To: Jim Hubbard, Under Secretary of USDA
c/o Jefferson National Forest
MVP Project #50036
5162 Valleypointe Parkway
Roanoke, VA 24019

From: Nan Gray, LPSS
668 Happy Hollow Rd.
Newport, VA 24128

RE: MVP and Equitrans Expansion project Draft Supplemental Environmental Impact Statement Comments
Mountain Valley Pipeline project #50036
Date of submission: 9 November 2020
Electronic Comments sent to:
https://cara.ecosystem-management.org/Public//CommentInput?Project=50036

Dear Jim Hubbard,
I am providing written comments prior to the close of the comment period which explain my concern and contentions that the draft SEIS does not guarantee adequate protection against soil erosion and sedimentation impacts during and after construction.

Qualifications and Credentials:
Bachelor of Science, Chemistry, Wilmington College, 1982
Master of Science, Agronomy, University of Illinois, 1986
Erosion and Sediment Control Inspector program, Certification # 5443, Virginia Department of Conservation and Recreation, 2011-2014
Onsite Soil Evaluator License, Master Alternative #1940001268, Commonwealth of Virginia, 2011-present
Licensed Professional Soil Scientist, #340100297, Commonwealth of Virginia, 2003-present, CPSS 2003-2015, LPSS 2015-2020
Licensed Professional Soil Scientist # 1213, Commonwealth of North Carolina, 2003 -present

I am highly qualified to perform a review of the Draft SEIS and all information is based on my personal knowledge unless otherwise indicated.

I have lived in Craig County, Virginia since 1987 and have explored the mountains around where I live, including Sinking Creek Mountain on which the route for the Mountain Valley Pipeline has already been cleared through an old growth forest.
I have been a practicing Soil Scientist since 1988 and been a Licensed Professional Soil Scientist (3401000297) since 2015, when licensure was approved by the Legislature. My profession is regulated by the Virginia Department of Professional and Occupational Regulations. I am also a Licensed Professional Soil Scientist in North Carolina. My other license is an Alternative On-site Soil Evaluator.
I have been a General Practitioner of Soil Science for 32 years, consulting in field mapping soils and landscapes for land uses such as conservation easements, road layout, fracture trace analysis, water well siting, shrink-swell clay problem solving, soil and geomorphic interpretations, agronomic practices, karst, wetland delineations, septic drainfield suitability and design, pond and dam material suitability, farming, erosion and sediment control, LiDAR, nutrient and pollution movement in soils.
I am the President of Soil Works, Inc., which has been a Small, Woman and Minority (SWaM) owned business and a Disadvantaged Business Enterprise (DBE) with Virginia Department of Transportation

(until Covid19 year 2020). I provide professional soil science services for a variety of land uses to the Private Sector and to Government Agencies.
Herein I express my professional assessment of the failure of the U.S. Forest Service to properly identify and address site-specific soils characteristics in the Draft Supplement Environmental Impact Statement for the Mountain Valley Pipeline construction project on the Jefferson National Forest.
I have been monitoring the construction activity for the Mountain Valley Pipeline, and documenting, in my opinion, violations of the terms of the Virginia Erosion and Sediment Control Regulations and the Federal Energy Regulatory Commission Upland Erosion Control Regulation impacts to the mountain flank of Sinking Creek Mountain and the surrounding karst area, in Craig and Giles Counties, Virginia.
I have submitted years of documentation to the citizens' Mountain Valley Watch monitoring program and to the Department of Environmental Quality.
The Forest Service has been given a report by the Mountain Valley Pipeline project developer that was generated by the internet information and computer programs and includes information from the Natural Resource Conservation Service on the general Order 2 Soil Survey, which does not have enough detail to route nor construct a pipeline. The WebSoilSurvey states that warning:

Warning: Soil Map may not be valid at this scale.

You have zoomed in beyond the scale at which the soil map for this area is intended to be used. Mapping of soils is done at a particular scale. The soil surveys that comprise your AOI were mapped at scales ranging from 1:15,800 to 1:24,000. The design of map units and the level of detail shown in the resulting soil map are dependent on that map scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

The warnings and interpretations of soils maps used to route MVP were ignored or not understood. The computer, off-site, cannot give the detail necessary to include all the smaller soil units that can cause problems to the integrity of a pipeline.
In my professional opinion, MVP has not done due diligence in mapping the existent soils at an appropriate scale to know what soils the pipeline corridor intersects.
Accurate soils identification is vital to many aspects of pipeline-construction planning an implementation including: erosivity, piping potential, slope stability, and the effectiveness of erosion control devices. The erosivity and effectiveness of the erosion control devices factor into erosion modeling.
Intense land disturbance, such as the MVP project, should use an Order 1 Soil Survey where detailed on-site soil information is gathered and interpreted rather than reliance on Order 2 data, gathered off-site by computer and internet sources.
Order 1 Soil Surveys should be performed by experienced Soil Scientists, in my professional opinion.
I was hired to conduct an Order 1 Soil Survey of the WBXpress replacement pipeline through the Monongahela National Forest in 2016. The job required more than 6 Licensed Professional Soil Scientists and rotating Soil Scientist interns, to sample, describe and runners to move the soil samples back to our cars. We had Archeologists digging the pits by hand because the FS would not let heavy machinery on the ROW. Soil Scientists coordinated the information and interpreted the soil survey.
I had talked a lot with Forest Service Soil Scientists in 2015 about what the Order 1 Soil Survey should entail before the survey began in 2016. The WBX pipe is a Williams pipeline, who contracted with Columbia gas for a third-party Soil Scientist for review and I was hired as a field scientist by NRG then ERM (Environmental Resources Management).
In my professional opinion, an Order 1 Soil Survey should be performed by trained Soil Scientists and the precedence was set in 2016 that an Order 1 Soil Survey in the National Forest must be performed by a Licensed Professional Soil Scientist familiar with the local soils.
An applicant for a soil scientist license must pass the national Fundamentals of Soil Science Examination before one can take the national Professional Practice Examination. After passing the Fundamentals of Soil Science examination, you must demonstrate four years of experience prior to taking the Professional Practice examination. You must pass the Fundamentals of Soil Science

examination and the Professional Practice examination and satisfy all other requirements to be considered for licensure.

The Fundamentals of Soil Science Examination is 150 multiple choice questions and comprised of 6 content areas: Soil Chemistry and Mineralogy; Soil Fertility and Nutrient Management; Soil Physics; Soil Genesis, Morphology, and Classification; Soil Biology and Soil Ecology; and Soil and Land Use Management.

The Professional Practice Examination is 120 multiple choice questions and comprised of 8 content areas: Soil Chemistry and Mineralogy; Soil Fertility and Nutrient Management; Soil Physics; Soil Genesis, Morphology, and Classification; Soil Biology and Soil Ecology; Soil and Land Use Management; Field and Laboratory Techniques; and Ethics.

The Specific tasks for an Order 1 Soil Survey include:

- Field review and training, which includes a combination of classroom and field review covering local geologic conditions (e.g., formations crossed by the project corridor and distinguishing characteristics, etc.), dominant soil properties and typical horizonation of the soil series in the region, slope stability criteria pertinent to recording slope stability data, methods for sample collection, and other information required to conduct the field investigations.
- At a map scale of 1:12,000 to 1:30, depending upon the complexity of soils present.
- Describing and sampling georeferenced locations identified from preliminary reconnaissance assessment in accordance with the Natural Resources Conservation Service (NRCS) Soil Survey Manual and the Field Book for Describing and Sampling Soils, Version 3.0. Soil descriptions will be recorded on standard NRCS Form 232 Pedon Description or digital equivalent. The locations of supplemental observations will be recorded using a mapping-grade GPS. Soil profile descriptions from the field will include the following:
    - Series or component Name and Map Unit Symbol
    - Photo #
    - Classification
    - Soil Moisture Regime (Tax)
    - Describer
    - Date, Weather, Temperature
    - Longitude and Latitude and Datum
    - Location
    - Landscape
    - Landform, microfeatures
    - Anthropogenic features
    - Elevation, Aspect, Slope (%)
    - Slope Complexity, Slope Shape
    - Hillslope Profile Position
    - Geomorphic Component
    - Microrelief
    - Physiographic Division, Physiographic Province, Physiographic Section
    - Drainage, Flooding, Ponding, Soil Moisture Status, Permeability, Ksat (measured)
    - Land Cover
    - Parent Material
    - Bedrock (Kind, Fractures, Hardness, Depth)
    - Erosion, Kind and degree, Runoff
    - Surface Fragments %, Grade, etc.
    - Diagnostic Horizons/Properties, Kind, Depth
    - Control Section
    - Vegetation

- Presence and thickness of organic horizons;
- Horizon depth and thickness;
- Horizon designations;
- Matrix color (moist);
- Presence, abundance, and contrast of redoximorphic features;
- USDA soil texture class (and appropriate modifiers);
- Rock fragment type, size, and abundance;
- Soil structure type, grade, and size;
- Moist Consistence;
- Mottles, concentrations and depletions;
- Stickiness and Plasticity estimates;
- Boundary topography and distinctness;
- Presence of pans or other restrictive layers;
- Topographic position;
- Slope;
- Roots and pores, quantity, size and location or shape
- Presence and abundance of surface rocks;
- Depth to bedrock and bedrock structure/ dip slope (where visible); and
- Determination of drainage class;
- pH, Effervescence with HCl and/or H_2O_2
- Estimated % Clay

- Recording the presence and locations of rock outcrops, concentrations of surface stoniness, past shallow slope failures (both natural and anthropogenic induced), and dominant vegetation at each soil observation site.
- Collecting and submitting electronic GPS location data for each soil observation site pursuant to approved protocols and formats.
- Collecting of at least 4 pound (2 kilogram) soil samples from every horizon in every soil observation site, sampling sequentially from the deepest soil horizon upwards. These samples shall be packaged in plastic bags clearly marked with the observation site identification number and horizon designation. All samples must be shipped to central location or laboratory within a week of sampling in packages weighing 70 pounds (32 kilograms) or less.
- Laboratory analyses to include Particle Size Analysis (USDA), pH, Cation Exchange Capacity, and other appropriate analyses related to soil fertility, Plasticity Index, coefficient of linear extensibility and/or X-ray diffraction or other mineralogy testing and based on Agriculture or Forest Soil requirements and land use.
- Furthermore, coordination of field, laboratory and office work must be managed by a Soil Scientist familiar with an Order 1 Soil Survey
- Interpretations of the Order 1 Soil Survey must be made by qualified Soil Scientists and reviewed by qualified Soil Scientists
- Route adjustments and route denial are possible with an Order 1 Soil Survey

The appropriate scale is 1:12,000 to 1:30 depending upon the complexity of soils identified in a field survey of soils at an Order 1 level. The more problematic soils require more detail in mapping to know where their boundaries are and what the properties are.

I have reviewed all the documents for the Forest Service Supplemental Draft Environmental Impact Statement and seen no Order 1 Soil Survey.

New and Additional information is available and should be considered. LiDAR was flown in 2017 and 2018, prior to MVP blasting the top of Sinking Creek Mountain. LiDAR should be flown again through the Forest Service lands and interpreted and made available to the Public, prior to any further soil disturbance or Earth damage by MVP.

LiDAR technology can measure actual soil movement that has occurred since the pipeline corridor was blasted and cleared in 2018. The soil loss can be measured throughout the entire project, just by comparing the LiDAR imagery from 2017 with new LiDAR. This guessing game with the RUSLE2 model is folly. The Forest Service needs current LiDAR imagery to show the changes to the soils and rocks, particularly on the east side of Sinking Creek Mountain since the entire east side of Sinking Creek Mountain has been jeopardized by blasting. The east side of the mountain is an 85% slope (nearly vertical), shear rock face that MVP blasted and scraped and tried to make suitable. But the area is in a high movement area, hard to walk on, with big rocks that slide against each other and it is NF land.

The RUSLE and RUSLE2 models have limitations that are not accounted for in the Draft Supplemental Environmental Impact Statement as follows:

a. Geosyntec aggregated the data, which according to the User's Guide for RUSLE2, they are not allowed to do: "Values for conditions along the slope length are used in RUSLE2 to compute a soil loss for the slope length. A limitation of this approach is that soil loss values cannot be aggregated based on conditions that vary along a slope length, such as multiple soil types." https://www.ars.usda.gov/southeast-area/oxford-ms/national-sedimentation-laboratory/watershed-physical-processes-research/research/rusle2/revised-universal-soil-loss-equation-2-rusle2-documentation/ , last modified in 2016.

b. Also from the User’s Guide: “6.1.1.2. Estimating Erosivity for High Elevations Erosivity varies greatly with location in mountainous areas. Erosivity maps, like those in Figure 6.2 (of the Rocky Mountains), do not provide accurate values because of insufficient map scale and limited rainfall data. Rain data are often not available at high elevations because rain gauges are usually located at lower elevations in valleys where economic activities, like aviation and farming, occur."

I have reviewed all documents and have not seen any current rainfall data for the JNF.

i. The precipitation data used as an input to the model are not current. By relying on average annual precipitation data from 1980 to 2010, an entire decade’s worth of the most recent precipitation data is excluded. Ongoing changes in global climate are expected to increase precipitation in certain regions, and decrease precipitation in others, and therefore the model more closely approximates the conditions in an increasingly distant past. It is notable that recent precipitation data were excluded from the model, as the report itself notes how “a higher frequency of storm events and above-average precipitation depths fell on the Project area in 2018.”

ii. Precipitation events are expected to become more intense as the climate continues warming. Therefore, even if average annual precipitation remains unchanged after including 2010-2020 precipitation data, more erosion is likely to occur on account of these high energy storms. The Draft SEIS, with reference to the hydrologic analysis, notes that “specific fire, flood, or short-term drought events are not able to be incorporated into RUSLE modeling, due to the short time frame (e.g., days or weeks) of the events and that RUSLE modeling is on an annual scale.” While the hydrologic analysis claims its reliance on MVP’s original sediment and erosion controls (i.e., not accounting for the “substantially upgraded” controls implemented in response to extreme precipitation events) is conservative, MVP’s challenges with erosion and slope stability have continued unabated.

c. "6.2.1. Basic Principles of Soils vary in their susceptibility to erosion. The soil erodibility factor K is a measure of erodibility for a standard condition." and has problems when a soil has permeability issues, such as a fragipan or duripan, crust, stone line or multiple horizons that do not transmit water through the soil in a uniform manner. https://www.ars.usda.gov/southeast-area/oxford-ms/national-sedimentation-laboratory/watershed-physical-processes-research/research/rusle2/revised-universal-soil-loss-equation-2-how-rusle2-computes-rill-and-interrill-erosion/ , equation 2 considers mass and sediment load in uniform soils.

i. "Soil organic matter reduces the K factor because it produces compounds that bind soil particles and reduce their susceptibility to detachment by raindrop impact and surface runoff. Also, organic matter increases soil aggregation to increase infiltration and reduce runoff and erosion. Permeability of the soil profile affects K because it affects runoff. Soil structure affects K because it affects detachment and infiltration. Soil structure refers to the arrangement of soil particles, including primary particles and aggregates, in the soil. Soil mineralogy has a significant effect on K for some soils, including subsoils, soils located in the upper Midwest of the U.S., and volcanic soils in the tropics." https://www.ars.usda.gov/southeast-area/oxford-ms/national-sedimentation-laboratory/watershed-physical-processes-research/research/rusle2/revised-universal-soil-loss-equation-2-how-rusle2-computes-rill-and-interrill-erosion/

ii. The K factor also has a limitation with rock in the soil matrix. All of the mountain landslide soils on the pipeline corridor in the national forest have lots of rock (20-80-100% rock).

iii. "The erodibility K will not be available for soils on construction sites...because of mixing of soil materials..." https://www.ars.usda.gov/ARSUserFiles/60600505/rusle/rusle2_science_doc.pdf. Once the forest is cleared and graded, the soils conditions are that of a construction site and no long the conditions of a forest.

iv. K values are also determined by temperature and precipitation on a monthly basis. My measurements of rainfall these past 10 years indicate annual precipitation is an average of 56 inches of liquid precipitation, with a range of 46-71 inches. To date, in the lower elevations of the mountains, 2300 feet, we have had almost 60 inches of precipitation. Clearly the models do not work.

v. "Rock cover, which also includes non-decomposing surface material, is a site-specific entry based on field measurements." This is not a computer derived value, but boots on the ground investigation data.

d. RUSLE2 also relies on a cover management factor. In areas of the ROW that I have seen, there is not uniform cover management, to no cover and to have no vegetation, the RUSLE2 fails to include that erosion. There is not uniform cover management on the MVP ROW.

e. Another limitation of RUSLE2 is that it relies on uniform slope, uniform soils in that slope and that would be a small area, 20 acres or so. Hard pressed to find 20 continuous acres of uniform soils or slope, so really the RUSLE2 would fit better if areas were less than 5 acres, but when your window of soils view is narrow, 150 feet wide and linear, many nonuniform unlike soils can be in an area long and narrow to 5 acres. Not without sampling soils would you know what is in a long narrow 5 acre slice of ground. So soils would need to be sampled every 100 feet or so to apply RUSLE2.

f. Profile lengths longer than 1,000 feet (300 meters) should also not be used in RUSLE2 because the reliability of RUSLE2 at these long slope lengths is questionable—and overland flow often becomes concentrated on most landscapes before such lengths are reached. The longest plot used in the derivation of RUSLE2 was about 650 feet (200 meters). Allowing a 1,000 foot (300 meter) profile length is a generous extrapolation. ref: 6.RUSLE2 Database Components page 39 USDA-Agricultural Research Service https://www.ars.usda.gov/ARSUserFiles/60600505/rusle/rusle2_science_doc.pdf

g. Topography RUSLE2 works best for slope lengths that are between 50 and 300 ft long. It works moderately well for slopes less than 20 ft long and for slope lengths between 300 and 600 ft. It works acceptably for slope lengths between 600 and 1000 ft long, and it should not be

used for slopes longer than 1000 ft.
https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_025079.pdf

h. RUSLE2 works best for slope steepness between 3 and 20 percent. It works moderately well for slope steepness less than 3 percent and between 20 and 35 percent. But the model is not meant for long steep slopes more than 30%. ref: RUSLE2
https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_025079.pdf

Site-specific soil types within the construction corridor, In my opinion, have not been identified. Such information is literally the foundation of an impact analysis for the construction of a 42-inch gas pipeline in the extreme ridge and valley terrain on the Jefferson National Forest. Reliance on dated, generalized data without performing any ground truthing is not due diligence.

The Forest Service should, in my opinion, not rely on the information provided in the Supplemental Draft Environmental Impact Statement to allow MVP access to JNF. Please deny MVP access to JNF lands and do not change any Forest Plans for MVP. Please select NO ACTION, Alternative 1, regarding MVP in National Forest lands.

Sincerely,
Nan Gray, LPSS