35	0.00	0.91	0.00	0.00	225.23
Headwaters South Fork Fishing Creek	3.90	10	0.2127	0.0547	0.0082	0.2756	104.69	0.00	1.61	3.76	0.00	0.00	110.06
Buckeye Creek	0.38	3	0.0422	0.0000	0.0115	0.0537	101.2	2.18	0.14	15.80	0.00	0.00	119.33
Meathouse Fork	1.42	4	0.2970	0.0000	0.0579	0.3549	143.69	0.85	0.00	14.28	0.00	0.00	158.82

[1] Acres delineated within the HUC-12 Watershed.

Table 4
LULC in the HUC-12 Watersheds that Fall Within the Middle Ohio-North Watershed

HUC-12 Watershed	Total HUC-12 Watershed Size (Acres)	Year	Forest		Mixed Development		Pasture, Hay, Agriculture		Streams Riparian Corridor, Floodplain		Water		Wetlands		Barren Including Mine, Oil and Gas		Roads, Impervious Surface	
			Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12
North Fork Fishing Creek	27,189	2011	25,502	93.8	89	0.3	506	1.9	162	0.6	6	0.0	0	0.0	0	0.0	992	3.4
	27,189	2016	25,100	92.3	207	0.8	488	1.8	450	1.7	6	0.0	0	0.0	0	0.0	937	3.4
	27,189	2019	24,917	91.6	217	0.8	489	1.8	630	2.3	6	0.0	0	0.0	2	0.0	928	3.4
Headwaters South Fork Fishing Creek	25,818	2011	24,821	96.1	103	0.4	190	0.7	38	0.1	4	0.0	0	0.0	0	0.0	661	2.6
	25,818	2016	24,540	95.1	134	0.5	187	0.7	285	1.1	5	0.0	0	0.0	0	0.0	666	2.6
	25,818	2019	24,302	94.1	148	0.6	187	0.7	522	2.0	5	0.0	0	0.0	2	0.0	652	2.5
Buckeye Creek	25,016	2011	22,527	90.0	333	1.3	985	3.9	249	1.0	5	0.0	0	0.0	0	0.0	916	3.7
	25,016	2016	21,798	87.1	544	2.2	877	3.5	821	3.3	3	0.0	0	0.0	0	0.0	973	3.9
	25,016	2019	21,573	86.2	550	2.2	877	3.5	1,036	4.1	3	0.0	0	0.0	8	0.0	968	3.9
Meathouse Fork	31,467	2011	28,310	90.0	74	0.2	1,481	4.7	361	1.1	1	0.0	0	0.0	0	0.0	1,239	3.9
	31,467	2016	27,812	88.4	173	0.5	1,442	4.6	745	2.4	1	0.0	0	0.0	0	0.0	1,293	4.1
	31,467	2019	27,710	88.1	206	0.7	1,424	4.5	828	2.6	1	0.0	0	0.0	8	0.0	1,289	4.1

3.2 West Fork

The Project crosses seven 12-digit HUC watersheds in the West Fork HUC-8 watershed (**Figure 24, Appendix A**). These include the Little Tenmile Creek (050200020503), the Outlet Tenmile Creek (050200020504), the Headwaters Tenmile Creek (050200020502, Salem Fork (050200020501), Kincheloe Creek (050200020302), Freemans Creek (050500020301), and Polk Creek-West Fork River (050200020105) (**Table 5**). The West Fork watershed is approximately 879.8 mi^2, while the seven 12-digit HUC watersheds total 210.2 mi^2.

3.2.1 Little Tenmile Creek

Project Stream Impacts. Little Tenmile Creek is the first HUC-12 watershed in the West Fork watershed with stream crossings. There are 12 stream crossings, four of which (all pipeline ROW crossings) are complete, located in this watershed. Proposed temporary impacts are associated with four timber mat crossings and two temporary access roads. Two proposed permanent stream crossings are associated with two permanent access roads. Total stream impacts, both temporary (484 linear feet) and permanent (86 linear feet), in the Little Tenmile Creek watershed total 570 linear feet, which represent less than 0.0481% of the modeled streams found in this HUC-12 watershed (**Table 5**) (**Figure 25, Appendix A**). Of these impacts, 369 linear feet of temporary impacts are complete.

Project Wetland Impacts. Approximately 1.00 acres of wetland were delineated by Mountain Valley contractors in the Little Tenmile Creek watershed. The Project has two proposed wetland crossings and one completed wetland crossing, which total 0.0653 acre of temporary impacts with no permanent impacts (**Table 6**). The NWI indicates that there are 123.4 acres of aquatic resources in the watershed, including 1.47 acres of Freshwater Emergent Wetland and no acres of Freshwater Forested/Scrub Wetland (**Table 6**). None of these resources are located in the Project Area (**Figure 26, Appendix A**).

Soils. The Little Tenmile Creek watershed soils data are from the Doddridge County, Harrison and Taylor Counties, and Wetzel County soil surveys. These surveys indicate that the hydric soil Atkins silt loam, 0 to 3 percent slopes, frequently flooded (At) (2.5 acres, less than 0.1% of the watershed area) and partially hydric soil Udifluvents and Fluvaquents (UF) (981.4 acres, approximately 5.4% of the watershed area) are found in the watershed (**Figure 27, Appendix A**) (**Appendix B**). Of these soils, 6.9 acres of UF soils are found in the Project Area.

LULC. LULC changes in the Little Tenmile Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 7** and **Figures 28, 29 and 29a (Appendix A)**. Overall, there are approximately 18,079 acres in this watershed. The dominant LULC in this area is Forested (over 86%), followed by PHA (approximately 6.2%). The LOD is approximately 138 acres, which represents less than 0.8% of the entire watershed.

3.2.2 Outlet Tenmile Creek

Project Stream Impacts. There are five stream crossings in the Project Area in the Outlet Tenmile Creek watershed (**Table 5**). Only one of the crossings is associated with permanent impacts, a permanent access road. The remaining stream crossings are one timber mat and three pipeline ROW crossings, one of which is complete. Total stream impacts, both temporary (347 linear feet) and permanent (29 linear feet), in the Outlet Tenmile Creek watershed total 376 linear feet, which represent less than 0.0209% of the modeled streams found in this HUC-12 watershed (**Figure 30, Appendix A**). Of these impacts, 115 linear feet of temporary impacts are complete.

Project Wetland Impacts. Approximately 3.29 acres of wetland were delineated by Mountain Valley contractors in the watershed. There are four proposed wetland crossings and one completed wetland crossing in the Project Area that, together, will temporarily impact 0.3939 acre of wetland. Of these impacts, 0.0276 acre of temporary impacts are complete. The NWI data indicate that there are 260.93 acres of aquatic resources, including 10.17 acres of Freshwater Emergent Wetland and 3.25 acres of Forested/Scrub Wetland in the watershed (**Table 6**). The NWI data indicate that the Project will cross approximately 0.0681 acre of Freshwater Emergent Wetland. However, this location was delineated through field surveys and, while a large wetland was identified in the vicinity, no wetlands were identified in the Project Area (**Figure 31, Appendix A**).

Soils. The Outlet Tenmile Creek watershed soils data are from the Doddridge County and Harrison and Taylor Counties soil surveys. Soils in the watershed included the hydric soil Fluvaquents, overwash (FO) (56.8 acres, approximately 0.2% of the watershed area) and partially hydric soil UF (698.6 acres, 2.7% of the watershed area) (**Figure 32, Appendix A**) (**Appendix B**). Soils in the Project Area include the partially hydric soil UF (0.4 acre).

LULC. LULC changes in the Outlet Tenmile Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 7** and **Figures 33, 34 and 34a (Appendix A)**. Overall, there are approximately 25,521 acres in this watershed. The dominant LULC in this area is Forested (over 77%), followed by PHA (approximately 11.8%). The LOD is approximately 77.6 acres, which represents less than 0.3% of the entire watershed.

3.2.3 Headwaters Tenmile Creek

Project Stream Impacts. The Headwaters Tenmile Creek watershed borders the northern and eastern edges of the Salem Fork watershed. This results in the Project crossing this watershed twice (**Figure 24, Appendix A**). There are 24 stream crossings in this watershed (**Table 5**). Six of these crossings (all pipeline ROW) are complete. Only two proposed crossings have permanent impacts (access roads). Proposed temporary stream impacts are associated with eight pipeline ROW crossings, seven are timber mat crossings, and one temporary access road. Stream impacts, both temporary (1,331 linear) and permanent (77 linear feet), in the Headwaters Tenmile Creek watershed total approximately 1,408 linear feet, which represent less than 0.0839% of the modeled streams found in this HUC-12 watershed (**Table 5**) (**Figure 35, Appendix A**). Of these impacts, 629 linear feet of temporary impacts are complete.

Project Wetland Impacts. Approximately 4.40 acres of wetland were delineated by Mountain Valley contractors in the Headwaters Tenmile Creek watershed. There are 18 wetland crossings, five of which are complete, in the watershed. There are 1.1541 acres of temporary impacts. Approximately 0.1444 acre of conversion impacts will occur and will be mitigated using a mitigation bank. Of these totals, approximately 0.3107 acre of temporary impacts are complete. The NWI mapping indicates that there are 177.44 acres of aquatic resources in the Headwaters Tenmile Creek. Both Freshwater Emergent Wetland (1.43 acres) and Freshwater Forested/Scrub Wetland (0.44 acre) were identified in these data (**Table 6**) (**Figure 36, Appendix A**). These features are not located in the Project Area. NWI information does indicate that a Freshwater Pond is located in the Project Area; however, the Project has avoided this waterbody.

Soils. The Headwaters Tenmile Creek watershed soils data are from the Doddridge County and Harrison and Taylor Counties soil surveys. Based on the information from these soil surveys, there are no hydric soils in the Headwaters Tenmile Creek. Partially hydric soil UF may be located in the watershed (1,092 acres, 4.2% of the watershed area) (**Figure 37, Appendix A**). Small amounts of UF soil (5.1 acres) may be located in the Project Area.

LULC. LULC changes in the Headwaters Tenmile Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 7** and **Figures 38, 39 and 39a (Appendix A)**. Overall, there are approximately 25,841 acres in this watershed. The dominant LULC in this area is Forested (over 86%), followed by PHA (approximately 6.2%). The LOD is approximately 133 acres, which represents less than 0.5% of the entire watershed.

3.2.4 Salem Fork

Project Stream Impacts. There is only one stream crossing, a pipeline ROW crossing, in the Salem Fork watershed. Stream impacts, all of which are temporary, are limited to 76 linear feet, which represent less than 0.0104% of the modeled streams found in this HUC-12 watershed (**Table 5**) (**Figure 40, Appendix A**).

Project Wetland Impacts. Approximately 1.04 acres of wetland were delineated by Mountain Valley contractors in the Salem Fork watershed. There are two proposed wetland crossings in the Project Area. The impacts associated with the crossings are temporary fill/conversion impacts, 0.0110 acre, and will be mitigated utilizing a mitigation bank. The NWI data indicate that there are 121.58 acres of aquatic resources in the Salem Fork watershed. This includes 2.5 acres of Freshwater Emergent Wetland and no Freshwater Forested/Scrub Wetland (**Table 6**) (**Figure 41, Appendix A**). None of the NWI wetlands are located in the Project Area.

Soils. The Salem Fork watershed soils data are from the Doddridge County and Harrison and Taylor Counties soil surveys. Soils in the watershed included the hydric soil At (11.6 acres, approximately 0.1% of the watershed) and partially hydric soil UF (311 acres, approximately 3.0% of the watershed area) (**Figure 42, Appendix A**) (**Appendix B**). Based on the soil surveys the Project Area soil may include partially hydric soil UF (0.1 acre).

LULC. LULC changes in the Salem Fork watershed between 2011, 2016 and 2019 are illustrated in **Table 7** and **Figures 43, 44 and 44a (Appendix A)**. Overall, there are approximately 10,515 acres in this watershed. The dominant LULC in this area is Forested (over 75%), followed by PHA (approximately 9.7%). The LOD is approximately 112 acres, which represents less than 1.06% of the entire watershed.

3.2.5 Kincheloe Creek

Project Stream Impacts. There are seven stream crossings in the Kincheloe Creek watershed, two of which are complete. There are four pipeline ROW crossings (two are complete), two timber mat crossings, and a temporary access road. All of these have temporary impacts, totaling approximately 701 linear feet of stream. This represents less than 0.0782% of the modeled streams mapped in this HUC-12 watershed (**Table 5**) (**Figure 45, Appendix A**). Of these impacts, 306 linear feet of temporary impacts are complete.

Project Wetland Impacts. Approximately 4.82 acres of wetland were delineated by Mountain Valley contractors in the Kincheloe Creek watershed. There are three proposed wetland crossings in the watershed with temporary impacts totaling 0.5264 acre. The NWI data indicate that there are 72.05 acres of aquatic resources in the Kincheloe Creek watershed. This includes 0.72 acre of Freshwater Emergent Wetland (**Table 6**) (**Figure 46, Appendix A**). None of the NWI wetlands are located in the Kincheloe Creek watershed.

Soils. The Kincheloe Creek watershed soils data are from the Doddridge County, Harrison and Taylor Counties, and Lewis County soil surveys. Based on data from these soil surveys, there are no hydric soils in the watershed. Two partially hydric soils, Lobdell-Holly silt loams (Lh) (108.5 acres, 0.796% of the watershed area) and UF (273.9 acres, 2.0% of the watershed), are found in the watershed and in the Project Area (0.3 acre and 0.6 acre, respectively) (**Figure 47, Appendix A**) (**Appendix B**).

LULC. LULC changes in the Kincheloe Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 7** and **Figures 48, 49 and 49a (Appendix A)**. Overall, there are approximately 13,629 acres in this watershed. The dominant LULC in this area is Forested (over 82%), followed by PHA (approximately 10.9%). The LOD is approximately 40.9 acres, which represents less than 0.3% of the entire watershed.

3.2.6 Freemans Creek

Project Stream Impacts. There are 14 stream crossings in the Freemans Creek watershed. There are eight pipeline ROW crossings (five of which are complete), five timber mat crossings, and a temporary access road. Like the Kincheloe Creek watershed, the impacts associated with these crossings are all temporary in nature (**Table 5**). Stream crossing impacts in the Freemans Creek watershed total approximately 812 linear feet of stream, which represent less than 0.0556% of the modeled streams mapped in this HUC-12 watershed (**Figure 50, Appendix A**). Of these impacts, 376 linear feet of temporary impacts are complete.

Project Wetland Impacts. Approximately 3.80 acres were delineated by Mountain Valley contractors in the Freemans Creek watershed. There are 15 wetland crossings in the Project Area, three of which are complete, that will result in temporary impacts to 0.6533 acre of wetland. Of these impacts, 0.1701 acre of temporary impacts are complete. The NWI data indicate that there are 127.75 acres of aquatic resources in the Freemans Creek watershed, of which 2.05 acres are Freshwater Emergent Wetland and 0.52 acre of Freshwater Forested/Scrub Wetland. These features are not located in the Project Area (**Table 6**) (**Figure 51, Appendix A**).

Soils. The Freemans Creek watershed soils data are from the Doddridge County and Lewis County soil surveys. These soil surveys indicate that there are no hydric soils in the watershed. The partially hydric soil Lh can be found in the watershed (273.8 acres, 1.4% of the watershed area). A small amount (2.9 acres) of the partially hydric Lh may be present in the Project Area (**Figure 52, Appendix A**) (**Appendix B**).

LULC. LULC changes in the Freemans Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 7** and **Figures 53, 54 and 54a (Appendix A)**. Overall, there are approximately 19,727 acres in this watershed. The dominant LULC in this area is Forested (over 76%), followed by PHA (approximately 16%). The LOD is approximately 107 acres, which represents less than 0.4% of the entire watershed.

3.2.7 Polk Creek-West Fork River

Project Stream Impacts. The Polk Creek-West Fork River watershed is the last drain with aquatic resource crossings in the West Fork HUC-8 watershed. However, there are no impacts, temporary or permanent, to streams in the Polk Creek-West Fork River watershed (**Table 5**) (**Figure 55, Appendix A).**

Project Wetland Impacts. Approximately 0.28 acre of wetland was delineated by Mountain Valley contractors in the Polk Creek-West Fork River watershed. There is one proposed wetland crossing in the Project Area that will temporarily impact 0.0231 acre wetland. The NWI data indicate that there are 224.24 acres of aquatic resources in the Polk Creek-West Fork River watershed, of which 11.61 acres are Freshwater Emergent Wetland and 0.95 acre Freshwater Forested/Scrub Wetland (**Table 6**) (**Figure 56, Appendix A)**. None of the NWI wetlands fall in the Project Area.

Soils. The Polk Creek-West Fork River watershed soils data are from the Lewis County soil surveys. These surveys indicate that the partially hydric soil Lh is present in the watershed (87.7 acres, 0.4% of the watershed area) (**Figure 57, Appendix A) (Appendix B)**. Based on the soil survey data, there are no hydric or partially hydric soils in Project Area.

LULC. LULC changes in the Polk Creek-West Fork River watershed between 2011, 2016 and 2019 are illustrated in **Table 7** and **Figures 58, 59 and 59a (Appendix A)**. Overall, there are approximately 21,264 acres in this watershed. The dominant LULC in this area is Forested (over 75%), followed by PHA (approximately 11.4%). The LOD is approximately 16.3 acres, which represents less than 0.08% of the entire watershed.

Table 5
Cumulative Project Stream Impacts in the HUC-12 Watersheds that Fall Within the West Fork Watershed

HUC-12 Watershed	Total Number of Stream Crossings	Proposed Impacts in Application (feet)		Total Project-Related Impacts (feet)		Estimated Linear Feet of Streams in Watershed	Project-Related Cumulative Impacts (feet)	Percentage of Impacted Linear Stream Feet Estimated in the Watershed
		Perm	Temp	Perm	Temp			
Little Tenmile Creek	12	86	115	86	484	1,184,108	570	0.0481%
Outlet Tenmile Creek	5	29	232	29	347	1,796,037	376	0.0209%
Headwaters Tenmile Creek	24	77	702	77	1331	1,678,285	1,408	0.0839%
Salem Fork	1	0	76	0	76	734,073	76	0.0104%
Kincheloe Creek	7	0	395	0	701	896,119	701	0.0782%
Freemans Creek	14	0	436	0	812	1,459,867	812	0.0556%
Polk Creek – West Fork River	0	0	0	0	0	1,496,397	0	0.0000%

Table 6
Cumulative Project-Related Wetland Impacts and National Wetland Inventory Data in the HUC-12 Watersheds that Fall Within the West Fork Watershed

HUC-12 Watershed	Delineated Acres[1]	Total Number of Wetland Crossings	Temporary Impacts (acres)	Permanent Conversion Impacts (Acres)	Permanent Fill Impacts (acres)	Total Wetland Impacts	National Wetland Inventory Data (acres)						
							Riverine	Freshwater Emergent Wetland	Freshwater Forested/Scrub Wetland	Freshwater Pond	Lake	Other	Total
Little Tenmile Creek	1.00	3	0.0653	0	0	0.0653	95.32	1.47	0	26.61	0	0	123.4
Outlet Tenmile Creek	3.29	5	0.3939	0	0	0.3939	135.52	10.17	3.25	80.63	31.36	0	260.93
Headwaters Tenmile Creek	4.40	18	1.1541	0.1444	0	1.2985	129.02	1.43	0.44	18.12	28.43	0	177.44
Salem Fork	1.04	2	0	0.0110	0	0.011	54.06	2.5	0	22.94	42.08	0	121.58
Kincheloe Creek	4.82	3	0.5264	0	0	0.5264	53.13	0.72	0	18.2	0	0	72.05
Freemans Creek	3.80	15	0.6533	0	0	0.6533	90.29	2.05	0.52	34.9	0	0	127.75
Polk Creek-West Fork River	0.28	1	0.0231	0	0	0.0231	153.8	11.61	0.95	57.88	0	0	224.24

[1] Acres delineated within the HUC-12 Watershed.

Table 7
LULC in the HUC-12 Watersheds that Fall Within the West Fork Watershed

HUC-12 Watershed	Total HUC-12 Watershed Size (Acres)	Year	Forest		Mixed Development		Pasture, Hay, Agriculture		Streams Riparian Corridor, Floodplain		Water		Wetlands		Barren Including Mine, Oil and Gas		Roads, Impervious Surface	
			Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12
Little Tenmile Creek	18,079	2011	15,549	86.0	189	1.0	1,144	6.3	247	1.4	1	0.0	0	0.0	5	0.0	944	5.2
	18,079	2016	15,647	86.5	195	1.1	1,115	6.2	164	0.9	1	0.0	0	0.0	5	0.0	952	5.3
	18,079	2019	15,596	86.3	201	1.1	1,115	6.2	215	1.2	1	0.0	0	0.0	5	0.0	946	5.2
Outlet Tenmile Creek	25,521	2011	19,824	77.7	452	1.8	3,085	12.1	486	1.9	82	0.3	2	0.0	93	0.4	1,497	5.9
	25,521	2016	19,756	77.4	486	1.9	3,006	11.8	560	2.2	74	0.3	2	0.0	103	0.4	1,534	6.0
	25,521	2019	19,863	77.8	493	1.9	3,000	11.8	473	1.9	86	0.3	2	0.0	77	0.3	1,527	6.0
Headwaters Tenmile Creek	25,841	2011	22,403	86.7	256	1.0	1,655	6.4	455	1.8	25	0.1	0	0.0	22	0.1	1,025	4.0
	25,841	2016	22,303	86.3	273	1.1	1,607	6.2	569	2.2	25	0.1	0	0.0	16	0.1	1,047	4.1
	25,841	2019	22,359	86.5	281	1.1	1,600	6.2	520	2.0	26	0.1	0	0.0	16	0.1	1,039	4.0
Salem Fork	10,515	2011	8,082	76.9	506	4.8	1,048	10.0	189	1.8	36	0.3	0	0.0	3	0.0	649	6.2
	10,515	2016	7,976	75.9	525	5.0	1,018	9.7	287	2.7	36	0.3	0	0.0	5	0.0	668	6.4
	10,515	2019	7,957	75.7	529	5.0	1,018	9.7	304	2.9	36	0.3	0	0.0	7	0.1	664	6.3
Kincheloe Creek	13,629	2011	11,433	83.9	32	0.2	1,494	11.0	157	1.2	1	0.0	0	0.0	7	0.1	505	3.7
	13,629	2016	11,314	83.0	40	0.3	1,486	10.9	275	2.0	1	0.0	0	0.0	7	0.1	506	3.7
	13,629	2019	11,266	82.7	44	0.3	1,486	10.9	322	2.4	1	0.0	0	0.0	8	0.1	502	3.7
Freemans Creek	19,727	2011	15,126	76.7	198	1.0	3,222	16.3	296	1.5	1	0.0	0	0.0	13	0.1	870	4.4
	19,727	2016	15,105	76.6	231	1.2	3,156	16.0	330	1.7	1	0.0	0	0.0	21	0.1	883	4.5
	19,727	2019	15,102	76.6	236	1.2	3,149	16.0	322	1.6	1	0.0	0	0.0	22	0.1	894	4.5
Polk Creek-West Fork River	21,264	2011	15,969	75.1	1,211	5.7	2,514	11.8	458	2.2	48	0.2	2	0.0	31	0.1	1,030	4.8
	21,264	2016	15,870	74.6	1,238	5.8	2,443	11.5	568	2.7	46	0.2	2	0.0	36	0.2	1,059	5.0
	21,264	2019	16,051	75.5	1,245	5.9	2,419	11.4	369	1.7	49	0.2	2	0.0	26	0.1	1,103	5.2

3.3 Little Kanawha

The Project crosses seven 12-digit HUC watersheds in the Little Kanawha HUC-8 watershed (**Figure 60, Appendix A**). These include Fink Creek (050302030201), the Headwaters Leading Creek (050302030202), the Headwaters Sand Fork (050302030101), Indian Fork (050302030102), Oil Creek (050302030306), Burnsville Lake-Little Kanawha River (050302030305), and Falls Run-Little Kanawha River (050302030303) (**Table 8**). The Little Kanawha watershed is approximately 2,307.7 mi^2. The combined drainage of the seven listed watersheds is approximately 235.1 mi^2 or less than 10% of the HUC-8 watershed.

3.3.1 Fink Creek

Project Stream Impacts: Fink Creek is the first watershed with stream crossings in the Little Kanawha watershed. Stream impacts include four temporary crossings, two of which are completed pipeline ROW crossings. The proposed impacts in the Fink Creek watershed are timber mat crossings. All impacts are temporary in nature and total 240 linear feet. This represents less than 0.0137% of the modeled streams mapped in this HUC-12 watershed (**Table 8**) (**Figure 61, Appendix A**). Of these impacts, 196 linear feet of temporary impacts are complete.

Project Wetland Impacts. Approximately 1.65 acres of wetland were delineated by Mountain Valley contractors in the Fink Creek watershed. Four proposed wetland crossings will temporarily impact 0.2133 acre of wetland, and one crossing will result in 0.0024 acre of wetland conversion impacts, for a total of 0.2157 acre of wetland impacts in the watershed (**Table 9**) (**Figure 62, Appendix A**). The NWI data indicate that there are 125.13 acres of aquatic resources in the watershed, of which 1.85 acres are Freshwater Emergent Wetland and 1.27 acres of Freshwater Forested/Scrub Wetland in the Fink Creek watershed. These are not located within the Project Area.

Soils. Soils data for the Fink Creek watershed were obtained from the Doddridge County, Gilmer County, and Lewis County, West Virginia soil surveys. Based on these soil surveys, there are no hydric soils in the watershed. A small fraction (0.2%) of the watershed soils is the partially hydric soil Lh (60.6 acres) (**Figure 63, Appendix A**) (**Appendix B**). A minor amount (1.3 acre) of Lh soil may be found in the Project Area

LULC. LULC changes in the Fink Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 10** and **Figures 64, 65 and 65a (Appendix A)**. Overall, there are approximately 27,207 acres in this watershed. The dominant LULC in this area is Forested (over 90%), followed by PHA (approximately 3.9%). The LOD is approximately 42.1 acres, which represents less than 0.2% of the entire watershed.

3.3.2 Headwaters Leading Creek

Project Stream Impacts. The Headwaters Leading Creek watershed has two stream crossings: a timber mat crossing and a pipeline ROW crossing (complete). Both of these stream crossings are temporary and total approximately 89 linear feet. This represents less than 0.0064% of the

modeled streams in the Headwaters Leading Creek watershed (**Table 8**) (**Figure 66, Appendix A**). Of these impacts, 67 linear feet of temporary impacts are complete.

Project Wetland Impacts. Approximately 1.06 acres of wetland were delineated by Mountain Valley contractors in the Headwaters Leading Creek watershed. There are four wetland crossings in the watershed, one of which is complete, which will result in 0.0180 acre of temporary impacts and 0.0086 acre of permanent impacts, for a total of 0.0266 acre of impacts (**Table 9**) (**Figure 67, Appendix A**). Permanent impacts will be mitigated using mitigation banking. Of these impacts, 0.0027 acre of permanent impacts are complete. The NWI data indicate that there are 109.17 acres of aquatic resources in the watershed, of which are 6.79 acres of Freshwater Emergent Wetland and 2.09 Freshwater Forested/Scrub Wetland. None of these are located in the proposed Project Area.

Soils. Soils data for the Headwaters Leading Creek watershed were obtained from the Gilmer County and Lewis County, West Virginia soil surveys. Based on these soil surveys, there are no hydric soils in the watershed. A small fraction (0.5%, 98 acres) of the watershed soils is the partially hydric soil Lh (**Figure 68, Appendix A**) (**Appendix B**). This soil type is not crossed by the Project.

LULC. LULC changes in the Headwaters Leading Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 10** and **Figures 69, 70 and 70a (Appendix A)**. Overall, there are approximately 19,067 acres in this watershed. The dominant LULC in this area is Forested (over 88%), followed by PHA (approximately 5.4%). The LOD is approximately 36.3 acres, which represents less than 0.2% of the entire watershed.

3.3.3 Headwaters Sand Fork

Project Stream Impacts. There are 21 stream crossings in the Headwaters Sand Fork watershed. Eight of these stream crossings, all pipeline ROW crossings, are complete. Permanent impacts are limited to two proposed permanent access road stream crossings. The remaining proposed stream impacts are eight timber mat crossing, a temporary work space, one pipeline crossing, and one temporary access road. Stream impacts, both temporary (1,003 linear feet) and permanent (53 linear feet), in the watershed total approximately 1,056 linear feet, which represent less than 0.0704% of the modeled streams found in this HUC-12 watershed (**Table 8**) (**Figure 71, Appendix A**). Approximately 721 linear feet of temporary impacts are complete.

Project Wetland Impacts. Approximately 1.54 acres of wetland were delineated by Mountain Valley contractors in the Headwaters Sand Fork watershed. There are 11 wetland crossings in this watershed, five of which are complete (0.1117 acre of temporary impacts). Six wetland crossings are proposed that will result in 0.2047 acre of temporary impacts (**Table 9**) (**Figure 72, Appendix A**) totaling 0.3164 acres of temporary impact. The NWI data indicate that there are 119 acres of aquatic resources in the watershed, of which 0.18 acre are Freshwater Emergent Wetland. None of these are located in the Project Area.

Soils. Soils data for the Headwaters Sand Fork watershed were obtained from the Gilmer County and Lewis County, West Virginia soil surveys. Based on these soil surveys, there are no hydric soils in the watershed. A small fraction (0.09%, 21.8 acres) of the watershed soils is the partially hydric soil Lh (**Figure 73, Appendix A**) (**Appendix B**). This soil type is not crossed by the Project.

LULC. LULC changes in the Headwaters Sand Fork watershed between 2011, 2016 and 2019 are illustrated in **Table 10** and **Figures 74, 75 and 75a (Appendix A)**. Overall, there are approximately 24,971 acres in this watershed. The dominant LULC in this area is Forested (over 92%), followed by PHA (approximately 1.7%). The LOD is approximately 128 acres, which represents less than 0.5% of the entire watershed.

3.3.4 Indian Fork

Project Stream Impacts. There are five stream crossings in the Indian Fork watershed (**Table 8**): three pipeline ROW crossings, one timber mat crossing, and one permanent access road. None of the associated stream impacts are permanent. Stream impacts total approximately 367 linear feet or less than 0.0407% of this HUC-12 watershed (**Figure 76, Appendix A**).

Project Wetland Impacts. Approximately 1.68 acres of wetland were delineated by Mountain Valley contractors in the Indian Fork watershed. There are nine wetland crossings in the Project Area that will result in 0.1176 acre of temporary wetland impacts and approximately 0.0331 acre of permanent impacts, for a total of 0.1507 acre of wetland crossing impacts (**Table 9**) (**Figure 77, Appendix A**). One crossing with temporary impacts totaling 0.0284 acre is complete. The NWI data indicate that there are 64.85 acres of aquatic resources in the Indian Fork watershed, of which 0.08 acre is Freshwater Emergent Wetland. These wetland acres are not located in the Project Area.

Soils. Soils data for the Indian Creek watershed were obtained from the Braxton County, Gilmer County, and Lewis County, West Virginia soil surveys. Based on these soil surveys, there are no hydric soils or partially hydric soils present in the watershed (**Figure 78, Appendix A**) (**Appendix B)**.

LULC. LULC changes in the Indian Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 10** and **Figures 79, 80 and 80a (Appendix A)**. Overall, there are approximately 15,213 acres in this watershed. The dominant LULC in this area is Forested (over 92%), followed by PHA (approximately 1.5%). The LOD is approximately 76.8 acres, which represents less than 0.5% of the entire watershed.

3.3.5 Oil Creek

Project Stream Impacts. The Oil Creek watershed has 22 stream crossings. Two pipeline ROW crossings are complete. There are three proposed permanent access road crossings. The remaining proposed stream crossings are temporary access roads (nine), timber mats (four), and four additional pipeline ROW crossings. Stream impacts, both temporary (1,581 linear feet) and

permanent (83 linear feet), total 1,664 linear feet in this watershed (**Table 8**). This is less than 0.1270% of the total modeled streams in the Oil Creek watershed (**Figure 81, Appendix A**). Approximately 248 linear feet of temporary impacts are complete.

Project Wetland Impacts. Approximately 3.06 acres of wetland were delineated by Mountain Valley contractors in the Oil Creek watershed. There are 27 wetland crossings in this watershed. Three of these wetland crossings are complete. These crossings will result in 0.5636 acre of temporary impacts and 0.1432 acre of conversion impacts, for a total of 0.7068 acre of wetland impacts (**Table 9**) (**Figure 82, Appendix A**). Conversion impacts will be mitigated using mitigation banking. Approximately 0.0185 acre of temporary impacts and 0.0146 acre of conversion impacts are complete. The NWI data indicate that there are 84.56 acres of aquatic resources in the watershed, of which 0.66 acre are Freshwater Emergent Wetland. These wetland acres do not fall within the Project Area.

Soils. Soils data for the Oil Creek watershed were obtained from the Braxton County, Gilmer County, and Lewis County, West Virginia soil surveys. Based on these soil surveys, there are no hydric or partially hydric soils in the watershed (**Figure 83, Appendix A**) (**Appendix B**).

LULC. LULC changes in the Oil Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 10** and **Figures 84, 85 and 85a (Appendix A)**. Overall, there are approximately 20,179 acres in this watershed. The dominant LULC in this area is Forested (over 90%), followed by Stream Riparian Corridor Floodplain (approximately 3.0%). The LOD is approximately 139 acres, which represents less than 0.7% of the entire watershed.

3.3.6 Burnsville Lake-Little Kanawha River

Project Stream Impacts. The Burnsville Lake falls in this watershed. As noted on **Figure 86** (**Appendix A**), this feature is not included in the total stream length. Without Burnsville Lake, which represents more than 10 miles of stream that have been converted to a lake, there are an estimated 1,158,723 linear feet (220 miles) of stream in Burnsville Lake-Little Kanawha River watershed. There are 12 stream crossings within this watershed in the Project Area. Two of the crossings are complete. Most of the impacts are temporary in nature (**Table 8**). The proposed permanent impacts are associated with four access roads (one temporary and three permanent). There are five pipeline ROW crossings (two of which are complete), two timber mat crossings, and a temporary access road/work space proposed in this watershed. Stream impacts, both temporary (503 linear feet) and permanent (136 linear feet), total approximately 639 linear feet. This is less than 0.0551% of the modeled streams in this HUC-12 watershed. Approximately 192 linear feet of impacts in this watershed are complete.

Project Wetlands Impacts. Approximately 0.47 acre of wetland was delineated by Mountain Valley contractors in the Burnsville Lake-Little Kanawha River watershed. These wetland areas were avoided, and there are no wetland impacts in the Burnsville Lake-Little Kanawha River watershed. NWI data indicate that there are 964.81 acres of aquatic resources in the watershed, including 27.89 acre of Freshwater Forested/Scrub Wetland (**Table 9**) (**Figure 87, Appendix A**). These wetlands fall outside of the Project Area.

Soils. Soils data for the Burnsville Lake-Little Kanawha River watershed were obtained from the Braxton County and Lewis County, West Virginia soil surveys. Based on these soil surveys, there are no hydric or partially hydric soils in the watershed (**Figure 88, Appendix A**).

LULC. LULC changes in the Burnsville Lake-Little Kanawha River watershed 2011, 2016 and 2019 are illustrated in **Table 10** and **Figures 89, 90 and 90a (Appendix A)**. Overall, there are approximately 22,753 acres in this watershed. The dominant LULC in this area is Forested (over 89%), followed by Water (approximately 3.8%). The LOD is approximately 88.9 acres, which represents less than 0.4% of the entire watershed.

3.3.7 Falls Run-Little Kanawha River

Project Stream Impacts. There are 25 stream crossings in the 21,120-acre Falls Run-Little Kanawha River watershed. This is the most southern HUC-12 watershed along the Project route in the Little Kanawha HUC-8 watershed. The impacts are associated with eight timber mat crossings, seven pipeline ROW crossings, a temporary access road, and the Harris Compressor Station. Eight of the crossings are complete – six pipeline crossings and two crossings associated with the Harris Compressor Station. The stream impacts, both temporary (1,466 linear feet) and permanent (148 linear feet), in this watershed total approximately 1,614 linear feet (**Table 8**). The percentage of modeled streams in the watershed is approximately 0.1207% (**Figure 91, Appendix A**). Approximately 539 linear feet of temporary impacts and 94 linear feet of permanent impacts are complete.

Project Wetland Impacts. Approximately 2.12 acres of wetland were delineated by Mountain Valley contractors in the Falls Run-Little Kanawha River watershed. There are four proposed wetland crossings that will result in 0.2446 acre of temporary wetland impacts. The NWI data for this watershed indicate that there are 184.25 acres of aquatic resources in the watershed, including 3.29 acres of Freshwater Emergent Wetland and 6.57 acres of Freshwater Forested/Scrub Wetland (**Table 9**) (**Figure 92, Appendix A**). These wetland acres are not located in the Project Area.

Soils. Soils data for the Falls Run-Little Kanawha River watershed were obtained from the Braxton County, Lewis County, and Webster County, West Virginia soil surveys. Based on these soil surveys, there are no hydric or partially hydric soils in the watershed (**Figure 93, Appendix A**) (**Appendix B**).

LULC. LULC changes in the Falls Run-Little Kanawha River watershed between 2011, 2016 and 2019 are illustrated in **Table 10** and **Figures 94, 95 and 95a (Appendix A)**. Overall, there are approximately 21,098 acres in this watershed. The dominant LULC in this area is Forested (over 86%), followed by PHA (approximately 4.2%). The LOD is approximately 205 acres, which represents less than 1.0% of the entire watershed.

Table 8
Cumulative Project Stream Impacts in the HUC-12 Watersheds that Fall Within the Little Kanawha Watershed

HUC-12 Watershed	Total Number of Stream Crossings	Proposed Impacts in Application (feet)		Total Project-Related Impacts (feet)		Estimated Linear Feet of Streams in Watershed	Project-Related Cumulative Impacts (feet)	Percentage of Impacted Linear Stream Feet Estimated in the Watershed
		Perm	Temp	Perm	Temp			
Fink Creek	4	0	44	0	240	1,757,227	240	0.0137%
Headwaters Leading Creek	2	0	22	0	89	1,391,441	89	0.0064%
Headwaters Sand Fork	21	53	282	53	1,003	1,500,869	1,056	0.0704%
Indian Fork	5	0	367	0	367	902,452	367	0.0407%
Oil Creek	22	83	1,333	83	1,581	1,310,301	1,664	0.1270%
Burnsville Lake – Little Kanawha River	12	136	311	136	503	1,158,723	639	0.0551%
Falls Run – Little Kanawha River	25	54	927	148	1,466	1,336,392	1,614	0.1207%

Table 9
Cumulative Project-Related Wetland Impacts and National Wetland Inventory data in the HUC-12 Watersheds that Fall Within the Little Kanawha Watershed

HUC-12 Watershed	Delineated Acres[1]	Total Number of Wetland Crossings	Temporary Impacts (acres)	Permanent Conversion Impacts (Acres)	Permanent Fill Impacts (acres)	Total Wetland Impacts	National Wetland Inventory Data (acres)						
							Riverine	Freshwater Emergent Wetland	Freshwater Forested/Scrub Wetland	Freshwater Pond	Lake	Other	Total
Fink Creek	1.65	4	0.2133	0.0024	0	0.2157	108.82	1.85	1.27	13.2	0	0	125.13
Headwaters Leading Creek	1.06	4	0.0180	0	0.0086	0.0266	80.4	6.79	2.09	19.89	0	0	109.17
Headwaters Sand Fork	1.54	11	0.3164	0	0	0.3164	114.52	0.18	0	4.3	0	0	119
Indian Fork	1.68	9	0.1176	0	0.0331	0.1507	61.94	0.08	0	2.83	0	0	64.85
Oil Creek	3.06	27	0.5636	0.1432	0	0.7068	81.24	0.66	0	2.66	0	0	84.56
Burnsville Lake-Little Kanawha River	0.47	---	---	---	---	---	69.61	--	27.89	2.61	864.7	---	964.81
Falls Run-Little Kanawha River	2.12	4	0.2446	0	0	0.2446	102.99	3.29	6.57	6.89	64.51	0	184.25

[1] Acres delineated within the HUC-12 Watershed.

Table 10
LULC in the HUC-12 Watersheds that Fall Within the Little Kanawha Watershed

HUC-12 Watershed	Total HUC-12 Watershed Size (Acres)	Year	Forest		Mixed Development		Pasture, Hay, Agriculture		Streams Riparian Corridor, Floodplain		Water		Wetlands		Barren Including Mine, Oil and Gas		Roads, Impervious Surface	
			Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12
Fink Creek	27,206	2011	24,660	90.6	37	0.1	1,071	3.9	255	0.9	2	0.0	0	0.0	1	0.0	1,180	4.3
	27,268	2016	24,660	90.4	42	0.2	1,059	3.9	316	1.2	2	0.0	0	0.0	1	0.0	1,189	4.4
	27,207	2019	24,660	90.6	46	0.2	1,053	3.9	232	0.9	2	0.0	0	0.0	2	0.0	1,213	4.5
Headwaters Leading Creek	18,914	2011	16,801	88.8	104	0.6	1,046	5.5	258	1.4	1	0.0	0	0.0	0	0.0	703	3.7
	19,191	2016	16,801	87.5	116	0.6	1,031	5.4	532	2.8	1	0.0	0	0.0	0	0.0	710	3.7
	19,067	2019	16,801	88.1	121	0.6	1,026	5.4	376	2.0	1	0.0	0	0.0	0	0.0	742	3.9
Headwaters Sand Fork	24,921	2011	23,054	92.5	61	0.2	425	1.7	375	1.5	0	0.0	0	0.0	1	0.0	1,005	4.0
	25,211	2016	23,054	91.4	74	0.3	413	1.6	659	2.6	0	0.0	0	0.0	1	0.0	1,009	4.0
	24,971	2019	23,054	92.3	79	0.3	412	1.7	400	1.6	0	0.0	0	0.0	4	0.0	1,021	4.1
Indian Fork	15,306	2011	14,129	92.3	97	0.6	240	1.6	256	1.7	0	0.0	0	0.0	0	0.0	585	3.8
	15,372	2016	14,129	91.9	103	0.7	221	1.4	323	2.1	0	0.0	0	0.0	6	0.0	592	3.8
	15,213	2019	14,129	92.9	105	0.7	221	1.5	166	1.1	0	0.0	0	0.0	3	0.0	590	3.9
Oil Creek	19,763	2011	18,193	92.1	304	1.5	379	1.9	216	1.1	0	0.0	2	0.0	10	0.0	660	3.3
	20,153	2016	18,193	90.3	310	1.5	381	1.9	590	2.9	0	0.0	2	0.0	6	0.0	671	3.3
	20,179	2019	18,193	90.2	312	1.5	377	1.9	601	3.0	0	0.0	2	0.0	6	0.0	687	3.4
Burnsville Lake-Little Kanawha River	22,445	2011	20,264	90.3	130	0.6	553	2.5	153	0.7	869	3.9	7	0.0	4	0.0	466	2.1
	22,736	2016	20,264	89.1	136	0.6	536	2.4	453	2.0	867	3.8	8	0.0	4	0.0	468	2.1
	22,753	2019	20,264	89.1	138	0.6	534	2.3	469	2.1	867	3.8	8	0.0	7	0.0	468	2.1
Falls Run-Little Kanawha River	20,522	2011	18,278	89.1	74	0.4	909	4.4	251	1.2	62	0.3	3	0.0	18	0.1	927	4.5
	20,990	2016	18,278	87.1	79	0.4	894	4.3	729	3.5	60	0.3	3	0.0	19	0.1	928	4.4
	21,098	2019	18,278	86.6	83	0.4	893	4.2	837	4.0	51	0.2	12	0.1	18	0.1	925	4.4

3.4 Elk

The Project crosses eight 12-digit HUC watersheds in the Little Kanawha HUC-8 watershed (**Figure 96, Appendix A**). These include the Outlet Holly River (050500070304), the Left Fork Holly River (050500070301), the Outlet Right Fork Holly River (050500070303), Upper Sutton Lake-Elk River (050500070602), Big Run-Elk River (050500070601), the Headwaters Laurel Creek (050500070201), Outlet Laurel Creek (050500070202), and Upper Birch River (050500070401) (**Table 11**). The Elk watershed is approximately 1,532.1 mi^2, while the eight 12-digit HUC watersheds total 268.1 mi^2.

3.4.1 Outlet Holly River

Project Stream Impacts. There are 13 stream crossings in the Outlet Holly River watershed: nine pipeline ROW crossings, three timber mat crossings, and a temporary access road. The proposed stream crossing impacts in this watershed are temporary in nature. Proposed stream impacts in the Outlet Holly River watershed total approximately 794 linear feet or less than 0.0642% of the modeled streams in this HUC-12 watershed (**Table 11**) (**Figure 97**, **Appendix A**).

Project Wetland Impacts. Approximately 1.28 acres of wetland were delineated by Mountain Valley contractors in the Outlet Holly River watershed. There are eight wetland crossings, two of which are complete, that will temporarily impact 0.1703 acre wetland in the watershed. The NWI data indicate that there are 245.14 acres of aquatic resources including 1.33 acres of Freshwater Emergent Wetland and 3.57 acres of Freshwater Forested/Scrub Wetland in the watershed (**Table 12**) (**Figure 98, Appendix A**). These NWI wetlands are not located in the Project Area.

Soils. Soils data for the Outlet Holly River watershed were obtained from the Braxton County and Webster County, West Virginia soil surveys. Based on these soil surveys, there are no hydric or partially hydric soils in the watershed (**Figure 99, Appendix A**) (**Appendix B**).

LULC. LULC changes in the Outlet Holly River watershed between 2011, 2016 and 2019 are illustrated in **Table 13** and **Figures 100, 101 and 101a (Appendix A)**. Overall, there are approximately 19,373 acres in this watershed. The dominant LULC in this area is Forested (over 92%), followed by PHA (approximately 2.0%). The LOD is approximately 83 acres, which represents less than 0.4% of the entire watershed.

3.4.2 Headwaters Holly River

Project Stream Impacts. The Headwaters Holly River watershed is sometimes referred to as the Left Fork Holly River watershed. There are approximately 634 linear feet of proposed temporary impacts associated with three pipeline ROW and one pipeline ROW crossing/temporary access road (**Table 11**). This represents less than 0.0290% of the modeled stream in this HUC-12 watershed (**Figure 102, Appendix A**).

Project Wetlands Impacts. Approximately 0.07 acre of wetland was delineated by Mountain Valley contractors in the Headwater Holly River watershed. These wetlands were avoided, and

there are no wetland impacts in this watershed. The NWI data indicate that there are 244.14 acres of aquatic resources in the watershed, including 12.5 acres of Freshwater Emergent Wetland and 15.61 acres of Freshwater Forested/Scrub Wetland. These wetlands are not located in the Project Area (**Table 12**) (**Figure 103, Appendix A**).

Soils. Soils data for the Headwater Holly River watershed were obtained from the Randolph County Area, Main Part, and Webster County, West Virginia soil surveys. Based on these soil surveys, there are two hydric soils in the watershed: Atkins loam, moist, 0 to 3 percent slopes, frequently flooded (At-Webster) (5.8 acres, less than 0.02% of the watershed), and Elkins silt loam (Ek) (8.1 acres, less than 0.03% of the watershed area) (**Figure 104, Appendix A**) (**Appendix B**). These soil types are not crossed by the Project.

LULC. LULC changes in the Headwaters Holly River watershed between 2011, 2016 and 2019 are illustrated in **Table 13** and **Figures 105, 106 and 106a (Appendix A)**. Overall, there are approximately 34,968 acres in this watershed. The dominant LULC in this area is Forested (over 93%), followed by Stream Riparian Corridor Floodplain (approximately 1.4%). The LOD is approximately 9.5 acres, which represents less than 0.03% of the entire watershed.

3.4.3 Outlet Right Fork Holly River

Project Stream Impacts. The Outlet Right Fork Holly River watershed has three proposed stream crossings. This includes permanent impacts (29 linear feet) associated with a permanent access road and temporary impacts (107 linear feet) from a pipeline ROW crossing and an additional temporary work space. The total stream crossing impacts are approximately 136 linear feet (**Table 11**). This equates to approximately 0.0141% of the stream length modeled in this HUC-12 watershed (**Figure 107, Appendix A**).

Project Wetlands Impacts. Approximately 0.18 acre of wetland was delineated by Mountain Valley contractors in the Outlet Right Fork Holly River watershed. These wetlands were avoided, and there are no wetland impacts in this watershed. The NWI data indicate that there are 93.35 acres of aquatic resources in this watershed, including 0.77 acre of Freshwater Emergent Wetland and 13.17 acres of Freshwater Forested/Scrub Wetland (**Table 12**) (**Figure 108, Appendix A**). These wetlands are not in the Project Area.

Soils. Soils data for the Outlet Right Fork Holly River watershed were obtained from the Braxton County and Webster County, West Virginia soil surveys. Based on these soil surveys, the hydric soil At-Webster (20.3 acre and less than 0.15% of the watershed area) is found in the watershed (**Figure 109, Appendix A**) (Appendix B). This soil type is not crossed by the Project.

LULC. LULC changes in the Outlet Right Holly River watershed between 2011, 2016 and 2019 are illustrated in **Table 13** and **Figures 110, 111 and 111a (Appendix A)**. Overall, there are approximately 13,679 acres in this watershed. The dominant LULC in this area is Forested (over 93%), followed by PHA (approximately 2.1%). The LOD is approximately 71.4 acres, which represents less than 0.5% of the entire watershed.

3.4.4 Upper Sutton Lake-Elk River

Project Stream Impacts. The Upper Sutton Lake-Elk River watershed contains the tailwaters of Sutton Lake. For the reasons explained in Section 2.0 above, and as noted in **Figure 112** (**Appendix A**), this aquatic resource is excluded from the stream model. There are six proposed stream crossings in this watershed, which total 208 linear feet of temporary impacts (**Table 11**). This includes four timber mat crossings and two pipeline ROW crossings. The total impacts equate to approximately 0.0305% of the stream length modeled in this HUC-12 watershed.

Project Wetlands Impacts. Approximately 0.50 acre of wetlands was delineated by Mountain Valley contractors in the Upper Sutton Lake-Elk River watershed. The Project includes four proposed wetland crossings. The Project will temporarily impact approximately 0.0662 acre of wetland. The NWI data indicate that there are 365.44 acres of aquatic resources in this watershed, including 2.3 acres of Freshwater Emergent Wetland and 1.85 acres of Freshwater Forested/Scrub Wetland. None of these wetlands are located in the Project Area (**Table 12**) (**Figure 113, Appendix A**).

Soils. Soils data for the Upper Sutton Lake-Elk River watershed were obtained from the Braxton County and Webster County, West Virginia soil surveys. Based on these soil surveys, there are no hydric or partially hydric soils in the watershed (**Figure 114, Appendix A**) (**Appendix B**).

LULC. LULC changes in the Upper Sutton Lake-Elk River watershed between 2011, 2016 and 2019 are illustrated in **Table 13** and **Figures 115, 116 and 116a (Appendix A)**. Overall, there are approximately 12,053 acres in this watershed. The dominant LULC in this area is Forested (over 92%), followed by Stream Riparian Corridor Floodplain (approximately 2.6%). The LOD is approximately 100.3 acres, which represents less than 0.8% of the entire watershed.

3.4.5 Big Run-Elk River

Project Stream Impacts. There are four proposed stream crossings in the Big Run-Elk River watershed: three pipeline ROW crossings and one timber mat crossings. These impacts are temporary and total approximately 114 linear feet of stream (**Table 11**). This represents less than 0.0102% of the stream length modeled in this HUC-12 watershed (**Figure 117, Appendix A**).

Project Wetlands Impacts. Approximately 0.13 acre of wetland was delineated by Mountain Valley contractors in the Big Run-Elk River watershed. There are seven wetland crossings, three of which are complete, in the watershed. The Project will result in a total of 0.1013 acre of temporary wetland impacts. The three completed crossings resulted in 0.0463 acre of temporary impacts. The NWI data indicate that there are 333.77 acres of aquatic resources in the watershed, including 0.75 acre of Freshwater Emergent Wetland and 5.01 acres of Freshwater Forested/Scrub Wetland. None of these wetlands are in the Project Area (**Table 12**) (**Figure 118, Appendix A**).

Soils. Soils data for the Big Run-Elk River watershed were obtained from the Webster County, West Virginia soil surveys. Based on this soil survey, the hydric soil At-Webster (3.8 acres, 0.02%

of the watershed area) occurs in the watershed (**Figure 119, Appendix A**) (**Appendix B**). This soil type is not crossed by the Project.

LULC. LULC changes in the Big Run-Elk River watershed between 2011, 2016 and 2019 are illustrated in **Table 13** and **Figures 120, 121 and 121a (Appendix A)**. Overall, there are approximately 17,907 acres in this watershed. The dominant LULC in this area is Forested (over 93%), followed by Stream Riparian Corridor Floodplain (approximately 2.0%). The LOD is approximately 26.8 acres, which represents less than 0.15% of the entire watershed.

3.4.6 Outlet Laurel Creek

Project Stream Impacts. There are 12 proposed stream crossings in the Outlet Laurel Creek watershed. The only permanent stream crossing impacts are associated with a permanent access road. Other proposed stream crossings include 10 pipeline ROW crossings and one temporary access road. Stream impacts, both permanent (30 linear feet) and temporary (773 linear feet), total approximately 803 linear feet or less than 0.0549% of the modeled stream in this HUC-12 watershed (**Table 11**) (**Figure 122, Appendix A**).

Project Wetland Impacts. Approximately 3.15 acres of wetland were delineated by Mountain Valley contractors in the Outlet Laurel Creek watershed. The Project has 22 wetland crossings, of which two are complete. The Project will temporarily impact approximately 0.4076 acre of wetland, will result in 0.4849 acre of wetland conversion impacts, and will permanently impact 0.0907 acres of wetland, for a total of 0.9832 acre of wetland impacts in the Project Area. The completed impacts include 0.0725 acre of wetland conversion impacts and 0.0117 acre of temporary impacts. Conversion and permanent wetland impacts will be mitigated using mitigation banking. The NWI data indicate that there are 129.49 acres of aquatic resources in the watershed, including 3.26 acres of Freshwater Emergent Wetland and 1.87 acres of Freshwater Forested/Scrub Wetland (**Table 12**) (**Figure 123, Appendix A**). These wetlands are not located in the Project Area.

Soils. Soils data for the Outlet Laurel Creek watershed were obtained from the Braxton County and Webster County, West Virginia soil surveys. Based on these soil surveys, the hydric soil At-Webster (4.6 acres, less than 0.02% of the watershed area) is found in the watershed (**Figure 124, Appendix A**) (**Appendix B**). This soil type is not crossed by the Project.

LULC. LULC changes in the Outlet Laurel Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 13** and **Figures 125, 126 and 126a (Appendix A)**. Overall, there are approximately 23,571 acres in this watershed. The dominant LULC in this area is Forested (over 88%), followed by Stream Riparian Corridor Floodplain (approximately 7.5%). The LOD is approximately 118 acres, which represents less than 0.6% of the entire watershed.

3.4.7 Headwaters Laurel Creek

Project Stream Impacts. The Headwaters Laurel Creek watershed has 19 stream crossings, three of which are complete. The completed stream crossings include two pipeline ROW crossings and an area that includes pipeline ROW and temporary access road. Eleven of the proposed stream crossings are pipeline ROW crossings. The remaining are three timber mat crossings and two temporary access roads. The stream impacts in this watershed are temporary in nature (**Table 11**). Combined, the 1,498 linear feet of stream impacts represent less than 0.1179% of the modeled streams in this HUC-12 watershed (**Figure 127**, **Appendix A**). Approximately 301 linear feet of temporary impacts are complete.

Project Wetlands Impacts. Approximately 2.96 acres of wetland were delineated by Mountain Valley contractors in the Headwaters of Laurel Creek watershed. There are five proposed wetland crossings in the Project Area. The crossings will result in 0.2553 acre of temporary impacts, 0.0108 acre of wetland conversion impacts, and 0.0400 acre of permanent wetland impacts. Conversion and permanent wetland impacts will be mitigated using mitigation banking. The NWI data indicate that there are 109.8 acres of aquatic resources in the watershed, including 1.01 acre of Freshwater Emergent Wetland and 1.57 Freshwater Forested/Scrub Wetland (**Table 12**) (**Figure 128, Appendix A**). These wetlands are not located in the Project Area.

Soils. Soils data for the Headwater Laurel Creek watershed were obtained from the Webster County, West Virginia soil surveys. Based on this soil survey, the hydric soils At-Webster (52.4 acres, less than 0.3% of the watershed area) and Ek (60.6 acres, approximately 0.3% of the watershed area) are mapped in the watershed. Approximately 0.9 acre of the hydric soil At-Webster may be present in the Project Area (**Figure 129, Appendix A**) (**Appendix B**).

LULC. LULC changes in the Headwaters Laurel Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 13** and **Figures 130, 131 and 131a (Appendix A)**. Overall, there are approximately 19,065 acres in this watershed. The dominant LULC in this area is Forested (over 87%), followed by Stream Riparian Corridor Floodplain (approximately 5.0%). The LOD is approximately 126.5 acres, confirm which represents less than 0.7% of the entire watershed.

3.4.8 Upper Birch River

Project Stream Impacts. The Upper Birch River watershed is the southernmost 12-digit HUC crossed by the Project in the Elk HUC-8 watershed. The 21 stream crossings include five complete pipeline ROW crossings. The remaining proposed stream crossings are two pipeline ROW crossings, seven timber mat crossings, and seven temporary access roads (**Table 11**). The total stream crossing impacts are approximately 700 linear feet. These impacts are all temporary in nature and amount to less than 0.0319% of the streams mapped in the Upper Birch River watershed (**Figure 132**, **Appendix A**). Approximately 228 linear feet of the temporary impacts are complete.

Project Wetlands Impacts. Approximately 2.96 acres of wetland were delineated by Mountain Valley contractors in the Upper Birch River watershed. There are ten wetland crossings, three of which are complete, in the Project Area. The Project will temporarily impact 0.1746 acre of

wetland and result in 0.0188 acre of wetland conversion impacts. Wetland conversion impacts will be mitigated using mitigation banking. The three completed crossings temporarily impacted 0.0136 acre of wetland. The NWI data indicate that there are 140.94 acres of aquatic resources in the watershed, including 3.27 acres of Freshwater Emergent Wetland and 0.81 acre of Freshwater Forested/Scrub Wetland (**Table 12**) (**Figure 133, Appendix A**). These wetlands are not located in the Project Area.

Soils. Soils data for the Upper Birch River watershed were obtained from the Braxton County, Nicholas County, and Webster County, West Virginia soil surveys. Based on these soil surveys, the hydric soil At-Webster (56.4 acre, less than 0.2% of the watershed area) may be found in the watershed. Approximately 1.7 acre At-Webster may be crossed by the Project (**Figure 134, Appendix A**) (**Appendix B**).

LULC. LULC changes in the Upper Birch River watershed between 2011, 2016 and 2019 are illustrated in **Table 13** and **Figures 135, 136 and 136a (Appendix A)**. Overall, there are approximately 31,002 acres in this watershed. The dominant LULC in this area is Forested (over 87%), followed by Stream Riparian Corridor Floodplain (approximately 6.1%). The LOD is approximately 85.9 acres, which represents less than 0.3% of the entire watershed.

Table 11
Cumulative Project Stream Impacts in the HUC-12 Watersheds that Fall Within the Elk Watershed

HUC-12 Watershed	Total Number of Stream Crossings	Proposed Impacts in Application (feet)		Total Project-Related Impacts (feet)		Estimated Linear Feet of Streams in Watershed	Project-Related Cumulative Impacts (feet)	Percentage of Impacted Linear Stream Feet Estimated in the Watershed
		Perm	Temp	Perm	Temp			
Outlet Holly River	13	0	743	0	794	1,236,071	794	0.0642%
Headwaters Holly River	4	0	634	0	634	2,183,798	634	0.0290%
Outlet Right Fork Holly River	3	29	107	29	107	964,639	136	0.0141%
Upper Sutton Lake – Elk River	6	0	208	0	208	681,017	208	0.0305%
Big Run – Elk River	4	0	114	0	114	1,122,166	114	0.0102%
Outlet Laurel Creek	12	30	773	30	773	1,463,657	803	0.0549%
Headwaters Laurel Creek	19	0	1,197	0	1,498	1,270,457	1,498	0.1179%
Upper Birch River	21	0	472	0	700	2,191,918	700	0.0319%

Table 12
Cumulative Project-Related Wetland Impacts and National Wetland Inventory Data in the HUC-12 Watersheds that Fall Within the Elk Watershed

HUC-12 Watershed	Delineated Acres[1]	Total Number of Wetland Crossings	Temporary Impacts (acres)	Permanent Conversion Impacts (Acres)	Permanent Fill Impacts (acres)	Total Wetland Impacts	National Wetland Inventory Data (acres)						
							Riverine	Freshwater Emergent Wetland	Freshwater Forested/Scrub Wetland	Freshwater Pond	Lake	Other	Total
Outlet Holly River	1.28	8	0.1703	0.000	0.000	0.1703	80.55	0	1.33	3.57	159.7	0	245.14
Headwaters Holly River	0.07	0	---	---	---	---	202.31	12.5	15.61	13.98	0	0	244.14
Outlet Right Fork Holly River	0.18	0	---	---	---	---	73.48	0.77	13.17	5.93	0	0	93.35
Upper Sutton Lake – Elk River	0.50	4	0.0662	0.000	0.000	0.0662	91.19	2.3	1.85	2.26	267.84	0	365.44
Big Run Elk River	0.13	7	0.1013	0.000	0.000	0.1013	320.07	0.75	5.01	7.94	0	0	333.77
Outlet Laurel Creek	3.15	22	0.4076	0.4849	0.0907	0.9832	116.85	3.26	1.87	7.51	0	0	129.49
Headwaters Laurel Creek	2.96	5	0.2553	0.0108	0.0400	0.3061	86.41	1.01	1.57	20.81	0	0	109.8
Upper Birch River	2.96	10	0.1746	0.0188	0.000	0.1934	129.4	3.27	0.81	7.46	0	0	140.94

[1] Acres delineated within the HUC-12 Watershed.

Table 13
LULC in the HUC-12 Watersheds that Fall Within the Elk Watershed

HUC-12 Watershed	Total HUC-12 Watershed Size (Acres)	Year	Forest		Mixed Development		Pasture, Hay, Agriculture		Streams Riparian Corridor, Floodplain		Water		Wetlands		Barren Including Mine, Oil and Gas		Roads, Impervious Surface	
			Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12
Outlet Holly River	19373.9	2011	18035.1	93.1	22.9	0.1	392.5	2.0	143.4	0.7	139.7	0.7	0.0	0.0	5.3	0.0	634.9	3.3
	19373.9	2016	17861.0	92.2	25.8	0.1	387.0	2.0	323.8	1.7	139.9	0.7	0.0	0.0	3.6	0.0	632.9	3.3
	19373.9	2019	17823.2	92.0	27.6	0.1	387.0	2.0	373.6	1.9	127.9	0.7	0.0	0.0	3.6	0.0	631.2	3.3
Headwaters Holly River	34968.5	2011	32950.5	94.2	44.5	0.1	436.3	1.2	257.1	0.7	5.1	0.0	12.7	0.0	21.6	0.1	1240.7	3.5
	34968.5	2016	32593.7	93.2	46.9	0.1	435.0	1.2	612.0	1.8	5.8	0.0	12.7	0.0	21.6	0.1	1240.7	3.5
	34968.5	2019	32711.6	93.5	48.5	0.1	432.1	1.2	503.9	1.4	5.8	0.0	12.7	0.0	14.7	0.0	1239.2	3.5
Outlet Right Fork Holly River	13679.3	2011	12849.3	93.9	39.8	0.3	295.3	2.2	111.2	0.8	1.8	0.0	3.8	0.0	1.1	0.0	377.0	2.8
	13679.3	2016	12793.9	93.5	41.8	0.3	295.1	2.2	166.6	1.2	1.8	0.0	3.8	0.0	1.1	0.0	375.2	2.7
	13679.3	2019	12724.3	93.0	42.7	0.3	293.8	2.1	236.2	1.7	1.8	0.0	3.8	0.0	2.4	0.0	374.3	2.7
Upper Sutton Lake – Elk River	12053.8	2011	11067.7	91.8	13.6	0.1	69.4	0.6	385.2	3.2	307.1	2.5	0.9	0.0	1.1	0.0	208.8	1.7
	12053.8	2016	11152.7	92.5	14.5	0.1	64.3	0.5	303.8	2.5	305.6	2.5	0.9	0.0	2.0	0.0	210.2	1.7
	12053.8	2019	11147.5	92.5	14.9	0.1	64.3	0.5	314.7	2.6	299.8	2.5	0.9	0.0	2.0	0.0	209.7	1.7
Big Run Elk River	17907.9	2011	16518.4	92.2	53.4	0.3	141.2	0.8	463.5	2.6	205.9	1.1	2.7	0.0	112.8	0.6	410.1	2.3
	17907.9	2016	16494.4	92.1	59.6	0.3	139.9	0.8	564.2	3.2	201.3	1.1	1.3	0.0	42.3	0.2	405.0	2.3
	17907.9	2019	16721.0	93.4	62.3	0.3	139.9	0.8	365.4	2.0	201.3	1.1	1.3	0.0	14.5	0.1	402.3	2.2
Outlet Laurel Creek	23571.6	2011	21572.5	91.5	93.9	0.4	162.3	0.7	935.6	4.0	4.2	0.0	0.7	0.0	299.1	1.3	503.3	2.1
	23571.6	2016	20757.2	88.1	111.0	0.5	160.6	0.7	1816.7	7.7	2.0	0.0	0.7	0.0	215.5	0.9	507.9	2.2
	23571.6	2019	20763.7	88.1	113.4	0.5	159.7	0.7	1757.6	7.5	1.6	0.0	0.7	0.0	269.5	1.1	505.5	2.1
Headwaters Laurel Creek	19065.9	2011	16723.0	87.7	141.2	0.7	611.8	3.2	367.6	1.9	3.3	0.0	17.6	0.1	644.5	3.4	556.9	2.9
	19065.9	2016	16757.9	87.9	143.2	0.8	610.7	3.2	637.2	3.3	3.3	0.0	16.5	0.1	339.2	1.8	558.0	2.9
	19065.9	2019	16612.7	87.1	146.6	0.8	612.3	3.2	954.5	5.0	4.2	0.0	16.5	0.1	164.6	0.9	554.7	2.9
Upper Birch River	31002.5	2011	26958.0	87.0	87.8	0.3	649.6	2.1	1700.7	5.5	7.8	0.0	2.9	0.0	801.5	2.6	794.2	2.6
	31002.5	2016	27239.4	87.9	91.2	0.3	644.1	2.1	1583.0	5.1	8.9	0.0	2.7	0.0	634.0	2.0	799.3	2.6
	31002.5	2019	27147.1	87.6	95.0	0.3	642.9	2.1	1875.9	6.1	6.4	0.0	2.7	0.0	437.0	1.4	795.5	2.6

3.5 Gauley

The Project crosses ten 12-digit HUC watersheds in the Gauley HUC-8 watershed (**Figure 137, Appendix A**) near the center of the watershed. These include Big Laurel Creek-Gauley River (050500050303), Big Beaver Creek (050500050801), Panther Creek-Gauley River (050500050804), the Outlet Hominy Creek (050500050502), the Headwaters Hominy Creek (050500050501), Anglins Creek (050500050607), Meadow Creek-Meadow River (050500050606), Mill Creek-Meadow River (050500050605), Sewell Creek (050500050604), and Otter Creek-Meadow River (050500050602) (**Table 14**). The Gauley watershed is approximately 1,419.7 mi^2. The combined drainage of the ten listed watersheds is approximately 465.8 mi^2.

3.5.1 Big Laurel Creek-Gauley River

Project Stream Impacts. Big Laurel Creek-Gauley River is the first watershed 12-digit HUC in the Gauley watershed with stream crossings in the Project area. There are 18 stream crossings in this watershed. Two of these crossings are complete (pipeline ROW crossings). It is one of the largest 12-digit HUCs that the Project passes through in West Virginia. Seven of the proposed stream crossings are pipeline ROW crossings, while seven are timber mat crossings and two are temporary access roads. The impacts in this watershed are all temporary in nature. The total stream impacts, an estimated 851 linear feet of stream, represent approximately 0.0388% of the modeled streams in the Big Laurel Creek-Gauley River watershed (**Table 14**) (**Figure 138, Appendix A**). Approximately 96 linear feet of temporary impacts are complete.

Project Wetlands Impacts. Approximately 15.49 acres of wetland were delineated by Mountain Valley contractors in the Big Laurel Creek-Gauley River watershed. The Project includes 21 wetland crossings -three are complete. Wetland impacts include 0.6279 acres of temporary impacts and 0.1085 acre of wetland conversion impacts totaling 0.7364 acre of wetland impacts. The wetland conversion impacts will be mitigated using mitigation banking. The completed wetland crossings include 0.0224 acre of temporary impacts and 0.0107 acre of wetland conversion impacts. The NWI data indicate that there are 625.08 acres of aquatic resources in the watershed, including 18.96 acres of Freshwater Emergent Wetland and 45.25 acre of Freshwater Forested/Scrub Wetland (**Table 15**) (**Figure 139, Appendix A**). These wetlands are not located in the Project Area.

Soils. Soils data for the Big Laurel Creek-Gauley River watershed were obtained from the Nicholas County and Webster County, West Virginia soil surveys. Based on these soil surveys, the hydric soils At-Webster (57.1 acres, less than 0.2% of the watershed area), Ek (229.2 acres and less than 0.7% of the watershed area), Elkins silt loam, drained (Ed) (346.2 acres, less than 1.0% of the watershed area), and Purdy silt loam, 0 to 5 percent slopes (62.6 acres, less than 0.2% of the watershed area) may be found in the watershed (**Figure 140, Appendix A**) (Appendix B). Approximately 4.7 acres of the hydric soil Ed may also be found in the Project Area.

LULC. LULC changes in the Big Laurel Creek-Gauley River watershed between 2011, 2016 and 2019 are illustrated in **Table 16** and **Figures 141, 142 and 142a (Appendix A)**. Overall, there are approximately 36,237 acres in this watershed. The dominant LULC in this area is Forested (over

82%), followed by PHA (approximately 6.5%). The LOD is approximately 110.7 acres, which represents less than 0.3% of the entire watershed.

3.5.2 Big Beaver Creek

Project Stream Impacts. The Big Beaver Creek watershed has 21 proposed stream crossings. Ten of these are pipeline ROW crossings, while nine stream crossings are associated with timber mat crossings and two are associated with temporary road crossings. These are all temporary in nature. The total stream impacts, approximately 1,216 linear feet of stream, represent approximately 0.0589% of the modeled streams in this HUC-12 watershed (**Table 14**) (**Figure 143, Appendix A**).

Project Wetlands Impacts. Approximately 2.93 acres of wetlands were delineated by Mountain Valley contractors in the Big Beaver Creek watershed. There are 14 wetland crossings, including three completed crossings, in this watershed. Impacts include 0.2264 acre of temporary impacts and 0.1598 acre of wetland conversion impacts, for a total of 0.3862 acre of wetland impacts. The wetland conversion impacts will be mitigated using mitigation banking. The three completed crossings resulted in 0.0165 acre of temporary impacts. The NWI data indicate that there are 809.50 acre of aquatic resources in the watershed, including 102.39 acres of Freshwater Emergent Wetland and 569.46 Freshwater Forested/Scrub Wetland (**Table 15**) (**Figure 144, Appendix A**). These wetlands are not located in the Project Area.

Soils. Soils data for the Big Beaver Creek watershed were obtained from the Nicholas County and Webster County, West Virginia soil surveys. Based on these soil surveys, the hydric soils Ed (750.5 acres, less than 3.5% of the watershed area), Ek (175.7 acres, less than 1.0% of the watershed area), Elkins silt loam, ponded (Ep) (645.5 acres, less than 2.7% of the watershed), and Pu (224.1 acres, less than 1.0% of the watershed area) may be found in the watershed. (**Figure 145, Appendix A**) (**Appendix B**). Approximately 0.5 acre of the hydric soil Pu may also be present in the Project Area.

LULC. LULC changes in the Big Beaver Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 16** and **Figures 146, 147 and 147a (Appendix A)**. Overall, there are approximately 24,725 acres in this watershed. The dominant LULC in this area is Forested (over 61%), followed by Stream Riparian Corridor Floodplain (approximately 14.6%). The LOD is approximately 92.6 acres, which represents less than 0.4% of the entire watershed.

3.5.3 Panther Creek-Gauley River

Project Stream Impacts. There are eight proposed stream crossings in the Panther Creek-Gauley River watershed. There are seven pipeline ROW crossings and one timber mat crossing. The proposed stream impacts, which total approximately 604 linear feet, are temporary. The impact total represents approximately 0.0343% of the modeled streams in this HUC-12 watershed (**Table 14**) (**Figure 148, Appendix A**).

Project Wetlands Impacts. Approximately 2.04 acres of wetlands were delineated by Mountain Valley contractors in the Panther Creek-Gauley River watershed. Six wetland crossings are proposed in the Project Area. Impacts include 0.0974 acre of temporary impacts and 0.1226 acre of wetland conversion impacts, for a total of 0.220 acre of wetland impacts. The NWI data indicate that there are 688.30 acres of aquatic resources in the watershed, including 3.85 acres of Freshwater Emergent Wetland and 6.18 acres of Freshwater Forested/Scrub Wetland (**Table 15**) (**Figure 149, Appendix A**). These wetlands do not fall in the Project Area.

Soils: Soils for the Panther Creek-Gauley River watershed were obtained from the Nicholas County, West Virginia soil survey. These data indicate that the hydric soils Ed (19.9 acres, less than 0.07% of the watershed area), Elkins silt loam, ponded (Ep) (10.5 acres, less than 0.04% of the watershed area), and Pu (7.9 acres, less than 0.03% of the watershed area) may be found in the watershed (**Figure 150, Appendix A**) (**Appendix B**). These soil types are not crossed by the Project.

LULC. LULC changes in Panther Creek-Gauley River watershed between 2011, 2016 and 2019 are illustrated in **Table 16** and **Figures 151, 152 and 152a (Appendix A)**. Overall, there are approximately 30,376 acres in this watershed. The dominant LULC in this area is Forested (over 74%), followed by Stream Riparian Corridor Floodplain (approximately 13.2%). The LOD is approximately 139.5 acres, which represents less than 0.5% of the entire watershed.

3.5.4 Outlet Hominy Creek

Project Stream Impacts. The Outlet Hominy Creek watershed is another large drain, approximately 32,064 acres, in the Gauley watershed. There are 11 proposed stream crossings in the Outlet Hominy Creek watershed, all temporary in nature. Nine of the proposed stream crossings are pipeline ROW crossings. The remaining two stream crossings are one timber mat crossing and one temporary access road. The total stream impacts, an estimated 782 linear feet of stream, represent approximately 0.0344% of the modeled streams in this HUC-12 watershed (**Table 14**) (**Figure 153, Appendix A**).

Project Wetland Impacts. Approximately 0.52 acre of wetland was delineated by Mountain Valley contractors in the Outlet Hominy Creek watershed. There are four wetland crossings, one completed, in the Project Area that will temporarily impact of 0.0197 acre of wetland. The completed crossing temporarily impacted 0.0029 acre of wetland. The NWI data indicate that there are 391.75 acres of aquatic resources in the watershed, including 28.08 acres of Freshwater Emergent Wetland and 33.48 acre of Freshwater Forested/Scrub Wetland. These wetlands fall outside of the Project Area. The NWI data also indicate that the Project will impact a Freshwater Pond found in the database. However, the NWI data do not accurately reflect the location of the pond, which is approximately 130 feet from an access road and avoided by the Project (**Table 15**) (**Figure 154, Appendix A**).

Soils: The soils data for the Outlet Hominy Creek watershed were obtained from the Nicholas County, West Virginia soil survey. These data indicate that the hydric soils Ed (51.6 acres), Ep (61.9 acres), and Pu (56.5 acres) may be located in the watershed (**Table 20**) (**Figure 155,**

Appendix A) (**Appendix B**). Each of these hydric soils represent less than 0.2% of the watershed area. These soil types are not crossed by the Project.

LULC. LULC changes in Outlet Hominy Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 16** and **Figures 156, 157 and 157a (Appendix A)**. Overall, there are approximately 32,031 acres in this watershed. The dominant LULC in this area is Forested (over 78%), followed by PHA (approximately 8.9%). The LOD is approximately 86.1 acres, which represents less than 0.3% of the entire watershed.

3.5.5 Headwaters Hominy Creek

Project Stream Impacts. There are 17 stream crossings in the Headwaters Hominy Creek watershed. Two of these crossings are complete (pipeline ROW crossings). Twelve of the proposed crossings are pipeline ROW crossings, and three are timber mat crossings. The stream impacts are all temporary in nature. These total approximately 1,261 linear feet of stream, which represent less than 0.0516% of the modeled streams in this HUC-12 watershed (**Table 14**) (**Figure 158, Appendix A**). Approximately 266 linear feet of the temporary impacts are complete.

Project Wetland Impacts. Approximately 2.07 acres of wetland were delineated by Mountain Valley contractors in the Headwaters Hominy Creek watershed. There are 13 wetland crossings, three of which are complete, in this watershed. Wetland crossings will temporarily impact 0.3511 acre of wetland and will result in 0.0177 acre of permanent impacts, for a total of 0.3688 acre of wetland impacts. Permanent impacts will be mitigated using mitigation banking. The completed crossings temporarily impacted 0.0728 acre of wetland. The NWI data indicate that there are 247.06 acres of aquatic resources in the watershed, including 25.69 acre of Freshwater Emergent Wetland and 49.12 acre of Freshwater Forested/Scrub Wetland (**Table 15**) (**Figure 159, Appendix A**). These wetlands fall outside of the Project Area.

Soils: Soil data for the Headwaters Hominy Creek watershed were obtained from the Greenbrier County, and Nicholas County, West Virginia soil survey. The soil survey data indicate that three hydric soils—Holly silt loam (Ho) (17.1 acres, less than 0.05% of the watershed area), Ed soil (117.5, less than 0.4% of the watershed area), and Ep soil (36 acres, less than 0.2% of the watershed area)—may be present in the watershed (**Figure 160, Appendix A**) (**Appendix B**). Approximately 9.8 acres of Ed soil may be present in the Project area.

LULC. LULC changes in Headwaters Hominy Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 16** and **Figures 161, 162 and 162a (Appendix A)**. Overall, there are approximately 34,057 acres in this watershed. The dominant LULC in this area is Forested (over 77%), followed by Stream Riparian Corridor Floodplain (approximately 15%). The LOD is approximately 228.3 acres, which represents less than 0.7% of the entire watershed.

3.5.6 Anglins Creek

Project Stream Impacts. The Project area also crosses the Anglins Creek watershed. However, there are no stream crossings in this watershed (**Figure 163**, **Appendix A**).

Project Wetland Impacts. Approximately 0.48 acre of wetlands was delineated by Mountain Valley contractors in the Anglin Creek watershed. Four wetland crossings will result in a temporary impact to 0.1011 acre of wetlands and conversion of 0.0039 acre of wetland, for a total of 0.1050 acre of wetland impacts in this watershed. Wetland conversion impacts will be mitigated using mitigation banking. The NWI data indicate that there are 172.70 acres of aquatic resources in the watershed, including 13.53 acre of Freshwater Emergent Wetland and 38.95 acre of Freshwater Forested/Scrub Wetland (**Table 15**) (**Figure 164, Appendix A**). These fall outside of the Project Area.

Soils. Soil data for the Anglins Creek watershed were obtained from the Fayette and Raleigh, Counties, Greenbrier County, and Nicholas County, West Virginia soil survey. The soil survey data indicate that there are no hydric soils and no partially hydric soils in the watershed (**Figure 165, Appendix A**) (**Appendix B**).

LULC. LULC changes in Anglins Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 16** and **Figures 166, 167 and 167a (Appendix A)**. Overall, there are approximately 21,111 acres in this watershed. The dominant LULC in this area is Forested (over 85%), followed by Stream Riparian Corridor Floodplain (approximately 8.7%). The LOD is approximately 41.5 acres, which represents less than 0.2% of the entire watershed.

3.5.7 Meadow Creek-Meadow River

Project Stream Impacts. There are six crossings in the Meadow Creek-Meadow River watershed, three timber mat crossings and three pipeline ROW crossings. One of the pipeline ROW crossings is complete. The stream impacts in this watershed, approximately 315 linear feet, represent approximately 0.0127% of the modeled streams in this HUC-12 watershed and are temporary in nature (**Table 14**) (**Figure 168, Appendix A**). Approximately 96 linear feet of the temporary impacts are complete.

Project Wetland Impacts. Approximately 6.69 acres of wetland were delineated by Mountain Valley contractors in the Meadow Creek-Meadow River watershed. Seven wetland crossings are proposed in this watershed. These crossings will result in 0.0951 acre of temporary impacts and 0.0744 acre of wetland conversion impacts for a total of 0.1695 acre of wetland impacts. The wetland conversion impacts will be mitigated using mitigation banking. The NWI data indicate that there are 605.37 acres of aquatic resources in the watershed, including 49.84 acres of Freshwater Emergent Wetland, 116.48 acres of Freshwater Forested/Scrub Wetland and 92.37 acres of Freshwater Pond (**Table 15**) (**Figure 169, Appendix A**). All of the potential impacts that were generated when evaluating the NWI data are associated with access roads. There are several areas where a NWI wetland falls adjacent to and sometimes overlaps access roads. In these instances, the roads are pre-existing, and there are no wetland impacts. In three of these locations,

there are Project wetland impacts associated with access road crossings; however, these impacts are upgradient, outside of the NWI. The Freshwater Pond impacts were avoided. Based on these observations, none of the NWI wetlands, as well as other aquatic resources identified in the NWI data, actually fall within the Project Area.

Soils. Soil data for the Meadow Creek-Meadow River watershed were obtained from the Fayette and Raleigh, Counties, Greenbrier County, and Nicholas County, West Virginia soil survey. The soil survey data indicate that there are no hydric soils present in the watershed; however, the data indicate the partially hydric soil Atkins-Philo-Potomac complex (An) (45.4 acres, less than 0.2% of the watershed area may be located in the watershed. Approximately 2.9 acres of the partially hydric soil An may be present in the Project Area (**Figure 170, Appendix A**) (**Appendix B**).

LULC. LULC changes in Meadow Creek-Meadow River watershed between 2011, 2016 and 2019 are illustrated in **Table 16** and **Figures 171, 172 and 172a (Appendix A)**. Overall, there are approximately 32,563 acres in this watershed. The dominant LULC in this area is Forested (over 83%), followed by Stream Riparian Corridor Floodplain (approximately 12.4%). The LOD is approximately 139 acres, which represents less than 0.4% of the entire watershed.

3.5.8 Mill Creek-Meadow River

Project Stream Impacts. The Mill Creek-Meadow River watershed may also be referred to as the Big Clear Creek-Meadow River watershed. There are three stream pipeline ROW crossings in this watershed, each with temporary impacts only. Two of the stream pipeline ROW crossings are complete. The total stream impacts, an estimated 496 linear feet of stream, represent approximately 0.0230% of the modeled streams in this HUC-12 watershed (**Table 14**) (**Figure 173, Appendix A**). The completed crossings total approximately 330 linear feet of temporary stream impacts.

Project Wetland Impacts. Approximately 2.09 acres of wetland were delineated by Mountain Valley contractors in the Mill Creek-Meadow River watershed. Five wetland crossings are proposed in this watershed, which will temporarily impact 0.3104 acre of wetland and permanently impact 0.0370 acre of wetlands. Permanent impacts will be mitigated using mitigation banking. The NWI data indicate that there are 979.05 acres of aquatic resources in the watershed, including 91.83 acres of Freshwater Emergent Wetland and 662.42 acre of Freshwater Forested/Scrub Wetland (**Table 15**) (**Figure 174, Appendix A**). None of these wetlands fall within the Project Area.

Soils. Soil data for the Mill Creek-Meadow River watershed were obtained from the Greenbrier County, West Virginia soil survey. The data indicate that the hydric soil Purdy silt loam, 0 to 3 percent slopes (PuA) (24.2 acres, less than 0.1% of the watershed area) as well as the partially hydric soils An (181.5 acres, less than 0.8% of the watershed area) and Melvin-Lindside complex (MI) (1,160.5 acres, approximately 4.8% of the watershed area) are present in the watershed. These soils are not crossed by the Project (**Figure 175, Appendix A**) (**Appendix B**).

LULC. LULC changes in Mill Creek-Meadow River watershed between 2011, 2016 and 2019 are illustrated in **Table 16** and **Figures 176, 177 and 177a (Appendix A)**. Overall, there are approximately 25,404 acres in this watershed. The dominant LULC in this area is Forested (over 78%), followed by Stream Riparian Corridor Floodplain (approximately 11.9%). The LOD is approximately 58.4 acres, which represents less than 0.2% of the entire watershed.

3.5.9 Sewell Creek

Project Stream Impacts. There are 17 stream crossings in the Sewell Creek watershed. This includes three proposed permanent access roads, three proposed timber mat crossings, and eight proposed pipeline ROW crossings. There are an additional three pipeline ROW crossings that are complete. The total temporary (890 linear feet) and permanent (84 linear feet) stream impacts, an estimated 974 linear feet of stream, represent approximately 0.0458% of the modeled streams in this HUC-12 watershed (**Table 14**) (**Figure 178, Appendix A**). The completed crossings total approximately 187 linear feet of temporary stream impacts.

Project Wetland Impacts. Approximately 12.04 acres of wetland were delineated by Mountain Valley contractors in the Sewell Creek watershed. Eight wetland crossings are proposed that will temporarily impact 0.2442 acre and permanently impact 0.0633 acre of wetlands for a total of 0.3075 acre of wetlands impacts. The permanent wetland impacts will be mitigated using mitigation banking. The NWI data indicate that there are 449.62 acres of aquatic resources in the watershed, including 53.38 acre of Freshwater Emergent Wetland and 222.56 acre of Freshwater Forested/Scrub Wetland (**Table 15**) (**Figure 179, Appendix A**). The NWI data indicate that the Project will impact NWI Freshwater Emergent Wetland (0.0523 acre) and Freshwater Forested/Scrub Wetland (0.0846 acre). The Freshwater Forested/Scrub Wetland impacts are associated with an access road. The wetland lies adjacent to the road and was avoided by the Project. The Freshwater Emergent Wetland impacts are also associated with an access road. The area was delineated, and the Project will permanently impact 0.0633 acre of Freshwater Emergent Wetland at this location (W-IJ47-PEM).

Soils. Soil data for the Sewell Creek watershed were obtained from the Fayette and Raleigh, Counties, Greenbrier County, and Mercer and Summers Counties, West Virginia. The soil survey data indicate that there are two hydric soils, Atkins loam, warm 0 to 3 percent slopes, frequently flooded (AtA) (36.4 acres, less than 0.2% of the watershed area) and Knowlton silt loam, 0 to 3 percent slopes, rarely flooded (KwA) (27.1 acres, less than 0.1% of the watershed area) are present in the Sewell Creek watershed. The partially hydric soil An (358.7 acres, less than 1.4% of the watershed area) may also be present in the watershed. These soils are not crossed by the Project (**Figure 180, Appendix A**) (**Appendix B**).

LULC. LULC changes in Sewell Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 16** and **Figures 181, 182 and 182a (Appendix A)**. Overall, there are approximately 25,910 acres in this watershed. The dominant LULC in this area is Forested (over 76%), followed by Stream Riparian Corridor Floodplain (approximately 10.5%). The LOD is approximately 145 acres, which represents less than 0.6% of the entire watershed.

3.5.10 Otter Creek-Meadow River

Project Stream Impacts. The Otter Creek-Meadow River watershed is the last drain with stream crossings in the Gauley River watershed. There are 19 stream crossings in this watershed. The permanent stream impacts in this watershed are associated with two Stallworth Compressor Station impacts and two permanent access roads. Temporary stream impacts are associated with ten pipeline ROW crossings, one access road, two temporary work spaces, and two Stallworth Compressor Station crossings. The impacts associated with the Stallworth Compressor Station are complete. The total temporary (1,161 linear feet) and permanent (421 linear feet) stream impacts, an estimated 1,582 linear feet of stream, represent approximately 0.0533% of the modeled streams in this HUC-12 watershed (**Table 14**) (**Figure 183, Appendix A**). The completed crossings total approximately 169 linear feet of temporary stream impacts and 362 linear feet of permanent stream impacts.

Project Wetlands Impacts. Approximately 59.97 acres of wetlands were delineated by Mountain Valley contractors in the Otter Creek-Meadow River watershed. There are 14 wetland crossings, including two completed crossings, located in this watershed. The wetland crossings will result in 1.3753 acres of temporary wetland impacts, 0.0885 acre of conversion wetland impacts, and 0.0621 acre of permanent impacts for a total of 1.529 acres of wetland impacts. The conversion and permanent wetland impacts will be mitigated using mitigation banking. The two completed wetland crossings resulted in 0.0071 acre of permanent impacts. The NWI data indicate that there are 5,615.68 acres of aquatic resources in the watershed, including 1,536.22 acres of Freshwater Emergent Wetland and 2,956.02 acres of Freshwater Forested/Scrub Wetland, and 74.59 acres of Freshwater Pond. The NWI data also indicate that the Project will impact 0.7999 acre of Freshwater Emergent Wetland, 0.3983 acre of Freshwater Forested/Scrub Wetland, and 0.2949 acre of other aquatic resources. One of the Freshwater Forested/Scrub wetlands is located in the Project Area's LOD in a pasture. This area was delineated by Mountain Valley's contractor, and it was determined not to be a forested or scrub-shrub wetland or other wetland type. The other NWI wetland areas were also part of the Project's delineation efforts. Only one area identified as wetland in the NWI data was field identified as wetland. The associated wetland crossing is W-K9-PEM-1, which temporarily impacts 0.0354 acre of emergent wetland (**Table 15**) (**Figure 184, Appendix A**).

Soils. Soils data for the Otter Creek-Meadow River watershed were obtained from the Fayette and Raleigh Counties, Greenbrier County, and Mercer and Summers Counties, West Virginia. The soil data indicate that the hydric soils At (16.5 acres, less than 0.04% of the watershed area) and PuA (4.3 acres, less than 0.01% of the watershed area), as well as the partially hydric soils Melvin-Lindside complex (Md) (17.7 acre, less than 0.06% of the watershed area), MI (653.6 acres, less than 1.8% of the watershed area), and Melvin-Lindside complex, 0 to 3 percent slopes, frequently flooded (MIA) (36.1 acres, less than 0.2% of the watershed area) are located in the watershed (**Figure 185, Appendix A**) (**Appendix B**). Approximately 10.8 acres of the partially hydric soil MI and approximately 8.6 acres of the partially hydric soil MIA may be present in the Project Area.

LULC. LULC changes in Otter Creek-Meadow River watershed between 2011, 2016 and 2019 are illustrated in **Table 16** and **Figures 186, 187 and 187a (Appendix A)**. Overall, there are approximately 35,682 acres in this watershed. The dominant LULC in this area is Forested (over 55%), followed by PHA (approximately 20.4%). The LOD is approximately 149 acres, which represents less than 0.4% of the entire watershed.

Table 14
Cumulative Project Stream Impacts in the HUC-12 Watersheds that Fall Within the Gauley Watershed

HUC-12 Watershed	Total Number of Stream Crossings	Proposed Impacts in Application (feet)		Total Project-Related Impacts (feet)		Estimated Linear Feet of Streams in Watershed	Project-Related Cumulative Impacts (feet)	Percentage of Impacted Linear Stream Feet Estimated in the Watershed
		Perm	Temp	Perm	Temp			
Big Laurel Creek – Gauley River	18	0	755	0	851	2,550,891	851	0.0338%
Big Beaver Creek	21	0	1,216	0	1,216	2,064,382	1,216	0.0589%
Panther Creek – Gauley River	8	0	604	0	604	1,758,427	604	0.0343%
Outlet Hominy Creek	11	0	782	0	782	2,272,489	782	0.0344%
Headwaters Hominy Creek	17	0	995	0	1261	2,445,086	1,261	0.0516%
Anglins Creek	0	0	0	0	0	1,365,792	0	0.0000%
Meadow Creek – Meadow River	6	0	219	0	315	2,483,496	315	0.0127%
Mill Creek – Meadow River	3	0	166	0	496	2,160,428	496	0.0230%
Sewell Creek	17	84	703	84	890	2,127,081	974	0.0458%
Otter Creek – Meadow River	19	59	992	421	1,161	2,968,000	1,582	0.0533%

Table 15
Cumulative Project-Related Wetland Impacts and National Wetland Inventory Data in the HUC-12 Watersheds that Fall Within the Gauley Watershed

HUC-12 Watershed	Delineated Acres[1]	Total Number of Wetland Crossings	Temporary Impacts (acres)	Permanent Conversion Impacts (Acres)	Permanent Fill Impacts (acres)	Total Wetland Impacts	National Wetland Inventory Data (acres)						
							Riverine	Freshwater Emergent Wetland	Freshwater Forested/Scrub	Freshwater Pond	Lake	Other	Total
Big Laurel Creek-Gauley River	15.49	21	0.6279	0.1085	0	0.7364	461.84	18.96	45.25	33.19	65.84	0	625.08
Big Beaver Creek	2.93	14	0.2264	0.1598	0	0.3862	65.1	102.39	569.46	72.55	0	0	809.50
Panther Creek-Gauley River	2.04	6	0.0974	0.1226	0	0.220	545.54	3.85	6.18	33.81	98.92	0	688.30
Outlet Hominy Creek	0.52	4	0.0197	0	0	0.0197	206.32	28.08	33.48	48.33	75.37	0	391.57
Headwaters Hominy Creek	2.07	13	0.3511	0	0.0177	0.3688	126.36	25.69	49.12	45.89	0	0	247.06
Anglins Creek	0.48	4	0.1011	0.0039	0	0.1050	101.42	13.53	38.95	18.8	0	0	172.70
Meadow Creek-Meadow River	6.69	7	0.0951	0.0744	0	0.1695	345.93	49.84	116.48	92.37	0	0.75	605.37
Mill Creek-Meadow River	2.09	5	0.3104	0	0.0370	0.3474	162.28	91.83	662.42	62.51	0	0	979.05
Sewell Creek	12.04	8	0.2442	0	0.0633	0.3075	115.47	53.38	222.56	56.05	0	2.17	449.62
Otter Creek-Meadow River	59.97	14	1.3753	0.0885	0.0621	1.5259	223.52	1536.22	2956.02	74.59	28.79	796.55	5615.68

[1] Acres delineated within the HUC-12 Watershed.

Table 16
LULC in the HUC-12 Watersheds that Fall Within the Gauley Watershed

HUC-12 Watershed	Total HUC-12 Watershed Size (Acres)	Year	Forest		Mixed Development		Pasture, Hay, Agriculture		Streams Riparian Corridor, Floodplain		Water		Wetlands		Barren Including Mine, Oil and Gas		Roads, Impervious Surface	
			Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12
Big Laurel Creek-Gauley River	36237.7	2011	30582.6	84.4	621.1	1.7	2386.5	6.6	360.3	1.0	356.3	1.0	74.9	0.2	186.1	0.5	1669.7	4.6
	36237.7	2016	30003.3	82.8	643.4	1.8	2356.9	6.5	935.4	2.6	362.5	1.0	78.1	0.2	125.2	0.3	1732.9	4.8
	36237.7	2019	29985.1	82.7	654.3	1.8	2370.3	6.5	968.3	2.7	360.9	1.0	78.1	0.2	98.7	0.3	1722.0	4.8
Big Beaver Creek	24725.0	2011	14844.4	60.0	344.9	1.4	3088.0	12.5	2474.4	10.0	30.5	0.1	740.6	3.0	2132.8	8.6	1069.5	4.3
	24725.0	2016	15254.7	61.7	361.2	1.5	3071.3	12.4	2335.6	9.4	31.1	0.1	759.3	3.1	1802.1	7.3	1109.8	4.5
	24725.0	2019	15153.1	61.3	371.6	1.5	3076.4	12.4	3611.9	14.6	9.6	0.0	751.7	3.0	651.4	2.6	1099.3	4.4
Panther Creek-Gauley River	30376.5	2011	23234.3	76.5	230.8	0.8	1677.3	5.5	3315.7	10.9	463.7	1.5	13.6	0.0	290.9	1.0	1150.2	3.8
	30376.5	2016	21139.5	69.6	240.6	0.8	1677.3	5.5	5423.8	17.9	460.6	1.5	12.2	0.0	245.3	0.8	1177.1	3.9
	30376.5	2019	22714.3	74.8	245.7	0.8	1681.1	5.5	4010.4	13.2	472.6	1.6	13.6	0.0	66.7	0.2	1172.0	3.9
Outlet Hominy Creek	32031.5	2011	25070.6	78.3	349.6	1.1	2877.3	9.0	1941.5	6.1	63.8	0.2	88.7	0.3	294.9	0.9	1345.0	4.2
	32031.5	2016	24683.4	77.1	366.7	1.1	2846.9	8.9	2269.5	7.1	74.3	0.2	84.3	0.3	292.4	0.9	1414.0	4.4
	32031.5	2019	25268.1	78.9	376.5	1.2	2846.0	8.9	1928.8	6.0	74.3	0.2	72.9	0.2	60.7	0.2	1404.2	4.4
Headwaters Hominy Creek	34057.3	2011	26875.1	78.9	318.5	0.9	1092.8	3.2	4563.8	13.4	7.6	0.0	87.2	0.3	192.4	0.6	920.0	2.7
	34057.3	2016	24448.5	71.8	330.5	1.0	1083.7	3.2	6988.5	20.5	3.8	0.0	79.8	0.2	179.9	0.5	942.5	2.8
	34057.3	2019	26407.2	77.5	338.7	1.0	1080.8	3.2	5112.0	15.0	3.8	0.0	79.8	0.2	100.7	0.3	934.3	2.7
Anglins Creek	21111.9	2011	17776.2	84.2	176.4	0.8	601.4	2.8	1821.4	8.6	0.7	0.0	41.8	0.2	220.8	1.0	473.3	2.2
	21111.9	2016	17278.3	81.8	179.7	0.9	602.5	2.9	2288.4	10.8	0.2	0.0	40.3	0.2	233.3	1.1	489.3	2.3
	21111.9	2019	17941.7	85.0	181.9	0.9	600.0	2.8	1831.6	8.7	0.2	0.0	38.3	0.2	31.1	0.1	487.0	2.3
Meadow Creek-Meadow River	32563.5	2011	27124.6	83.3	355.2	1.1	131.0	0.4	3608.6	11.1	147.0	0.5	129.7	0.4	481.7	1.5	585.8	1.8
	32563.5	2016	26350.7	80.9	358.5	1.1	123.2	0.4	4404.5	13.5	147.4	0.5	96.3	0.3	486.6	1.5	596.2	1.8
	32563.5	2019	27091.7	83.2	361.4	1.1	123.0	0.4	4044.9	12.4	147.4	0.5	91.0	0.3	110.8	0.3	593.3	1.8

HUC-12 Watershed	Total HUC-12 Watershed Size (Acres)	Year	Forest		Mixed Development		Pasture, Hay, Agriculture		Streams Riparian Corridor, Floodplain		Water		Wetlands		Barren Including Mine, Oil and Gas		Roads, Impervious Surface	
			Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12
Mill Creek-Meadow River	25404.8	2011	20222.1	79.6	708.3	2.8	363.8	1.4	2511.9	9.9	28.0	0.1	592.0	2.3	366.1	1.4	612.5	2.4
	25404.8	2016	19217.8	75.6	710.1	2.8	357.6	1.4	3494.0	13.8	29.4	0.1	600.5	2.4	332.9	1.3	662.5	2.6
	25404.8	2019	19903.4	78.3	723.9	2.8	353.4	1.4	3029.7	11.9	29.4	0.1	594.9	2.3	114.5	0.5	655.6	2.6
Sewell Creek	25910.1	2011	21044.8	81.2	845.5	3.3	1066.8	4.1	1262.5	4.9	2.4	0.0	368.7	1.4	382.1	1.5	937.2	3.6
	25910.1	2016	19855.6	76.6	850.0	3.3	1061.0	4.1	2462.4	9.5	2.9	0.0	352.9	1.4	385.6	1.5	939.6	3.6
	25910.1	2019	19862.3	76.7	854.0	3.3	1061.3	4.1	2716.3	10.5	2.9	0.0	352.9	1.4	124.8	0.5	935.6	3.6
Otter Creek-Meadow River	35682.8	2011	20606.0	57.7	1083.3	3.0	7278.3	20.4	465.9	1.3	19.8	0.1	4859.5	13.6	178.4	0.5	1191.6	3.3
	35682.8	2016	20024.7	56.1	1099.7	3.1	7243.4	20.3	1047.9	2.9	32.5	0.1	4828.6	13.5	193.5	0.5	1212.5	3.4
	35682.8	2019	19823.2	55.6	1142.0	3.2	7269.4	20.4	1254.1	3.5	32.5	0.1	4815.3	13.5	138.3	0.4	1208.0	3.4

3.6 Lower New

The Project crosses one 12-digit HUC watershed in the Lower New HUC-8 watershed (**Figure 188, Appendix A**), Lick Creek (050500040203) (**Table 17**). The Lower New watershed is approximately 690.9 mi^2. The drainage of the Lick Creek watershed is approximately 39.2 mi^2 or less than 10% of the HUC-8 watershed.

3.6.1 Lick Creek

Project Stream Impacts. The Lick Creek watershed is located on the eastern edge of the Lower New watershed. The Project Area includes 18 stream crossings in the watershed. Five of these crossings, pipeline ROW crossings, are complete. The proposed permanent stream impacts include two permanent access roads. Proposed temporary stream impacts are associated with five pipeline ROW crossings, five timber mat crossings, and one temporary access road. The total temporary (1,084 linear feet) and permanent (64 linear feet) impacts, an estimated 1,148 linear feet of stream, represent approximately 0.0540% of the modeled streams in this HUC-12 watershed (**Table 17**) (**Figure 189, Appendix A**). The completed crossings total approximately 433 linear feet of temporary stream impacts.

Project Wetland Impacts. Approximately 1.02 acres of wetland were delineated by Mountain Valley contractors in the Lick Creek watershed. The Project has two proposed wetland crossings in this watershed that will temporarily impact 0.1517 acre of wetland. The NWI data indicate that there are 90.53 acres of aquatic resources in the watershed, including 4.82 acres of Freshwater Emergent Wetland, 1.18 acre of Freshwater Forested/Scrub Wetland, and 10.46 acres of Freshwater Pond. These wetlands fall outside of the Project Area (**Table 18**) (**Figure 190, Appendix A**).

Soils. Soils data for Meadow Creek watershed are from the Greenbrier County, Mercer and Summers Counties, and New River Gorge National River, West Virginia soil surveys. The soil surveys indicate that there are no hydric or partially hydric soils in the watershed (**Figure 191, Appendix A**) (**Appendix B**).

LULC. LULC changes in Lick Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 19** and **Figures 192, 193 and 193a (Appendix A)**. Overall, there are approximately 25,087 acres in this watershed. The dominant LULC in this area is Forested (over 87%), followed by PHA (approximately 4.2%). The LOD is approximately 114.2 acres, which represents less than 0.5% of the entire watershed.

Table 17

Cumulative Project Stream Impacts in the HUC-12 Watersheds that Fall Within the Lower New Watershed

HUC-12 Watershed	Total Number of Stream Crossings	Proposed Impacts in Application (feet)		Total Project-Related Impacts (feet)		Estimated Linear Feet of Streams in Watershed	Project-Related Cumulative Impacts (feet)	Percentage of Impacted Linear Stream Feet Estimated in the Watershed
		Perm	Temp	Perm	Temp			
Lick Creek	18	64	651	64	1,084	2,125,309	1,148	0.0540%

Table 18

Cumulative Project-Related Wetland Impacts and National Wetland Inventory Data in the HUC-12 Watersheds that Fall Within the Lower New Watershed

HUC-12 Watershed	Delineated Acres[1]	Total Number of Wetland Crossings	Temporary Impacts (acres)	Permanent Conversion Impacts (Acres)	Permanent Fill Impacts (acres)	Total Wetland Impacts	National Wetland Inventory Data (acres)						
							Riverine	Freshwater Emergent Wetland	Freshwater Forested/Scrub	Freshwater Pond	Lake	Other	Total
Lick Creek	1.02	2	0.1517	0	0	0.1517	74.08	4.82	1.18	10.46	0	0	90.53

[1] Acres delineated within the HUC-12 Watershed.

Table 19
LULC in the HUC-12 Watersheds that Fall Within the Lower New Watershed

HUC-12 Watershed	Total HUC-12 Watershed Size (Acres)	Year	Forest		Mixed Development		Pasture, Hay, Agriculture		Streams Riparian Corridor, Floodplain		Water		Wetlands		Barren Including Mine, Oil and Gas		Roads, Impervious Surface	
			Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12
Lick Creek	25087.0	2011	22127.6	88.2	659.2	2.6	1067.1	4.3	407.9	1.6	0.7	0.0	11.8	0.0	144.6	0.6	668.3	2.7
	25087.0	2016	21870.3	87.2	662.3	2.6	1057.3	4.2	671.4	2.7	0.9	0.0	9.1	0.0	145.9	0.6	669.9	2.7
	25087.0	2019	21856.1	87.1	664.5	2.6	1056.6	4.2	791.1	3.2	0.7	0.0	9.1	0.0	41.4	0.2	667.6	2.7

3.7 Greenbrier

The Project crosses two 12-digit HUC watersheds in the Greenbrier HUC-8 watershed (**Figure 194, Appendix A**), Hungard Creek-Greenbrier River (050500030906) and Stony Creek-Greenbrier River (050500030907) (**Table 20**). The Greenbrier watershed is approximately 1,678.5 mi^2. The combined drainage of the two listed watersheds is approximately 51.2 mi^2 or less than 10% of the HUC-8 watershed.

3.7.1 Hungard Creek-Greenbrier River

Project Stream Impacts. The Project Area includes 28 stream crossings in the Hungard Creek-Greenbrier River watershed. This includes four completed pipeline ROW crossings. This watershed includes two proposed access roads that have permanent impacts. The remaining proposed stream crossing impacts—nine pipeline ROW crossings, 10 timber mat crossings, and three temporary access roads—are temporary in nature. The total temporary (1,435 linear feet) and permanent (53 linear feet) impacts, an estimated 1,488 linear feet of stream, represent approximately 0.0853% of the modeled streams in this HUC-12 watershed (**Table 20**) (**Figure 195, Appendix A**). The completed crossings total approximately 387 linear feet of temporary stream impacts.

Project Wetlands Impacts. Approximately 11.53 acres of wetland were delineated by Mountain Valley contractors in the Hungard Creek-Greenbrier River watershed. There are six wetland crossings, including one completed crossing, in the watershed. The Project will temporarily impact 0.1376 acre of wetland and will result in 0.299 acre of wetland conversion impacts, for a total of 0.4366 acre of impacts. The wetland conversion impacts will be mitigated using mitigation banking. The completed crossing temporarily impacted 0.0191 acre of wetland. The NWI data indicate that there are 344.48 acres of aquatic resources in the watershed, including 33.9 acres of Freshwater Emergent Wetland and 25.83 acres of Freshwater Forested/Scrub Wetland (**Table 21**) (**Figure 196, Appendix A**). The NWI data also indicate that the Project will impact 2.1683 acre of Freshwater Forested/Scrub Wetland and 0.0007 acre of Freshwater Pond. The Freshwater Forested/Scrub Wetland is located adjacent to the Greenbrier River. Impacts associated with this location were part of the Project's delineation efforts. A large wetland was identified and avoided to the extent practicable but will result in conversion impacts. The associated wetland crossing is identified as W-MM20-PFO, which will result in conversion impacts to 0.2990 acre of forested wetland. These impacts will be mitigated using mitigation banking. The Freshwater Pond was also included in the Project's delineation and was avoided.

Soils. The soil data from the Hungard Creek-Greenbrier River watershed are from the Mercer and Summers Counties, and Monroe County, West Virginia. The hydric soils At (10.9 acres, less than 0.05% of the watershed area) and Me (90.5 acres, less than 0.5% of the watershed) and the partially hydric soil Udifluvents-Fluvaquents complex (Uf) (95.5 acres, less than 0.5% of the watershed) may be present in the watershed (**Figure 197, Appendix A**) (**Appendix B)**. These soil types are not crossed by the Project.

LULC. LULC changes in Hungard Creek-Greenbrier watershed between 2011, 2016 and 2019 are illustrated in **Table 22** and **Figures 198, 199 and 199a (Appendix A)**. Overall, there are approximately 22,038 acres in this watershed. The dominant LULC in this area is Forested (over 75%), followed by PHA (approximately 15.1%). The LOD is approximately 248 acres, which represents less than 1.1% of the entire watershed.

3.7.2 Stony Creek-Greenbrier River

Project Stream Impacts. There are five stream crossings in the Stony Creek-Greenbrier River watershed: two timber mat crossings and three pipeline ROW crossings. One of the pipeline ROW crossings is complete. These impacts are all temporary in nature. The total impacts, an estimated 274 linear feet of stream, represent approximately 0.0349% of the modeled streams in this HUC-12 watershed (**Table 20**) (**Figure 200, Appendix A**). The completed crossing totals approximately 76 linear feet of temporary stream impacts.

Project Wetland Impacts. Approximately 3.96 acres of wetland were delineated by Mountain Valley contractors in the Stony Creek-Greenbrier River watershed. There is one proposed wetland crossing in this watershed that will temporarily impact 0.1359 acre of wetland. The NWI data indicate that there are 261.4 acre of aquatic resources in the watershed, including 22.89 acres of Freshwater Emergent Wetland and 8.79 acres of Freshwater Forested/Scrub Wetland (**Table 21**) (**Figure 201, Appendix A**). None of these wetlands fall within the Project Area.

Soils. The soil data from the Stony Creek-Greenbrier River watershed are from the Mercer and Summers Counties, and Monroe County, West Virginia. The hydric soil At (3.0 acres, less than 0.03% of the watershed area), Atkins silt loam, warm, 0 to 3 percent slopes, frequently flooded (At-Monroe) (72.5 acres, less than 0.7% of the watershed area), and the partially hydric soil Uf (167.1 acres, less than 1.6% of the watershed area) may be present in the watershed. Approximately 1.0 acres of the hydric soil At and approximately 0.3 acre of the hydric soil Uf will be crossed by the Project (**Figure 202, Appendix A**) (**Appendix B).**

LULC. LULC changes in Stony Creek-Greenbrier watershed between 2011, 2016 and 2019 are illustrated in **Table 22** and **Figures 203, 203a and 203b (Appendix A)**. Overall, there are approximately 10,775 acres in this watershed. The dominant LULC in this area is Forested (over 60%), followed by PHA (approximately 26.2%). The LOD is approximately 75.9 acres, which represents less than 0.7% of the entire watershed.

Table 20
Cumulative Project Stream Impacts in the HUC-12 Watersheds that Fall Within the Greenbrier Watershed

HUC-12 Watershed	Total Number of Stream Crossings	Proposed Impacts in Application (feet)		Total Project-Related Impacts (feet)		Estimated Linear Feet of Streams in Watershed	Project-Related Cumulative Impacts (feet)	Percentage of Impacted Linear Stream Feet Estimated in the Watershed
		Perm	Temp	Perm	Temp			
Hungard Creek – Greenbrier River	28	53	1,048	53	1,435	1,744,033	1,488	0.0853%
Stony Creek – Greenbrier River	5	0	198	0	274	786,091	274	0.0349%

Table 21
Cumulative Project-Related Wetland Impacts and National Wetland Inventory Data in the HUC-12 Watersheds that Fall Within the Greenbrier Watershed

HUC-12 Watershed	Delineated Acres[1]	Total Number of Wetland Crossings	Temporary Impacts (acres)	Permanent Conversion Impacts (Acres)	Permanent Fill Impacts (acres)	Total Wetland Impacts	National Wetland Inventory Data (acres)						
							Riverine	Freshwater Emergent Wetland	Freshwater Forested/Scrub Wetland	Freshwater Pond	Lake	Other	Total
Hungard Creek-Greenbrier River	11.53	6	0.1376	0.299	0	0.4366	261.75	33.9	25.83	23	0	0	344.48
Stony Creek-Greenbrier River	3.96	1	0.1359	0	0	0.1359	208.58	22.89	8.79	21.14	0	0	261.4

[1] Acres delineated within the HUC-12 Watershed.

Table 22
LULC in the HUC-12 Watersheds that Fall Within the Greenbrier Watershed

HUC-12 Watershed	Total HUC-12 Watershed Size (Acres)	Year	Forest		Mixed Development		Pasture, Hay, Agriculture		Streams Riparian Corridor, Floodplain		Water		Wetlands		Barren Including Mine, Oil and Gas		Roads, Impervious Surface	
			Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12
Hungard Creek-Greenbrier River	22,038	2011	16,661	75.6	415	1.9	3,340	15.2	524	2.4	184	0.8	29	0.1	58	0.3	827	3.8
	22,038	2016	16,529	75.0	422	1.9	3,329	15.1	653	3.0	184	0.8	22	0.1	62	0.3	837	3.8
	22,038	2019	16,562	75.2	429	1.9	3,337	15.1	635	2.9	184	0.8	22	0.1	39	0.2	830	3.8
Stony Creek WV – Greenbrier River	10,775	2011	6,558	60.9	299	2.8	2,822	26.2	383	3.5	189	1.8	11	0.1	2	0.0	513	4.8
	10,775	2016	6,524	60.5	305	2.8	2,802	26.0	433	4.0	191	1.8	10	0.1	2	0.0	509	4.7
	10,775	2019	6,484	60.2	307	2.8	2,819	26.2	451	4.2	191	1.8	10	0.1	7	0.1	506	4.7

3.8 Upper/Middle New

The Project crosses six 12-digit HUC watersheds in the Upper/Middle New HUC-8 watershed (**Figure 204, Appendix A**). These include Middle Indian Creek (050500020704), Rich Creek (050500020601), Stony Creek (050500020305), Little Stony Creek-New River (050500020304), Lower Sinking Creek (050500020303), and Upper Sinking Creek (050500020302) (**Table 24**). The Middle/Upper New watershed is approximately 1,687.8 mi^2. The combined drainage of the six listed watersheds is approximately 282.2 mi^2.

3.8.1 Middle Indian Creek

Project Stream Impacts. There are 28 stream crossings in the Middle Indian Creek watershed. Two of these crossings, pipeline ROW crossings, are complete. The proposed stream crossings include four permanent access roads with permanent impacts and temporary impacts associated with 16 pipeline ROW crossings, four timber mat crossings and two temporary access road crossings. The total stream impacts, temporary (1,346 linear feet) and permanent (109 linear feet) impacts, total an estimated 1,455 linear feet of stream, represent less than 0.0529% of the modeled streams in this HUC 12 watershed (**Table 23**) (**Figure 205, Appendix A**). The completed crossing totals approximately 152 linear feet of temporary stream impacts.

Project Wetlands Impacts. Approximately 14.64 acres of wetland were delineated by Mountain Valley contractors in the Middle Indian Creek watershed. Eleven wetland crossings are proposed that will result in 0.5132 acre of temporary wetland impacts, 0.2020 acre of wetland conversion impacts, and 0.0288 acres of permanent wetland impacts for a total of 0.7380 acre of wetland impacts. The NWI data indicate that there are 547.83 acres of aquatic resources in the watershed, including 37.38 acres of Freshwater Emergent Wetland and 25.35 acres of Freshwater Forested/Scrub Wetland. The NWI data also indicate that the Project will impact 0.1201 acre of Freshwater Emergent Wetland and 0.0525 acre of Freshwater Pond. Mountain Valley has completed wetland delineations in this area and no wetlands were identified in the areas where the NWI wetlands are located within the Project Area. The Freshwater Pond is no longer present and would have been avoided (**Table 24**) (**Figure 206, Appendix A**).

Soils. The soil data for the Middle Indian Creek watershed are from the Jefferson National Forest, Virginia and the Monroe County, West Virginia soil surveys. The hydric soils At-Monroe) (468.3 acres, less than 1.4% of the watershed area), Dunning silty clay loam, karst (Dz) (25.8 acres, less than 0.08% of the watershed area), Mauretown silt loam, 0 to 3 percent slopes (MaA) (61.4 acres, less than 0.2% of the watershed area), and Me (959.3 acres, less than 3.0% of the watershed area) and the partially hydric soils Uf (364.2 acres, less than 1.1% of the watershed area) may be located in the watershed. Approximately 6.7 acres of the hydric soil Me and approximately 5.6 acres of the hydric soil Uf may be present in the Project Area (**Figure 207, Appendix A**) (**Appendix B)**.

LULC. LULC changes in Middle Indian Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 25** and **Figures 208, 209 and 209a (Appendix A)**. Overall, there are approximately 34,866 acres in this watershed. The dominant LULC in this area is Forested (over

67%), followed by PHA (approximately 24.6%). The LOD is approximately 184 acres, which represents less than 0.5% of the entire watershed.

3.8.2 Rich Creek

Project Stream Impacts. There are nine stream crossings in the Rich Creek watershed. These proposed impacts are limited to seven pipeline ROW crossings and two temporary access road crossings. The stream impacts are temporary in nature. The total stream impacts, an estimated 766 linear feet of stream, represent approximately 0.0308% of the modeled streams in this HUC-12 watershed (**Table 23**) (**Figure 210, Appendix A**).

Project Wetlands Impacts. Approximately 2.04 acres of wetland were identified by Mountain Valley contractors in the Rich Creek watershed. Four wetland crossings are proposed that will temporarily impact 0.2632 acre of wetland. The NWI data indicate that there are 428.33 acres of aquatic resources in the watershed, including 2.01 acre of Freshwater Emergent Wetland and 1.31 acre of Freshwater Forested/Scrub Wetland. None of these wetlands fall within the Project Area (**Table 24**) (**Figure 211, Appendix A**).

Soils. The soil data for the Rich Creek watershed are from the Jefferson National Forest, Virginia and the Monroe County, West Virginia soil surveys. The soil surveys indicate that the hydric soils At-Monroe (1507.5 acres, less than 5.0% of the watershed area), MaA (61.4 acres, less than 0.2% of the watershed area), and Me (412.4 acres, less than 1.4% of the watershed area) and the partially hydric soil, Uf (329.5 acres, less than 1.1% of the watershed area) may be located in the watershed. Approximately 7.4 acres of the hydric soil Me, and 5.5 acres of the hydric soil MaA as well as approximately 1.0 acres the partially hydric soil, Uf may be located in the Project Area (**Figure 212, Appendix A**) (**Appendix B**).

LULC. LULC changes in Rich Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 25** and **Figures 213, 214 and 214a (Appendix A)**. Overall, there are approximately 34,114 acres in this watershed. The dominant LULC in this area is Forested (over 53%), followed by PHA (approximately 34.4%). The LOD is approximately 113.7 acres, which represents less than 0.4% of the entire watershed.

3.8.3 Stony Creek

Project Stream Impacts. There are six stream crossings in the southern portion of the Stony Creek watershed. These proposed stream impacts are limited to three timber mat crossings and three pipeline ROW crossings and are temporary in nature. The total impacts, an estimated 344 linear feet of stream, represent approximately 0.0240% of the modeled streams in this HUC-12 watershed (**Table 23**) (**Figure 215, Appendix A**).

Project Wetland Impacts. Approximately 1.33 acres of wetland were identified by Mountain Valley contractors in the Stony Creek watershed. There are no wetland impacts in this watershed. The NWI data indicate that there are 344.30 acres of aquatic resources in the watershed, including

54.46 acres of Freshwater Forested/Scrub Wetland. None of these wetlands fall in the Project Area (**Table 24**) (**Figure 216, Appendix A**).

Soils. The soil data for the Stony Creek watershed are from the Giles County, and Jefferson National Forest, Virginia and the Monroe County, West Virginia soil surveys. The hydric soils Fluvaquents, nearly level (Soil 12) (207.5 acres, less than 1.0% of the watershed area), Atkins loam, 0 to 3 percent slopes, frequently flooded (Soil 1) (15.1 acres, less than 0.05% of the watershed area), and Haplosaprists, high elevation bog, 0 to 3 percent slopes (Soil 110) (44.7 acres, less than 0.2% of the watershed area) may be present in the watershed (**Figure 217, Appendix A**) (**Appendix B**). These soil types are not crossed by the Project.

LULC. LULC changes in Stony Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 25** and **Figures 218, 219 and 219a (Appendix A)**. Overall, there are approximately 31,289 acres in this watershed. The dominant LULC in this area is Forested (over 94%), followed by Stream Riparian Corridor Floodplain (approximately 1.6%). The LOD is approximately 119 acres, which represents less than 0.4% of the entire watershed.

3.8.4 Little Stony Creek-New River

Project Stream Impacts. There are 21 stream crossings in the Little Stony Creek-New River watershed. These proposed stream impacts are limited to 13 timber mat crossings, seven pipeline ROW crossings, and a temporary access road, all temporary in nature. The total stream impacts, an estimated 981 linear feet of stream, represent approximately 0.0795% of the modeled streams in this HUC-12 watershed (**Table 23**) (**Figure 220, Appendix A**).

Project Wetlands Impacts. Approximately 0.09 acre of wetlands was delineated by Mountain Valley contractors in the Little Stony Creek-New River watershed. There are two proposed crossings in this watershed. Impacts are limited to 0.0262 acre of temporary wetland impacts and 0.0136 acre of wetland conversion impacts for a total of 0.0398 acre of wetland impacts. Wetland conversion impacts will be mitigated using mitigation banking. The NWI data indicate that there are 787.88 acres of aquatic resources in the watershed, including 7.32 acres of Freshwater Emergent Wetland and 9.96 acres of Freshwater Forested/Scrub Wetland (**Table 24**) (**Figure 221, Appendix A**). None of these wetlands fall within the Project Area.

Soils. Soil data for Little Stony Creek-New River watershed are from Giles County and Jefferson National Forest, Virginia. The soil surveys indicate that Soil 1 (an Atkins loam soil type) (4.1 acres, less than 0.02% of the watershed area), Philo fine sandy loam, 0 to 3 percent slopes, occasionally flooded (Soil 2) (31.8 acres, less than 0.2% of the watershed area), and Soil 110 (a Haplosaprist soil type) (75.8 acres, less than 0.3% of the watershed area) soil types are present in the watershed (**Figure 222, Appendix A**) (**Appendix B**). These soil types are not crossed by the Project.

LULC. LULC changes in Little Stony Creek-New River watershed between 2011, 2016 and 2019 are illustrated in **Table 25** and **Figures 223, 224 and 224a (Appendix A)**. Overall, there are approximately 29,250 acres in this watershed. The dominant LULC in this area is Forested (over

78%), followed by PHA (approximately 9.2%). The LOD is approximately 110.5 acres, which represents less than 0.4% of the entire watershed.

3.8.5 Lower Sinking Creek

Project Stream Impacts. There are 20 proposed stream crossings in the Lower Sinking Creek watershed. This includes temporary impacts for eight temporary access roads, one permanent access road, seven pipeline ROW crossings, and three timber mat crossings. Permanent stream impacts are limited to one permanent access road crossing. The total temporary (870 linear feet) and permanent (31 linear feet) impacts, an estimated 901 linear feet of stream, represent approximately 0.1048% of the modeled streams in this HUC-12 watershed (**Table 23**) (**Figure 225, Appendix A**).

Project Wetland Impacts. Approximately 0.53 acre of wetlands was delineated by Mountain Valley contractors in the Lower Sinking Creek watershed. These areas were avoided, resulting in no wetland impacts in the watershed. The NWI data indicate that there are 160.15 acres of aquatic resources in the watershed, including 1.6 acres of Freshwater Emergent Wetland. None of these wetlands fall in the Project Area (**Table 24**) (**Figure 226, Appendix A**).

Soils. The soil data from the Lower Sinking Creek watershed are from Craig County, Giles County, and Jefferson National Forest, Virginia soil surveys. The hydric soil, Soil 12 (Fluvaquents) (6.1 acres, less than 0.04% of the watershed area) may be found in the watershed (**Figure 227, Appendix A**) (**Appendix B)**. These soil types are not crossed by the Project.

LULC. LULC changes in Lower Sinking Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 25** and **Figures 228, 229 and 229a (Appendix A)**. Overall, there are approximately 18,795 acres in this watershed. The dominant LULC in this area is Forested (over 62%), followed by PHA (approximately 27.6%). The LOD is approximately 111 acres, which represents less than 0.6% of the entire watershed.

3.8.6 Upper Sinking Creek

Project Stream Impacts. There are 13 proposed stream crossings in the Upper Sinking Creek watershed. Ten of these proposed crossings are pipeline ROW crossings, while two are temporary access roads, and one is a timber mat crossing. Impacts associated with these stream crossings are temporary in nature. The total impacts, an estimated 884 linear feet of stream, represent approximately 0.0585% of the modeled streams in this HUC-12 watershed (**Table 23**) (**Figure 230, Appendix A**).

Project Wetlands Impacts. Approximately 0.36 acre of wetlands was delineated by Mountain Valley contractors in the Upper Sinking Creek watershed. Three wetland crossings are proposed that will result in 0.0518 acre of temporary impacts. The NWI data indicate that there are 374.44 acres of aquatic resources in the watershed, including 35.13 acres of Freshwater Emergent Wetland and 14.2 acres of Freshwater Forested/Scrub Wetland (**Table 24**) (**Figure 231, Appendix A**). These wetlands fall outside of the Project Area.

Soils. The soil data from the Upper Sinking Creek watershed are from the Craig County, Giles County, Jefferson National Forest, and Montgomery County, Virginia soil surveys. The soil surveys indicate that hydric soils Atkins fine sandy loam, 0 to 3 percent slopes, frequently flooded (Soil 3A) (338.9 acres, less than 1.1% of the watershed area) and Mauretown silt loam, 0 to 3 percent slopes, rarely flooded (Soil 24A) (74.2 acres, less than 0.3% of the watershed area) may be located in the watershed (**Figure 232, Appendix A**) (**Appendix B**). These soil types are not crossed by the Project.

LULC. LULC changes in Upper Sinking Creek watershed between 2011 and 2016 are illustrated in **Table 25** and **Figures 233, 234 and 234a (Appendix A)**. Overall, there are approximately 33,803 acres in this watershed. The dominant LULC in this area is Forested (over 62%), followed by PHA (approximately 31.4%). The LOD is approximately 108.4 acres, which represents less than 0.3% of the entire watershed.

Table 23
Cumulative Project Stream Impacts in the HUC-12 Watersheds that Fall Within the Upper/Middle New Watershed

HUC-12 Watershed	Total Number of Stream Crossings	Proposed Impacts in Application (feet)		Total Project-Related Impacts (feet)		Estimated Linear Feet of Streams in Watershed	Project-Related Cumulative Impacts (feet)	Percentage of Impacted Linear Stream Feet Estimated in the Watershed
		Perm	Temp	Perm	Temp			
Middle Indian Creek	28	109	1,194	109	1,346	2,777,615	1,455	0.0524%
Rich Creek	9	0	766	0	766	2,487,504	766	0.0308%
Stony Creek	6	0	344	0	344	1,392,380	344	0.0240%
Little Stony Creek – New River	21	0	981	0	981	1,243,725	981	0.0795%
Lower Sinking Creek	20	31	870	31	870	860,082	901	0.1048%
Upper Sinking Creek	13	0	884	0	884	1,509,862	884	0.0585%

Table 24
Cumulative Project-Related Wetland Impacts and National Wetland Inventory data in the HUC-12 Watersheds that Fall Within the Upper/Middle New Watershed

HUC-12 Watershed	Delineated Acres[1]	Total Number of Wetland Crossings	Temporary Impacts (acres)	Permanent Conversion Impacts (Acres)	Permanent Fill Impacts (acres)	Total Wetland Impacts	National Wetland Inventory Data (acres)						
							Riverine	Freshwater Emergent Wetland	Freshwater Forested/Scrub Wetland	Freshwater Pond	Lake	Other	Total
Middle Indian Creek	14.64	11	0.5132	0.2020	0.0288	0.7380	422.1	37.38	25.35	63	0	0	547.83
Rich Creek	2.04	4	0.2632	0	0	0.2632	374.12	2.01	1.31	50.88	0	0	428.33
Stony Creek	1.33	0	0	0	0	0	282.11	0	54.46	7.73	0	0	344.3
Little Stony Creek-New River	0.09	2	0.0262	0.0136	0	0.0398	711.2	7.32	9.96	11.77	47.63	0	787.88
Lower Sinking Creek	0.53	0	0	0	0	0	151.25	1.6	0	7.31	0	0	160.15
Upper Sinking Creek	0.36	3	0.0518	0	0	0.0518	303.1	35.13	14.2	22.01	0	0	374.44

[1] Acres delineated within the HUC-12 Watershed.

Table 25
LULC in the HUC-12 Watersheds that Fall Within the Upper/Middle New Watershed

HUC-12 Watershed	Total HUC-12 Watershed Size (Acres)	Year	Forest		Mixed Development		Pasture, Hay, Agriculture		Streams Riparian Corridor, Floodplain		Water		Wetlands		Barren Including Mine, Oil and Gas		Roads, Impervious Surface	
			Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12
Middle Indian Creek	34,866	2011	23,550	67.5	621	1.8	8,588	24.6	675	1.9	18	0.1	134	0.4	7	0.0	1,273	3.7
	34,866	2016	23,774	68.2	632	1.8	8,572	24.6	489	1.4	18	0.1	103	0.3	8	0.0	1,270	3.6
	34,866	2019	23,674	67.9	634	1.8	8,578	24.6	580	1.7	18	0.1	100	0.3	12	0.0	1,267	3.6
Rich Creek	34,114	2011	18,421	54.0	1,714	5.0	11,733	34.4	490	1.4	10	0.0	83	0.2	39	0.1	1,625	4.8
	34,114	2016	18,339	53.8	1,748	5.1	11,710	34.3	626	1.8	8	0.0	37	0.1	39	0.1	1,607	4.7
	34,114	2019	18,241	53.5	1,764	5.2	11,725	34.4	697	2.0	8	0.0	37	0.1	51	0.2	1,590	4.7
Stony Creek (VA)	31,289	2011	28,202	90.1	165	0.5	441	1.4	1,763	5.6	4	0.0	72	0.2	80	0.3	562	1.8
	31,289	2016	28,567	91.3	167	0.5	416	1.3	1,435	4.6	4	0.0	64	0.2	76	0.2	561	1.8
	31,289	2019	29,468	94.2	168	0.5	415	1.3	514	1.6	4	0.0	64	0.2	58	0.2	597	1.9
Little Stony Creek-New River	29,250	2011	22,614	77.3	870	3.0	2,734	9.3	1,053	3.6	524	1.8	39	0.1	38	0.1	1,376	4.7
	29,250	2016	22,739	77.7	885	3.0	2,708	9.3	926	3.2	528	1.8	32	0.1	42	0.1	1,389	4.7
	29,250	2019	23,067	78.9	913	3.1	2,694	9.2	592	2.0	527	1.8	38	0.1	26	0.1	1,391	4.8
Lower Sinking Creek	18,795	2011	11,870	63.2	505	2.7	5,216	27.7	285	1.5	2	0.0	0	0.0	2	0.0	917	4.9
	18,795	2016	11,847	63.0	516	2.7	5,180	27.6	328	1.7	2	0.0	0	0.0	2	0.0	921	4.9
	18,795	2019	11,735	62.4	522	2.8	5,186	27.6	433	2.3	2	0.0	0	0.0	3	0.0	916	4.9
Upper Sinking Creek	33,803	2011	20,830	61.6	333	1.0	10,675	31.6	727	2.2	0	0.0	23	0.1	4	0.0	1,211	3.6
	33,803	2016	21,076	62.3	342	1.0	10,623	31.4	522	1.5	0	0.0	21	0.1	4	0.0	1,215	3.6
	33,803	2019	21,066	62.3	348	1.0	10,621	31.4	534	1.6	0	0.0	21	0.1	4	0.0	1,208	3.6

3.9 Upper James

The Project crosses one 12-digit HUC watersheds in the Upper James HUC-8 watershed (**Figure 235, Appendix A**), Trout Creek-Craig Creek (020802011001) (**Table 26**). The Upper James watershed is approximately 2,210.7 mi^2. The drainage of the Trout Creek-Craig Creek watershed is approximately 51.9 mi^2 or less than 3% of the HUC-8 watershed.

3.9.1 Trout Creek-Craig Creek

Project Stream Impacts. There are seven proposed stream crossings in the Trout Creek-Craig Creek watershed: six timber mat crossings and one temporary access road. These are the only stream crossings in the Upper James HUC-8 watershed. The stream impacts are all temporary in nature and total approximately 200 linear feet. This represents approximately 0.0121% of the modeled streams in this HUC-12 watershed (**Table 26**) (**Figure 236, Appendix A**).

Project Wetland Impacts. Approximately 0.04 acre of wetlands was delineated by Mountain Valley contractors in the Trout Creek-Craig Creek watershed. These wetlands were avoided, and there are no wetland impacts in the watershed. The NWI data indicate that there are 478.39 acres of aquatic resources in the watershed, including 0.2 acre of Freshwater Emergent Wetland and 2.02 acres of Freshwater Forested/Scrub Wetland. None of these wetlands fall in the Project Area (**Table 27**) (**Figure 237, Appendix A**).

Soils. The Trout Creek-Craig Creek watershed soil data are from the Craig County, Jefferson National Forest, Montgomery County, and Roanoke County and the Cities of Roanoke and Salem, Virginia. The data indicate that there are no hydric soils in the watershed. The data also indicate that the partially hydric soil McGary and Purdy soils (Soil 25) (7.5 acres, less than 0.03% of the watershed area) may be located in the watershed (**Figure 238, Appendix A**) (**Appendix B**). This soil type is not crossed by the Project.

LULC. LULC changes in Trout Creek-Craig Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 28** and **Figures 239, 240 and 240a (Appendix A)**. Overall, there are approximately 33,194 acres in this watershed. The dominant LULC in this area is Forested (over 91%), followed by PHA (approximately 4.1%). The LOD is approximately 34.9 acres, which represents less than 0.1% of the entire watershed.

Table 26
Cumulative Project Stream Impacts in the HUC-12 Watersheds that Fall Within the Upper James Watershed

HUC-12 Watershed	Total Number of Proposed Stream	Proposed Impacts in Application (feet)		Total Impacts (feet)		Estimated Linear Feet of Streams in Watershed	Project Related Cumulative Impacts (feet)	Percentage of Impacted Linear Stream Feet Estimated in the Watershed
		Perm	Temp	Perm	Temp			
Trout Creek – Craig Creek	7	0	200	0	200	1,655,432	200	0.0121%

Table 27
Cumulative Project-Related Wetland Impacts and National Wetland Inventory Data in the HUC-12 Watersheds that Fall Within the Upper James Watershed

HUC-12 Watershed	Delineated Acres[1]	Total Number of Proposed Wetland Crossings	Temporary Impacts (acres)	Permanent Conversion Impacts (Acres)	Permanent Fill Impacts (acres)	Total Wetland Impacts	National Wetland Inventory Data (acres)						
							Riverine	Freshwater Emergent Wetland	Freshwater Forested/Scrub	Freshwater Pond	Lake	Other	Total
Trout Creek-Craig Creek	0.04	0	0	0	0	0	471.66	0.2	2.02	4.51	0	0	478.39
[1] Acres delineated within the HUC-12 Watershed.													

Table 28
LULC in the HUC-12 Watersheds that Fall Within the Upper James Watershed

HUC-12 Watershed	Total HUC-12 Watershed Size (Acres)	Year	Forest		Mixed Development		Pasture, Hay, Agriculture		Streams Riparian Corridor, Floodplain		Water		Wetlands		Barren Including Mine, Oil and Gas		Roads, Impervious Surface	
			Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12
Trout Creek-Craig Creek	33,194	2011	30,265	91.2	185	0.6	1,388	4.2	798	2.4	0	0.0	0	0.0	14	0.0	544	1.6
	33,194	2016	30,257	91.2	189	0.6	1,376	4.1	815	2.5	0	0.0	0	0.0	14	0.0	543	1.6
	33,194	2019	30,411	91.6	196	0.6	1,377	4.1	593	1.8	0	0.0	0	0.0	2	0.0	614	1.8

3.10 Upper Roanoke

The Project crosses thirteen 12-digit HUC watersheds in the Upper Roanoke HUC-8 watershed (**Figure 241, Appendix A**). These include Dry Run-North Fork Roanoke River (030101010201), Wilson Creek-North Fork Roanoke River (030101010202), Bradshaw Creek-North Fork Roanoke River (030101010203), Brake Branch-South Fork Roanoke River (030101010105), Sawmill Hollow-Roanoke River (030101010301), Bottom Creek (030101010102), South Fork Blackwater River (030101010502), North Fork Blackwater River (030101010501), Madcap Creek-Blackwater River (030101010503), Maggodee Creek (030101010504), Standiford Creek-Smith Mountain Lake (030101010601), Owens Creek-Pigg River (030101010804), and Tomahawk Creek-Pigg River (030101011001) (**Table 29**). The Upper Roanoke watershed is approximately 2,189.9 mi^2. The combined drainage of the thirteen listed watersheds is approximately 529.6 mi^2.

3.10.1 Dry Run-North Fork Roanoke River

Project Stream Impacts. There are 14 stream crossings in the Dry Run-North Fork Roanoke River watershed. Four of these crossings are complete. The proposed crossings include six pipeline ROW crossings, three timber mat crossings, and one temporary access road. These stream impacts are all temporary in nature. The total stream impacts, an estimated 1,041 linear feet of stream, represent approximately 0.0771% of the modeled streams in this HUC-12 watershed (**Table 29**) (**Figure 242, Appendix A**). The completed crossings total approximately 385 linear feet of temporary stream impacts.

Project Wetlands Impacts. Approximately 4.48 acres of wetland were delineated by Mountain Valley contractors in the Dry Run-North Fork Roanoke River watershed. There are four wetland crossings, one complete, in this watershed. The Project with temporarily impact a total of 0.0529 acre of wetland in the watershed. The completed crossing temporarily impacted 0.0083 acre of wetland. The NWI data indicate that there are 362.09 acres of aquatic resources in the watershed, including 2.85 acres of Freshwater Emergent Wetland (**Table 30**) (**Figure 243, Appendix A**). The NWI data also indicate that the Project will impact 0.0963 acre of Freshwater Emergent Wetland. One area identified as wetland by NWI was identified as wetland during the Project's delineation efforts. The associated wetland crossing is identified as W-NN6, which temporarily impacts 0.0083 acre of emergent wetland. The delineations at the other areas did not confirm the presence of a wetland.

Soils. The soil data from the Dry Run-North Fork Roanoke River are from the Jefferson National Forest, Montgomery County, and Roanoke County and the Cities of Roanoke and Salem, Virginia soil surveys. The data indicate that the hydric soil Clubcaf silt loam, 0 to 2 percent slopes, occasionally flooded (Soil 7A) (17 acres, less than 0.06% of the watershed area) and partially hydric soil, Soil 25 (a McGary and Prudy soil) (265.2 acres, less than 0.9% of the watershed area) may be present in the watershed. Approximately 2.4 acres of the partially hydric soil, Soil 25 may be present in the Project Area (**Figure 244, Appendix A**) (**Appendix B**).

LULC. LULC changes in Dry Run-North Fork Roanoke River watershed between 2011, 2016 and 2019 are illustrated in **Table 31** and **Figures 245, 246 and 246a (Appendix A)**. Overall, there are approximately 32,811 acres in this watershed. The dominant LULC in this area is Forested (over 68%), followed by PHA (approximately 22.8%). The LOD is approximately 129.5 acres, which represents less than 0.4% of the entire watershed.

3.10.2 Wilson Creek-North Fork Roanoke River

Project Stream Impacts. There are 10 proposed stream crossings in the Wilson Creek-North Fork Roanoke River watershed. Nine of the proposed stream crossings are pipeline ROW crossings, while the remaining crossing is a timber mat crossing. These stream impacts are all temporary in nature. The total impacts, an estimated 760 linear feet of stream, represent approximately 0.0751% of the modeled streams in this HUC-12 watershed (**Table 29**) (**Figure 247, Appendix A**).

Project Wetland Impacts. Approximately 0.161 acre of wetlands was delineated by Mountain Valley contractors in the Wilson Creek-North Fork Roanoke River watershed. Five wetland crossings are proposed in the watershed. These crossings will temporarily impact 0.2205 acre of wetland and result in conversion impacts to 0.1153 acre of wetland for a total of 0.3358 acre of wetland impacts. Wetland conversion impacts will be mitigated using mitigation banking. The NWI data indicate that there are 289.28 acres of aquatic resources in the watershed, including 4.61 acre of Freshwater Emergent Wetland and 0.98 acre of Freshwater Forested/Scrub Wetland (**Table 30**) (**Figure 248, Appendix A**). These wetlands fall outside of the Project Area.

Soils. The soil data from the Wilson Creek-North Fork Roanoke River watershed are from the Montgomery County, Virginia soil survey. The data indicate that the partially hydric soil, Soil 25 (185.8 acres, less than 0.8% of the watershed area) may be present in the watershed. Approximately 0.5 acre of the watershed area of the partially hydric soil, Soil 25 may be located in the Project Area (**Figure 249, Appendix A**) (**Appendix B**).

LULC. LULC changes in Wilson Creek-North Fork Roanoke River watershed between 2011, 2016 and 2019 are illustrated in **Table 31** and **Figures 250, 251 and 251a (Appendix A)**. Overall, there are approximately 25,895 acres in this watershed. The dominant LULC in this area is Forested (over 69%), followed by Mixed Development (approximately 11.9%). The LOD is approximately 33.3 acres, which represents less than 0.1% of the entire watershed.

3.10.3 Bradshaw Creek-North Fork Roanoke River

Project Stream Impacts. There are three proposed stream crossings in the Bradshaw Creek-North Fork Roanoke River watershed. Two of the proposed stream crossings are pipeline ROW crossings, while the remaining crossing is a timber mat crossing. These impacts are all temporary in nature. The total impacts, an estimated 248 linear feet of stream, represent approximately 0.0345% of the modeled streams in this HUC-12 watershed (**Table 29**) (**Figure 252, Appendix A**).

Project Wetland Impacts. Approximately 0.26 acre of wetlands was delineated by Mountain Valley contractors in the Bradshaw Creek-North Fork Roanoke River watershed. There is one proposed wetland crossing in the watershed that will temporarily impact 0.0454 acre of wetland. The NWI data indicate that there are 233.62 acres of aquatic resources in the watershed, including 2.13 acres of Freshwater Emergent Wetland and 1.61 acre of Freshwater Forested/Scrub Wetland. The NWI data also indicate that the Project will impact 0.2377 acre of Freshwater Pond. The Freshwater Pond has been avoided and is outside of the Project Area (**Table 30**) (**Figure 253, Appendix A**).

Soils. The soils data in the Bradshaw Creek-North Fork Roanoke River watershed are from the Montgomery County and Roanoke County and the Cities of Roanoke and Salem, Virginia soil surveys. The data indicate that there are no hydric soils in the watershed, but the partially hydric soil, Soil 25 (a McGary and Prudy soil) (85.5 acres, less than 0.6% of the watershed area) may be present in the watershed. The soil surveys also indicates that the partially hydric soil, Soil 25 (10.2 acres would be crossed by the Project (**Figure 254, Appendix A**) (**Appendix B**). This represents less than 12% of the Soil 25 in the watershed.

LULC. LULC changes in Bradshaw Creek-North Fork Roanoke River watershed between 2011, 2016 and 2019 are illustrated in **Table 31** and **Figures 255, 256 and 256a (Appendix A)**. Overall, there are approximately 15,320 acres in this watershed. The dominant LULC in this area is Forested (over 83%), followed by PHA (approximately 7.3%). The LOD is approximately 101.2 acres, which represents less than 0.7% of the entire watershed.

3.10.4 Brake Branch-South Fork Roanoke River

Project Stream Impacts. There is only one proposed stream crossing in the Brake Branch-South Fork Roanoke River watershed. The pipeline ROW crossing is temporary in nature. The total impacts, an estimated 79 linear feet of stream, represent approximately 0.0102% of the modeled streams in this HUC-12 watershed (**Table 29**) (**Figure 257, Appendix A**).

Project Wetland Impacts. Approximately 0.20 acre of wetlands was delineated by Mountain Valley contractors in the Brake Branch-South Fork Roanoke River watershed. There is one proposed wetland crossing in this watershed that will permanently impact 0.0392 acre of wetland. These impacts will be mitigated using mitigation banking. The NWI data indicate that there are 253.17 acres of aquatic resources in the watershed, including 4.42 acre of Freshwater Emergent Wetland and 1.96 acre of Freshwater Forested/Scrub Wetland. None of these wetlands are located in the Project Area (**Table 30**) (**Figure 258, Appendix A**).

Soils. The soils data in the Brake Branch-South Fork Roanoke River watershed are from the Montgomery County and Roanoke County and the Cities of Roanoke and Salem, Virginia soil surveys. The data indicate that there are no hydric soils in the watershed, but the partially hydric soil, Soil 25 (226.4 acres, less than 1.1% of the watershed area) may be present in the watershed. The soil surveys also indicate that the partially hydric soil, Soil 25 (0.9 acre) may be present in the Project Area (**Figure 259, Appendix A**) (**Appendix B**).

LULC. LULC changes in Brake Creek-North Fork Roanoke River watershed between 2011, 2016 and 2019 are illustrated in **Table 31** and **Figures 260, 261 and 261a (Appendix A)**. Overall, there are approximately 21,870 acres in this watershed. The dominant LULC in this area is Forested (over 78%), followed by PHA (approximately 9.4%). The LOD is approximately 22.6 acres, which represents less than 0.1% of the entire watershed.

3.10.5 Sawmill Hollow-Roanoke River

Project Stream Impacts. There are seven proposed stream crossings in the Sawmill Hollow-Roanoke River watershed. These stream impacts are all temporary in nature and include four pipeline ROW crossings and three timber mat crossings. The total stream impacts, an estimated 468 linear feet of stream, represent approximately 0.0284% of the modeled streams in this HUC-12 watershed (**Table 29**) (**Figure 262, Appendix A**).

Project Wetland Impacts. Approximately 1.97 acres of wetlands were delineated by Mountain Valley contractors in the Sawmill Hollow-Roanoke River watershed. The Project includes two proposed wetland crossings that will result in 0.0040 acres of temporary impacts and 0.0852 acre of wetland conversion impacts for a total of 0.0892 acre of wetland impacts in this watershed. The conversion impacts will be mitigated using banking. The NWI data indicate that there are 646.93 acres of aquatic resources in the watershed, including 1.18 acre of Freshwater Emergent Wetland and 3.47 acre of Freshwater Forested/Scrub Wetland (**Table 30**) (**Figure 263, Appendix A**). None of these wetlands fall in the Project Area.

Soils. The soil data for the Sawmill Hollow-Roanoke River watershed are from the Montgomery County and Roanoke County and the Cities of Roanoke and Salem, Virginia soil surveys. The data indicate that the hydric soils Soil 7A (4.9 acres, less than 0.02% of the watershed area) and Purdy silt loam, 0 to 4 percent slopes (Soil 36A) (68.8 acres, less than 0.2% of the watershed area) as well as the partially hydric soil, Soil 25 (16.8 acres, less than 0.05% of the watershed area) may be present in the watershed. The soil survey data indicate that the partially hydric soil, Soil 25 (2.0 acres) may be present in the Project Area (**Figure 264, Appendix A**) (**Appendix B**).

LULC. LULC changes in Sawmill Hollow-Roanoke River watershed between 2011, 2016 and 2019 are illustrated in **Table 31** and **Figures 265, 266 and 266a (Appendix A)**. Overall, there are approximately 40,523 acres in this watershed. The dominant LULC in this area is Forested (over 66%), followed by MD (approximately 20.2%). The LOD is approximately 147.3 acres, which represents less than 0.4% of the entire watershed.

3.10.6 Bottom Creek

Project Stream Impacts. There are 25 stream crossings in the Bottom Creek watershed. Sixteen of the proposed crossings are associated with timber mat crossings, and seven are pipeline ROW crossings. The remaining two are temporary access roads. These stream impacts are all temporary in nature. The total impacts, an estimated 1,225 linear feet of stream, represent approximately 0.1871% of the modeled streams in this HUC-12 watershed (**Table 29**) (**Figure 267, Appendix A**).

Project Wetland Impacts. Approximately 28.38 acres of wetlands were delineated by Mountain Valley contractors in the Project Area. There are 40 wetland crossings proposed in the Project Area. These proposed crossings will result in 1.3295 acres of temporary impacts and 0.7001 acre of wetland conversion impacts, for a total of 2.0296 acres of wetland impacts. Wetland conversion impacts will be mitigated using mitigation banking. The NWI data indicate that there are 315.66 acres of aquatic resources in the watershed, including 45.12 acre of Freshwater Emergent Wetland and 60.81 acre of Freshwater Forested/Scrub Wetland. The NWI data also indicate that the Project will impact 0.0038 acre of Freshwater Emergent Wetland, 0.3114 acre of Freshwater Forested/Scrub Wetland, and 0.0375 acre of Freshwater Pond in the watershed (**Table 30**) (**Figure 268, Appendix A**). The Freshwater Pond has been avoided and is outside of the Project Area. Freshwater Emergent Wetland impacts are included in W-AB6-PEM-2, which has 0.3271 acre of temporary impacts. Freshwater Forested/Scrub Wetland impacts occur at W-EF46, which has 0.0682 acre of scrub-shrub wetland, and W-IJ36, which has 0.1237 acre of scrub-shrub wetland. These impacts will be mitigated using mitigation banking.

Soils. Soil data for the Bottom Creek watershed are from the Floyd County, Franklin County, Montgomery County and Roanoke County and Cities of Roanoke and Salem, Virginia soil surveys. The data indicate that the hydric soils Alderflats silt loam, 0 to 4 percent slopes (Soil 1A) (465.2 acres, less than 2.6% of the watershed area) and Soil 7A (42 acres, less than 0.3% of the watershed area) may be present in the watershed. The survey data also indicate that hydric soil, Soil 1A (5.9 acres) may be present in the Project Area (**Figure 269, Appendix A**) (**Appendix B**).

LULC. LULC changes in Bottom Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 31** and **Figures 270, 271 and 271a (Appendix A)**. Overall, there are approximately 18,129 acres in this watershed. The dominant LULC in this area is Forested (over 80%), followed by PHA (approximately 11.3%). The LOD is approximately 117 acres, which represents less than 0.7% of the entire watershed.

3.10.7 South Fork Blackwater River

Project Stream Impacts. There are nine stream crossings in the South Fork Blackwater River watershed. Three of these crossings are completed pipeline ROW crossings. Two of the proposed crossings are pipeline ROW crossings, three are timber mat crossings, and one is a permanent access road. These stream impacts are all temporary in nature. The total impacts, an estimated 421 linear feet of stream, represent approximately 0.0606% of the modeled streams in this HUC-12 watershed (**Table 29**) (**Figure 272, Appendix A**). The completed crossings total approximately 236 linear feet of temporary stream impacts.

Project Wetland Impacts. Approximately 3.53 acres of wetlands were delineated by Mountain Valley contractors in the South Fork Blackwater River watershed. There are five proposed wetland crossings that will result in 0.1871 acre of temporary wetland impacts in this watershed. The NWI data indicate that there are 222.00 acres of aquatic resources in the watershed, including 9.66 acres of Freshwater Emergent Wetland and 13.65 Freshwater Forested/Scrub Wetland (**Table 30**) (**Figure 273, Appendix A).** None of these wetlands fall in the Project Area.

Soils. The soil data for the South Fork Blackwater River watershed are from the Floyd County, Franklin County, and Roanoke County and the Cities of Roanoke and Salem, Virginia soil surveys. The soil data indicate that there are no hydric soils in the watershed, but the partially hydric soil Delanco-Kinkora complex, 0 to 8 percent slopes, rarely flooded (15B) (0.4 acre, less than 0.003% of the watershed area) may be present in the watershed (**Figure 274, Appendix A**) (**Appendix B**). This soil type is not crossed by the Project.

LULC. LULC changes in South Fork Blackwater River watershed between 2011, 2016 and 2019 are illustrated in **Table 31** and **Figures 275, 276 and 276a (Appendix A)**. Overall, there are approximately 18,019 acres in this watershed. The dominant LULC in this area is Forested (over 71%), followed by PHA (approximately 20.3%). The LOD is approximately 30.8 acres, which represents less than 0.2% of the entire watershed.

3.10.8 North Fork Blackwater River

Project Stream Impacts. There are 22 stream crossings in the North Fork Blackwater River watershed. Four of these crossings, pipeline ROW crossings, are complete. The proposed stream impacts are all temporary in nature and include 12 pipeline ROW crossings and six timber mat crossings. The total impacts, an estimated 1,588 linear feet of stream, represent approximately 0.1866% of the modeled streams in this HUC-12 watershed (**Table 29**) (**Figure 277, Appendix A**). The completed crossings total approximately 377 linear feet of temporary stream impacts.

Project Wetland Impacts. Approximately 2.23 acres of wetlands were delineated by Mountain Valley contractors in the North Fork Blackwater River. There are three proposed wetland crossings and one completed wetland crossing in the watershed. The Project will result in 0.0779 acre of temporary impacts. The NWI data indicate that there are 268.88 acres of aquatic resources including 0.89 acre of Freshwater Emergent Wetland and 4.36 acre of Freshwater Forested/Scrub Wetland in the watershed. The NWI data also indicate that the Project will impact 0.3939 acre of Freshwater Forested/Scrub Wetland in the watershed (**Table 30**) (**Figure 278, Appendix A**). This area is maintained pasture, and no wetlands during Project delineation were identified in the NWI wetland footprint.

Soils. The soil data for the North Fork Blackwater River watershed are from the Franklin County, and Roanoke County and the Cities of Roanoke and Salem, Virginia soil surveys. Based on these data, there are no hydric soils or partially hydric soils present in the watershed or Project Area (**Figure 279, Appendix A**).

LULC. LULC changes in North Fork Blackwater River watershed between 2011, 2016 and 2019 are illustrated in **Table 31** and **Figures 280, 281 and 281a (Appendix A)**. Overall, there are approximately 20,475 acres in this watershed. The dominant LULC in this area is Forested (over 70%), followed by PHA (approximately 20.3%). The LOD is approximately 111 acres, which represents less than 0.5% of the entire watershed.

3.10.9 Madcap Creek-Blackwater River

Project Stream Impacts. There are 55 stream crossings in the Madcap Creek-Blackwater River watershed. Twelve of these crossings are complete, all of which are pipeline ROW crossings. The proposed crossings include 24 pipeline ROW crossings, 18 timber mat crossings, and one temporary work area. These stream impacts are all temporary in nature. The total stream crossing impacts in this watershed are approximately 3,373 linear feet. While this represents the largest total amount of impacts in any of the 12-digit HUCs in the Virginia portion of the Project area, the percentage of modeled streams in the watershed is approximately 0.2301% (**Table 29**) (**Figure 282, Appendix A**). The completed crossings total approximately 994 linear feet of temporary stream impacts.

Project Wetland Impacts. Approximately 8.29 acres of wetlands were delineated by Mountain Valley contractors in the Madcap Creek-Blackwater River watershed. The Project has ten proposed wetland crossings that will result in 0.4095 acre of temporary impacts and 0.2372 acre of wetland conversion impacts, for a total of 0.6467 acre of wetland impacts in the watershed. Wetland conversion impacts will be mitigated using mitigation banking. The NWI data indicate that there are 704.00 acres of aquatic resources in the watershed, including 47.4 acres of Freshwater Emergent Wetland and 103.79 acres of Freshwater Forested/Scrub Wetland. The NWI data also indicate that the Project will impact 0.2544 acre of Freshwater Emergent Wetland and 0.9832 acre of Freshwater Forested/Scrub Wetland in the watershed (**Table 30**) (**Figure 283, Appendix A**). These areas were delineated, and any wetland identified has been avoided.

Soils. The soil data for the Madcap Creek-Blackwater River watershed are from the Franklin County, Virginia soil survey. Based on these data, there are no hydric soils or partially hydric soils present in the watershed or Project Area (**Figure 284, Appendix A**) (**Appendix B**).

LULC. LULC changes in Madcap Creek-Blackwater River watershed between 2011, 2016 and 2019 are illustrated in **Table 31** and **Figures 285, 286 and 286a (Appendix A)**. Overall, there are approximately 37,059 acres in this watershed. The dominant LULC in this area is Forested (over 52%), followed by PHA (approximately 34.9%). The LOD is approximately 245 acres, which represents less than 0.7% of the entire watershed.

3.10.10 Maggodee Creek

Project Stream Impacts. There are seven proposed stream crossings in the Maggodee Creek watershed: five pipeline ROW crossings, one temporary access road, and one timber mat crossing. These stream impacts are all temporary in nature. The total impacts, an estimated 497 linear feet of stream, represent approximately 0.0420% of the modeled streams in this HUC-12 watershed (**Table 29**) (**Figure 287, Appendix A**).

Project Wetland Impacts. Approximately 0.20 acre of wetlands was delineated by Mountain Valley contractors in the Maggodee Creek watershed. There is one proposed wetland crossing that will result in 0.0004 acre of temporary impacts in the watershed. The NWI data indicate that there are 460.4 acres of aquatic resources in the watershed, including 36.09 acres of Freshwater

Emergent Wetland and 11.58 acres of Freshwater Forested/Scrub Wetland (**Table 30**) (**Figure 288, Appendix A).** None of these wetlands are in the Project Area.

Soils. The soil data for the Maggodee Creek watershed are from the Franklin County, and Roanoke County and the Cities of Roanoke and Salem, Virginia soil surveys. Based on these data, there are no hydric soils or partially hydric soils present in the watershed or Project Area (**Figure 289, Appendix A**).

LULC. LULC changes in Maggodee Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 31** and **Figures 290, 291 and 291a (Appendix A)**. Overall, there are approximately 29,144 acres in this watershed. The dominant LULC in this area is Forested (over 63%), followed by PHA (approximately 25.2%). The LOD is approximately 26.1 acres, which represents less than 0.1% of the entire watershed.

3.10.11 Standiford Creek-Smith Mountain Lake

Project Stream Impacts. There are 28 stream crossings in the Standiford Creek-Smith Mountain Lake watershed. One of these crossing, a pipeline ROW crossing, is complete. As noted in other drains, lakes are not included in stream miles in the model that was used to estimate stream lengths. Proposed stream impacts include 15 pipeline ROW crossings, 10 timber mat crossings, and two temporary access roads, all of which are temporary in nature. The total impacts, an estimated 1,577 linear feet of stream, represent approximately 0.1725% of the modeled streams in this HUC-12 watershed (**Table 29**) (**Figure 292, Appendix A**). The completed crossing total approximately 78 linear feet of temporary stream impacts.

Project Wetland Impacts. Approximately 5.66 acres of wetlands were delineated by Mountain Valley contractors in the Standiford Creek-Smith Mountain Lake watershed. There are four wetland crossings proposed in the watershed that will result in 0.1464 acre of temporary impacts and 0.0697 acre of wetland conversion impacts totaling 0.2161 acre of wetland impacts. The wetland conversion impacts will be mitigated using mitigation banking. The NWI data indicate that there are 2,483.43 acres of aquatic resources in the watershed, including 28.02 acre of Freshwater Emergent Wetland and 69.01 acre of Freshwater Forested/Scrub Wetland. The NWI data also indicate that the Project will impact 0.1073 acre of Freshwater Emergent Wetland in the watershed (**Table 30**) (**Figure 293, Appendix A**). These areas were delineated, and Freshwater Emergent Wetland impacts present are included in W-A12-PEM, which has 0.0651 acre of temporary impacts.

Soils. The soil data for the Standiford Creek-Smith Mountain Lake watershed are from the Franklin County, Virginia soil surveys. Based on these data, there are no hydric soils or partially hydric soils present in the watershed or Project Area (**Figure 294, Appendix A**) (**Appendix B**).

LULC. LULC changes in Standiford Creek-Smith Mountain Lake watershed between 2011, 2016 and 2019 are illustrated in **Table 31** and **Figures 295, 296 and 296a (Appendix A)**. Overall, there are approximately 29,829 acres in this watershed. The dominant LULC in this area is Forested

(over 44%), followed by PHA (approximately 31%). The LOD is approximately 142.4 acres, which represents less than 0.5% of the entire watershed.

3.10.12 Owens Creek-Pigg River

Project Stream Impacts. There are 31 proposed stream crossings in the Owens Creek-Pigg River watershed. Stream impacts in this watershed are temporary in nature and are associated with 18 timber mat and 13 pipeline ROW crossings. The total impacts, an estimated 1,330 linear feet of stream, represent approximately 0.1511% of the modeled streams in this HUC-12 watershed (**Table 29**) (**Figure 297, Appendix A**).

Project Wetland Impacts. Approximately 2.31 acres of wetlands were delineated by Mountain Valley contractors in the Owens Creek-Pigg River watershed. There are eight wetland crossings proposed in the watershed that will result in 0.1057 acre of temporary impacts and 0.0440 acre of wetland conversion impacts for a total of 0.1497 acre of wetland impacts. The conversion impacts will be mitigated using mitigation banking. The NWI data indicate that there are 448.12 acre of aquatic resources in the watershed, including 36.87 acre of Freshwater Emergent Wetland and 48.91 acre of Freshwater Forested/Scrub Wetland (**Table 30**) (**Figure 298, Appendix A**). These wetlands are not located in the Project Area.

Soils. The soils data for the Owens Creek-Pigg River watershed are from the Franklin County, and Pittsylvania County and the City of Danville, Virginia soil surveys. These soil data indicate that there are no other hydric soils or partially hydric soils present in the watershed or Project Area (**Figures 299, Appendix A**) (**Appendix B**).

LULC. LULC changes in Owens Creek-Pigg River watershed between 2011, 2016 and 2019 are illustrated in **Table 31** and **Figures 300, 301 and 301a (Appendix A)**. Overall, there are approximately 23,204 acres in this watershed. The dominant LULC in this area is Forested (over 60%), followed by PHA (approximately 22.5%). The LOD is approximately 117 acres, which represents less than 0.5% of the entire watershed.

3.10.13 Tomahawk Creek–Pigg River

Project Stream Impacts. There are 22 proposed stream crossings in the Tomahawk Creek-Pigg River watershed. Proposed stream impacts in this watershed are temporary in nature and are associated with 10 timber mat crossings and 12 pipeline ROW crossings. The total impacts, an estimated 1,191 linear feet of stream, represent approximately 0.1194% of the modeled streams in this HUC-12 watershed (**Table 29**) (**Figure 302, Appendix A**).

Project Wetland Impacts. Approximately 3.93 acre of wetlands were delineated by Mountain Valley contractors in the Tomahawk Creek-Pigg River watershed. Seven wetland crossings are proposed in this watershed. The crossings will result in 0.2378 acre of temporary impacts and 0.0332 acre of wetland conversion impacts that total 0.2710 acre of wetland impacts. Wetland conversion impacts will be mitigated using mitigation banking. The NWI data indicate that there are 777.91 acre of aquatic resources in the watershed, including 54.22 acres of Freshwater

Emergent Wetland and 194.52 acres of Freshwater Forested/Scrub Wetland. The NWI data also indicate that the Project will impact 0.8589 acre of Freshwater Forested/Scrub Wetland in the Project Area (**Table 30**) (**Figure 303, Appendix A**). This area was delineated, and no wetlands were identified.

Soils. The soils data for the Tomahawk Creek-Pigg River watershed are from the Franklin County, and Pittsylvania County and the City of Danville, Virginia soil surveys. These data indicate that there are no hydric or partially hydric soils present in the watershed or Project Area (**Figure 304, Appendix A**) (**Appendix B**).

LULC. LULC changes in Tomahawk Creek-Pigg River watershed between 2011 and 2016 are illustrated in **Table 31** and **Figures 306, 307 and 307a (Appendix A)**. Overall, there are approximately 26,599 acres in this watershed. The dominant LULC in this area is Forested (over 48%), followed by PHA (approximately 31.9%). The LOD is approximately 188.4 acres, which represents less than 0.7% of the entire watershed.

Table 29
Cumulative Project Stream Impacts in the HUC-12 Watersheds that Fall Within the Upper Roanoke (03010101) Watershed

HUC-12 Watershed	Total Number of Stream Crossings	Proposed Impacts in Application (feet)		Total Project-Related Impacts (feet)		Estimated Linear Feet of Streams in Watershed	Project-Related Cumulative Impacts (feet)	Percentage of Impacted Linear Stream Feet Estimated in the Watershed
		Perm	Temp	Perm	Temp			
Dry Run – North Fork Roanoke River	14	0	656	0	1,041	1,350,145	1,041	0.0771%
Wilson Creek – North Fork Roanoke River	10	0	760	0	760	1,012,489	760	0.0751%
Bradshaw Creek – North Fork Roanoke River	3	0	248	0	248	719,801	248	0.0345%
Brake Branch – South Fork Roanoke River	1	0	79	0	79	777,601	79	0.0102%
Sawmill Hollow – Roanoke River	7	0	468	0	468	1,648,284	468	0.0284%
Bottom Creek	25	0	1,225	0	1,225	654,699	1,225	0.1871%
South Fork Blackwater River	9	0	185	0	421	695,228	421	0.0606%
North Fork Blackwater River	22	0	1,211	0	1,588	851,091	1,588	0.1866%
Madcap Creek – Blackwater River	55	0	2,379	0	3,373	1,466,132	3,373	0.2301%
Maggodee Creek	7	0	497	0	497	1,184,040	497	0.0420%
Standiford Creek – Smith Mountain Lake	28	0	1,499	0	1,577	914,176	1,577	0.1725%
Owens Creek – Pigg River	31	0	1,330	0	1,330	880,190	1,330	0.1511%
Tomahawk Creek – Pigg River	22	0	1,191	0	1,191	997,467	1,191	0.1194%

Table 30
Cumulative Project-Related Wetland Impacts and National Wetland Inventory data in the HUC-12 Watersheds that Fall Within the Upper Roanoke Watershed

HUC-12 Watershed	Delineated Acres[1]	Total Number of Wetland Crossings	Temporary Impacts (acres)	Permanent Conversion Impacts (Acres)	Permanent Fill Impacts (acres)	Total Wetland Impacts	National Wetland Inventory Data (acres)						
							Riverine	Freshwater Emergent Wetland	Freshwater Forested/Scrub Wetland	Freshwater Pond	Lake	Other	Total
Dry Run-North Fork Roanoke River	4.48	4	0.0529	0	0	0.0529	342.9	2.85	0	16.34	0	0	362.09
Wilson Creek-North Fork Roanoke River	1.61	5	0.2205	0.1153	0	0.3358	264.03	4.61	0.98	19.66	0	0	289.28
Bradshaw Creek-North Fork Roanoke River	0.26	1	0.0454	0	0	0.0454	225.01	2.13	1.61	4.88	0	0	233.62
Brake Branch-South Fork Roanoke River	0.20	1	0	0	0.0392	0.0392	240.71	4.42	1.96	6.07	0	0	253.17
Sawmill Hollow-Roanoke River	1.97	2	0.0040	0.0852	0	0.0892	610.28	1.18	3.47	32	0	0	646.93
Bottom Creek	28.38	40	1.3295	0.7001	0	2.0296	183.79	45.12	60.81	25.95	0	0	315.66
South Fork Blackwater River	3.53	5	0.1871	0	0	0.1871	187.46	9.66	13.65	11.24	0	0	222.00
North Fork Blackwater River	2.23	4	0.0779	0	0	0.0779	224.23	0.89	4.36	39.39	0	0	268.88
Madcap Creek-Blackwater River	8.29	10	0.4095	0.2372	0	0.6467	479.48	47.4	103.79	73.33	0	0	704.00
Maggodee Creek	0.20	1	0.0004	0	0	0.0004	357	36.09	11.58	55.73	0	0	460.4
Standiford Creek-Smith Mountain Lake	5.66	4	0.1464	0.0697	0	0.2161	258.86	28.02	69.01	69.15	2058.39	0	2483.43

HUC-12 Watershed	Delineated Acres[1]	Total Number of Wetland Crossings	Temporary Impacts (acres)	Permanent Conversion Impacts (Acres)	Permanent Fill Impacts (acres)	Total Wetland Impacts	National Wetland Inventory Data (acres)						
							Riverine	Freshwater Emergent Wetland	Freshwater Forested/Scrub Wetland	Freshwater Pond	Lake	Other	Total
Owens Creek-Pigg River	2.31	8	0.1057	0.0440	0	0.1497	289.21	36.87	48.91	73.14	0	0	448.12
Tomahawk Creek–Pigg River	3.93	7	0.2378	0.0332	0	0.2710	353.98	54.22	194.52	113.14	62.05	0	777.91
[1] Acres delineated within the HUC-12 Watershed.													

Table 31
LULC in the HUC-12 Watersheds that Fall Within the Upper Roanoke Watershed

HUC-12 Watershed	Total HUC-12 Watershed Size (Acres)	Year	Forest		Mixed Development		Pasture, Hay, Agriculture		Streams Riparian Corridor, Floodplain		Water		Wetlands		Barren Including Mine, Oil and Gas		Roads, Impervious Surface	
			Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12
Dry Run-North Fork Roanoke River	32,811	2011	22,094	67.3	1,174	3.6	7,519	22.9	693	2.1	4	0.0	0	0.0	3	0.0	1324.1	4.0
	32,811	2016	22,080	67.3	1,192	3.6	7,479	22.8	732	2.2	5	0.0	0	0.0	2	0.0	1319.7	4.0
	32,811	2019	22,305	68.0	1,219	3.7	7,473	22.8	502	1.5	5	0.0	0	0.0	4	0.0	1303.2	4.0
Wilson Creek-North Fork Roanoke River	25,895	2011	18,324	70.8	2,972	11.5	2,690	10.4	568	2.2	8	0.0	0	0.0	102	0.4	1231.6	4.8
	25,895	2016	17,918	69.2	3,015	11.6	2,666	10.3	961	3.7	7	0.0	0	0.0	102	0.4	1226.5	4.7
	25,895	2019	17,951	69.3	3,090	11.9	2,632	10.2	865	3.3	7	0.0	0	0.0	136	0.5	1214.3	4.7
Bradshaw Creek-North Fork Roanoke River	15,320	2011	12,865	84.0	605	3.9	1,142	7.5	279	1.8	1	0.0	0	0.0	83	0.5	346.0	2.3
	15,320	2016	12,888	84.1	609	4.0	1,132	7.4	259	1.7	1	0.0	0	0.0	84	0.5	346.9	2.3
	15,320	2019	12,789	83.5	634	4.1	1,112	7.3	332	2.2	1	0.0	0	0.0	107	0.7	345.6	2.3
Brake Branch-South Fork Roanoke River	21,870	2011	17,286	79.0	1,375	6.3	2,073	9.5	280	1.3	0	0.0	1	0.0	85	0.4	769.0	3.5
	21,870	2016	17,115	78.3	1,397	6.4	2,054	9.4	456	2.1	0	0.0	1	0.0	84	0.4	762.1	3.5
	21,870	2019	17,112	78.2	1,407	6.4	2,051	9.4	457	2.1	0	0.0	1	0.0	81	0.4	760.1	3.5
Sawmill Hollow-Roanoke River	40,523	2011	27,224	67.2	8,044	19.8	1,849	4.6	733	1.8	141	0.3	0	0.0	19	0.0	2514.0	6.2
	40,523	2016	26,833	66.2	8,121	20.0	1,805	4.5	1,052	2.6	142	0.3	0	0.0	20	0.0	2551.1	6.3
	40,523	2019	26,858	66.3	8,196	20.2	1,788	4.4	990	2.4	142	0.3	0	0.0	50	0.1	2499.7	6.2
Bottom Creek	18,129	2011	14,180	78.2	337	1.9	2,046	11.3	810	4.5	8	0.0	164	0.9	5	0.0	580.5	3.2
	18,129	2016	14,237	78.5	343	1.9	2,040	11.3	759	4.2	7	0.0	155	0.9	5	0.0	581.8	3.2
	18,129	2019	14,593	80.5	348	1.9	2,045	11.3	398	2.2	7	0.0	155	0.9	5	0.0	577.1	3.2
	18,019	2011	12,989	72.1	227	1.3	3,650	20.3	521	2.9	3	0.0	4	0.0	3	0.0	622.0	3.5

HUC-12 Watershed	Total HUC-12 Watershed Size (Acres)	Year	Forest		Mixed Development		Pasture, Hay, Agriculture		Streams Riparian Corridor, Floodplain		Water		Wetlands		Barren Including Mine, Oil and Gas		Roads, Impervious Surface	
			Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12
South Fork Blackwater River	18,019	2016	12,747	70.7	234	1.3	3,641	20.2	764	4.2	3	0.0	4	0.0	3	0.0	624.3	3.5
	18,019	2019	12,811	71.1	239	1.3	3,658	20.3	682	3.8	3	0.0	4	0.0	3	0.0	619.1	3.4
North Fork Blackwater River	20,475	2011	14,652	71.6	303	1.5	4,153	20.3	570	2.8	21	0.1	2	0.0	2	0.0	772.4	3.8
	20,475	2016	14,522	70.9	310	1.5	4,155	20.3	688	3.4	21	0.1	2	0.0	1	0.0	776.8	3.8
	20,475	2019	14,423	70.4	314	1.5	4,160	20.3	779	3.8	21	0.1	2	0.0	4	0.0	772.8	3.8
Madcap Creek-Blackwater River	37,059	2011	19,653	53.0	1,395	3.8	13,003	35.1	1,023	2.8	28	0.1	32	0.1	5	0.0	1919.3	5.2
	37,059	2016	19,457	52.5	1,465	4.0	12,903	34.8	1,272	3.4	31	0.1	30	0.1	5	0.0	1896.4	5.1
	37,059	2019	19,271	52.0	1,485	4.0	12,919	34.9	1,432	3.9	31	0.1	30	0.1	8	0.0	1882.3	5.1
Maggodee Creek	29,144	2011	18,524	63.6	995	3.4	7,375	25.3	769	2.6	27	0.1	8	0.0	2	0.0	1445.8	5.0
	29,144	2016	18,371	63.0	1,060	3.6	7,313	25.1	966	3.3	26	0.1	8	0.0	2	0.0	1398.2	4.8
	29,144	2019	18,383	63.1	1,069	3.7	7,331	25.2	935	3.2	26	0.1	8	0.0	3	0.0	1389.1	4.8
Standiford Creek-Smith Mountain Lake	29,829	2011	13,493	45.2	959	3.2	9,345	31.3	2,232	7.5	1,897	6.4	30	0.1	21	0.1	1851.7	6.2
	29,829	2016	13,527	45.3	995	3.3	9,196	30.8	2,322	7.8	1,892	6.3	31	0.1	22	0.1	1843.7	6.2
	29,829	2019	13,364	44.8	1,003	3.4	9,256	31.0	2,425	8.1	1,891	6.3	34	0.1	21	0.1	1835.4	6.2
Owens Creek-Pigg River	23,204	2011	14,532	62.6	290	1.3	5,237	22.6	2,370	10.2	26	0.1	28	0.1	7	0.0	714.1	3.1
	23,204	2016	14,046	60.5	306	1.3	5,196	22.4	2,887	12.4	26	0.1	26	0.1	7	0.0	710.3	3.1
	23,204	2019	13,998	60.3	310	1.3	5,214	22.5	2,918	12.6	26	0.1	26	0.1	7	0.0	706.3	3.0
Tomahawk Creek-Pigg River	26,599	2011	13,117	49.3	418	1.6	8,382	31.5	3,446	13.0	132	0.5	60	0.2	0	0.0	1043.0	3.9
	26,599	2016	12,203	45.9	427	1.6	8,391	31.5	4,342	16.3	137	0.5	58	0.2	1	0.0	1039.9	3.9
	26,599	2019	12,831	48.2	435	1.6	8,489	31.9	3,615	13.6	137	0.5	58	0.2	1	0.0	1031.9	3.9

3.11 Banister

The Project crosses three 12-digit HUC watersheds in the Banister HUC-8 watershed (**Figure 72, Appendix A**). These include Cherrystone Creek (030101050104), Mill Creek-Whitehorn Creek (030101050201), and Shockoe Creek-Banister River (030101050203) (**Table 42**). The Banister watershed is approximately 596.7 mi^2, the smallest in the Project area. The combined drainage of the three listed watersheds is approximately 116.6 mi^2. This includes the Shockoe Creek-Banister River watershed that has no stream impacts.

3.11.1 Cherrystone Creek

Project Stream Impacts. There are 34 proposed stream crossings in the Cherrystone Creek watershed. There is one proposed permanent access road with permanent impacts. The 33 remaining proposed stream crossings are associated with 18 timber mat crossings and 15 pipeline ROW crossings. These impacts are temporary in nature. The total impacts, temporary (1,646 linear feet) and permanent (32 linear feet), an estimated 1,646 linear feet of stream, represent approximately 0.1519% of the modeled streams in this HUC-12 watershed (**Table 42**) (**Figure 308, Appendix A**).

Project Wetland Impacts. Approximately 27.35 acres of wetland were delineated by Mountain Valley contractors in the Cherrystone Creek watershed. There are 14 proposed wetland crossings that will result in 1.0421 acres of temporary impacts and 0.5706 acre of wetland conversion impacts totaling 1.6127 acres of wetland impacts. The wetland conversion impacts will be mitigated using mitigation banking. The NWI data indicate that there are 816.46 acres of aquatic resources in the watershed, including 57.23 acres of Freshwater Emergent Wetland and 170.75 acres of Freshwater Forested/Scrub Wetland. The NWI data also indicate that the Project will impact 0.0701 acre of Freshwater Emergent Wetland and 0.7166 acre of Freshwater Forested/Scrub Wetland located in two separate parcels in the Project Area. These areas were included in the Project's delineation. A portion of the Freshwater Forested/Scrub Wetland impacts are included in W-MM9, which has 0.0108 acre of temporary impacts (**Table 43**) (**Figure 309, Appendix A**). The other Freshwater Forested/Scrub Wetland area were investigated, and no wetlands were identified. The Freshwater Emergent Wetland area was also delineated, and a wetland was not present.

Soils. The soils data for the Cherrystone Creek watershed are from the Pittsylvania County and City of Danville, Virginia soil survey. The data indicate that one hydric soil Hatboro silt loam, 0 to 2 percent slopes, frequently flooded (Soil 41A) (150.3 acres, less than 0.6% of the watershed area) may be present in the watershed. The soil survey data also indicate that the hydric soil, Soil 41A (1.1 acres) may be present in the Project Area (**Figure 310, Appendix A**) (**Appendix B**).

LULC. LULC changes in Cherrystone Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 44** and **Figures 311, 312 and 312a (Appendix A)**. Overall, there are approximately 29,138 acres in this watershed. The dominant LULC in this area is Forested (over 41%), followed by PHA (approximately 36.2%). The LOD is approximately 175 acres, which represents less than 0.6% of the entire watershed.

3.11.2 Mill Creek-Whitehorn Creek

Project Stream Impacts. There are four proposed pipeline ROW stream crossings in the Mill Creek-Whitehorn Creek watershed. These impacts are temporary in nature. The total impacts, an estimated 390 linear feet of stream, represent approximately 0.0394% of the modeled streams in this HUC-12 watershed (**Table 42**) (**Figure 313, Appendix A**).

Project Wetland Impacts. Approximately 0.69 acre of wetland was delineated by Mountain Valley contractors in the Mill Creek-Whitehorn Creek watershed. These impacts have been avoided, and there are no wetland impacts in the watershed. The NWI data indicate that there are 670.10 acres of aquatic resources in the watershed, including 72.67 acres of Freshwater Emergent Wetland and 191.44 acres of Freshwater Forested/Scrub Wetland (**Table 43**) (**Figure 314, Appendix A**). None of these wetlands fall in the Project Area.

Soils. The soils data for the Mill Creek-Whitehorn Creek watershed are from the Pittsylvania County and City of Danville, Virginia soil survey. The soil data indicate that the hydric soils, Soil 41A (18 acres, less than 0.07% of the watershed area), and Leaksville silt loam, 0 to 4 percent slopes (Soil 20B-Pittsylvania) (11.1 acres, less than 0.05% of the watershed) may be present in the watershed; however, these soil types are not crossed by the Project (**Figure 315, Appendix A**) (**Appendix B**).

LULC. LULC changes in Mill Creek-Whitehorn Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 44** and **Figures 316, 317 and 317a (Appendix A)**. Overall, there are approximately 26,718 acres in this watershed. The dominant LULC in this area is Forested (over 43%), followed by PHA (approximately 36.9%). The LOD is approximately 33.5 acres, which represents less than 0.1% of the entire watershed.

3.11.3 Shockoe Creek-Banister River

Project Stream Impacts. The Project area includes the Shockoe Creek-Banister River watershed. However, there are no stream crossings in this watershed (**Table 42**) (**Figure 318**, **Appendix A**).

Project Wetland Impacts. Approximately 0.67 acre of wetlands was delineated by Mountain Valley contractors in the Shockoe Creek-Banister River watershed. There are two proposed wetland crossings that will result in 0.0773 acre of wetland conversion impacts in the watershed. These impacts will be mitigated using mitigation banking. The NWI data indicate that there are 564.95 acres of aquatic resources in the watershed, including 31.31 acres of Freshwater Emergent Wetland and 236.77 acres of Freshwater Forested/Scrub Wetland (**Table 43)** (**Figure 319, Appendix A**). These wetlands are not located in the Project Area.

Soils. The soils data for the Shockoe Creek-Banister River watershed are from the Pittsylvania County and City of Danville, Virginia soil survey. The soil data indicate that the hydric soil, Soil 41A (161.7 acres, less than 0.9% of the watershed area) and Soil 20B-Pittsylvania (437.9 acres, less than 2.4% of the watershed area) may be present in the watershed; however, these data indicate

that there are no hydric soils or partially hydric soils in the Project Area (**Figure 320, Appendix A**) (**Appendix B**).

LULC. LULC changes in Mill Creek-Whitehorn Creek watershed between 2011, 2016 and 2019 are illustrated in **Table 44** and **Figures 321, 322 and 322a (Appendix A)**. Overall, there are approximately 18,816 acres in this watershed. The dominant LULC in this area is Forested (over 58%), followed by PHA (approximately 21.9%). The LOD is approximately 11.9 acres, which represents less than 0.1% of the entire watershed.

Table 42
Cumulative Project Stream Impacts in the HUC-12 Watersheds that Fall Within the Banister (03010105) Watershed

HUC-12 Watershed	Total Number of Stream Crossings	Proposed Impacts in Application (feet)		Total Project-Related Impacts (feet)		Estimated Linear Feet of Streams in Watershed	Project-Related Cumulative Impacts (feet)	Percentage of Impacted Linear Stream Feet Estimated in the Watershed
		Perm	Temp	Perm	Temp			
Cherrystone Creek	34	32	1,646	32	1,646	1,083,738	1,646	0.1519%
Mill Creek – Whitehorn Creek	4	0	390	0	390	989,566	390	0.0394%
Shockoe Creek – Banister River	0	0	0	0	0	703,910	0	0%

Table 43
Cumulative Project-Related Wetland Impacts and National Wetland Inventory Data in the HUC-12 Watersheds that Fall Within the Banister Watershed

HUC-12 Watershed	Delineated Acres[1]	Total Number of Wetland Crossings	Temporary Impacts (acres)	Permanent Conversion Impacts (Acres)	Permanent Fill Impacts (acres)	Total Wetland Impacts	National Wetland Inventory Data (acres)						
							Riverine	Freshwater Emergent Wetland	Freshwater Forested/Scrub Wetland	Freshwater Pond	Lake	Other	Total
Cherrystone Creek	27.35	14	1.0421	0.5706	0	1.6127	273.4	57.23	170.75	185.8	129.28	0	816.46
Mill Creek-Whitehorn Creek	0.69	---	---	---	---	---	274.9	72.67	191.44	131	0	0	670.10
Shockoe Creek-Banister River	0.67	2	0	0.0773	0	0.0773	207.78	31.31	236.77	89.09	0	0	564.95

[1] Acres delineated within the HUC-12 Watershed.

Table 44
LULC in the HUC-12 Watersheds that Fall Within the Banister Watershed

HUC-12 Watershed	Total HUC-12 Watershed Size (Acres)	Year	Forest		Mixed Development		Pasture, Hay, Agriculture		Streams Riparian Corridor, Floodplain		Water		Wetlands		Barren Including Mine, Oil and Gas		Roads, Impervious Surface	
			Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12	Acres	% of Total HUC-12
Cherrystone Creek	29,138	2011	11,996	41.2	1,136	3.9	10,662	36.6	3,637	12.5	220	0.8	133	0.5	15	0.1	1,340	4.6
	29,138	2016	11,201	38.4	1,200	4.1	10,481	36.0	4,511	15.5	215	0.7	133	0.5	14	0.0	1,382	4.7
	29,138	2019	12,193	41.8	1,222	4.2	10,560	36.2	3,431	11.8	216	0.7	133	0.5	12	0.0	1,371	4.7
Mill Creek-Whitehorn Creek	26,718	2011	11,473	42.9	825	3.1	9,970	37.3	3,222	12.1	69	0.3	75	0.3	3	0.0	1,083	4.1
	26,718	2016	10,839	40.6	850	3.2	9,729	36.4	4,048	15.1	67	0.2	76	0.3	4	0.0	1,106	4.1
	26,718	2019	11,706	43.8	857	3.2	9,866	36.9	3,034	11.4	67	0.2	76	0.3	12	0.0	1,099	4.1
Shockoe Creek-Banister River	18,816	2011	10,443	55.5	243	1.3	4,157	22.1	3,084	16.4	52	0.3	278	1.5	0	0.0	559	3.0
	18,816	2016	10,353	55.0	247	1.3	4,070	21.6	3,248	17.3	49	0.3	290	1.5	0	0.0	558	3.0
	18,816	2019	11,087	58.9	255	1.4	4,117	21.9	2,463	13.1	50	0.3	290	1.5	0	0.0	553	2.9

4.0 CONCLUSIONS

Stream Impacts. This report estimates the total number of linear feet of streams in each 12-digit HUC watershed, identifies the number of linear feet of streams that will be affected by the Project in that watershed, and provides the percentage of the total HUC-12 stream feet that those Project impacts represent. This process included the modeling of stream flow paths to establish the total linear feet of stream in each watershed. Using the model for this type of evaluation provides a more accurate estimate than using NHD streamlines. The NHD values typically are limited to blue-line or hatched blue-line streams and, in most instances, do not count high-gradient intermittent and ephemeral streams that fall within the USACE's jurisdiction.

Based on the information generated for this analysis, the Project will have negligible impacts to streams in each 12-digit watershed. Permanent stream impacts are limited and are primarily the result of installing, repairing, or replacing culverts under access roads.[6] Temporary impacts are primarily associated with timber mat crossings or the pipeline ROW. Timber mats are placed within the ordinary high water mark and thus are included in the impacts; however, they do not sit in the streambed and do not significantly alter substrate. These structures also have little to no potential to affect water quality or aquatic habitat. Temporary pipeline ROW crossings are very short term, with construction crews completing these types of crossings within a few hours to few days, when practicable. Further, crossings in many of the intermittent and ephemeral streams will be completed during low-flow or no-flow conditions, minimizing the potential for downstream water-quality impacts.

In addition, Mountain Valley has developed a proposed *Stream and Wetland Restoration, Monitoring, and Mitigation Framework*. The *Mitigation Framework* presents a comprehensive approach to mitigating unavoidable impacts that exceeds the regulatory requirements in the USACE and Environmental Protection Agency compensatory mitigation rule (40 C.F.R. § 230.93). The *Mitigation Framework* provides compensatory mitigation for both permanent and temporal losses, including temporal losses associated with the period of post-construction recovery of temporarily impacted streams and wetlands. Because it is proposing to provide compensatory mitigation in advance of temporary impacts, Mountain Valley is confident this approach will result in no net impacts to aquatic functions and values—if not produce a net lift—at any time during or after construction. In the *Mitigation Framework*, Mountain Valley has proposed to conduct post-construction monitoring in accordance with defined performance standards. If the success criteria are not attained, corrective action plans measures will be developed in accordance with adaptive management principles. The results of the post-construction monitoring and, where necessary, corrective action plans will be reported to the USACE, WVDEP, and VADEQ annually. These measures will ensure that the relevant resource agencies can verify that restoration has been successfully completed. All of these factors play a role in minimizing the potential effects both individually and cumulatively.

[6] Many of the existing culverts included in the application are inadequately sized, poorly constructed, and/or damaged in a manner that adversely affects stream flow and aquatic habitat. Repairing or replacing improper culverts in those situations with properly sized and countersunk culverts will have a beneficial long-term effect on streams, which is relevant to the consideration of the net cumulative impacts of these "permanent" stream impacts.

All permanent and conversion impacts have been mitigated for using banks or in-lieu-fee programs. Temporary impacts will be restored post construction. The result is an extremely small fraction of permanent impacts, and in some cases no permanent impacts, in each 12-digit HUC watershed.

Wetland Impacts. The combined impacts on wetlands within each 12-digit HUC watershed are similarly insignificant. Eight of the HUC-12 watersheds have no wetland impacts. The watershed with the largest combined wetland impact is Bottom Creek, with 2.03 acres of impact in a large watershed with a total drainage area exceeding 18,000 acres. However, two-thirds of the temporary impacts in this watershed (1.33 acres) are palustrine emergent wetlands that will be restored to preconstruction conditions. The Project will not cause the "loss" of any wetland acreage in this watershed; the 0.70 acres of "permanent" impacts are all conversions that will be restored to palustrine emergent wetlands. The watershed with the greatest area of combined permanent wetland fill is Outlet Laurel Creek, which has six small areas of fill associated with access road construction that sum to less than 0.10 acre (before accounting for compensatory mitigation). In short, the total Project-related wetland impacts are minimal in each 12-digit HUC watershed.

Approximately 2,578 acres of NWI emergent wetland and 6,043 acres of NWI forested/scrub wetland were identified in the Project Area. Of this total, ArcGIS NWI data suggested that the Project would have impacts to 7.6599 acres of wetland in 13 of the HUC-12 watersheds. However, results of the Project-specific wetland delineation demonstrated that the Project would have fewer impacts than suggested by the NWI data. Nine wetland crossings were identified in NWI wetlands; the other locations identified as NWI wetland were not, in fact, delineated as wetlands. The total impact associated with the nine crossings in NWI wetlands is approximately 1.0009 acres; however, this is an overestimate as not all of the impact area at some of these locations were identified as an NWI wetland, i.e., only a portion of the wetland is found in the NWI boundary. This 1.0009 acres represent approximately 0.01% of the NWI wetlands identified in the Project's HUC-12 watersheds. The NWI data also indicated impacts to seven Freshwater Ponds. However, there are no impacts to Freshwater Ponds. Some of the ponds were no longer present, and all of the locations were avoided.

NWI data are generally used as a screening tool during project development. The NWI data are created from remote-sensing techniques and are typically not field-verified resources. To accurately identify wetlands within a project area, field surveys are required and were completed for the Mountain Valley Pipeline Project. The total amount of wetland acreage that was delineated in the Project's watersheds, 281.53 acres, is a more accurate reflection of the Project's wetland impacts than USFWS's NWI mapping and Mountain Valley's efforts to avoid wetlands.

Hydric Soils. Because much of the Project is located along ridgetops, a large amount of hydric soil was not expected to be found in the Project Area. The NRCS soil surveys confirmed that this expectation was accurate. There are no hydric soils in the Project Area in the HUC-12 watersheds in the Middle Ohio North, West Fork, Little Kanawha, Lower New, and Upper James watersheds. There are 2.6 acres of Atkins loam, moist, 0 to 3 percent slopes, frequently flooded (At) present in the Elk Run watershed. The Gauley watershed has two hydric soils in the Project Area: Elkins

silt loam, drained (Ed) (14.5 acres) and Purdy silt loam, 0 to 5 percent slopes (Pu) (0.5 acre). The Greenbrier watershed has 1.0 acres of Atkins silt loam, warm, 0 to 3 percent slopes, frequently flooded. The Upper New watershed has two hydric soils present in the Project Area: Melvin silt loam (Me-Monroe) and Mauretown silt loam, 0 to 3 percent slopes (MaA) (14.1 acres and 5.5 acres, respectively). There are 5.9 acres of hydric soil (Alderflats silt loam, 0 to 4 percent slopes – 1A) in the Upper Roanoke watershed and 1.1 acres of hydric soil (Hatboro silt loam, 0 to 2 percent slopes, frequently flooded – 41A) in the Banister watershed. In total, based on the various soil surveys, there are 45.2 acres of hydric soils in the 6,403 acres of Project Area. It should be noted that the presence of hydric soils does not mean that these soils will be disturbed or that a wetland is present.

LULC. With a few exceptions, the majority of the HUC-12 watersheds are primarily Forested, 44 of which have forested areas that exceed 70%. In most HUC-12 watersheds (60 out of 62), the Project Area represents less than 1.0% of the watershed area.