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September 2, 2016

**RE: Evidence of Prevalence and Density of Springs On/Near the MVP Corridor in Sample Areas of Monroe County, WV, Confirms Need for Hydrogeological Studies (9/2/2016).
Docket No. CP16-10-000**

[This document replaces a version of the Supplemental Information dated August 13, 2016]

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EVIDENCE OF PREVALENCE AND DENSITY OF SPRINGS ON/NEAR THE MVP CORRIDOR IN SAMPLE AREAS OF MONROE COUNTY, WV, CONFIRMS NEED FOR HYDROGEOLOGICAL STUDIES (9/2/2016)

Indian Creek Watershed Association (ICWA) is today submitting maps that outline two locations of more than 98 springs on or near two sections of the pipeline in Monroe County. Data about these springs have been gathered to provide the FERC and other agencies information that, in most cases, is not in the current docket. In doing so, we provide an example of the level of diligence that is required to protect the water of the state and the drinking water of the residents in Monroe County.

We conclude that without hydrogeological studies that examine the potential impact of pipeline construction in a region of complex karst and compound geologic hazards—and the potential impact of blasting on springs and wells located on near and neighboring properties—the FERC lacks sufficient information to make a considered judgment about whether or not to permit the proposed route in Monroe County. The FERC should therefore require such studies before issuing a Draft EIS that includes a route through Monroe County. ICWA invites the FERC and other federal and state agencies to contact us for more information, and to send a team to Monroe County to conduct field-based assessments.

BACKGROUND:

The FERC is required by NEPA and the Clean Water Act to consider the effects of the pipeline on drinking water aquifers. In order to comply with that provision, first it must have identified the springs which will be affected. Sources of previously submitted information about the springs in Monroe County include:

- MVP—MVP’s information about the springs on and near any of the routes through Monroe County has been insufficient and is based on its desire to build a pipeline rather than the facts. In its original filing, when MVP justified its choice to route the pipeline through Monroe County, it asserted that there was only one spring. While this information has been found to be false and misleading, MVP has continued to ignore or underreport the potential effects of the pipeline on water resources both on the route and on the near and neighboring properties.
- Publicly available information—There is a sharp contrast between publicly available data and on-the-ground data. The ICWA Interactive Environmental Map illustrates this point. Brian Geoff Richards, as part of his master’s thesis in geology at WVU, performed a ground study wherein he collected data about and provided coordinates for 221 springs on the northeastern section of Peters Mountain in Monroe County.¹ Once ICWA had access to mapping capability, we were able to plot the Richards data and it is shown in Figure 1a.² In contrast, Figure 1b shows the same section of Peters Mountain with the information available on the DEP and other agency data bases but **without** the “Richards” layer. This public data map shows only 8 springs, or 4% of the number of springs discovered by Richards in his on-the-ground study. There can be no stronger example that affirms the need of an extensive on-the-ground study of the springs of Peters Mountain. **Public information is insufficient. Reliance on public information instead of ground studies can be misleading to those charged with locating or permitting projects.**

¹ “Aqueous geochemistry of springs along Peters Mountain in Monroe County, WV,” Brian Geoff Richards, submitted to Docket PF15-3-000, 5/21/15. Accession No. 20150521-4015.

² The ICWA Interactive Environmental Map is available to the public and can be accessed through www.IndianCreekWatershedAssociation.org. Technical development and hosting of the map is by Downstream Strategies, LLC, of Alderson, West Virginia.

- Indian Creek Watershed Association—ICWA submitted information to the FERC (10/14/2015) that showed a count of springs on various landowner properties on the MVP route. This submittal did not include all of the springs on the route. In addition, ICWA reported the presence of unmapped karst features in the area in our comments to the FERC (11/13/2015) and to USACE and WVDEP (1/21/2106).

IN THIS CURRENT SUBMISSION we are supplementing our previously submitted information with additional facts for the FERC to consider in deciding whether to site the pipeline through Monroe County.

Method: ICWA volunteers have located and are hereby documenting the presence of over 98 springs in two of the many vulnerable areas in Monroe County and elsewhere that would be degraded or potentially destroyed by MVP—the Peters Mountain crossing and the Ellison Ridge area. These areas are shown in Figures 2 and 3. Although geological information about these general areas was submitted in previous ICWA reports, information about most of these springs was not included because ICWA had not yet collected and mapped it.

ICWA volunteers located the springs by walking the properties with GPS devices to determine the GPS coordinates. In consideration of landowners’ privacy of information, the exact locations of the springs are not being made available to the general public. We are sharing information about the general area and number of springs, however, in order to demonstrate the striking difference between publicly available data and data obtainable through ground studies. We note that these differences along the MVP route are comparable to that shown in Figures 1a and 1b of the northeastern section of Peters Mountain.

I - PETERS MOUNTAIN (Figure 2)

The springs of Peters Mountain are the primary source waters for Monroe County's three public water districts and hundreds of private springs and wells. Most of the landowners on Peters Mountain near the MVP proposed route rely on springs or wells for their drinking and agricultural water supply. Public water is not available. To comply with provisions of NEPA, the Clean Water Act and the Safe Drinking Water Act, the FERC must have accurate and complete information about the water resources on Peters Mountain and the cumulative effect of geological features on those resources.

Empirical data: Figure 2 outlines the location of 38 springs on Peters Mountain in close proximity to the proposed MVP route. Volunteers located each of these springs and we were able to use the ICWA Interactive Environmental Map to identify potential risks and hazards to these springs given different interacting factors such as slope, soil type, depth to bedrock, relationship to karst, location within seismic zone, etc.

- ICWA volunteers found that springs are prevalent and densely located in the region of Peters Mountain that is crossed by the pipeline. The number and density of the springs in the region observed by the ICWA volunteers is roughly equivalent to that in an area of comparable size selected from the Richards map. Presumably, the prevalence of springs would be similar all along the 34-mile stretch of Peters Mountain in Monroe County.
- As in the northeastern Peters Mountain section shown in Figures 1a and 1b, Figure 2 shows that publicly available data from state and federal agencies is virtually non-existent in this *southwestern* section of Peters Mountain when compared to a physical count of springs. ICWA volunteers located 38 springs through their on-the-ground work, whereas the public information only shows 1 spring in the same region (3%).

- This sampling of springs along Peters Mountain leads to the conclusion that wherever MVP sites the line along Peters Mountain, high quality springs will likely be found in a density comparable to the ICWA and Richards observations. (The springs in Figure 2 cluster more densely to the south of the proposed route because the ICWA volunteers focused on that area before MVP shifted the original route approximately one-third mile to the north.)
- It is important to emphasize that ICWA volunteers did not make a complete inventory of the springs in this region of Monroe County. They simply provided evidence that there is insufficient information about springs in the MVP application, and that the location and geological qualities of the springs on Peters Mountain must be determined and considered **before** a pipeline can be considered by the FERC. It is the responsibility of MVP and the FERC, not unpaid volunteers, to identify and consider all potential hazards to drinking water aquifers.

Significance: NEPA and the Clean Water Act require that the FERC consider the cumulative effects of the pipeline.

- The highly uncertain and potentially significant environmental effects of the pipeline are explained in the Kastning report³—The MVP pipeline built through karst geology which includes springs, caves, sinkholes, and other fracture features would pose unique environmental risks to the underlying aquifer. Given that there is no hydrogeological study of this area at the present time, NEPA regulations would require a hydrogeological study to discover the interconnectedness and the direction of the underlying aquifers on Peters Mountain to establish the facts upon which the FERC could make a decision.
- Dr. Kastning warns that “Performing ground truth is the only proven way to detect the presence and abundance of small sinkholes. In the area of concern along the MVP, the proposed corridor crosses numerous places in karst terrain where subtle sinkholes may be the only ones present. Even very small sinkholes are important indicators of karst development, especially where subsurface features (such as caves and other openings) occur. In general, the presence of sinkholes of any size in a soluble rock terrain is an indicator of a subsurface hydrologic karst environment (a network of enlarged openings that have or still do conduct groundwater)” (p. 13).
- The Kastning report cites the example of contamination of the Red Sulphur Public Service District (RSPSD) spring to show that pollution travels through the karst. This incident, which occurred after construction of the much smaller Columbia Gas-Celanese natural gas pipeline, points to the need for a complete study of the aquifer on Peters Mountain before a pipeline route can be sited.
- **In its submittals to the FERC, MVP submits NO INFORMATION about springs that are on land parcels that do not include the pipeline Right of Way or workspaces.** However, as evidenced by the Columbia Gas-Celanese pipeline incident, impacts to groundwater sources do not confine themselves to Rights of Way or parcel boundaries. Sinkholes near the pipeline can provide direct routes for aquifer pollution. Pipeline construction or blasting may change the fracture lines of rocks in the surrounding area through which ground water moves and springs are defined, and a

³ “Geologic Hazards in the Karst Regions of Virginia and West Virginia,” Ernst H. Kastning, Ph.D., P.G., submitted to Docket CP16-10-000, Accession # 20160713-5029.

permanent 42-inch diameter pipeline and associated trench will have a permanent impact on water within and beyond the ROW.

- No hydrogeologist has certified a specific “safe distance” between the pipeline and the springs on Peters Mountain. Both MVP and the FERC have made reference to a 500 foot distance for spring identification along the corridor in karst terrain, presumably determining that distance to be adequate to protect the aquifers. However, they have not provided a professional determination of that claim. To the contrary, facts show that the spill site and related sinkhole along the Columbia Gas-Celanese pipeline right of way was approximately one-half mile, not 500 feet, from the RSPSD spring. Because of the density of the spring locations and possible interconnectedness of the aquifers, mitigation (e.g., buffer zones) to protect springs that are not directly on the line cannot be instituted without hydrogeological studies *before* a pipeline can be sited. Afterwards is too late.

II - ELLISON RIDGE (Figure 3)

To comply with provisions of NEPA and the Clean Water Act, the FERC must have accurate and complete information about the spring water resources on Ellison Ridge, the cumulative effect of geology on those resources, and the effect of the pipeline on the drinking water of low income residents.

Empirical data: Figure 3 outlines the location of more than 60 springs on Ellison Ridge and in the Greenville area in close proximity to the proposed MVP route.

- Figure 3 shows that if one were to rely only on public information sources there would be no concern about the springs along the line between mileposts 181 and 188 because there are only 2 springs in that same region that have been identified by the federal and state agencies (3%).
- Many of the springs identified by the ICWA volunteers have not been included in MVP’s submittals to the FERC, because MVP generally omits springs that are on land parcels that do not include the pipeline right of way or workspace.
- These springs are located on steep slopes below the ridgeline where there is shallow depth to bedrock and where pipeline construction will destroy critical forest cover.
- The ICWA volunteers did not make a complete inventory of the springs in this region of Monroe County. They simply provided evidence that the MVP application contains insufficient information and that the location and geological qualities of the springs on Ellison Ridge and near Greenville must be determined **before** a pipeline can be considered by the FERC. It is the responsibility of MVP and the FERC, not unpaid volunteers, to identify and consider all potential hazards to drinking water.

Significance: Critical Water Resources—NEPA regulations require that the FERC must consider the possible devastating impacts on residents if the MVP pipeline destroyed or degraded the principal and sole drinking water aquifers such as those which supply the spring and well water on Ellison Ridge.

- In order to protect the aquifers that supply water for drinking and agricultural use, the FERC must consider the effect of the pipeline construction on property *near* the pipeline route as well as *on* the pipeline route itself. Even though MVP has indicated that they might provide well testing within a 150 foot distance in non-karst terrain, that distance is arbitrary and omits mention of the threat to springs. Most importantly, no hydrogeologist has certified a specific “safe distance” between the pipeline and springs in specific conditions found in the Ellison Ridge – Greenville area.

- In an August 2016 hydrogeological assessment of impacts to the watersheds of Summers County and Monroe County caused by construction of the proposed MVP route, Dr. Pamela C. Dodds, a professional geologist who specializes in hydrogeology, finds that “The MVP gas pipeline construction will require deforestation and blasting, both of which will reduce groundwater recharge and cause significant changes to the amount of groundwater available as a drinking water source, as well as to groundwater flow routes” (p. 4).⁴
- The pipeline’s effect on the springs must be studied in combination with the effects of the other geologic and hydrological features such as slope, soils, and depth to bedrock. Figure 4 shows the area of the Ellison Ridge-Greenville springs with two of these critical layers activated:
 - Soil erosion potential—The potential for soil erosion is “high” and the steep slopes could advance runoff and degrade the springs and creeks below.
 - Depth to bedrock layer—According to MVP’s application, the shallow depth to bedrock would necessitate blasting. Blasting could destroy or degrade the springs and the water supply of the people who live on or near the line.
- Of additional concern is the possibility of landslides, given the underlying bedrock. Dodds notes: “The West Virginia Geological and Economic Survey has provided documentation that landslides occur on steep slopes where the underlying bedrock is red shale. The Mauch Chunk red shale bedrock is the predominant unit in areas of Summers and Monroe Counties where the MVP gas pipeline construction is proposed. Regardless of best management practice, erosion and landslides will occur within these areas” (p. 40).
- There is NO PUBLIC WATER supply that serves Ellison Ridge. In a recent survey of Monroe landowners on and near the MVP Corridors, 80% reported that they depend on a private well or a spring as their primary source of drinking water; only 20% reported having access to public water.
- *Testing* of water supplies does not mitigate destruction or degradation of spring water. It is not preventative. Testing only shows whether or not the water **has been** polluted. Spring water is simply irreplaceable. Once a spring is destroyed, it is gone forever.

Significance: Low Income Populations—The FERC must address the fact that the pipeline with its current route on Ellison Ridge will have a disproportionately high and adverse effect on the water supplies of low income populations.

- Monroe County residents rely on springs and wells for safe, reliable drinking water for their families, schools, businesses and livestock, as well as for irrigating vegetable gardens and crops. Ground and surface water does not respect property boundaries. At this point, MVP has restricted offering easement contracts to landowners *actually on* the pipeline or its worksites. Until there is a full analysis of the interconnectedness of underlying aquifers and the effect of the pipeline on headwater streams and springs, there can be no assurances that downgradient (in either above or underground flow direction) springs will not be affected.

⁴ “Hydrogeological Assessment of Watershed Impacts Caused by Constructing the Mountain Valley Gas Pipeline Through Summers and Monroe Counties, West Virginia,” Pamela C. Dodds, Ph.D., L.P.G., August 2016, submitted to Docket CP16-10-000, Accession # 20160815-5135.

- NEPA refers to a requirement for the FERC to consider *Environmental Justice*. The common term is *Economic Fairness*. As seen in Figure 5, the 2014 median household income of the census tract (540639502.004) that contains the Ellison Ridge area stands at \$25,716 which is only 49.3% of the US median household income of \$52,076. Monroe County landowners who are not being offered payment for an easement on their property simply have neither the monetary resources to replace a water system nor the legal know-how and money to hire attorneys to engage in the complicated process to force enforcement of environmental laws and to obtain restitution for losses of their drinking or agricultural water.

CONCLUSION

Clearly the FERC cannot consider data that it does not have. **In order to protect spring water, the FERC must have current and accurate information about not only the springs that are on the pipeline corridor itself, but also the other springs that could be affected.** MVP restricts its disclosure of springs to those found on land parcels that are actually crossed by the pipeline—specifically property where MVP intends to buy an easement in order to build the pipeline itself. MVP **does not** submit information to the FERC that concerns springs that would be affected by the pipeline if those springs are on parcels that are **not** crossed by the pipeline.

All of the “waters of the United States,” including the “waters of West Virginia,” are protected by statutes and regulations enforced by federal (USEPA and USACE) and state (WVDEP) agencies. It is the obligation of these agencies to ensure that *all* waters potentially affected by this project and covered by the Clean Water Act and the Safe Drinking Water Act are protected from pollution—regardless of construction easement boundaries, and whether or not landowners have granted easements to MVP.

As we submit facts about the location of 98+ springs, we wish to emphasize that this information is necessary but not sufficient for the FERC to perform its responsibility under NEPA and the Clean Water Act. Only a small section of the pipeline in Monroe County was included in our exploration. The purpose of our submitting this information is to show the importance of fieldwork that is informed by local knowledge and public input and the need for rigorous independent analysis by federal and state agencies to assure compliance with NEPA, the Clean Water Act, and other federal, state, and local laws. Buffer distances cannot be established in complex terrain without detailed professional hydrogeological analysis.

We therefore reiterate our request that the FERC and the other federal and state cooperating agencies require:

- **In-depth, independent hydrogeological studies of critical watershed areas**, especially in regions of karst or other complex geological features that can affect public and private drinking water sources. The range of travel of pollutants in the areas of the pipeline traversing karst topography is not known because of the intrinsic nature of karst. Therefore, ICWA requests that the FERC, USEPA, WVDEP and USACE require dye tracing, water parameter comparisons, and other methods of determining aquifer connectedness before issuing any draft permits. Such a study needs to be conducted over multiple seasons and a range of high and low water conditions in order to more accurately assess the changing underground patterns that can take place under different conditions. The previously cited example of the diesel pollutant discharged into the Red Sulphur Public Service District drinking water supply is a case in point that must not be repeated, but should be viewed as an object lesson that such avoidable contamination is both possible and unacceptable.

- **A comprehensive amended version of the “final” MVP application before issuance of the DEIS**—so that affected landowners, as well as cooperating agencies and other interested parties, have a realistic opportunity to view, evaluate, and comment on the actual proposed route, above-ground facilities, access roads, ATWS, hydrostatic testing locations, and other project-related features that are being considered by the FERC.
- **USACE and WVDEP consideration of 404, 401 Certification and the Stormwater Permit should not begin until after the FERC has issued a Certificate of Need**, thereby establishing a final route.
- **Individual permits which include site-specific plans to prevent impacts on individual stream and wetland crossings and prevent stormwater pollution and groundwater degradation.** The universal conditions in *General* permits are not sufficient to meet site-specific requirements for environmental protection by the 404, 401, and Stormwater permits given the scale of this project, the diverse types of crossings involved, and the unacceptably poor quality of work demonstrated by MVP in its filings to date. Publicly available data are inadequate for a full understanding of issues at individual stream and wetland crossings and other vulnerable locations in proximity to the pipeline route.
- **Establishment of Peters Mountain as a “No Build” Zone as proposed by Dr. Kastning.** MVP (and other similar projects) should be restricted from proposing a route that crosses Peters Mountain anywhere along its length: the geology is too hazardous and the potential for environmental damage is too great. There is no “best route” across Peters Mountain.

We support the comments made by the Red Sulphur Public Service District, the Monroe County Commissioners and the Monroe County Board of Health that raise concerns about the safety of Monroe County’s drinking water. A comprehensive hydrogeological study needs to be conducted before granting any permit for pipeline construction. Given the reliance on private springs and wells in this area, such a study should not be limited to areas close to public water critical zones, but should include all of the proposed pipeline route through Monroe County, if not the entire corridor.

ICWA invites the FERC to contact us, or send a team to Monroe County. We would be happy to share information in more detail with your environmental staff or to help schedule a visit. Many landowners in the area who have not allowed surveying of their property by MVP have indicated that they would consider allowing environmental surveyors under FERC’s direction. We would also be willing to help facilitate contact with these landowners.

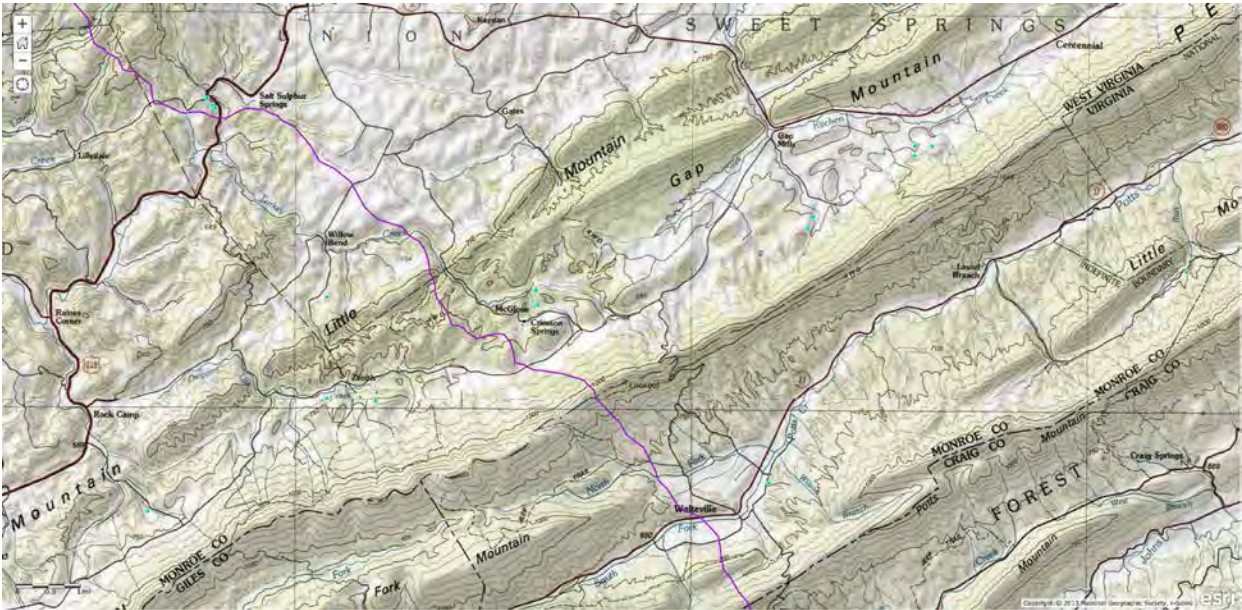
Respectfully submitted,

Indian Creek Watershed Association Board of Directors

Judy Azulay, President; Scott Womack, Vice President;
Howdy Henritz, Treasurer; Nancy Bouldin, Secretary

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**FIGURE 1a: Peters Mountain Northeastern Section
Showing only 8 springs that are in the state and federal agency databases**



**FIGURE 1b: Peters Mountain Northeastern Section
Adding 221 springs from Brian Geoff Richards Thesis**

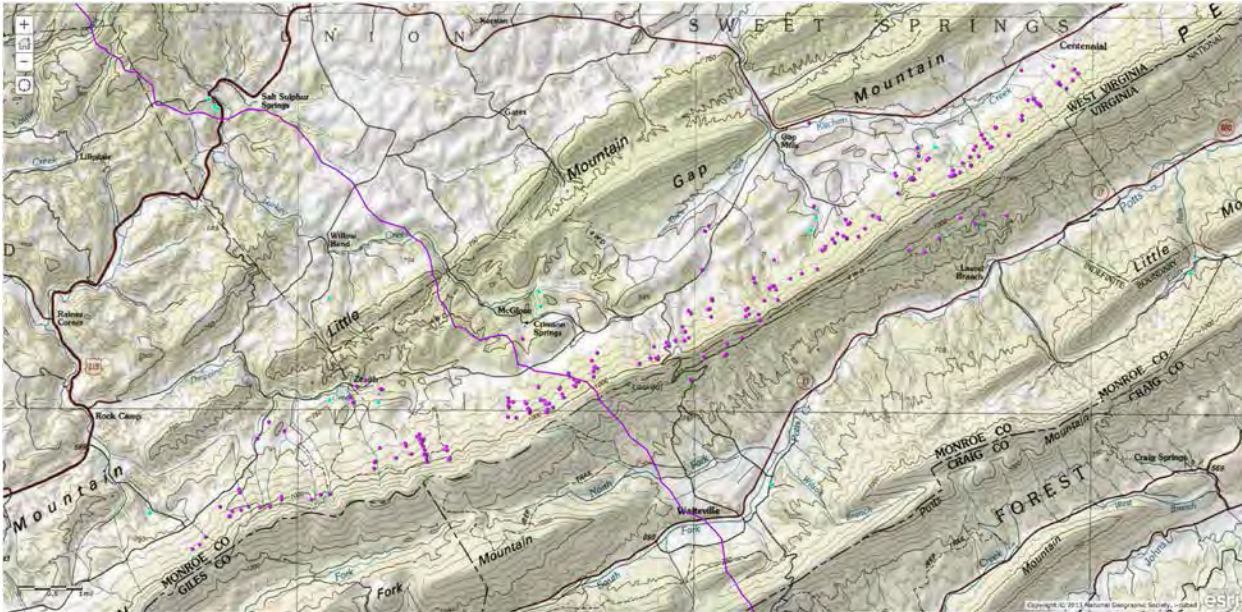
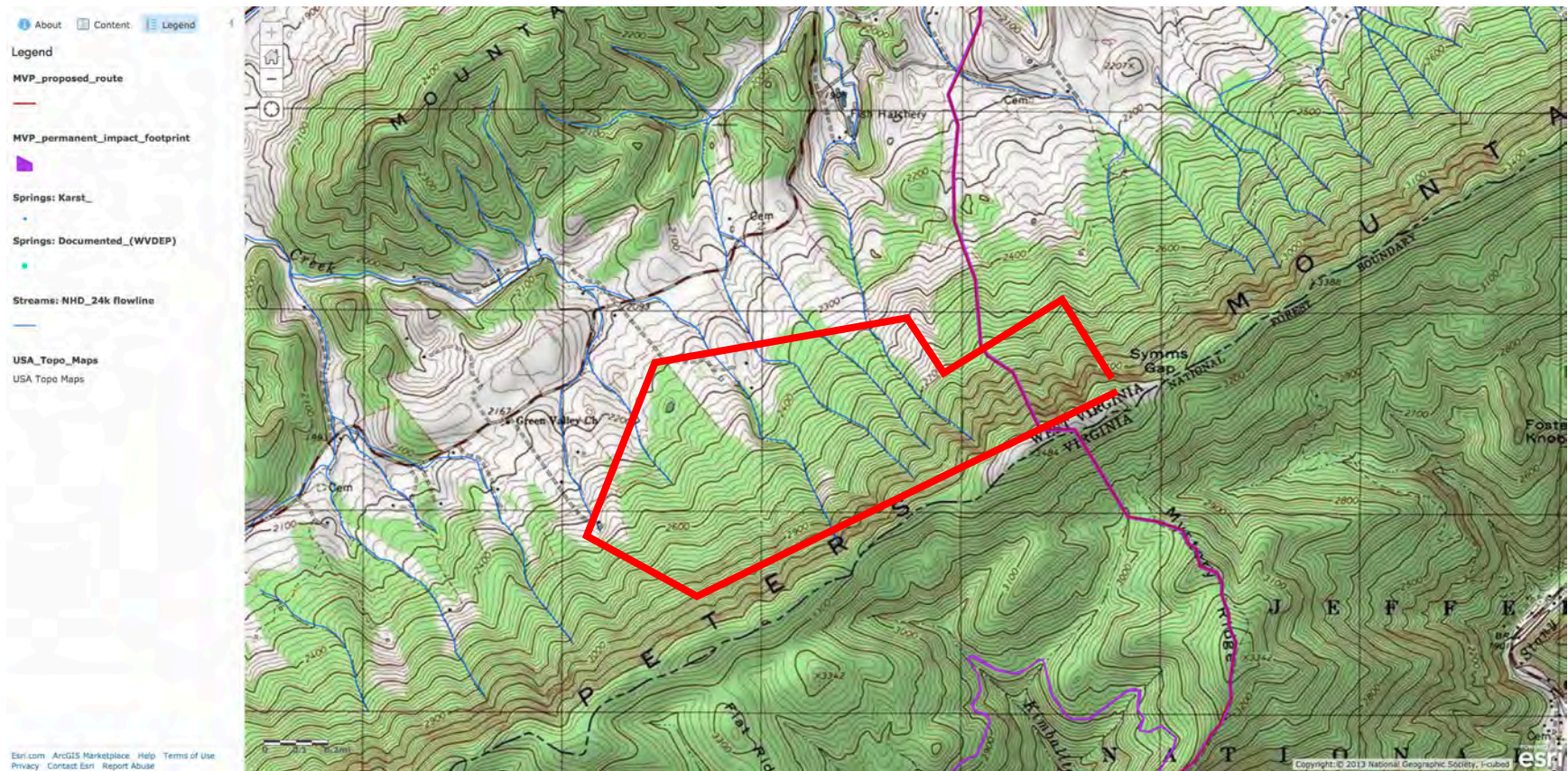
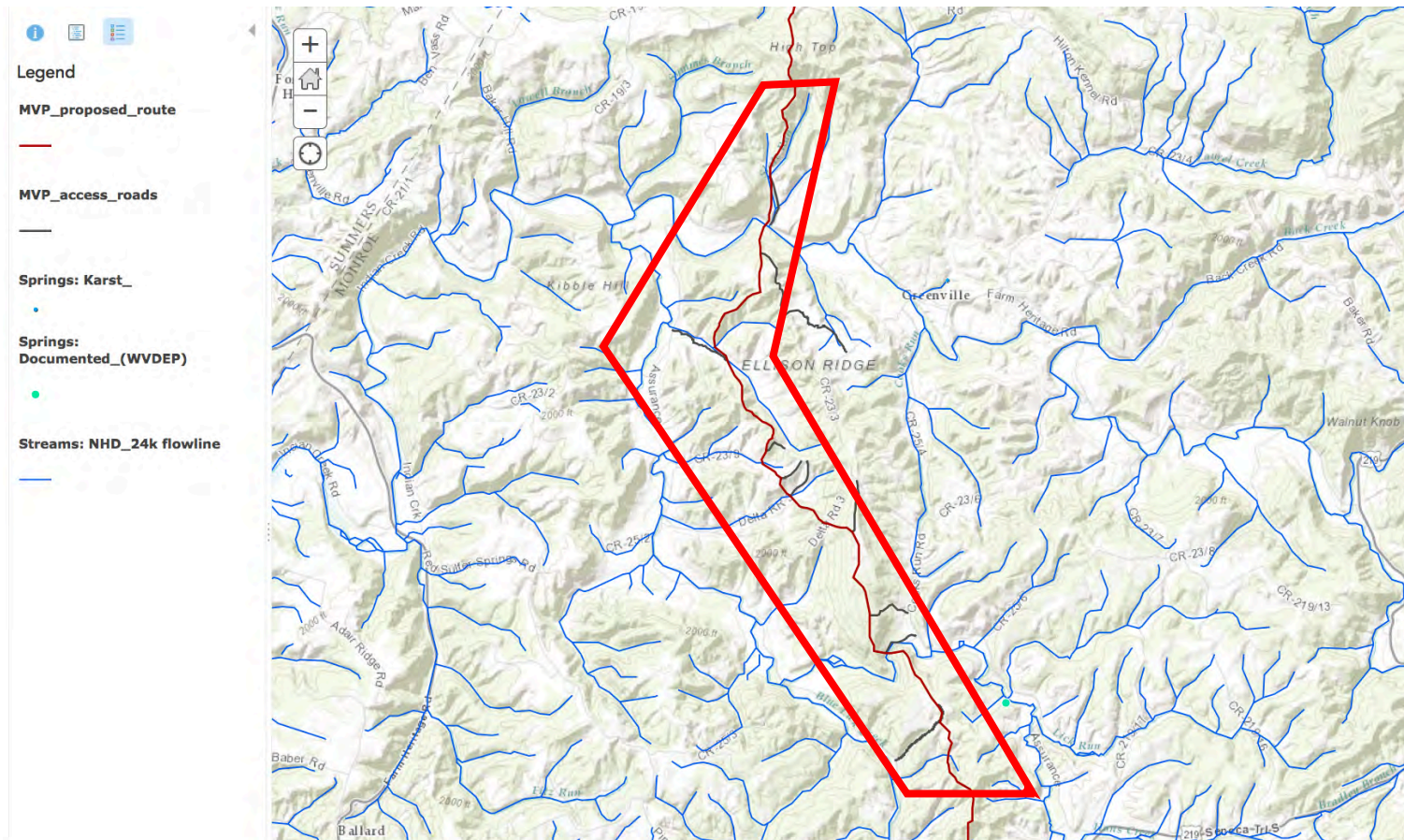


FIGURE 2: Southwestern Section of Peters Mountain on MVP Route showing 1 spring that is in the state and federal agency databases and also outlining the general area of the 38 springs that have been identified by ICWA volunteers.



- Area where ICWA volunteers identified 38 springs in this section of Peters Mountain
- Springs in public karst database (1 spring)
- Springs in WVDEP database (0 springs)

FIGURE 3. Ellison Ridge and Greenville Area of MVP Pipeline Route showing 2 springs that are in the state and federal agency databases and also outlining the general area of the 60+ springs that have been identified by ICWA volunteers.






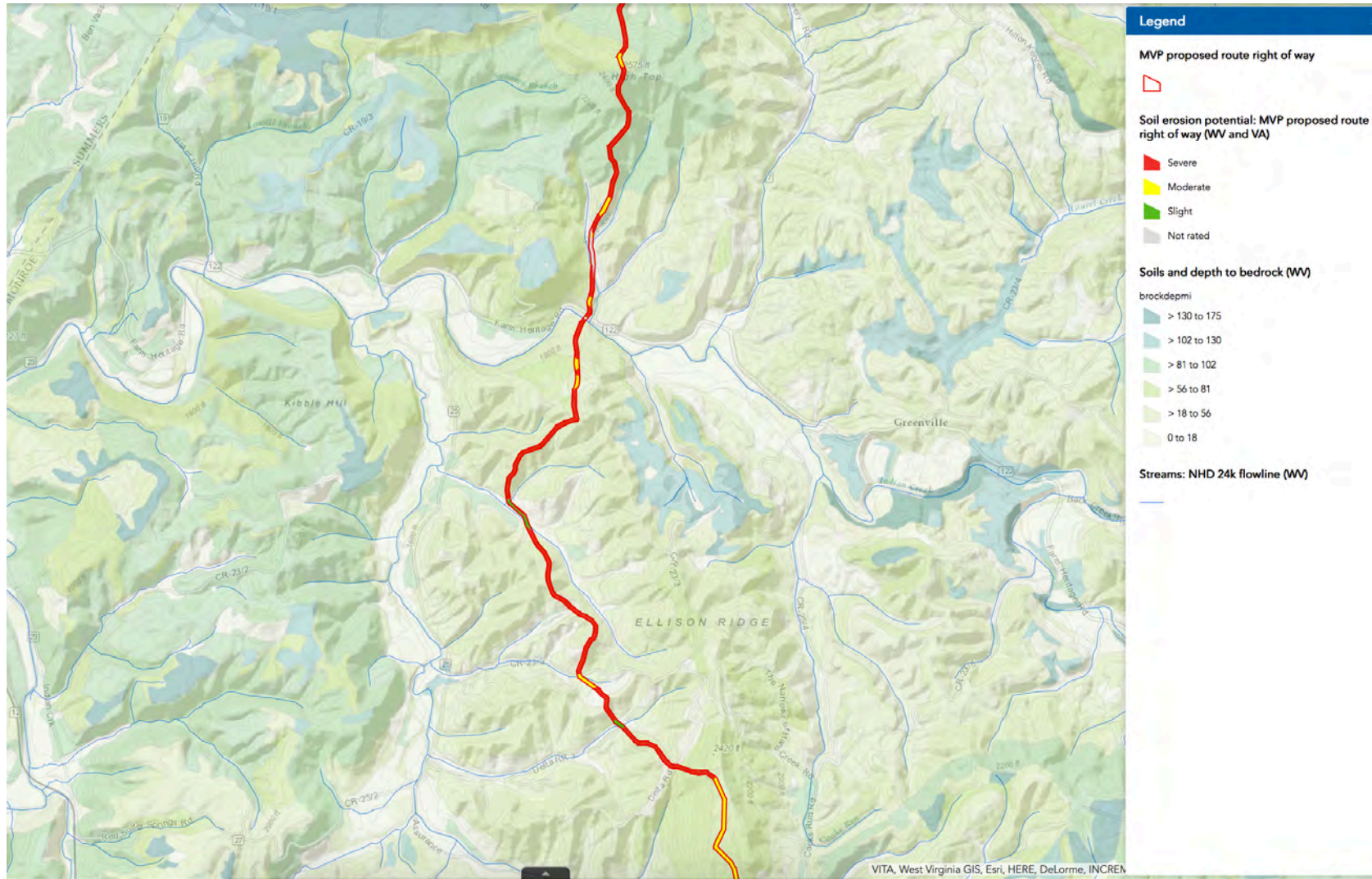
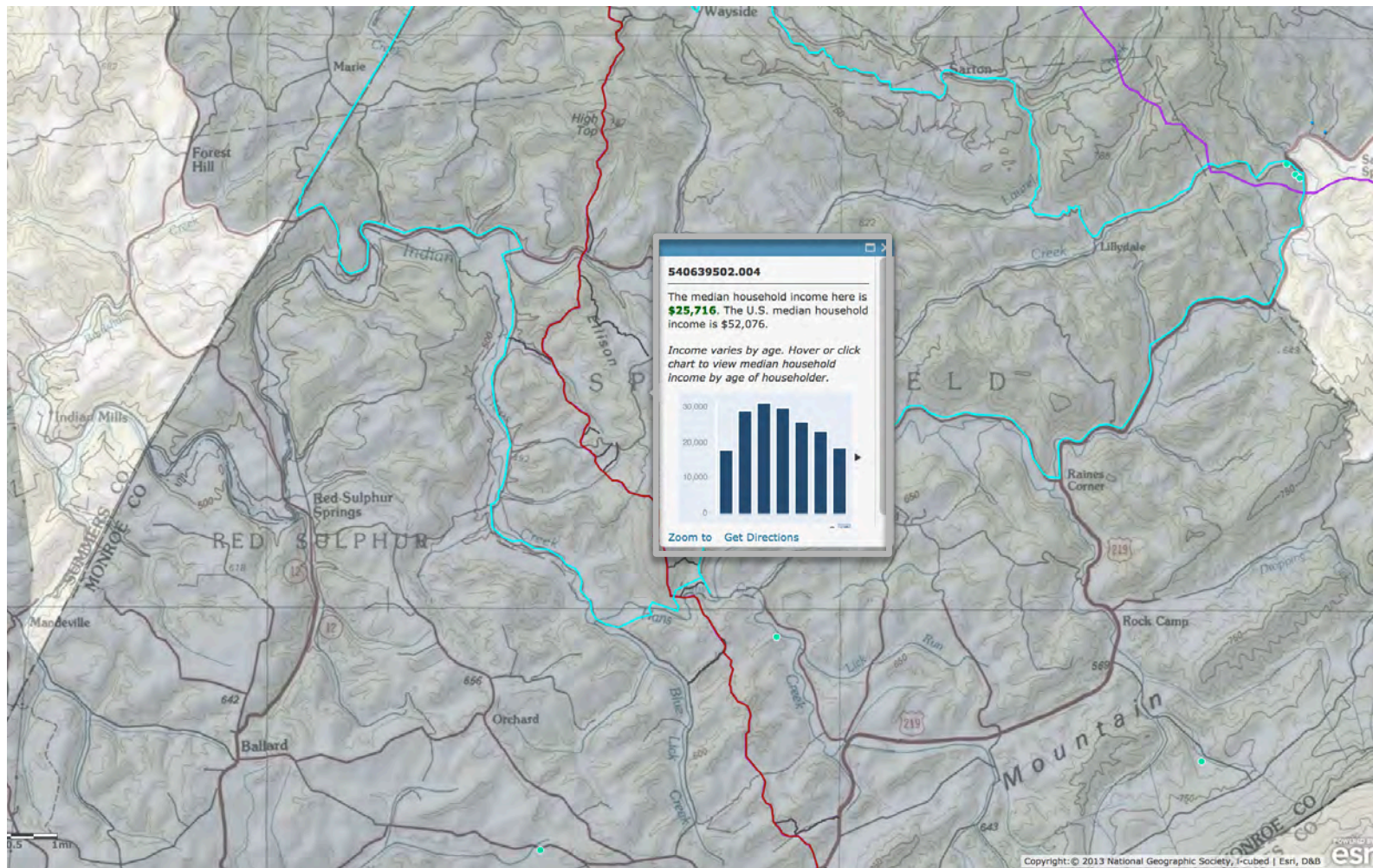
-  Area of springs where ICWA volunteers identified 60+ springs
-  Springs in public karst database (1 spring)
-  Springs in WVDEP database (1 spring)

FIGURE 4. Depth to Bedrock and Soil Erosion Potential in Ellison Ridge Area



ICWA Interactive Environmental Map accessed at www.IndianCreekWatershedAssociation.org

FIGURE 5. Census Tract Ellison Ridge Area, Monroe County, WV



Shaded area is Census Tract 540639502.004 (Ellison Ridge Area of Monroe County, WV)—
The median household income of \$25,716 is only 49.3% of US median household income.