PC: Sierra Club
Appalachians Against Pipelines

Mountain Valley Pipeline Stream and Wetland Crossings

Review of Inspection Reports

2024

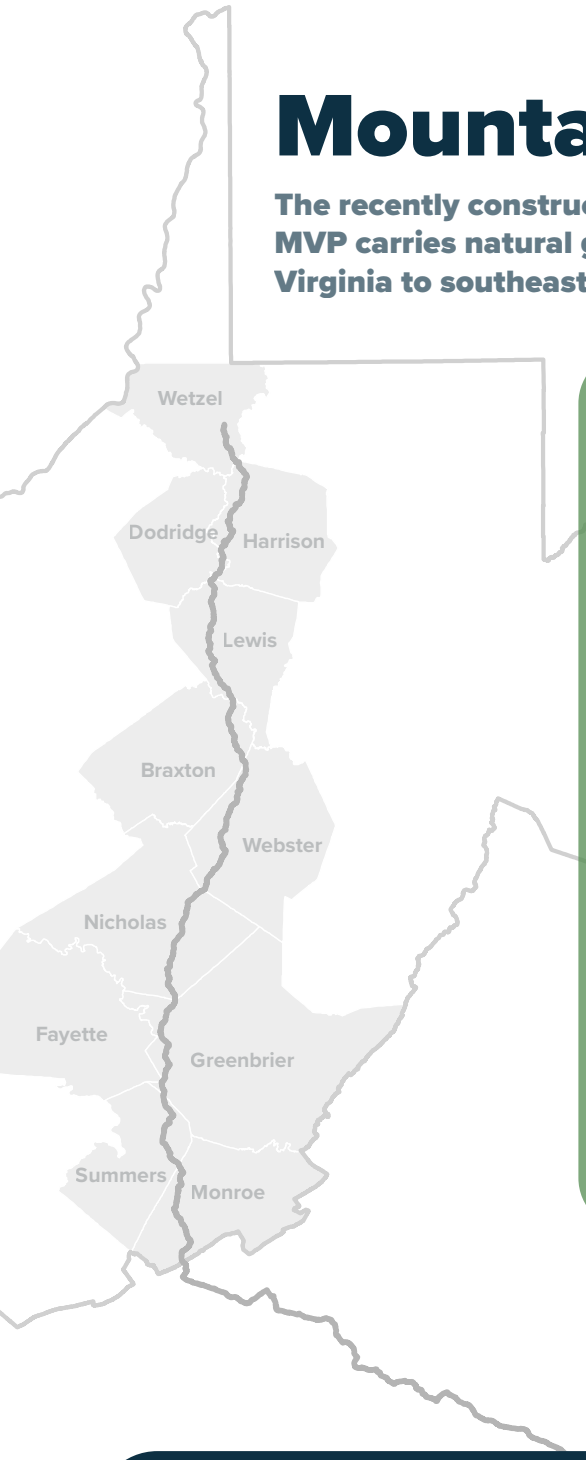
PC: Appalachian Voices
Mason Adams and Virginia Mercury

Downstream Strategies
Ideas that sustain.

WEST VIRGINIA RIVERS

Mountain Valley Pipeline

The recently constructed 303-mile long, 42-inch wide MVP carries natural gas from north-central West Virginia to southeastern Virginia.



MVP passes through

- **195 miles of mountainous terrain**
- **11 counties**
- **8 watersheds**
  Middle New, Little Kanawha, Greenbrier, Lower New, Gauley, Elk, Little Muckingum-Middle Island, West Fork
- **4 rivers**
  Little Kanawha River, Elk River, Gauley River, Greenbrier River
- **4 critical habitat designation areas**
- **thousands of streams and wetlands**

in West Virginia.

This report summarizes inspection reports for

139 Stream Crossings

61 Wetland Crossings

Stream and Wetland Crossing Impacts

Construction Impacts

- Destabilized stream banks and stream beds
- Removal of riparian vegetation
- Dewatering stream beds for prolonged periods
- Accidental spills of fuels or drilling mud
- Compound impacts from multiple crossings within a watershed

Water Quality + Aquatic Life Impacts

- Destabilized stream banks and stream beds
- Increased stormwater runoff and sedimentation
- Disrupted feeding and breeding, and death, if species are not removed from dewatered areas
- Degraded water quality
- Compounded impacts that lead to loss of habitat

Adapted from WVRC and Trout Unlimited 2022, Table 1.

Inspection Reports

MVP's 401 Certification issued on June 8, 2023 by the West Virginia Department of Environmental Protection (WVDEP) requires that all stream and wetland crossings be inspected by a qualified third-party inspector prior to and following construction of the crossing.

Inspection reports were required to be submitted to WVDEP within 14 days of completion of the crossing. Reports were retrieved from WVDEP's online database of public records in May 2024. (WVDEP 2023-2024)

Pre-Construction

Third party inspectors completed surveys of specific **biological conditions** at each wetland and stream crossing location. Each factor received a pre-construction rating of 1 through 4 for wetlands and 1 through 5 for streams. **A score of 1 indicates pristine conditions and 4 or 5 indicates degraded conditions.**

During Construction

Third party inspectors observed construction activities and documented adherence to required **BMPs.**

Stream Crossing BMPs

1) use of pre-construction survey data to restore contours
2) minimization of time of completion
3) prevention of unauthorized discharges

Wetland Crossings BMPs

1) use of equipment mats or other methods to minimize soil compaction by heavy equipment
2) removal and stockpiling of vegetation and wetland soils
3) proper disposal of excess fill material
4) use of native wetland topsoil in the top 12 inches of fills
5) implementation of decompaction practices prior to reseeding
6) completion of reseeding
7) proper removal of timber matting
8) utilization of erosion controls
9) use of pre-construction survey data to return the wetland to original contours and hydrological flow patterns
10) minimization of time of completion
11) prevention of unauthorized discharges

Post Construction

A few days following completion of the stream or wetland crossing, third party inspectors completed the same surveys for **biological conditions** as were completed prior to construction. Again, inspectors assigned a rating for each factor. Data gathered and documented on inspection reports were reviewed and analyzed. Results of this analysis are documented in this report.

Our review of the inspection reports indicates significant impacts to biological conditions are occurring despite meeting requirements for best management practices.

Stream Crossings

Why are streams important?

Streams are vital for healthy, mountainous ecosystems. In order to provide habitat for wildlife, aid in climate resilience, purify drinking water, and offer recreation opportunities, streams must have a variety of natural features. Different species rely on healthy streams with vegetated streambanks, riffles, runs, pools, shade, and meandering channels through varying terrain.

National Habitat Designations

Trout

Native and non-native trout are important sources of food and recreational opportunities for West Virginians. Trout species, including West Virginia's native brook trout, require clean, cold streams. Trout spawn by creating nests (redds) in stream bottoms.

Increased sediment and embedded stream bottoms prevent egg survival and trout reproduction. Healthy vegetation in riparian zones is crucial for maintaining cool waters necessary for healthy trout populations.

Black bears, otters, owls, kingfishers, bass, pike, and bald eagles are some examples of species that rely heavily on trout to survive. The disruption of trout habitat would affect West Virginia's economy and biodiversity.

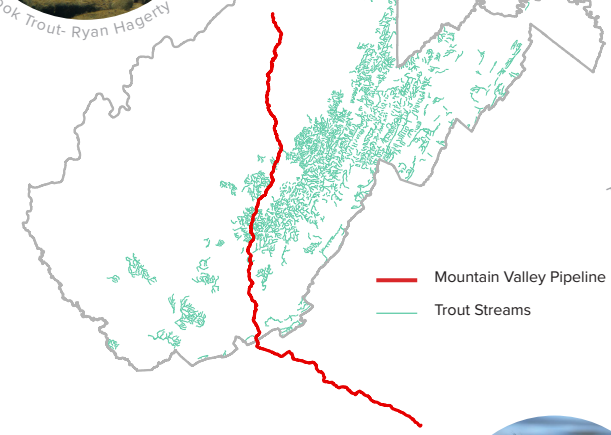
PC: Kingfisher- Rick Leche

PC: Bass- Game and Fish Magazine

PC: Brook Trout- Ryan Hagerty

PC: Black Bears- Jim Blackwood

PC: Eastern Screech Owls- Larry Hitchens



Mussels

Populations of freshwater mussels are diminishing rapidly, and West Virginia is a global hotspot. Freshwater mussels are indicator species; the presence of mussels in streams indicates high water quality due to their sensitivity to environmental changes.

They play a key role in purifying drinking water due to their ability to filter pollutants and are a primary food source for hundreds of species including otters, muskrats, raccoons, herons, egrets, and bald eagles. The disruption of mussel habitat drastically alters the food web for wildlife populations as well as humans.

PC: Bald Eagle- Charlie Hamilton James

PC: Muskrat- WVU Extension Services

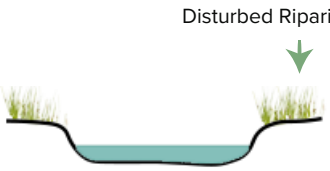
PC: Green Floater- US. Fish and Wildlife Service

PC: Otter- Daniel Olaleye

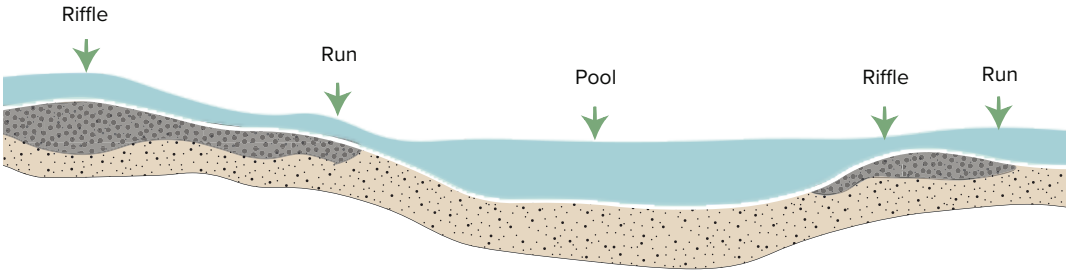
Spatial data sources: WVDNR 2020 and 2023

Healthy Streams

Root systems from vegetation stabilize the bank, managing erosion, providing habitat, and filtering the stream water. Trees provide shade, which ensures water temperatures are cool.

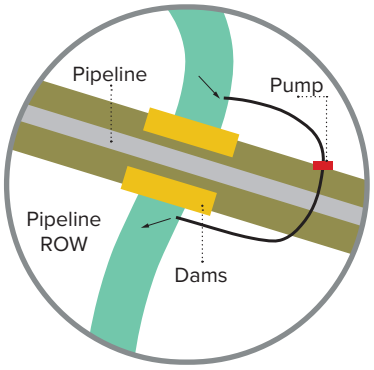


Life is not supported close to the water, and root systems are not sufficient to stabilize stream banks. Instream habitat does not support diverse aquatic life.



A natural stream ecosystem has gradual riffles, runs, and pools. In order for a stream ecosystem to function, aquatic species need a variety of places to hunt, breed, and nest. When a stream's channel conditions are altered and do not include riffles, runs, and pools, aquatic species cannot meet their needs.

MVP Stream Crossing Methods

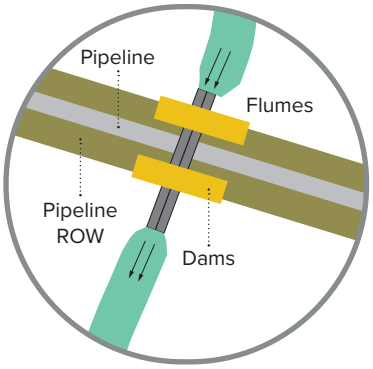


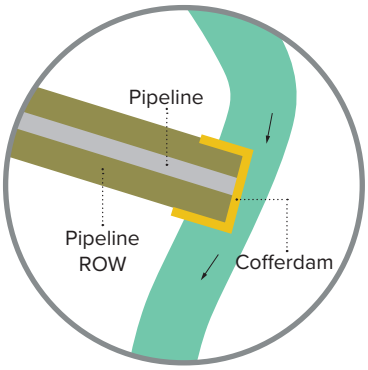
Dam and Pump

Dams are constructed across the stream upstream and downstream of the pipeline right of way (ROW), and water is pumped through hoses from the upstream reach to the downstream reach to create a dry work zone. Once construction is completed, flow is returned to the streambed by removing the dams, pump, and hoses.

Flume

Dams are utilized to create a dry work zone. In this method, pipes are utilized to transport water from the upstream to the downstream reach. Flow is returned to the stream following construction by removing the dams and pipes.





Cofferdam

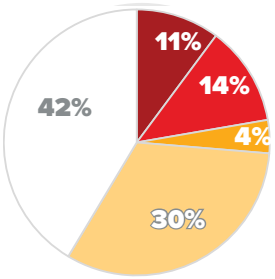
This method involves dewatering of a portion of the stream using dams extending from one bank of the stream to the middle to create a dry work space. Once construction in the dammed portion is completed, the dams are removed and the opposite side of the stream is dammed and dewatered for continued construction of the crossing. Once the crossing is completed across the entire stream, all dams are removed and flow is returned to the full streambed.

Each stream crossing methods is considered a "dry crossing method," where the work zone is ***dewatered during construction of the crossing.***

Change in Biological Conditions
(Post Construction)

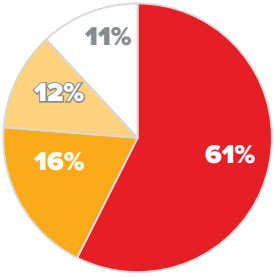
Biological conditions, described below, were observed and scored by inspectors prior to and immediately following completion of construction.

- **No Change** (No Impacts)
- **Decrease of 1** (Minor Impacts)
- **Decrease of 2** (Some Impacts)
- **Decrease of 3** (Impacted)
- **Decrease of 4** (Highly Impacted)



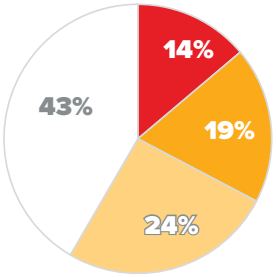
Channel Conditions

Inspectors evaluated the stability of streambanks. Unstable streambanks lead to erosion and sedimentation.



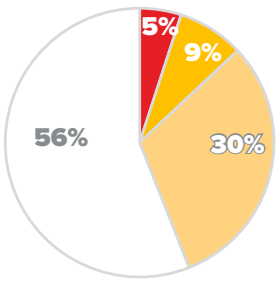
Riparian Buffer Zone

Inspectors evaluated vegetative cover in the area extending 50 feet from the top of the stream bank. A lack of vegetative cover can lead to increased water temperatures and a lack of shade. Many aquatic species, such as trout, require cool water temperatures. Vegetation in the riparian buffer zone provides streambank stability and slows erosion.



Instream Habitat Conditions

Inspectors looked for a variety of factors indicative of instream habitat conditions including: varied substrate sizes, combination of water velocities and depths, presence of woody debris, substrate stability, embeddedness, and shade protection. Aquatic species, including trout, require complex stream habitats. These habitats offer hiding covers, shade, and varied water velocities. Trout require cobble substrates for reproduction. Increased sediment and silt can lead to embedded stream beds, which smother fish eggs.



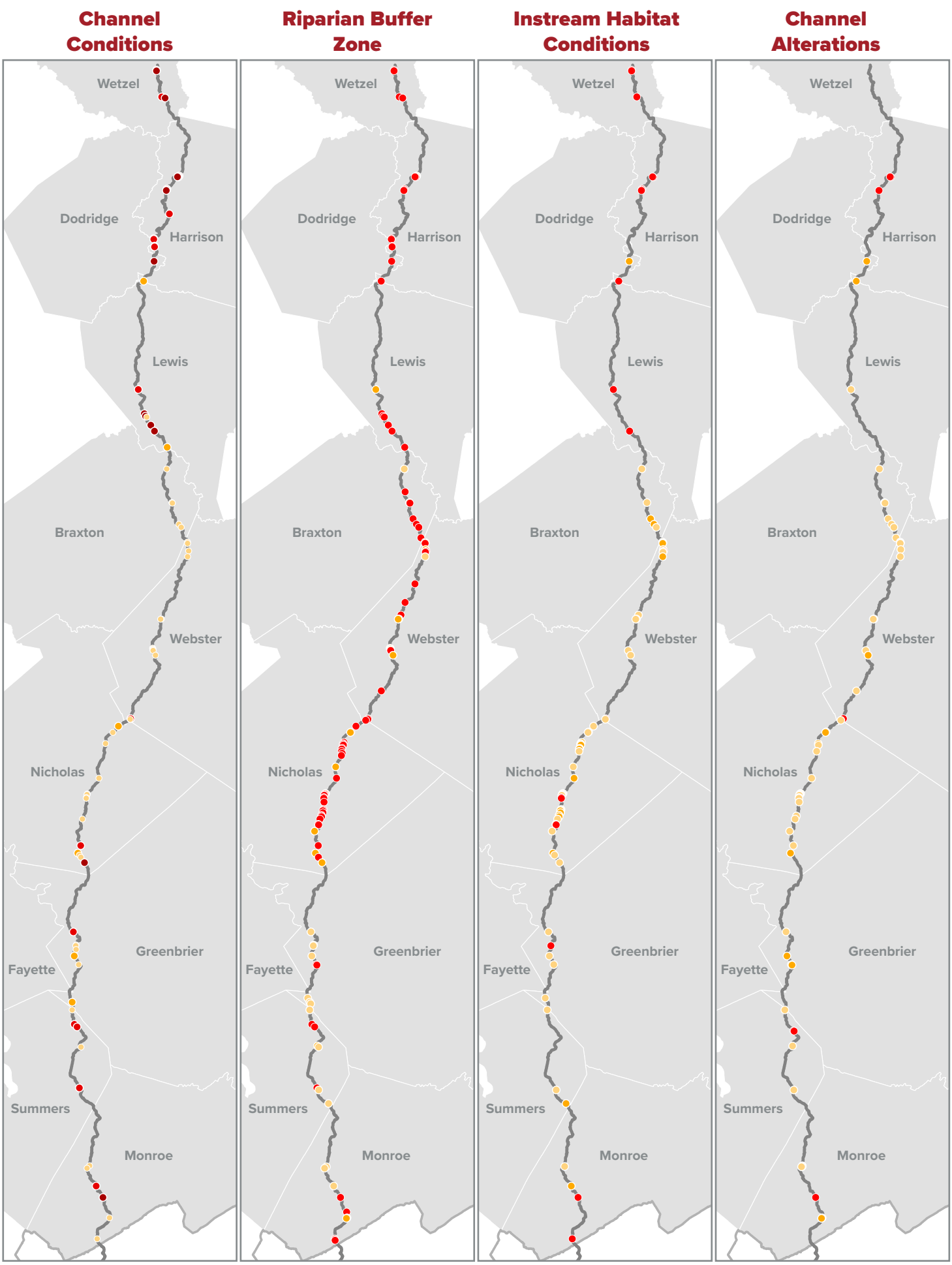
Channel Alterations

Inspectors assessed channels for unnatural features such as straightened channels or non-native banks including riprap or gabions. Straightened stream channels interfere with natural stream flow patterns and often increase stream velocities. Increased velocities can lead to erosion and sedimentation. Healthy streams migrate across the landscape over long periods of time. Altered channels do not allow for natural stream migration and can lead to washout and increased erosion. Aquatic life requires streams with pools and runs, as are present under natural stream flow patterns. Straightening channels and reinforcing with man-made embankments can remove the variability in flow features, thus diminishing aquatic habitat.

Findings

Only 6% of the crossings maintained the same biological scores. The Riparian Buffer Zone and Channel Conditions scores were most impacted.

88% of crossings showed a decrease of biological conditions within the riparian buffer zone. At 14 crossings, Channel Conditions were highly impacted, with decreases in scores of 4 points.


Channel Conditions
Riparian Buffer Zone
Instream Habitat Conditions
Channel Alterations
Wetzel
Dodridge
Harrison
Lewis
Braxton
Webster
Nicholas
Greenbrier
Fayette
Summers
Monroe
Mountain Valley Pipeline

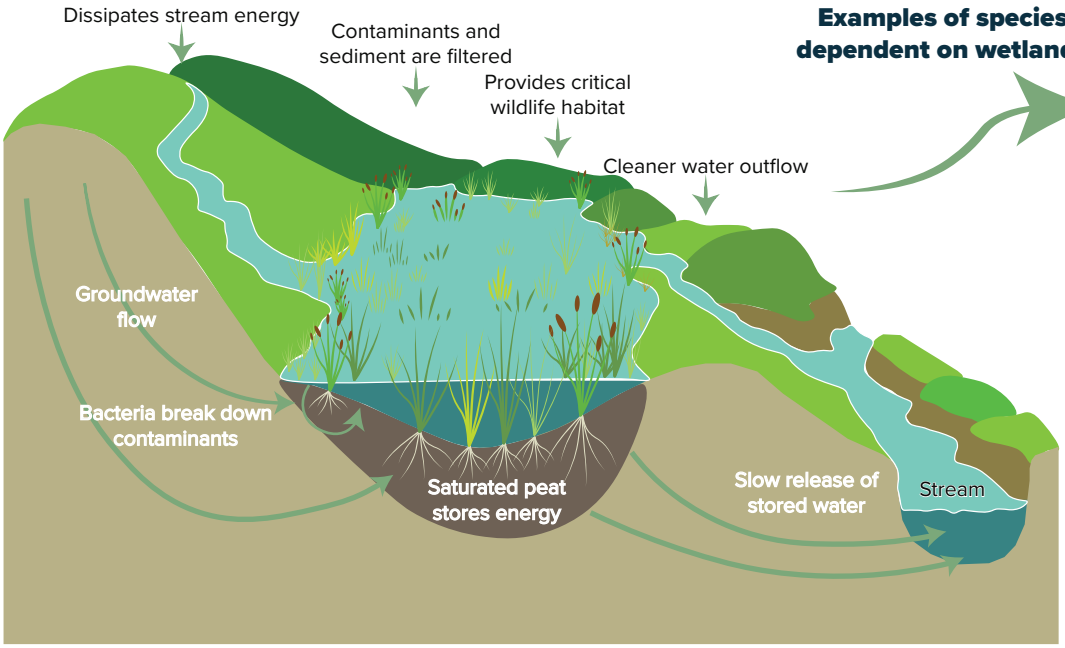
Wetland Crossings

Why are wetlands important?

Wetlands act as nature's kidneys.

- **Wetlands provide crucial habitat for many species of plants and animals. Fish, amphibians, birds, insects, and mammals–thrive in wetlands**
- **Wetlands are important in flood control because they act like sponges, absorbing large quantities of water, which is slowly released over time**
- **This slow release of water is also important in recharging groundwater resources. The ability of wetlands to absorb water flows can alleviate streambank erosion**

How Wetlands Work



Examples of species dependent on wetlands


Canada Goose


Common Yellowthroat


Tree Swallows


Thrushes


Spring Peeper


Eastern River Cooter

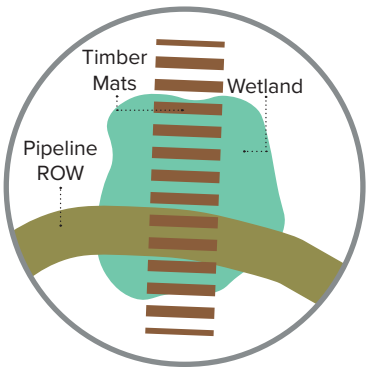

Garter Snake


Red Spotted Newt


Rough Green Snake

Adapted from Ohio State University. 2017. Fish Tales for Ohio. What's the Deal With Wetlands. November 3

MVP Wetland Crossing Method



A typical wetland crossing method involves use of timber (or wood) mats to prevent compaction of wetland soils. Vehicles remain on the mats during construction.

Native soils are returned to the impacted area and reseeded with wetland-specific plants following construction.

Additional details on specific crossing methods were not provided in the inspection reports reviewed.

Timber Mats placed at Wetland (W-K333)

Change in Biological Conditions
(Post Construction)

Biological conditions (including wetland saturation, soil conditions, and presence of vegetation) were observed and scored by inspectors prior to and post-construction. The difference between the pre- and post-construction scores at the 61 wetland crossings represented as follows:

- Decrease of 4 (Highly Impacted)
- Decrease of 3 (Impacted)
- Decrease of 2 (Some Impacts)
- Decrease of 1 (Minor Impacts)
- No Change (No Impacts)

Wetland Saturation

Inspectors noted whether the surface waters, the water table, and/or soils were saturated.

Drying of a wetland can lead to loss of wetland species that require saturated conditions to survive.

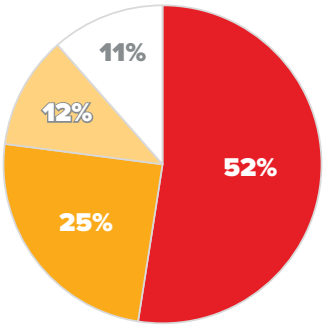
At least **10 wetlands** became **unsaturated during construction events.**

Soil Conditions

Inspectors rated crossings on the level of disturbance present to the wetland soils.

Disturbance and compaction of wetland soils removes their ability to act as sponges, and thus, their ability to absorb and slowly release water and filter out contaminants.

Disturbed soils do not support wetland vegetation.



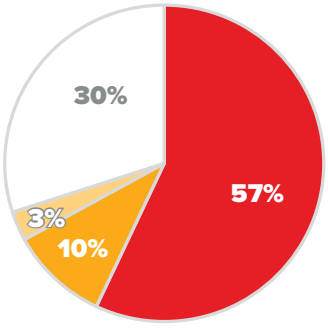
52%
of the wetlands crossed dropped **3 classification levels, rendering once undisturbed soils as "poor"**

Presence of Vegetation

Inspectors documented the presence of vegetative cover at each crossing.

An optimal rating of 1 was assigned when 60-100% of the wetland was covered with healthy vegetation. A poor score of 4 was given when the wetland was mowed, impervious, or sparsely vegetated. Wetland vegetation provides important habitat for a variety of wildlife.

Vegetation in a wetland ecosystem is important in slowing stream flows, keeping soils from eroding, and capturing sediment and nutrients.



57%
of the wetlands crossed dropped **three classification levels, rendering once heavily vegetated soils as sparsely vegetated**

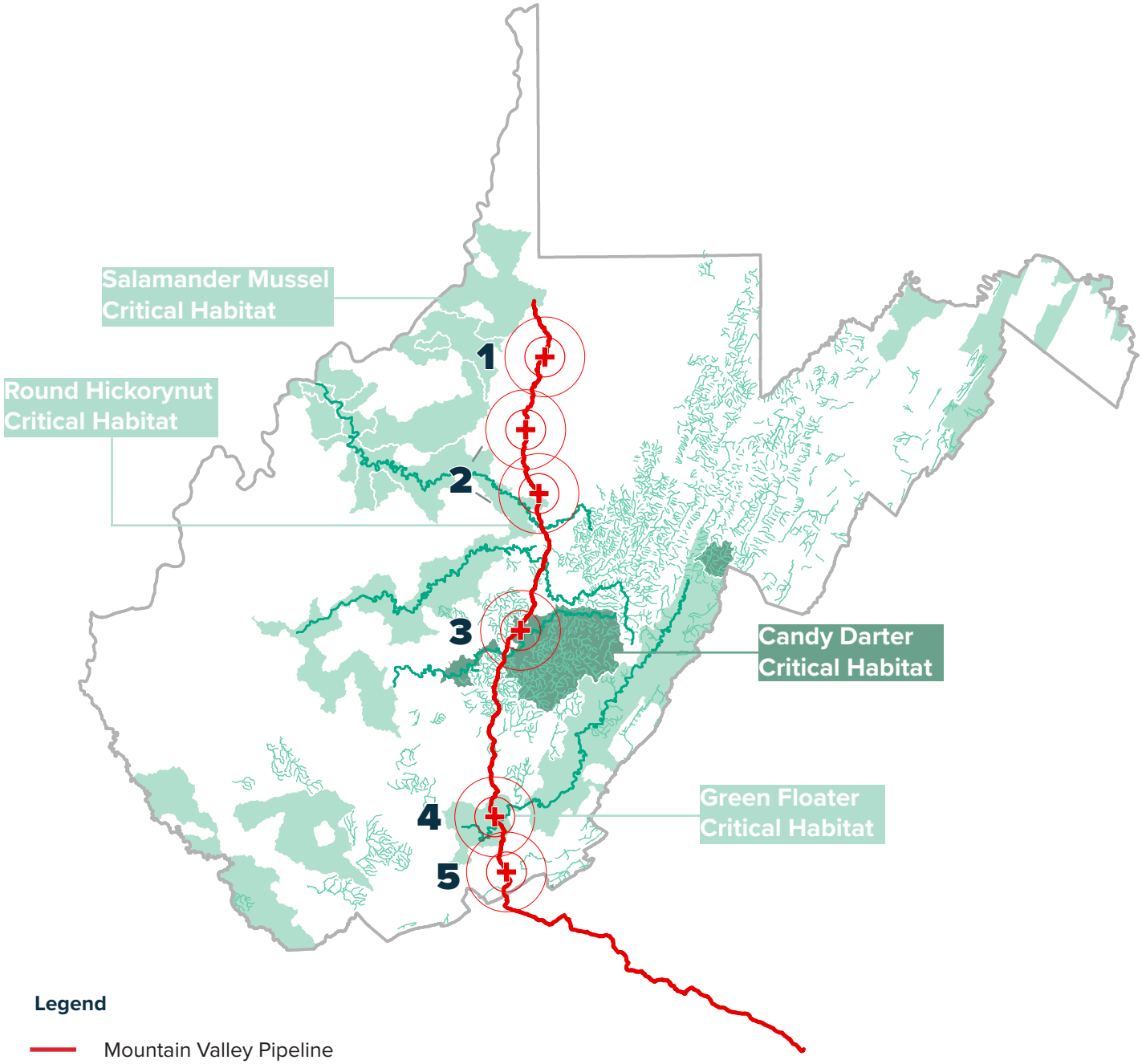
Findings

Biological Condition scores decreased at most of the crossings.

Wetland soils were impacted at 89% of crossings.

The presence of vegetation was diminished at 70% of crossings.

Examples of Impacted
Stream & Wetland Crossings



Legend

- Mountain Valley Pipeline
- West Virginia Rivers crossed by MVP
- Trout Streams
- Case Study Points (with 5- and 10-Mile Buffer)

U.S. Fish & Wildlife Service Critical Habitat Designations

- Aquatic Invertebrates
- Fish

Spatial data sources: USFWS 2024 and WVDNR 2020

1 B3a-Rockcamp Run

+ Tenmile Creek of the West Fork Watershed

Method: Dam and Pump Crossing
Primary Impacts: Degraded biological conditions

Downstream view of permitted impact area during post-construction assessment.

The excavation continued until pipe could be placed into crossing.

Two crossings of Rockcamp Run near MVP milepost 18.92 were inspected. Both crossings utilized the dam and pump method. Prior to construction of the crossing, both locations were rated "optimal" for biological conditions for each factor reviewed. Following construction, biological conditions were degraded and the lowest score (5) was assigned for all biological conditions assessed at each of the crossings.

However, no indications that any problems occurred during construction were documented. The only exception noted was that a bank on the south side of the crossing area was restored to a shallower angle than the original bank.

The assessment indicates that this crossing received poor ratings due to a lack of vegetation and temporary presence of a high level of soil particles in the disturbed permitted impact area following the completion of the crossing and restoration efforts.

2 Wetlands W-K33 PEM and W-VV3 PEM

+ W-K33: Fink Creek of the Little Kanawha Watershed
+ W-VV3: Oil Creek of the Little Kanawha Watershed

Method: Timber Mats
Primary Impacts: Removal of wetland vegetation

The sheet piling at W-K33.

Emergent wetlands W-K33 PEM and W-VV3 PEM, located near MVP Mileposts 45 and 65, respectively provide examples of wetlands impacted during crossing construction. Each wetland was classified as having negligible disturbance and heavy vegetative cover prior to construction and as highly disturbed with poor vegetative cover following construction.

Timber mats were used during construction, and inspections indicated that BMPs were implemented to avoid impacts. The complete lack of vegetation within the disturbed area was the primary reason for the low biological factor ratings.

3 S-E50 Unnamed Tributary to the Gauley River

+ Big Laurel Creek of the Gauley River Watershed

Method: Dam and Pump with Flume
Primary Impacts: Degraded biological conditions across all factors evaluated

Contractor dewatering ditch line and ditching.

Excavated ditch dewatering and bottom pad installation.

The dam and pump with flume crossing method was utilized to cross stream S-E50 near MVP Milepost 109.63. A wetland (W-E21) was also crossed at this location. Prior to construction of the crossing, the stream provided ideal habitat for aquatic life. Following construction, biological conditions were no longer suitable for habitat. Each of the biological conditions assessed changed from the best score to the worst score during installation of the stream crossing.

The inspection report indicates that BMPs were implemented; however, the crossing was impacted significantly. Blasting of stream bedrock was required to create the pipeline trench, and a heavy rain event halted crossing construction for a day.

4 S-M3 Hungards Creek and S-KL29 Right Fork Hungards Creek

+ Hungard Creek of the Greenbrier River Watershed

Method: Dam and Pump, Dam and Pump with Flume
Primary Impacts: Unauthorized discharge of sediment, mulitiple crossings within a watershed

Constructing upstream dam.

MVP crosses Hungards Creek and Right Fork Hungards Creek near Milepost 170. These crossings provide examples of locations where unauthorized discharges to streams occurred during crossing construction. Heavy rains on January 28, 2024 (one day following blasting of the trench) led to dam failure and inundation of the excavated trench. This resulted in a discharge of sediment-laden water from the worksite. Dams were restored on January 30, 2024.

5 S-CV19 Unnamed Tributary to Blue Lick Creek

+ Middle Indian Creek of the New River Watershed

Method: Dam and Pump
Primary Impacts: Degraded biological conditions, permanent change to bedrock

Excavating trench through aquatic resource.

Downstream view of unimpacted area during post-construction assessment.

This stream was crossed by the dam and pump method near MVP Milepost 188. Prior to construction, the stream bed consisted of bedrock and boulder, and following construction the bed was cobble. Biological habitat was greatly degraded during construction of the crossing. Prior to construction, this stream provided optimal habitat, with scores of one. Following pipeline installation, sub-optimal biological conditions were documented; the stream received scores of 4, indicating poor habitat or severely impacted conditions.

Construction was halted for at least one day due to a heavy rain event, and timber mats remained in place to provide a vehicle travel lane at the time of the post-construction inspection.

References

Trout Unlimited and West Virginia Rivers Coalition (WVRC). 2022. Reducing Impacts of Pipelines Crossing Rivers and Streams, Addendum, Available online at: extension://efaidnbmnnnibpcajpcglclefindmkaj/https://wvrivers.org/wp-content/uploads/2020/06/streamcrossingreport.pdf

West Virginia Department of Environmental Protection (WVDEP). 2023-2024. Publicly available third-party inspection reports. Completed by Precision and Price Gregory International. Managed by Potesta and Environmental Resources Management. Available online through WVDEP Xtender application. Accessed by WVRC and DS May through August 2024.

West Virginia Department of Natural Resources (WVDNR). 2020. Fisheries Management Unit. NHD Trout Distribution shapefile. Published March 2020. Available online at https://services6.arcgis.com/cGI8zn9Oo7U9dF6z/arcgis/rest/services/WV_NHD_TroutDistribution/FeatureServer

_____. 2023. Wildlife Resources. NHD WV Mussel Streams layer pack. Published 2023. Available online at: https://services6.arcgis.com/cGI8zn9Oo7U9dF6z/arcgis/rest/services/NHD_Mussel_Streams_2018/FeatureServer

Photo References
Sierra Club/Appalachians Against Pipelines
https://www.sierraclub.org/articles/2022/03/mountain-valley-pipeline-far-inevitable

Appalachian Voices/Mason Adams and Virginia Mercury
https://appvoices.org/2020/10/09/appalachian-voices-denounces-fercs-greenlight-for-mountain-valley-pipeline-to-resume/

Examples of impacted stream and wetland crossing photos are sourced from WVDEP 2023-2024

Conclusion

While more than half of streams and 90% of wetlands experienced decreases in biological habitat quality scores, few indications of noncompliance with BMPs were documented.

This illustrates that either: **(1)** the requirements for crossing construction did not provide protection for aquatic habitats or **(2)** the inspectors and/or inspection procedures did not allow for adequate identification of practices that led to degradation of biological conditions.

Lack of vegetation is a primary concern at many impacted crossings. Many inspection reports documented that impacted areas had been re-seeded and vegetation was expected to return. However, no follow-up inspections were completed to ensure that vegetation returned to pre-construction conditions or that re-seeding was completed, if necessary.

The inspection reports reviewed spanned August 2023 through February 2024. Thus, many crossings were constructed during late fall and winter months when vegetation regrowth is unlikely. Additional inspections at dates further out from completion would ensure that vegetation has been established and reseeding has been completed, as necessary.

MVP construction was required to utilize "enhanced BMPs" at water crossings. Despite the appearance of compliance with these enhanced BMPs in inspection reports, biological conditions data indicated that aquatic communities have suffered due to MVP construction.

Want to help monitor streams and wetlands affected by the Moultain Valley Pipeline?

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