NATIVE RESTORATION ON THE MOUNTAIN VALLEY PIPELINE RIGHT-OF-WAY



Right-of-Way Restoration

The revegetation activities under FERC guidelines can be undertaken using any plant species, even those invasive or not native to the United States. Often times, right-of-ways are therefore seeded using low-cost mixes with fast establishing species that offer limited value to wildlife and biodiversity. MVP is committed to utilizing the pipeline installation as an opportunity to increase conservation and biodiversity value in the region. The restoration of the pipeline corridor will be conducted using native grasses and wildflowers, a voluntary pledge from the team surpassing the regulatory requirements. The benefit of creating valuable wildlife habitat has the potential to truly separate Mountain Valley Pipeline LLC from other companies who choose to revegetate right-of-ways using the traditional approach.

Mountain Valley Pipeline, LLC
MVP is proposing a natural gas pipeline project that will span nearly 300 miles starting in northwest West Virginia and ending in southern Virginia. If approved, construction of the pipeline will impact a consecutive stretch of acres to create a right-of-way for the underground pipeline system. The proposed project is regulated by the Federal Energy Regulatory Commission (FERC). Under FERC regulations, the project sponsor is responsible for ensuring successful revegetation of soils disturbed by project-related activities.

Wildlife Habitat Council (WHC)
WHC promotes and certifies habitat conservation and management on corporate lands through partnerships and education. WHC works with corporations and conservation groups to create solutions that balance the demands of economic growth with the requirements of a healthy, diverse, and sustainable environment.

Utilizing Conservation Concepts to Guide Restoration

In a spirit of innovation and dedication to stewardship, MVP sought WHC's expertise to provide guidance on 1) potential activities to enhance the environment compatible with the project, and 2) implementation recommendations.

This document, prepared by WHC, provides explanation of the importance of native restoration and recommended native seed mixes created in collaboration with native seed supplier, Ernst Conservation Seeds, Inc. The customized appendices present various seed mixes as well as additional information in conjunction with the assessment that was conducted.

WHC provided expertise through a series of assessments analyzing ecological and social data, in-situ tours, as well as stakeholder interaction. The scope of the conservation analysis reached beyond the immediate land disturbance of the pipeline right-of-way; it took into account concepts of conservation values and impacts in a 20-mile radius.

The ecological and social parameters resulted in outlining specific areas along the route where habitat enhancement efforts would have a greater stewardship impact (map 1; Appendix A provides larger, clearer version). At the landscape scale, those areas were defined by the assessment as degrees of conservation importance.

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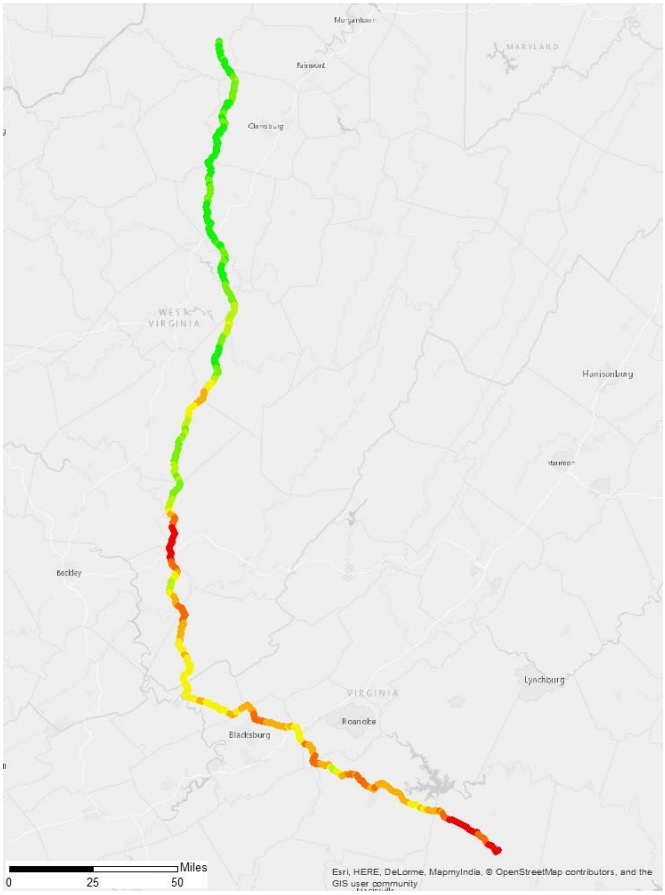


Map 1: Results from assessment showing opportunity along route

Green: limited conservation impact beyond the localized changes to the habitat from the presence of the right-of-way.

Orange: potential need for a balanced approach to conservation and natural resources due to moderate occurrence of important ecological features and declaration of conservation priorities.

Red: highest opportunity for an integrated approach to conservation and habitat enhancement in conjunction with education and outreach efforts with potential for partner involvement. The red stretches suggest strong alignment potential with conservation values and priorities.

At a finer scale, the parameters allowed the identification of additional opportunities to consider for stewardship planning. Such sectors include:

- Highly visible areas. Locations along the route known for use by community members, or areas with significant foot or vehicle traffic, representing great conservation and educational potential.
- Stakeholder engagement hotspot. Areas of conservation or recreational value, available to utilize for restoration efforts and outreach initiatives. Those sectors have an ease of access to community members, local environmental groups (native plant societies, watershed groups, trail conservancies) or schools.

The assessments provided a targeted number of projects that could be implemented at a large scale across most of the route, were compatible with pipeline operations, met conservation needs in Virginia and West Virginia, addressed stakeholder's interest and provide sustainable conservation outcomes. Of the options, WHC's primary recommendation is to



focus on native restoration efforts post-construction as the best way to leverage resources and create a long lasting positive environmental impact as part of the project.

Native restoration offers flexibility along the route and can be adapted to operational constraints and topography features. It produces tangible conservation outcomes and related to multiple existing conservation priorities, from local watershed efforts to the Presidential memorandum to create habitat for pollinator species.

A variety of benefits have been linked to the establishment of native grassland habitats. More information can be found in appendix B where copies of the handouts distributed to stakeholders at open houses can be found.

Native Restoration

Native species are animals and plants that originally evolved with one another in this specific area. These plants and animals are accustomed and reliant on one another and on the local climate, therefore creating a well-balanced ecosystem together. Infrastructure installation for the natural gas pipeline will cause a temporary disturbance, but native restoration can create an environment beneficial for wildlife, such as pollinators and other insects, songbirds, and small mammals to flourish. Compared to non-native plants, native plant species provide greater value to wildlife, produce greater water quality benefits, and require less maintenance with irrigation, fertilizers and pesticides.

Systematic implementation of native restoration along the right-of-way can be an excellent starting point with positive impacts associated with watershed health, pollinator, bird, and community benefits. Research on right-of-way management over the past few decades has produced new techniques and ideas on balancing the needs for reliable, safe operations and stewardship of natural resources.

WHC recommends establishment of native vegetation along as much of the route as allowed, based on landowner feedback. It is suggested that at a minimum, the restoration along the disturbed area be completed using a diverse mix of species native to Virginia and West Virginia, turning the easement into an early successional type habitat. Maintained in that state, the right-of-way will not progress toward woody vegetation establishment and will remain as grassland habitat. WHC recommends using native plants, which provide the most value to wildlife, have deeper root systems that absorb and filter more runoff and improve water infiltration into soils, and require relatively little maintenance since they are adapted to the conditions of the region.

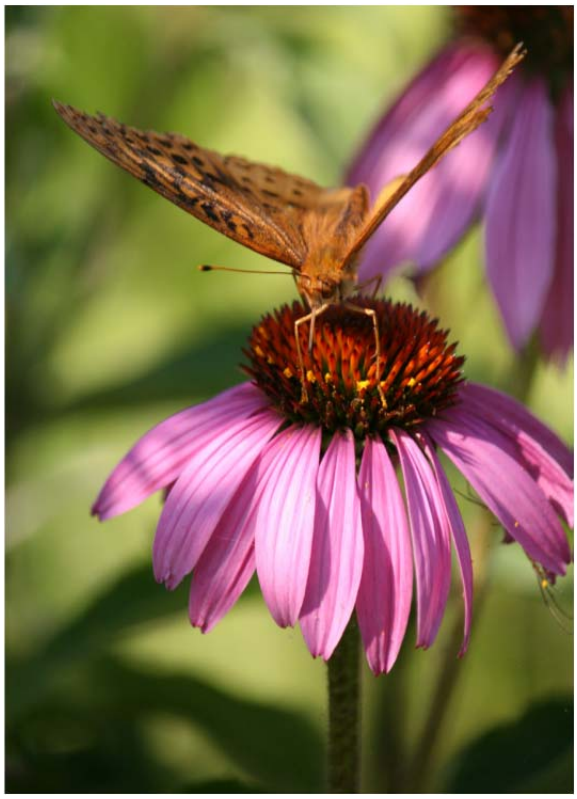
Tailored Seed Mixes for MVP Native Restoration

To guide in the team's plan to pursue native restoration, a suite of mixes have been created as options to use along the route. The mixes were developed to provide a rich native habitat while meeting construction specifications, budgetary targets, and stakeholder desires. A summary guide for the mixes, including a base mix and several upgrade options for each habitat, is provided in Appendix D.



The seed mixes options share key features:

- All species native to the eastern United States
- Regionally appropriate for the Virginia and West Virginia counties
- Mixes designed in partnership with Ernst Conservation Seeds, Inc.
- Variety of floral structures to accommodate different pollinators
- Designed for May thru early October blooming



In order to choose the most appropriate options along the route, the MVP team is encouraged to first determine their conservation and education objectives in pursuing native vegetation establishment. In doing so, the team will be able to align features of the different mixes with desired outcomes. Sample objectives to consider are: managing land for the benefit of a specific species or suite of species (e.g. pollinating, threatened and endangered species), pursue native restoration to create wildlife corridors, enhance habitat to meet a need for conservation education in the community, etc. WHC can assist in objective development if needed.

The options can be divided into two main categories:

A) Options of seed mixes for stewardship purposes. All mixes meet the desired characteristics for erosion control and quick establishment while providing additional habitat, wildlife, aesthetic and conservation value.

- Base mix - minimum seed mix the MVP team should consider when vegetating the right-of-way (Appendix C provides an example of a pre-made commercially available native base seed mix); creates native grassland habitat. The base mixes provide native vegetation and therefore basic essential habitat components for a variety of wildlife species. Suitable for green areas in Map 1.
- Level 3 mixes - should be considered if the team wants to incorporate vegetation for a target species in addition to providing a native grassland habitat. Level 3 mixes for each habitat have a minimum goal of providing a benefit for pollinating species. Suitable for green and orange areas.



- Level 2 mixes – mid level seed mix with grasses and increased wildflower variety offers additional and targeted benefits to pollinators while achieving a higher biodiversity of wildlife species visiting established habitat. Recommended for red areas.

- Level 1 mixes – highest diversity of grasses and wildflowers meant for higher value sites along route including wetlands, protected areas, high visibility locations such as recreational trails and national forest where stewardship activities could be conducted. Level 1 mix is going to satisfy and exceed the target of pollinators by providing the most benefit and therefore attracting the highest biodiversity of wildlife as well as being the most appealing to the human eye, inviting public interaction with the landscape. Recommended for small segments of the red areas.

B) Options of seed mixes to address physical and construction characteristics. Enhanced seed mixes for typical feature diversity such as slopes, wet areas, etc.

- Riparian mix – Created to revegetate locations occurring on the banks along water features where erosion concerns and wet soils are present.

- Wet Meadows Mix – Created to revegetate locations that are usually wet, but sometimes dry; species can tolerate saturated or dry soils.

- Wetland Mix - Created to revegetate locations that are inundated or saturated at all times; species can tolerate constantly wet conditions.

Localized recommendations by segment

The base seed mix should be used at a minimum on the entire run of the project although we encourage the MVP team to consider an upgrade if possible within budget and planning. Regardless of the option used, a localized analysis of the route conservation assessment displayed specific needs and additional considerations for higher diversity mixes to be used on specific segments.

Incorporating habitat improvements into corporate land management and planning represents a powerful, integrated approach to ecological health and sustainability.

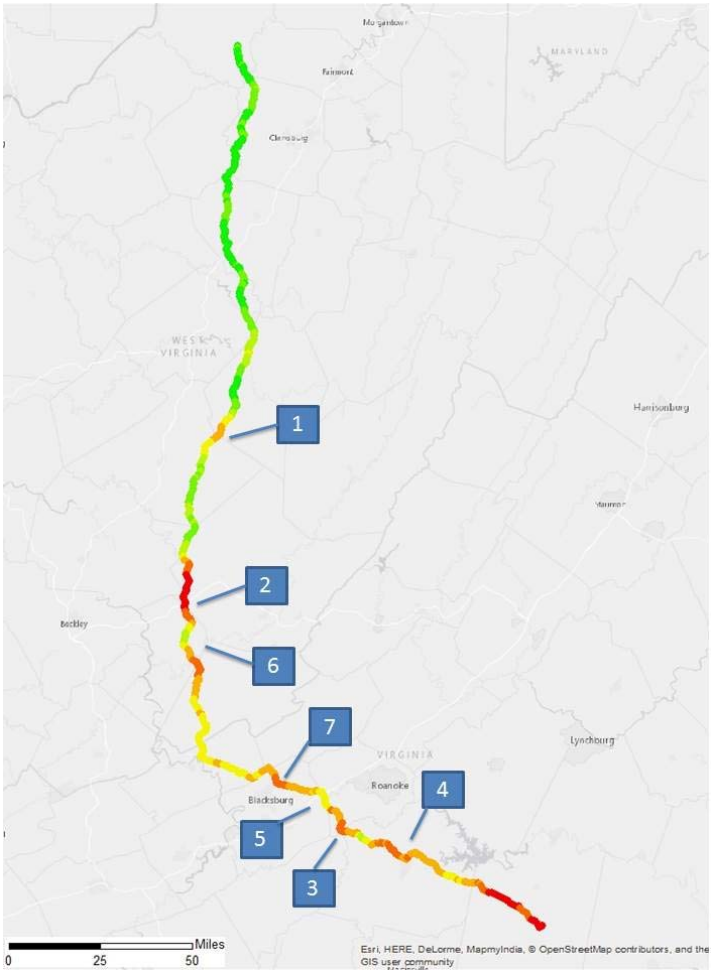
Tables with examples of evaluated information from various route alternatives have been provided for which WHC recommends considering higher value mixes (Level 1-3). Critical segments are provided in one table (Appendix E) and critical crossings (Appendix F) are addressed in another. Complete lists of WHC recommendations will be provided upon completion of field surveys.

Example of noteworthy items includes:

- Water features such as wetlands, reservoirs, rivers, streams, etc.
- Land held in conservation easements or labeled as priority with groups such as The Nature Conservancy, Virginia Outdoors Foundation and Blue Ridge Land Conservancy
- Locations with high visibility potential such as major road and recreational trail crossings
- Proximity to residential areas and schools

Upgraded mixes should be considered for as many segments and points as feasible in order to provide habitat for a wider range of wildlife species. This will create pockets of higher biodiversity while providing an atmosphere of learning for community members.

The identified critical segments do not address the locations driven by physical features (wetlands, topography) as it is always recommended the team use survey data gathered in the field to pinpoint those locations.



Map 2: Numbers notate the general vicinity of critical segments as determined by assessment

Stewardship Activities

For purposes of stewardship activities and future habitat enhancements, the MVP team can revisit the assessment to help determine site visit locations for WHC and/or other stakeholders. The right-of-way created for the natural gas pipeline holds high potential for additional habitat enhancement activities such decreased edge effect where present, installation of songbird nestboxes and other artificial nesting structures as well as community engagement events and sustainable agriculture initiatives.

WHC encourages the MVP team to build momentum in the communities the route traverses by increasing its presence around activities linked to conservation and environment. Initiating a dialogue about the upcoming project in different settings will continue to disseminate the right information into community groups and offer the opportunity to meet community leaders in the areas (WVDNR, USFWS, VDGIS, etc…) who will be valuable partners in next steps.



Outreach Opportunities

During work on the MVP right-of-way, there may be road and trail closures for a period of time. The project area will presumably present signage of any closures and construction areas. WHC recommends supplementing the standard construction signage with large signs informing community members of the restoration efforts in place. Optimal areas for educational signage are in high foot traffic locations such as recreational areas and trail crossings. If the project uses temporary fencing, similar signage can be prepared for banners adapted to fencing. The signage can accompany the construction crews throughout the project life and provide a different narrative around the construction and restoration work.

Schools in close proximity offer great opportunities for partnership and benefit to both parties. Teachers from elementary thru high school can utilize the restored native habitat for science classes, while higher level schools can conduct annual studies and identification surveys on flora, fauna and water quality to create solid monitoring documentation for the MVP team's records. Signage is a good motivator to harness partners to participate in stewardship activities if MVP finds it feasible to focus efforts towards community outreach and engagement.

Maintenance and Monitoring of a Grassland Habitat

A long term maintenance plan is important to draft and understand prior to planting. Maintenance of a grassland habitat should include a mowing regimen (as controlled burns will be more difficult to conduct) in order to maintain the open nature of the early succession growth while suppressing the growth of trees and shrubs. It will also promote the productive growth of native wildflowers and grasses, and may help to increase the diversity of these plants as well. All maintenance operations will be completed within the requirement of FERC.

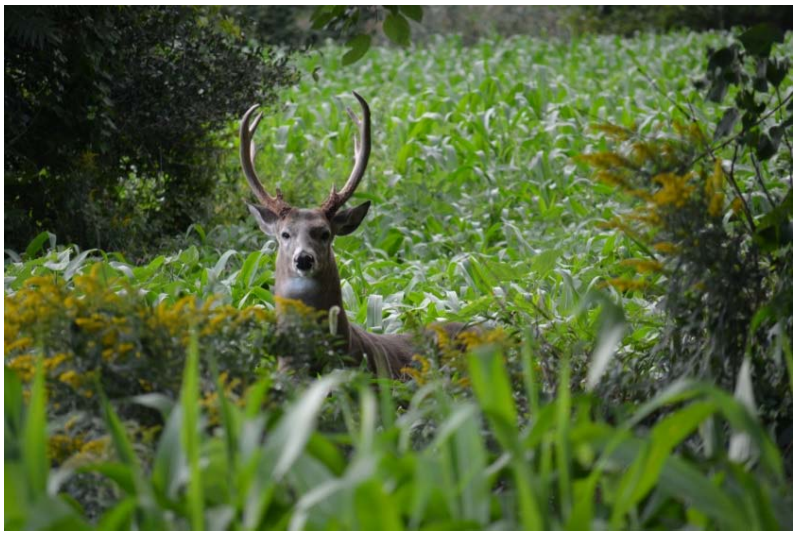
In the case of the MVP, the team has committed to no herbicide use unless instructed by a federal agency such as the United States Forest Service. They will bypass chemical removal and opt for mechanical and hand removal of woody species. An example of when MVP may be instructed to use an approved herbicide would be in cases of severe invasive species populations where appropriate application of herbicide by a certified expert is necessary to reduce infestations to work towards eradication.

If a mowing schedule is conducted, mow outside the nesting season to prevent harm to birds and their nests. Mow either in the early spring (late March to early April), which will remove the previous year's vegetation and new growth by non-native, cool-season grasses and other invasive plants, or in the early fall (September to early October). Mow in a way

that will flush any wildlife in the grasses out from the center of the field, so they do not become trapped in the field during mowing (e.g., spiraling outwards from the center).

In addition to routine maintenance, the MVP team should be sure to monitor the growth and abundance of the desired native grasses and wildflowers as well as other vegetation in the grassland habitat. Monitoring data will provide information on the diversity of native grasses and wildflowers, persistence of weeds, and overall community structure.

Third Party Recognition



Eligibility for WHC Conservation Certification

Habitats maintained, enhanced or created as part of the Mountain Valley Pipeline could be qualifying projects under WHC's Conservation Certification. Beyond habitat and species projects, stewardship and community outreach activities can also be eligible. Based on the recommendations provided in this document and dependent upon the results of implementation decisions, MVP would most likely be eligible for certification under the project type "grasslands".

In the event that the MVP team pursues additional activities discussed on various occasions, the program could then consider the following project types as well for certification:

- Pollinator Species: if monitoring for pollinator presence and population diversity in some specific areas of the right-of-way occur.
- Awareness & Community Engagement: if educational signage is being used or if active projects involve schools or community groups.

MVP must have at least one qualifying project on the ground prior to submitting a certification application. An eligible project could include a portion of restored native habitat on the right-of-way or the entire restored right-of-way. As part of an integrated program, all acts of conservation should be documented and submitted. To be recognized as a qualifying project, one of the projects suggested above will need to meet the following criteria:

1. Be locally appropriate (e.g., relevant to the habitat conditions found on site, relevant to the needs of the surrounding ecosystem, and/or learning needs for the community, etc.).
2. Exceed regulatory requirements, if any are associated with the upgrade.
3. Associated with at least one conservation and/or education objective, which provides guidance for making management decisions and evaluating outcomes.



4. Provides habitat value that benefits local wildlife and/or provides community value that benefits a learning audience.
5. Supported by documentation of measurable outcomes for project activities, such as lists of species planted, habitat monitoring logs, meeting notes, lesson plans, photographs, etc.

Documentation is a vital component of WHC's Conservation Certification. Information pertaining to planning, implementation, maintenance, and monitoring activities for each project should ideally be captured. Required and suggested data to collect for suggested projects are presented as a reference in the table below.

WHC Project Guidance documents will soon be available on wildlifehc.org for a complete description of the characteristics required and recommended for the projects, as well as suggested conservation and education objectives and the list of application questions to anticipate. A WHC representative can best help guide the certification path and documentation once decisions on restoration and activities are completed.

Table 1: Conservation Certification Theme Alignments

Theme	Minimal Activities & Documentation	Recommended Desirable Characteristics
Grassland Habitat	▪ Seed the grassland with native species of flowering plants and grasses to add native plant diversity appropriate for the region ▪ Monitor plant species diversity, survival, and visitation of the habitat by wildlife ▪ Document activities (e.g., photos of habitat, monitoring and/or maintenance logs, seed mix lists) ▪ Monitor and control for non-native, invasive species in the grassland	▪ Meet the habitat needs for one or more species of concern (may include shrub & tree structural requirements for birds) ▪ Consider expanding into conservation areas if possible ▪ Utilize the grassland as a learning context for education of local community members about grassland ecology and/or the importance of grassland habitats ▪ Share knowledge resulting from the project with an outside entity, via outlets such as publication, presenting at conferences, or submitting data collected by trained volunteers to a citizen science program
Pollinator Species	▪ Plant native plants that benefit local pollinator species ▪ Monitor plant diversity, survival, and visitation by pollinators ▪ Document activities (e.g., photos of habitat and signage, monitoring logs, seed mixes, plant tour agendas and dates, employee communications)	▪ Link efforts to corporate commitment ▪ Post informational signage in the pollinator habitat for visitors to learn about the plants and how they benefit pollinators ▪ Submit pollinator monitoring data to existing citizen science projects, such as annual butterfly counts via North American Butterfly Association
Awareness & Community Engagement	▪ Conduct educational activities that raise awareness about an environmental or conservation topic related to the site's habitat program (e.g., Earth Day event, on-site planting event, visiting schools, employee training) ▪ Document activities (e.g., partner correspondence, examples of curriculum used, event agendas, photographs)	▪ Align the program content with the educational goals of partner organizations (e.g., curriculum standards, scout badges)



For any project to be eligible for application of WHC conservation certification, including native restoration, the MVP team must be able to show documented results of a project. Evidence of ongoing activity must be provided at the time of application. Submit species lists, monitoring and maintenance logs (as recommended above) along with photographic evidence of established flora and fauna utilizing habitat. Include items such as education material used for public outreach efforts (flyers distributed at the open houses – Appendix B) and photos of any signage the team installs in a temporary or permanent manner along right-of-way to educate the community on what is taking place.

In addition, provide documentation and support of any community activities or events that take place with any stakeholder groups. For example, if MVP hosts a planting event near the Appalachian Trail or other recreational area, submit photos and keep detailed logs of activities and sign-up sheets.

WHC will be available for continued presence, guidance and assistance as needed throughout the MVP right-of-way process through certification.

NATIVE RESTORATION ON THE MOUNTAIN VALLEY PIPELINE RIGHT-OF-WAY



Appendix A - Map
Larger version of map 1 showing colored segments

Appendix B – External flyers
One page – front & back – flyers created specifically for external circulation during public meetings in Virginia and West Virginia

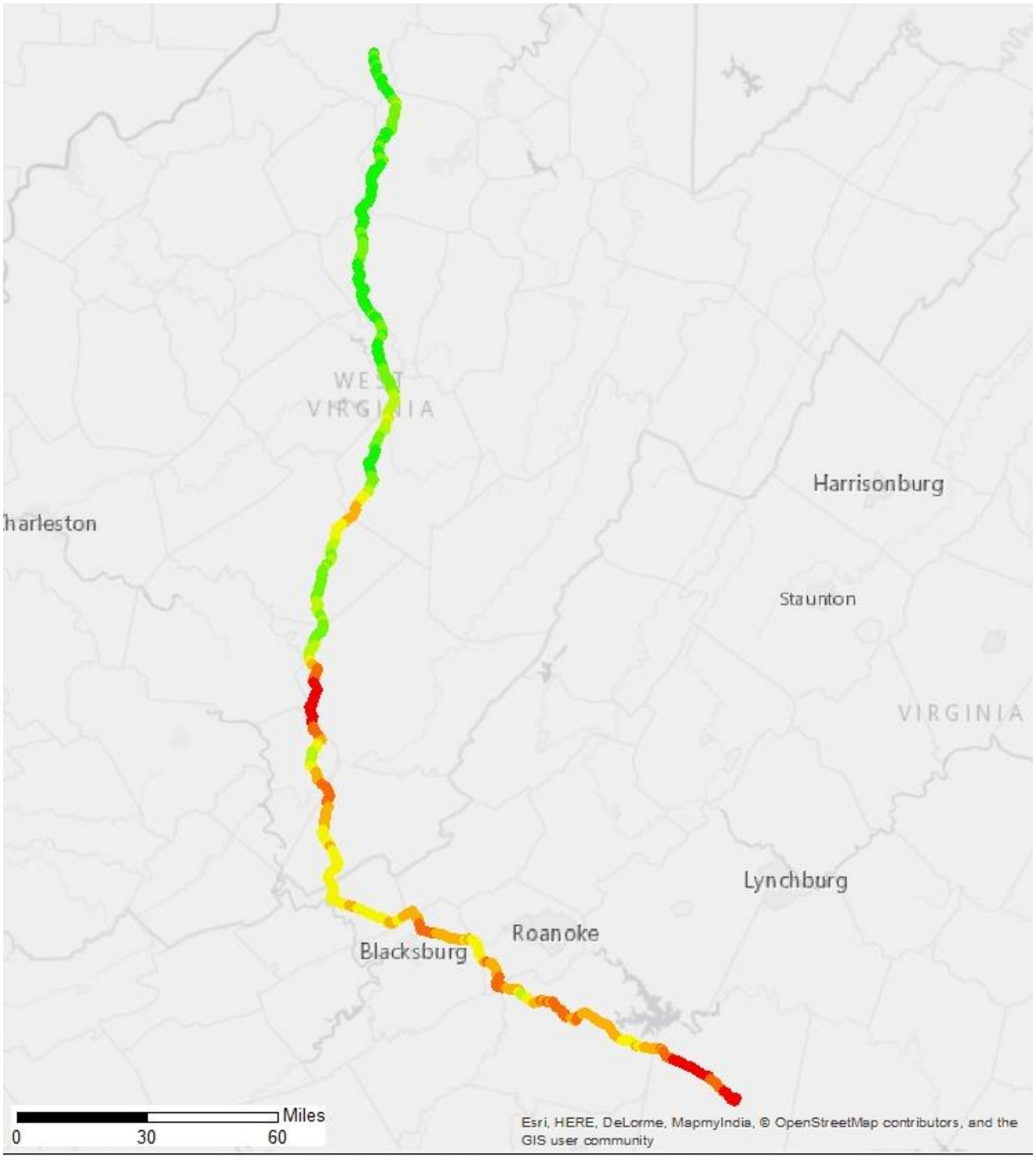
Appendix C – Example pre-made seed mix
Commercially available native seed mix example recommended as potential base mix for use along the entire stretch of right-of-way

Appendix D – Seed mix summary guide
Guide for quick reference as to what each seed mix would be recommended for as created in collaboration with reputable seed supplier, Ernst Seeds

Appendix E – Segments of importance
Table created to assist MVP team in choosing locations to implement upgraded seed mixes. Segments highlighted in red indicate higher priority.

Appendix F – Specific crossings of potential interest
Table created to highlight crossings that may be of high interest to MVP team. If team chooses to implement upgrade seeding, choose red as highest or first priority, orange second and green as lowest or last priority.

Appendix A



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WILDLIFE HABITAT COUNCIL℠

Native Reclamation in **Virginia**

Songbirds benefit from early successional habitat as a food source and for shelter.

What is Native Reclamation?

Native species are animals and plants that originally evolved with one another in a specific area. Reclamation is the process of planting vegetation to re-establish improved conditions in disturbed areas. Native reclamation creates a better environment for wildlife, such as pollinators and other insects, songbirds, and small mammals, to flourish.

Why Does WHC Recommend Native Reclamation?

Compared to non-native plants, native plant species provide greater value to wildlife, produce greater water quality benefits, and require less maintenance with irrigation, fertilizers and pesticides.

What is Early Successional Habitat?

Early successional habitat is an environment in the early stages of becoming a forest, and is typically dominated by forbs, grasses and shrubs. Early successional habitats include meadows and grasslands.

What are the **benefits**?

Benefits to **WATERSHEDS**

A watershed is the area of land where all of the water that is under it or drains off of it goes into the same body of water, like a river or stream. Native plants in an early successional habitat benefit watershed health and water quality in many ways, including:

- The deep, extensive root systems of the native grasses, forbs and shrubs stabilize soil, which prevents erosion and water quality problems associated with it.
- Native plants also reduce flooding and improve water quality in watersheds by absorbing stormwater runoff (and many of its pollutants), and improving soil drainage and filtration for runoff that enters the soil.
- Native plants also help filter out particles (siltation) in runoff as it flows past them.

Benefits to **SOILS**

Native warm-season grasses and forbs in an early successional habitat develop deep, complex root systems that contribute to soil health, as they improve soil drainage and reduce compaction. Here's how:

- The decomposition of these native plant root systems contribute significant amounts of organic matter to the soil over time, further enhancing soil drainage, improving moisture, increasing nutrients, and reducing compaction.
- These deep, complex root systems provide much greater soil stabilization than the poorly developed root systems of non-native cool-season turf grasses like fescue.

More →

Benefits to **POLLINATORS**

Pollinators are the animals – including bees, butterflies, moths, hummingbirds, beetles, flies, and, in some regions, bats – that feed on nectar in flowers. By doing so, they move pollen from flower to flower to accomplish fertilization. Most North American bees are solitary, so they rarely sting because they have no colony to defend (unlike the non-native European honeybee). Pollinators are vital to the health and economy of the world, propagating wild flowering plants as well as many crops. Their many benefits include:

- Early successional habitats that include a diversity of native grasses, forbs and shrubs provide valuable homes to a variety of pollinator species. Native plants have been shown to support more abundant and diverse pollinators than non-native plants.
- Pollinators can forage for nectar and pollen among the flowering plants in this habitat.
- The fruits of many trees, shrubs, and vines provide important food sources for butterflies.
- Pollinators can seek shelter in tall grasses, forbs, and shrubs.
- Many of the plants in early successional habitat also serve as larval host plants for caterpillars, who rely on these plants for leafy forage and cover.

Pollinators using wildflowers in an early successional habitat.

Benefits to the **COMMUNITY**

Early successional habitats can provide many aesthetic, recreational and health benefits to the local community, including:

- Improved water quality in local water bodies and groundwater resources, particularly if wells and reservoirs are the primary sources of drinking water.
- The colorful flowers of native forbs and shrubs growing in the early successional habitat can greatly improve the look of the area.
- The animals attracted to the early successional habitat provide unique wildlife watching opportunities.

Preventing **INVASIVE SPECIES**

When species are introduced into an area where they do not naturally occur, the predators, parasites and competing species that would normally limit them are lacking. As a result, some of these species become invasive, causing harm to that ecosystem by aggressively outcompeting or predating upon other species.

Controlling invasive species is vital to the conservation of native habitats and wildlife. Because they are more likely to establish in disturbed areas, creating an early successional habitat by planting native plant species as soon as possible after the pipeline has been installed will help prevent the establishment of invasive species.

WILDLIFE HABITAT COUNCIL℠

Native Reclamation in **West Virginia**

Songbirds benefit from early successional habitat as a food source and for shelter.

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- Native plants also reduce flooding and improve water quality in watersheds by absorbing stormwater runoff (and many of its pollutants), and improving soil drainage and filtration for runoff that enters the soil.
- Native plants also help filter out particles (siltation) in runoff as it flows past them.

Benefits to **GAME SPECIES**

Early successional habitats provides important foraging opportunities for game species like deer, wild turkey, quail, and mourning doves, including:

- Native forbs, grasses, and shrubs provides food such as seeds, nuts, berries, herbaceous forage, and woody browse. Specifically, woody plants and wildflowers – particularly legumes and mast-producing shrubs – provide the most valuable browse sources to deer.
- Native plants support the insects eaten by many game birds, including quail and juvenile wild turkey.
- The native bunch grasses, forbs, and shrubs provide smaller game species, like quail, with valuable shelter from predators and the elements.

More →

Benefits to **POLLINATORS**

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- Pollinators can seek shelter in tall grasses, forbs, and shrubs.
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Pollinators using wildflowers in an early successional habitat.

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- The animals attracted to the early successional habitat provide unique wildlife watching opportunities.

Benefits to **GROUND-NESTING BIRDS**

Ground-nesting birds are a suite of bird species that build their nests on the ground, in between the bunching native grasses and forbs, or sometimes underneath shrubby cover. Many of the bird species that use early successional habitat are ground-nesters and will benefit in the following ways:

- Native grasses and shrubs in the early successional habitat provide the cover these birds need for nesting.
- Birds also use the spaces between bunching grasses and forbs for moving about in the early successional habitat.
- Native grasses and forbs provide the birds food in the form of seeds and insects.

Appendix C

Native Upland Wildlife Forage & Cover Meadow Mix

ERNMX #	ERNMX-123
Cost Per Pound	$8.81
Seeding Rate	20 lb per acre
Mix Type	Upland & Meadow Sites
Species List (click for details)	35% Big Bluestem, 'Prairie View'-IN Ecotype (Andropogon gerardii, 'Prairie View'-IN Ecotype) 21% Virginia Wildrye, PA Ecotype (Elymus virginicus, PA Ecotype) 18% Switchgrass, 'Shawnee' (Panicum virgatum, 'Shawnee') 10% Coastal Panicgrass, 'Atlantic'-VA Ecotype (Panicum amarum, 'Atlantic'-VA Ecotype) 5% Partridge Pea, PA Ecotype (Chamaecrista fasciculata (Cassia f.), PA Ecotype) 3% Blackeyed Susan, Coastal Plain NC Ecotype (Rudbeckia hirta, Coastal Plain NC Ecotype) 3% Indiangrass, PA Ecotype (Sorghastrum nutans, PA Ecotype) 2% Oxeye Sunflower, PA Ecotype (Heliopsis helianthoides, PA Ecotype) 1.5% Showy Ticktrefoil, PA Ecotype (Desmodium canadense, PA Ecotype) 1% Plains Coreopsis (Coreopsis tinctoria) 0.4% Panicledleaf Ticktrefoil, PA Ecotype (Desmodium paniculatum, PA Ecotype) 0.1% Common Milkweed, PA Ecotype (Asclepias syriaca, PA Ecotype) Total: 100%

Prices are subject to change without notice. Please call (800) 873-3321 for current pricing.

See more at: http://www.ernstseed.com/seed-mix/?category-id=299#sthash.sqs2t2Wa.dpuf

Appendix D

Native Restoration – Virginia Options Rev 5/20/15

Seed Mix		Description	Purpose
Native Base Mix		Standard mix of native species with **bulk native warm season grasses** and limited wildflower species included	Recommended as a minimum base mix for entire ROW; not ideal for sensitive areas
Meadow Mix	1	**High level diversity**; mix of native warm season grasses and wildflower species that offer valuable early successional habitat to wide variety of native wildlife; low profile, aesthetically pleasing mix	• Highly visible areas • More sensitive/conservation driven segments • Generally short stretches on ROW where community members tend to be present (i.e. trails, parks, other recreational areas) • Can be utilized for educational activities and outreach
	2	**Very good diversity**; native warm season grasses and wildflower species offer quality early successional habitat to native wildlife species; low profile aesthetically pleasing mix	
Pollinator Mix	1	Well-balanced native species with **excellent variety** of native warm season grass and wildflowers to target pollinator species including monarch butterflies	• Mix options for stretches along ROW • Provides range of quality: from increased biodiversity mix for native restoration to high quality native pollinator habitat • Suitable for slopes 3:1 and lower
	2	**Very good diversity** Native species with good variety of native warm season grass and wildflower species to target pollinator species including monarch butterflies	
	3	Native species mix with warm season grasses and wildflower species included to provide **diverse habitat with a pollinator focus**	
Steep Slope Mix	1	**High diversity** of native warm season grasses and wildflowers better suited to vegetate steeper slopes while still providing quality habitat for pollinators and other species	• Use mix on stretches of ROW with slopes greater than 3:1 • Utilize data collected from surveys conducted directly on MVP ROW to identify locations
	2	**Medium diversity** of native warm season grasses and wildflowers better suited to vegetate steeper slopes while still providing suitable habitat for pollinators and other species	
Riparian Mix		Native warm season grasses and wildflowers well suited to vegetate locations occurring on the bank of water features (i.e. river, stream, lake)	• Use mix on stretches of ROW along water features
Wet Meadow Mix		Mix of native species that can tolerate areas of wetness and dryness (saturation or not); grasses, sedges, and wildflowers well suited to vegetate locations that are usually wet, but sometimes dry	• Use mix on stretches of ROW where habitat occurs such as wet meadows
Wetland Mix		Mix of native, water-loving species for areas that are inundated or saturated at all times	• Use mix on stretches of ROW where wetland habitat occurs

Appendix D

Native Restoration – West Virginia Rev 5/20/15

Seed Mix		Description	Purpose
Native Base Mix		Standard mix of native species with **bulk native warm season grasses** and limited wildflower species included	Recommended as a minimum base mix for entire ROW; not ideal for sensitive areas
Meadow Mix	1	**Higher diversity**; mix of native warm season grasses and wildflower species that offer valuable early successional habitat to wide variety of native wildlife; low profile, aesthetically pleasing mix	• Highly visible areas • More sensitive/conservation driven segments • Generally short stretches on ROW where community members tend to be present (i.e. trails, parks, other recreational areas) • Can be utilized for educational activities and outreach
	2	**Good diversity**; native warm season grasses and wildflower species offer quality early successional habitat to native wildlife species; low profile aesthetically pleasing mix	
Pollinator Mix	1	Well-balanced native species with **excellent variety** of native warm season grass and wildflowers to target pollinator species including monarch butterflies	• Base mix for longer stretches along ROW • Provides range of quality: from base mix for native restoration to high quality native pollinator habitat • Suitable for slopes 3:1 and lower
	2	**Medium Diversity** Native species with good variety of native warm season grass and wildflower species to target pollinator species including monarch butterflies	
	3	Native species with **bulk native warm season grasses** and limited wildflower species included	
Steep Slope Mix	1	**High diversity** of native warm season grasses and wildflowers better suited to vegetate steeper slopes while still providing quality habitat for pollinators and other species	• Use mix on stretches of ROW with slopes greater than 3:1 • Utilize data collected from surveys conducted directly on MVP ROW to identify locations
	2	**Medium diversity** of native warm season grasses and wildflowers better suited to vegetate steeper slopes while still providing suitable habitat for pollinators and other species	
Riparian Mix		Native warm season grasses and wildflowers well suited to vegetate locations occurring on the bank of water features (i.e. river, stream, lake)	• Use mix on stretches of ROW along water features
Wet Meadow Mix		Mix of native species that can tolerate areas of wetness and dryness (saturation or not); grasses, sedges, and wildflowers well suited to vegetate locations that are usually wet, but sometimes dry	• Use mix on stretches of ROW where habitat occurs such as wet meadows
Wetland Mix		Mix of native, water-loving species for areas that are inundated or saturated at all times	• Use mix on stretches of ROW where wetland habitat occurs

Appendix E

	General location description	Recommended upgrade	Reason for seed mix upgrade; features of importance	Additional notes
1	Webster and Nicolas County in Craigsville, WV	Meadow Mix	Streams and wetlands; Cherry Run conservation easement **crosses along backyards and town**	
2	South of Greenbrier into Summers counties	Appropriate wet mixes	**Sensitive area** - streams, wetlands, karst, protected areas, Wildlife Management Areas	Vast network of water features in this location
3	Roanoke, Franklin and Floyd county trisect	Meadow Mix	**Route follows stream, trail crossing present, dissects Blue Ridge Land Conservancy conservation easement**	Easement and trail crossing present
4	Franklin county	Meadow Mix	Streams and wetlands, several colleges in close proximity	**Appears to run along a creek and through some residential backyards**
5	Spring Hollow Reservoir in Roanoke County	Meadow Mix	Proposed route runs adjacent to reservoir	A nearby school provides a partnership opportunity here
6	Crossing from Summer into Monroe County	Appropriate wet mixes	River, wetlands, karst	River crossing; flood plain is nearly all agricultural – **Opportunity to discuss BMP's for agriculture**
7	Montgomery County	Appropriate wet mixes	Karst, conservation easement, TNC lands, streams	Crossing two water features, but mostly agricultural lands - **Opportunity to discuss BMP's for agriculture**

Appendix F

General Location Description	Recommended upgrade	Additional notes; reasons for suggested upgrade
Appalachian Trail Crossing	Meadow Mix	High foot traffic area
Runs directly through TNC conservation easement	Pollinator Mix	Consider reaching out to TNC to align with easement efforts
Running directly through wetland	Wetland Mix	Sensitive area
School located near proposed route	Meadow Mix	Red segment; opportunity for community involvement in area of priority
School located near proposed route	Meadow Mix	Consider partnering with James Monroe High School in Lindside, WV, Monroe County; area with upgraded seed mix could be utilized as outdoor classroom
School located near proposed route	Pollinator Mix	Consider partnering with Bent Mountain Elementary, area with upgraded seed mix could be utilized as outdoor classroom
Cluster of schools including higher level located near proposed route	Pollinator Mix	Opportunity for community relationship building activity if needed near northern portion of route
Approximately fifteen miles to Roanoke city center	Pollinator Mix	Red segment; strong opportunity to involve Roanoke County community, large cluster of schools including eight higher level
Cluster of schools located near proposed route	Pollinator Mix	Red segment; opportunity to involve Chatham, VA community in Pittsylvania County
Highway 29 road crossing with trail crossing	Meadow Mix	Higher visibility from road plus foot traffic
Highway 50 road crossing with recreational trail crossing	Meadow Mix	Higher visibility from road plus foot traffic
Highway 122 road crossing with recreational trail crossing #1	Meadow Mix	Higher visibility from road plus foot traffic
Highway 122 road crossing with recreational trail crossing #2	Meadow Mix	Very close to crossing #1, road visibility and foot traffic
Recreational trail crossing	Meadow Mix	Potential for high foot traffic
Recreational trail crossing	Meadow Mix	Potential for high foot traffic
Recreational trail crossing	Meadow Mix	Potential for high foot traffic
Recreational trail crossing	Meadow Mix	Potential for high foot traffic
Pigg River crossing	Riparian Mix	Major river crossing, potential high visibility
Virgil Goode Highway crossing	Pollinator Mix	Potential high visibility from major road crossing
Highway 29 road crossing	Pollinator Mix	Potential high visibility from road
Highway 81 and Highway 11 road crossings	Pollinator Mix	Crossings are as close as one mile from Spring Hollow Reservoir