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DEP Citizens Advisory Council  
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***Submission to the Citizen's Advisory Council on *The Effects of Subsidence Resulting from Underground Bituminous Coal Mining, 2008-2013****

The Center for Coalfield Justice was founded in 1994 by individuals organizing against the destruction caused by longwall coal mining. Over more than 20 years, we have expanded our mission to work on issues related to extractive industries generally in Washington and Greene counties. CCJ has nearly two thousand members and supporters, most of whom live in Washington and Greene counties and live with the daily impacts of fossil fuel extraction.

The Sierra Club is one of the nation's oldest and largest non-profit environmental and conservation organizations. The Pennsylvania Chapter of the Sierra Club has more than 24,600 members in the Commonwealth. The mission of the Sierra Club is to explore, enjoy, and protect the wild places of the earth; to practice and promote responsible use of the earth's ecosystems and resources; to educate and enlist humanity to protect the quality of the natural and human environment; and to use all lawful means to carry out these objectives.

On behalf of the Center for Coalfield Justice and the Pennsylvania Chapter of the Sierra Club, we present these comments to the Department of Environmental Protection Citizens Advisory Council.

**I. Data Management Issues and Access to Information**

It is critical to note immediately that any discussion of the fourth Act 54 Report, covering 2008-2013, will fail to take into account data that was not submitted to DEP, was submitted in a format that hindered analysis, and/or data that DEP lacks the capacity to store, manage and organize in a way that allows for evaluation. The report contains multiple references to the need for DEP to address format and management issues with all of the data they collect.

It is significant that this report was produced with DEP's records alone because it revealed the egregious gaps in data and the dire state of disorganization of information, but also resulted in a report based solely on publicly available information. If mining companies have data that could have been provided to the University of Pittsburgh in their work on this report, but that data was not provided to DEP, that is information the public cannot access. The existence of such information does not change the fact that DEP's records are perilously inadequate and that is precisely what needs to be addressed by the CAC and in turn, the Department.

Accordingly, we ask that the CAC recommend DEP implement an information system and standards for data that are enforced to facilitate meaningful evaluation of data, as well as accessibility and transparency for citizens of the Commonwealth who wish to review DEP files.

## **II. Effects of Mining on Streams**

The effects of underground mining in the Commonwealth are staggering: the 46 mines operating between 2008 and 2013 undermined a total of 31,343 surface acres. Approximately 40% of the acreage undermined by bituminous coal mining in Pennsylvania is within Greene County, and 19% in Washington County. The mining in Washington and Greene Counties is performed with both longwall and room-and pillar methods.

A total of 96.05 miles of streams were undermined from 2008 to 2013. Of these, 50.59 miles of streams were undermined by longwall mining methods, while 45.04 miles were undermined by room-and-pillar methods. (VII-15). About 77% of the total miles of streams undermined by longwall techniques, 39.2 of the 50.59 miles, experienced flow loss, pooling or both. Thus, only 23% of the total miles of streams undermined by longwall techniques did not experience mining-induced flow loss or pooling. (VII-20). Maximum post-mining flow loss lengths in the dry season ranged from 936-ft to 10,883-ft and 96-ft to 8,106-ft in the wet season. Maximum flow losses across all streams totaled 52.2 miles of undermined streams in the dry season and 23.7 miles in the wet season. (VII-22).

Under the Clean Streams Law, the Department has legal authority to issue orders to prevent the pollution of the "waters of the Commonwealth," which are defined broadly to include "any and all rivers, streams, creeks, rivulets ... ponds and springs" without regard to whether and how they flow. 35 P.S. § 691.1. The term "pollution" is not limited by the type of harm, and includes physical alteration of surface waters such as diminution or deviation in flow. 35 P.S. § 691.1. *See* 35 P.S. § 691.5 (the Department has authority to issue orders); 35 P.S. § 691.611 (unlawful to commit water pollution); 25 Pa. Code § 86.37 (there must be no presumptive evidence of pollution to waters of the Commonwealth); 25 Pa.

Code § 89.36 (the mine operator must ensure protection of the hydrologic balance and prevent adverse hydrologic consequences); 25 Pa. Code § 89.65(a) (the mine operator must protect environmental values); 25 Pa. Code § 89.142a (mine operator must protect values and uses of streams).

Under applicable Pennsylvania law, the Department must determine, among other things that an applicant for an underground mine “has demonstrated that there is no presumptive evidence of potential pollution of the waters of the Commonwealth.” 25 Pa. Code § 86.37(a)(3). Stated differently, DEP is precluded from issuing a permit for full extraction longwall mining where the applicant predicts that the flow of a stream will be diminished or eliminated, either temporarily or permanently. The Environmental Hearing Board has explained DEP’s responsibilities this way:

If it is known in advance that things will go bad, the permit cannot be issued in the first place. The fact that the Department requires deep mining permit applicants to describe how they will repair streams *if* they are damaged does not mean that it is acceptable to damage the streams. Stream mitigation plans are designed to address *unanticipated* damage, not to excuse or approve damage in advance.<sup>1</sup>

Yet, the Department continues to expose Pennsylvania streams to an activity that is shown to destroy or impair streams 77% of the time, whether predicted or not.

According to the report, mining induced subsidence generally creates two geological effects that impact streams. First, uneven subsidence between panels and gate road entries can create barriers to stream flow and result in stream water pooling. Second, bedrock fracturing within and beneath the streambed can drain surface water and redirect groundwater resulting in a loss of stream flow. (I-15).

The report details the variety of adverse effects on the entire stream ecosystem that can result from disturbances in stream flow and chemistry, including excessive stream vegetation growth, increases in undesirable insect species, reduced aquatic insect diversity, reductions in fish populations, habitat space reduction, higher water temperatures, and lower oxygen levels. (I-16). Mining-induced flow loss and pooling in streams were found to have an adverse effect on stream biological communities and health. The report found a greater than 12% reduction in a stream’s Total Biological Score (TBS) pre-mining average after mining-induced flow loss occurred. (VII-31). On average, mining induced flow loss

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<sup>1</sup> *UMCO Energy Inc. v. Commonwealth of Pennsylvania, Department of Environmental Protection and Citizens for Pennsylvania’s Future*, 2006 E.H.B. 570.

reduced a stream's TBS by 9 points and mining-induced pooling reduced TBS by 7 points. It is notable that these changes can only be detected when all of the necessary data is submitted in accordance with DEP policy, where it exists, and the report indicated that such TBS data for the Cumberland and Emerald Mines was horrendously insufficient and in violation of DEP TGD 563-2000-655 (VII-31).

The report found “[t]he surface areas undermined by the longwall mines reduced 31% from the 3rd to 4th assessment period. Since longwall mining produces the highest numbers of subsidence related impacts, the amount of reported effects was expected to decrease. However, this is not the case....” (III-29). This finding should be a catalyst for research and analysis exploring why despite the fact that less surface acres have been undermined by the longwall mining method, the number of reported structural and water supply effects did not decrease. A meaningful study of the cumulative impacts of underground coal mining, including both legacy and active mines, needs to be incorporated into Act 54 and the permitting process. As subsidence increases at rates beyond what would be anticipated for individual mines, it is increasingly clear that these permits cannot be issued in a vacuum without considering the synergistic effects of subsidence from other mines, the topography, and geology of Southwestern Pennsylvania,<sup>2</sup> particularly as longwall panels increase in width.<sup>3</sup>

The report also found that as permit revisions are submitted over time, baseline hydrological information becomes less detailed, more concise, and fails to reflect hydrological changes that have occurred over the life of the project, or since the last revision. This piecemeal revision system allows environmental impacts to evade review by failing to account for changes over time. This practice is against Pennsylvania law and regulations, and exacerbates the extensive, lasting consequences of mining. In light of the significant negative impacts of operating in this manner, it flies in the face of logic and established principles of environmental science to allow the permitting process to continue this way.

We think the law requires accurate baseline hydrologic information and under the Clean Streams Law, DEP must account for the cumulative impacts of *all anticipated mining*. The

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<sup>2</sup> See the presentation prepared by Hebblewhite and Gray, *Non-conventional Surface Ground Behavior Induced by Underground Mining in Pennsylvania* at [http://www.marshall.edu/cegas/geohazards/2014pdf/presentations/S2/4\\_NonConventional\\_Surface\\_Ground\\_Behavior\\_Induced\\_by\\_Underground\\_Mining.pdf](http://www.marshall.edu/cegas/geohazards/2014pdf/presentations/S2/4_NonConventional_Surface_Ground_Behavior_Induced_by_Underground_Mining.pdf)

<sup>3</sup> “The average panel size is 238.1-acres with a standard deviation of 121.6 acres. The largest panels are over 400-acres in size. The average panel width is now 1,290-ft with many of the newest panels approaching 1,500-ft. The average panel length is 8,536-ft.” (III-15). “Clearly, the width of longwall panels is expected to continue to increase.” (III-27).

Department is responsible for performing a Cumulative Hydrologic Impact Analysis (CHIA), 25 Pa. Code § 86.37(a)(4), and the Applicant is responsible for including a Prediction of Hydrologic Consequences (PHC) in its mining application. 25 Pa. Code § 89.35. The Department should have all of the information at its disposal needed to make regulatory decisions that protect ecosystems. Therefore, this seems to be an issue of internal operation and/or enforcement failures. One way of establishing improved compliance would be to recommend every District Mining Office Manager or Permit Chief ensure receipt of the PHC and comprehensive, up-to-date baseline hydrology information before permit issuance.

The report reveals that Hydrologic Monitoring Report (HMR) is only collected once a day (maximum), which is not frequent enough to take into account natural variability of streams, springs, and other water supplies when evaluating the impacts of underground mining. This is significant because variability of once per day collection “seems to be on par or greater in relative magnitude than the water losses causing impacts.” (VI-21). More frequent collection and reporting (i.e., at 15 or 30 minute intervals) would allow for more precise analysis and some more frequent collection is already occurring in some cases. During field visits, the authors of the report observed “[m]ultiple cases of equipment deployed in groundwater wells to measure groundwater elevations....” (VI-22).

The report also found that HMR data was sparse, with regard to the frequency of reporting and location, not as close as they could be to impacted and at risk water sources. Currently HMRS, including flow, water elevation, and water chemistry data, are only submitted quarterly based on a limited number of HMR points within focal watersheds. More HMR data points and more frequent reporting would provide more insight into affected water supplies and the role of groundwater in reported effects. (VI-41).

Accordingly, we ask that the CAC recommend

1. DEP overhaul the permitting and enforcement process and demand that companies submit detailed, updated baseline hydrologic information in every application for a permit revision.
2. DEP require collection and reporting of more frequent hydrologic data (i.e., at 15 or 30 minute intervals) rather than a maximum of once daily.
3. DEP increase Hydrologic Monitoring Report (HMR) points, locate them closer to impacted and at risk water sources, and require more frequent reporting.
4. DEP formalize groundwater elevation measurement activities and require reporting in a systematic format to allow for more comprehensive assessment of the hydrologic impacts of mining.
5. DEP apply the process for monitoring stream recovery and requiring compensatory damages after five years to unexpected pooling impacts, not solely flow loss impacts

because pooling impacts also have detrimental effects on stream health and watershed vitality.

6. DEP more effectively implement an ecosystem view of permitting, which considers cumulative impacts in its approach to approving and issuing mining permits.

### **III. Damage to Structures from Mining**

During the five-year assessment period, portions of 6,744 surface properties were undermined, totaling 31,343 surface acres. (III-29, III-12). This resulted in 389 reported structural effects during the assessment period with 19 occurring at non-active mining operations. (IV-2). Two-hundred-and-thirty or 96.6% of the “Company Liable” structural effects occurred in association with longwall mining. (IV-6).

Act 54 requires that all structures impacted by underground coal mining be repaired or that the owner be compensated. However, there is no recognition of the greater community impacts of underground mining. “In the 4th assessment, most structure impacts were mitigated through unspecified agreements, pre-mining agreements, or by the company purchasing the property.” (IV-6). This seemingly straightforward sentence in the report reveals some of the deep community impacts of underground mining. Underground coal mining is systematically depopulating portions of the Commonwealth. As coal companies address subsidence impacts by purchasing property either before or after mining, more people move out of the area or even out of the state. After facing the agonizing impacts of having their home undermined, people often leave the area rather than buying another home in the region where they could face similar or more severe impacts from another mine, whether new or legacy. It may also be too difficult to find another home in the area because so many properties are owned by coal companies and thus removed from the real estate market. The pre-mining buyout strategy also results in a situation where the true number of structural impacts across the state is unknown because if the company is the landowner, they are very unlikely to report structural damage to DEP. When pre and post-mining buyouts are combined with buyouts that often occur in areas where Coal Refuse Disposal Areas exist and are proposed, the scope of the problem can begin to be understood.

Areas of elevated risk for subsidence along hillsides should be established according to the topographic relief in Western Pennsylvania which exacerbates subsidence impacts along hillsides. The report found that 176 of the 230 company liable structure effects, some with multiple problems, were located within the tops of the hills, along the hillside slopes, or within the valley bottoms. And 69% of all company liable structure effects were located along hillsides. (IV-11). These findings should not be ignored, but taken in account in the

permitting process and more scrutiny should be applied to permits undermining such areas.<sup>4</sup>

The report shows that significant numbers of company liable structural effects occur above the longwall panels. However, significant numbers of company liable structural effects were outside the 200-ft buffer zone that the University used to determine whether a structure was undermined. (IV-12, IV-4). These findings help to paint the picture of the landscape of extensive destruction and widespread effects of this form of extreme extraction. Yet, the report was unable to present the full picture of all of the impacts because the Bituminous Underground Mining Information System database meant to track all features (i.e. surface structures, water supplies and water resources) undermined by coal mining operations did not contain enough information to match structures on maps with a BUMIS record. Thus, the report could not present information on the number and kind of structures undermined during the assessment period. (IV-2).

Accordingly, we ask that the CAC recommend

1. DEP consider hillsides areas of elevated risk for subsidence-related structural damage due to the topography in western Pennsylvania.
2. DEP recalculate the angle of influence to account for structural damage that may also be caused by mining, but not currently recognized by DEP.
3. DEP update the BUMIS database and ensure effects are accurately reported in manner that allows for evaluation and upholds transparency.
4. DEP issue enforceable orders for repair or replacement of structures when the company is found liable for the effect.<sup>5</sup>

#### **IV. Effects of Mining on Water Supplies**

During 2008 and 2013, there were 855 reported effects to wells, springs, and ponds. (V-5). A total of 201 reported water supply effects were unresolved at the end of the assessment period, and only three of the 201 were given an interim status to indicate that liability was being assessed. (V-6). The status of the remaining 198 unresolved reported water supply effects could not be determined from reviewing DEP's records, so they are in limbo, either

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<sup>4</sup> "Western Pennsylvania is known for its topographic relief where mass wasting (landslides) commonly occur along hillsides. Under these conditions, the effects of subsidence on structures could be enhanced. One-hundred and seventy-six of the 230 company liable structure effects, some with multiple problems, were accurately located within either the tops of the hills, along the hillside slopes, or within the valley bottoms (Figure IV-7). Sixty-nine percent of all company liable structure effects are located along the hillside. Hillsides should be considered areas of elevated risk for structure affected by subsidence." (IV-11).

<sup>5</sup> The Department has a statutory duty to issue an administrative order when it is determined that such orders are necessary to assure compliance. 52 P.S. § 1406.5e(c).

liability is not yet being assessed for those effects or this is another example of DEP data disorganization.

Regardless, once the Department determines that mining activity impacted the water supply or the operator accepts responsibility, then the Department should issue an order requiring the company to “promptly” restore or replace the water supply. Such an order should be issued regardless of whether or not the operator promises voluntary compliance. 52 P.S. § 1406.5b(b)(2). These orders will help ensure the company’s compliance, and if there is non-compliance beyond 2 years after notification, which is the standard for promptness established by the Office of Surface Mining Reclamation and Enforcement,<sup>6</sup> then the Department can enforce the order.

The water supply effects that take the longest to resolve are effects on Permanent Supplies, for which the average times to resolution can exceed two years. (V-7). The CAC should keep in mind that these are not just statistics; behind the unresolved water supply effects and long resolution times are people who have significant problems with their water supplies for months or years. As mentioned previously, the true amount of impacted water supplies is unknown because companies are unlikely to report impacts to the water supplies to homes that they already own.

There may also be problems with the adequacy of some pre-mining sampling performed on properties that will be undermined, either with regard to the existence of water supplies or a baseline of gallons per minute. For example, Kenneth and Kim Jones, who testified at the CAC’s Act 54 Hearing on March 27, 2015 held at the DEP’s California District Mining Office. When pre-mining sampling fails to account for water supplies, the landowner is left with either no recourse or a costly legal battle that may not resulting a favorable decision.<sup>7</sup>

The report also found that company liable water supply effects can occur when a mine is in a non-active status and outside the Rebuttable Zone of Presumption (RPZ). In fact, 51% of company liable water supply effects were outside the RPZ buffer, particularly when in connection with room-and-pillar mines. (V-13).

A majority (283 of 367) of company liable water supply effects, some with multiple problems, were located within the tops of the hills, along the hillside slopes, or within the valley bottoms. (V-12). Accordingly, a similar area of elevated risk along hillsides should be established for water supplies as well as structural subsidence impacts, as described above.

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<sup>6</sup> 30 CFR § 817.41(j) and 66 Fed. Reg. 670110-01 (December 27, 2001).

<sup>7</sup> See EHB Docket Number 2007281.



Accordingly, we ask that the CAC recommend

1. DEP initiate water supply investigations in the remaining 198 cases if they are not currently being investigated.
2. DEP issue enforceable orders for repair or replacement of water supplies when the company is found liable for the impact.
3. DEP policy on the Rebuttable Zone of Presumption should be reformulated based on its own data of company liable effects outside the current buffer.

## **V. Ecosystem-Wide Effects**

A major theme that runs through the report is the way that one effect can result in a variety of impacts, which in turn affect the surrounding ecosystem. Specifically, disturbances in stream flow and chemistry result in a variety of adverse effects on the entire stream ecosystem (I-15-16). Flow loss or disruption in streams can have far-reaching and long effects. For this reason, we propose that DEP adopt an ecosystem view that considers cumulative impacts in its approach to approving and issuing mining permits.

The current piecemeal revision system allows environmental impacts that evade meaningful review by failing to account for changes over time and the extensive, lasting consequences of mining. As discussed above, approving revisions based on increasingly concise, potentially out of date baseline hydrological information is an alarming status quo and it has gone on long enough.

The report describes the importance of the hill slope springs of southwestern Pennsylvania, which are plentiful and support flora and fauna that are considered globally rare and threatened. The springs provide a specific type of habitat for a diverse range of organisms contributing to the biodiversity of the Commonwealth. Damage to these springs can result in reduced water availability to the surrounding forest, affecting forest health and potentially magnifying potential climate change impacts to forest ecosystems. (VI-42).

The hydrologic connections between groundwater aquifers, springs and surface water discussed in the report emphasize the importance of protecting all water resources in the Commonwealth. Springs along the hillslopes interact with “substantial groundwater aquifers that sustain surface water flow during periods without precipitation and provide drinking water for many residents of Pennsylvania living beyond public water distribution networks.” (I-14). As water cycles through the ground and soil, it provides habitat for trees and wildlife, supporting the entire ecosystem. The impacts of longwall mining have significant implications, including diminished water yield and/or water quality from wells that draw on these aquifers and from springs along the hill slopes. The seriousness of

impacts on groundwater cannot be overstated, particularly because Pennsylvania streams flow with not only surface water, but with significant groundwater contribution as well.<sup>8</sup> The report highlights the far-reaching nature of these issues, stating, “The widespread diminishment of these processes affects citizens of the Commonwealth beyond individual property owners.” (I-14).

## **VI. The Mitigation Fallacy and Stream Investigation Issues**

The high rate of damage to streams from underground mining is even more alarming considering the finding that “while mining companies are generally either able to repair, replace, or financially compensate for damages to structures, the ability to repair damage to streams remains largely unknown.” (I-7) This is very troubling considering that DEP improperly operates according to a model which allows longwall mining to seriously impact streams, even to the point of destruction, and then relies on stream mitigation procedures to try to remediate and reconstruct the streams after mining and subsidence have occurred. In fact, the report provides some compelling evidence that stream restoration is largely, if not entirely, a failure.

Streams over longwall mining have been observed to have elevated conductivity and alkalinity levels. (VII-36). Streams that are grouted could also experience increases in conductivity and pH due to grout mitigation activities and weathering of the grout material over time. Although the report could not produce a definitive conclusion on the exact causes of increases in conductivity and pH based on the available data, ultimately, “longwall mining clearly pushes stream conductivity levels over the U.S. EPA benchmark for aquatic life.” (VII-36-37). In assessing the effectiveness of stream mitigation techniques, the report concluded, “water quality does not recover over time and pH and conductivity at flow loss sites remain elevated following mitigation.” (VII-76).

During the assessment period, 57 streams received grouting to mitigate mining-induced flow loss and 40% received grouting in multiple panels. Because DEP does not currently require mine operators to report the length of stream grouted, it is not possible to evaluate the actual extent of grouting after mining. (VII-52). Yet, the data available on the Bailey mine indicates that, “~5,941-ft and ~2,758-ft of streams were grouted in the 3rd and 4th quarters of 2008” and if that is extrapolated out to keep pace with mining progress at

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<sup>8</sup> See Commonwealth of Pennsylvania Department of Conservation and Natural Resources, *The Geology of Pennsylvania's Groundwater*, 1999, page 11: “Groundwater provides two thirds of the water to our streams, lakes, and wetlands.” Page 29: “Because groundwater contributes most of the flow to streams in Pennsylvania, groundwater contamination can affect the quality of surface water” (3, 11, 29)

Bailey, “then ~50% of the stream length undermined in Bailey Mine was likely grouted.” (VII-52). The report added that the research team “suspects that this estimate of grouting in Bailey is highly conservative.” (VII-52).

The University attempted to investigate whether mitigation measures can restore the health of macro invertebrate communities, because “it is unknown if the mitigation measures (i.e. augmentation, grouting, liners, gate cuts) utilized by mining companies are effective in restoring the communities.” (VII-59). Specifically, they hoped to study TBS after grouting because far more stream segments received grouting than gate cuts for mitigation purposes. (VII-59). However, the University “could not identify any TBS that were specifically identified as being collected ‘post-grouting.’ The TBS collected after mining at sites that are known to have received grouting are identified as simply “post-mining”. Because the date of grouting is unknown, it is uncertain if these ‘post-mining’ TBS were collected before or after grout mitigation.” (VII-59). This is a disturbing finding that further reveals how insufficient data precludes analysis of impacts and the effectiveness of mitigation activities as well.

Augmentation was another stream mitigation method used on streams, and during the assessment period, “95 streams had augmentation discharges installed along their channel and augmentation was active at 74 of these streams to maintain flow during or after mining.” (VII-76). Consol’s “Bailey Mine had the greatest number of streams with installed and active augmentation discharge points.” (VII-51). However, reliance on augmentation is troubling because though it seems like it can keep the aquatic life in a stream alive for a while, augmentation cannot be required in perpetuity. DEP TGD 563-2000-655 (outlining stream mitigation policies, including that if a stream cannot be restored after a total of five years, the operator may then be required to perform compensatory mitigation rather than continue futile mitigation efforts). Also, there are no standards for the water quality of the water to be used in augmentation. It is clear that if water ceased to flow in a stream, fish would quickly die and over time macro invertebrates would also be lost. However, the quality of water used for flow augmentation will also have a significant impact on a stream’s aquatic life and ultimately whether the stream is able to uphold its existing and designated uses. There is also potential for disruption of the greater hydrologic balance if water is being pumped from an aquifer to augment a stream at a rate that exceeds its recharge rate, or water is being taken from another stream beyond what may be necessary to maintain that stream’s existing use and accounting for natural variability. These are issues that could occur in the same watershed or a different watershed, which could further complicate the situation.

In the area near the Bailey Mine in Washington and Greene Counties, 24 stream bio-monitoring stations experienced mining-induced flow loss impacts (i.e. received

augmentation and/or grouting). Consol's Bailey Mine is the only mine that has been placed under a compliance schedule by DEP. (VII-30). Also, in the Bailey Mine area, ~7,913-ft of access roads were constructed immediately adjacent to streams in a three month period to support mitigation activities. (VII-76). It is unclear whether this amount of access road construction is representative of construction at other mines because data for other mines and time periods was not available for analysis. In fact, mine operators are not required to formally report this information in the mitigation plans. However, the report suggests that submission of access road construction information would "provide valuable information regarding the degree of disturbance to terrestrial and aquatic ecosystems during mitigation." (VII-76).

To mitigate mining-induced pooling, 28 stream segments received gate cuts across 4.21 miles of streams to lower the streambed elevation and promote flow across the gate area during the 5 year period analyzed. (VII-39). The single longest gate cut mitigation project occurred on Dyers Fork in Cumberland Mine where nearly 4,000-ft of stream were mitigated. Prior to the gate cut, pooling along this portion of Dyers Fork was so severe that increases in natural stream depth were found to be up to 6.1 feet. (VII-39).

The report's analysis of DEP stream investigations was deeply concerning. Two of the five stream investigations conducted by DEP during the assessment period were found to have relied on inadequate data and observations before reaching determinations that impacts were "Not due to underground mining." For two more investigations currently underway, the flow data available to DEP is inadequate. (VII-28).

Following up on stream investigations that were still pending during the last assessment period, the University found that an investigation of reported flow loss in a tributary to North Fork of Dunkard Fork, a stream that was the focus of three other stream investigations during the last assessment period, had been withdrawn from consideration by DEP. The investigation was withdrawn without explanation the day after the mining company requested an extension for development of a mitigation plan. (VIII-3).

Seven stream investigations had a final resolution status of "Not recoverable: compensatory mitigation required" meaning that all other mitigation efforts have failed and the company will have to compensate the state monetarily for the loss of these natural resources. In total, eight cases represent stream impacts that have not recovered from mining-induced flow loss. (VIII-5). Four stream investigations from the 3rd Act 54 assessment remain unresolved and have been open for 7-8 years.

Accordingly, we ask that the CAC recommend

1. DEP establish a technical committee or workgroup, either composed of staff or independent experts, tasked with studying the success of stream restoration activities undertaken in the Commonwealth to determine whether it is actually possible to restore a stream to its pre-mining condition once it has been damaged by underground coal mining. DEP and this group should also consider also the potential for weathered stream grouting material to cause or contribute to increases in conductivity and pH in streams.
2. Conduct stream investigations with adequate data and observations.
3. Full extraction mining should not be permitted under streams.
4. DEP require access road construction plans and data be incorporated into mitigation plans submitted to the Department.

## **VII. Wetlands**

During the assessment period, five longwall mines reported a combined total of 235.7 wetland acres prior to mining. (IX-16). Only four longwall mines had post-mining data on wetlands available for evaluation by the University of Pittsburgh. Three mines reported net gains in wetland acreage post-mining due to the creation of new wetlands to offset losses. Ultimately, 33-41% of the original wetland acreage was lost after subsidence. (IX-16 - IX-17). The report details the ways that mining-related subsidence can affect water levels in wetlands and result in a net loss of wetland acreage. (I-17). Wetlands mitigation is another example of the daunting challenges of attempting to replace or restore a complex natural resource. Thus far, Pennsylvania does not have a history of wetlands mitigation projects which successfully replaced the full range of functions of lost wetlands (IX-15). The new wetlands created to offset losses “do not functionally replace the complexity and resources that were provided by the original wetlands” and it could take decades for them to develop the types of vegetation necessary to provide those functions. (IX-17). However, under applicable rules, the permittee is only required to monitor a wetlands mitigation site for five years. So DEP cannot require ongoing maintenance and remediation of a site beyond five years to ensure functionality and long-term success. (IX-15) (DEP TGD 363-0300-001). Moreover DEP only requires one pre-mining and one post-mining delineation for each wetland. The report suggests that multiple delineations on a focal group of wetlands may provide DEP with information to control for climatic variation while assessing the impacts of subsidence. (IX-7).

Accordingly, we ask that the CAC recommend DEP revise TGD 363-0300-001 to allow DEP to require ongoing maintenance and remediation of wetlands beyond five years, considering the unique nature of wetlands and the years necessary for new wetlands to develop necessary functionality.

## **Conclusion**

The information discussed above has been at the Department's disposal, and they have chosen to continue to permit and facilitate the wholesale destruction of Pennsylvania homes, streams, and water supplies, ultimately degrading entire ecosystems. This report provides definitive proof that DEP is failing to uphold and enforce the laws it is responsible for and the CAC must demand more from the Department.