CITIZENS COAL COUNCIL

POLICY REPORT

Act 54 and Longwall Mining in Pennsylvania

Impacts, Oversight, and the Case for Reform

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EXECUTIVE SUMMARY

In February 2021, the Citizens Coal Council (CCC) submitted a letter to Department Secretary Patrick McDonell outlining 19 specific items and questions regarding the structure and water resource impacts of longwall mining operations. The Department replied on April 1, 2021, and held seven conference calls with CCC between May 2021 and early 2022. CCC appreciates the Department's engagement in this process and acknowledges that the discussions informed the Department's understanding of coalfield residents' concerns. However, Departmental representatives did not respond to most of CCC's questions during these discussions.

The record of those discussions and the 6th Report text do not support the Department's conclusion in its 6th Act 54 Report (2025) that it adequately responded to CCC's concerns. The 6th Report shows no apparent progress toward resolving those issues. The Department's 6th Act 54 Report cites two outcomes from its engagement with CCC: posting raw data to its website and adding limited wetlands analysis. These minor and ineffective steps, while noted, do not fulfill the Department's statutory obligation to produce comprehensive five-year reports with trend analysis, impact assessment, and accountability measures — reports that independent contractors prepared for four consecutive cycles before the 6th Report.

The 19 items CCC raised were not peripheral. They address patterns documented over 30 years in the Department's Act 54 reports: persistent stream damage, inadequate resource inventories and impact predictions, incomplete restoration tracking, and limited enforcement. The Department has indicated it cannot address many of these concerns due to constraints on staff, funding, scope, and legal authority. CCC acknowledges that the Department's resources are limited but finds no evidence that the Department is seeking the funding necessary to fulfill its responsibilities in the coalfields. This report assesses whether the Department is using its existing authority effectively — and on that question, the data speak clearly.

This report follows up on the CCC's 2021 discussions with the Department by examining what the six Act 54 reports, the Department's own records, and three decades of field experience among coalfield residents reveal about the program's effectiveness and the changes needed to align it with the statute's intent. At the time of CCC's discussions with DEP, the 5th Report was the most recent available. Subsequently, CCC reviewed the 6th Report, which addresses CCC's concerns even less than its predecessor reports.

FINDINGS

01 Lack of Impact Prediction and Enforcement

The Department continues to dismiss the importance of predicting stream impacts, citing that operators are required to restore damaged streams to pre-mining conditions. This stance leads to several troubling outcomes:

- The Department does not maintain records of predicted stream impacts or address their accuracy.
- There is no accurate impact prediction, and unpredicted impacts are not addressed systematically or completely identified.
- The Department treats stream impacts in a manner similar to structural or water supply damage, focusing on resolving individual cases rather than avoiding short- and long-term resource damage.
- Stream impacts are mitigated only slowly, often requiring many years to reestablish uses if at all, and restoration seldom is credibly documented.
- The surface impacts of underground mining on water and other surface resources are caused almost entirely by longwall technology, not by traditional room-and-pillar mining.

02 Failure to Address Known Stream Impacts

The Department continues to issue permits for mine expansions despite evidence of frequent and ongoing long-term damage to streams, including pooling and flow loss, as reported in each of its Act 54 five-year reports. Key issues include:

- Discrepancies between the Department's acceptance of mine operators' claims of no expected adverse impacts and its own data showing actual widespread stream damage.
- Stream restoration often takes longer than the three-year limit prescribed as adequate by DEP’s technical guidance, with no real effort to assess or report the actual restoration progress and no consequences for mine operators.

03 Lack of Transparency and Accountability

- The DEP's separation of mine permitting from enforcement following subsidence damages precludes consistent enforcement and precludes informative recordkeeping.
- The Department does not report the duration of stream damage or track whether streams are restored to their designated uses.
- DEP does not identify any trends in lengths of damaged streams, in the years elapsed between mine damage and accepted restoration, or the cumulative impacts on streams.
- Data posted by the Department on stream impacts fail to differentiate between predicted and unpredicted impacts, making it difficult for anyone to assess the accuracy of the Department's permit review or performance oversight.
- Wetlands in the coalfields continue to be under-identified, preventing credible acknowledgment of impacts and adequacy of mitigation.

PRINCIPAL RECOMMENDATIONS

In light of ongoing challenges facing the mining program in Pennsylvania, both CCC and the DEP's Citizens Advisory Council have developed comprehensive recommendations to enhance the program's effectiveness and accountability to lend credence to the DEP's claim that Act 54 requires a "you damage it, you fix it" compliance standard for the mining industry. These recommendations stem from an analysis of annual data trends, citizen feedback, and the legislative mandates in Act 54, which governs mining operations and their environmental impacts.

1 Data and Reporting Improvements

- Yearly Data currently posted on the mining program website inadequately substitute for the required 5-year Act 54 reports, which were prepared more effectively for DEP by outside contractors for two decades.
- The mining program should use available funding from other Departmental programs, other Commonwealth agencies, and federal sources to support ongoing impact analysis and future Act 54 Reports useful to Department policymakers and the General Assembly.

2 Enhanced Oversight and Transparency

- The Department must acknowledge and address the shortcomings in its mining program as detailed in the Act 54 Reports and highlighted repeatedly by the Department's Citizens Advisory Council (CAC), CCC, and the public.
- The mining program must positively engage with the General Assembly to secure additional resources for effective regulation and staff to protect the public and the environment.
- The Department should ensure that all impacts to streams, wetlands, structures, and water supplies are documented and then follow up with a clearly disclosed resolution of damage (e.g., whether the impact was repaired or not).

3 Stream and Wetland Protection

- Delineate, document, and review all streams and wetlands above proposed mining permit areas prior to issuing permits.
- The existing uses of streams should be assessed during permit review, including the use of the Department's Division of Water Quality to evaluate uses higher than designated in 25 Pa. Code Chapter 93 when establishing restoration requirements.
- A special policy should be developed for Special Protection waters, with a presumptive reliance on non-longwall mining methods in such areas.

- Potentially needed access from all surface landowners must be secured *prior* to permit issuance to ensure prompt restoration of any potentially impacted streams, given the inaccuracy of impact predictions.

4 Enforcement and Accountability

- The Department should adopt an appropriate, modern geographic information system (GIS) to track mine-related impacts and resolutions, moving away from outdated systems like BUMIS or modifying BUMIS to incorporate the extensive data from permit applications.
- Non-Disclosure Agreements (NDAs) must not be used to conceal the extent of mine-related impacts. All impacts, even those resolved under an NDA, must be reported with clear information on whether the damage was repaired, because this affects both the public and the individual landowner.
- The mining enforcement budget should be increased. If additional funding is not available, funds should be transferred from the permitting budget to ensure existing mines comply with environmental laws before authorizing new mining.

5 Predictive Modeling and Mitigation

- The Department must reevaluate outdated methods for predicting stream impacts, including the 35-degree rebuttable presumption zone and the Peng model for predicting flow loss. A new, credible model should be developed in collaboration with the mining industry.
- Adequate data must be collected for permit applications and analyzed for the hydrology of localized stream segments to be undermined, such as the recent analyses by Hittle & Risser at the US Geological Survey (2019).
- Any predicted stream damage must be avoided or minimized, and mitigation efforts should be explicitly outlined in permit applications.
- Unpredicted impacts to streams and wetlands should be mitigated at a 2:1 ratio for function and value, with additional mitigation if restoration takes longer than one year.
- Careful records on the accuracy of damage predictions must be maintained if methods to avoid and minimize impacts are to be improved.
- The Department should dispense with its checkoff boxes for Cumulative Hydrologic Impact Assessments (CHIAs) on each permit application and instead follow the format of OSMRE model hydrologic impact reports. That way, cumulative knowledge of the hydrologic impacts of mining could accumulate, and results could be summarized in five-year Act 54 reports.

6 Stream Damage Resolution

- Prolonged, near-permanent damage to Pennsylvania streams was not authorized by Act 54.
- If a stream segment has not been fully restored to pre-mining conditions (flow and biology) within three years, the mine's permit should be suspended until that stream segment's restoration is complete.
- Special measures should be taken for Special Protection waters, with no predicted damage allowed and suspension of the permit if unpredicted damage occurs.
- Performance bonds must never be released before stream and wetland recovery is demonstrated following longwall mine damage.

7 Collaboration and Use of Expertise

- The Department must collaborate with other state and federal agencies (e.g., Fish & Boat Commission, U.S. Fish and Wildlife Service, U.S. EPA, U.S. Geological Survey, U.S. OSMRE) to leverage their expertise and potential funding when assessing premining resources and postmining conditions prior to longwall mine bond release.
- Stream and habitat assessments must be conducted using expertise from other Department programs and external agencies, particularly regarding aquatic habitat and GIS capabilities.

8 Technical Guidance Document (TGD #563-2000-655)

- Existing TGD 563-2000-655 has been fully applicable since 2007, but has never been consistently followed during mine permit review.
- Efforts to revise the mining/stream protection TGD should continue, but necessary program changes should not be delayed while waiting for these long-delayed revisions.
- Most provisions of the TGD should be incorporated into regulations to ensure uniform production of data for permit applications that would enable enforcement.

SECTION 01

5-YEAR ACT 54 REPORTS, FUNDING & OVERSIGHT

Format and Substance

Act 54, enacted in 1994, requires the Pennsylvania Department of Environmental Protection (DEP) to produce five-year reports evaluating the impacts of underground coal mining, with a focus on subsidence effects on structures, water supplies, and water resources. These reports were established to address the consequences of previously prohibited longwall mining, which the industry claimed could be predicted, controlled, and repaired but could potentially cause widespread damage.

Overview of the Act 54 Reports and Yearly Updates

Five-Year Act 54 Reports

- These reports are a key mechanism to assess the effects of underground mining and provide analysis of trends of increase or decrease in surface subsidence impacts.
- Since the adoption of Act 54, there have been six such reports, with the first and sixth prepared by DEP staff. The second, third, fourth, and fifth were more informative and prepared by different contractors (California University of Pennsylvania and the University of Pittsburgh).
- The fifth report (covering 2013-2018) was examined in detail and found inadequate by the public, CCC, and DEP's Citizens Advisory Council (CAC) because of poor data quality and lack of analysis.

Yearly Data Updates

- Following the release of the fifth Act 54 report, the Department posted "Yearly Data" on its website, consisting of limited information from its BUMIS (Bituminous Underground Mining Information System) database.
- The Yearly Data, covering incidents starting in 2018, were inaccurate, raw, poorly labeled, and lacked analysis. The posted Excel spreadsheets provided unexamined data and basic maps that lacked context on impacts, resolutions, mitigations, and trends.
- Such data do not adequately address key aspects of mining impacts, such as repair status, ongoing reclamation, and the duration of precluded aquatic uses.
- Nevertheless, DEP reissued such data as its sixth (2025) Act 54 Report.

Criticisms of Yearly Data

- The data presented as Yearly Data are inadequate for the purposes outlined in Act 54, as they lack detailed analysis and interpretation to enable necessary updates to legislation, regulations, and technical guidance as longwall mines continue to grow ever larger.
- The raw Excel data and general BUMIS maps are not useful for understanding trends or specific impacts, and the format of Yearly Data is clearly insufficient to replace the comprehensive five-year reports.
- The Department acknowledged that it lacks sufficient resources to analyze the BUMIS data effectively or improve upon them in its sixth Act 54 report that was prepared by DEP staff.

Recommendations

→ The Yearly Data posted by the Department are insufficient to update the analytical information in prior Act 54 five-year reports. If the Yearly Data are to continue, the Department must:

1. Review the data for accuracy before posting.
2. Update the data more frequently.
3. Supplement the data with explanatory analyses to highlight trends and impacts.

→ The Department must also establish an interactive, web-based mapping system (similar to FracTracker for shale gas) to present impact, restoration, and inventory data in a more useful and understandable way for both its staff and the public, given the availability of detailed electronic maps in permit applications.

→ Contractors should prepare future Five-Year Act 54 Reports because Yearly Data alone cannot replace the much more comprehensive, though still incomplete, analysis initiated in five-year reports 2 through 5. The majority of effort in prior report contracts was devoted to bringing data from permit applications into contact with enforcement data from BUMIS.

→ Existing data require thorough review and detailed analysis to be useful, but laborious analysis is currently made difficult by the Department's incompatible mining data management systems. The Department is encouraged to continue engaging competent contractors to produce comprehensive five-year reports, incorporating appropriate improvements to make them cumulatively more informative for both the public and policymakers.

→ Improvements to the five-year reports, as recommended by the public, CCC, and CAC in prior reviews, should be adopted to enhance their utility for policymakers and to better protect private property and public and environmental resources.

Funding, or Lack Thereof

Under Act 54, the Pennsylvania Department of Environmental Protection (DEP) must compile data and analyze the impacts of underground coal mining every five years through comprehensive Act 54 Reports. These reports assess subsidence damage from mining, specifically its effects on structures, water supplies, and water resources.

Funding Concerns

- The DEP claims it faces "fiscal restrictions" and lacks the internal resources to prepare 5-Year Reports.
- Despite these fiscal challenges, there are multiple potential funding sources that could be tapped to support completion of the mandated 5-Year Reports:
    1. The Office of Surface Mine Reclamation and Enforcement (OSMRE) in the U.S. Department of the Interior has funded half of the previous reports, and may be able to increase its share or offer additional funds from related programs.
    2. Other DEP programs could provide technology or GIS support, including the Office of Geospatial Technologies Operations and Office of Information Technology. At present, the Department's management of underground mining is critically impaired by incompatible data systems, as demonstrated by its five-year Act 54 reports.
    3. The Mine Subsidence Insurance Program has accrued a surplus of about $100 million since its creation and could contribute to funding the reports.
    4. The U.S. Environmental Protection Agency (USEPA) has various funding mechanisms for wetland and water resource protection projects, some of which could support sections of the Act 54 report.

Recommendations

Given the critical nature of the 5-Year Reports and the mandate under Act 54, CCC recommends the following actions to ensure that the required reports are produced.

→ The DEP should secure dedicated funding immediately for the preparation of the 7th 5-Year Act 54 Report.

→ If necessary, seek additional funds from OSMRE, which has historically contributed to the cost of the reports.

→ The DEP should explore supplementary funding from other DEP programs (such as the Office of Administration, the Office of Information Technology, and the Office of Geospatial Technologies Operations) to support GIS and technology resources.

→ The Mine Subsidence Insurance Program could be tapped for modest funding to assist with report preparation.

→ The USEPA could provide supplementary funding, particularly for sections dealing with wetlands and water resources in the report.

→ The DEP should contract with a competent external entity or institution with appropriate expertise in environmental analysis and reporting to ensure the 7th 5-Year Act 54 Report is comprehensive and meets legislative requirements. Contract budgets should be sufficient to address the ongoing incompatibility in the Department's data management.

Conclusion

The 5-Year Act 54 Reports are an essential part of Pennsylvania's regulatory framework for addressing the environmental impacts of underground coal mining. Despite fiscal challenges and resource limitations, it is imperative that the DEP secure the necessary funds to rationalize its mining data. This would not only enhance its ability to protect Pennsylvanians and their environment but also enable it to produce five-year Act 54 reports in a timely, less costly manner. The recommended funding sources, including federal and state programs, should be pursued to ensure the continued success of these reports and to protect the public's interest in the coalfields.

Coordination with CAC, Advocacy with PA Legislature

The 5-year Act 54 Reports are required by law to be submitted to the Governor, the General Assembly, and DEP's Citizens Advisory Council (CAC) to assess the effectiveness of coal mining laws in protecting citizens, property, and resources. The CAC reviews the reports, holds public hearings, solicits feedback, and provides formal recommendations to the Department of Environmental Protection (DEP), the Governor, and the General Assembly. The DEP typically acknowledges the CAC's recommendations but often lacks follow-through. After the 4th Act 54 Report, the DEP created a workgroup and a spreadsheet to track 95 issues. After failing to provide consistent updates or undertake revisions to program or technical guidance, the Department apparently lost interest in that effort.

Ongoing Concerns

- Unresolved Issues: Many issues raised by CCC, the CAC, and the public have persisted for years without meaningful resolution. Consequently, Pennsylvania coalfield residents and environmental resources continue to suffer.
- General Assembly's Inaction: There has been no substantive engagement between the General Assembly and the DEP regarding the Act 54 Reports. The General Assembly approved an amendment (Act 32 of 2017) to mining regulations at the mining industry's request, but this was done without CAC consultation. It increased the importance of accurately predicting potential damage to streams.

- Lack of Coordination: The CAC has not had direct coordination with the General Assembly on Act 54 issues, and the General Assembly has not provided substantive responses to CAC's advice.

Recommendations

→ The DEP should regularly document and summarize concerns arising from the Act 54 Reports and provide quarterly updates to the CAC.

→ The DEP should address recurring issues by determining whether they require regulatory or legislative changes.

→ Key provisions of the Technical Guidance Document (TGD #563-2000-655) should be made mandatory to address subsidence problems, as the DEP has been inconsistent in applying existing TGD provisions over the decades.

SECTION 02

STRUCTURE AND WATER SUPPLY IMPACTS

Act 54 intended to repair all damages and track impacts

Act 54 significantly amended the Bituminous Mine Subsidence and Land Conservation Act (BMSLCA) to permit previously prohibited planned subsidence that can damage homes and structures in a "controlled" manner, especially subsidence from longwall mining. Enacted in 1994, Act 54 allowed damage from underground coal mining, particularly longwall mining, but emphasized the need for prompt repair of any damage while mining was ongoing—often summarized as a "you break it, you fix it" law.

Ongoing Concerns

- Damage from Longwall Mining: Over the last 10 years (2013-2023), 467 mine-liable impacts on *structures* were reported, of which 459 (98%) were linked to longwall mines and only 8 (2%) to room-and-pillar mines.
- Shift in Mining Technology: Traditional room-and-pillar mining has greatly reduced its historic surface damage, whereas longwall mining, which has evolved over time, has led to increased damage to structures. Such damage long was prohibited in Pennsylvania under BMSLCA.
- Failure to Repair Damages: Since Act 54's implementation, repairs and replacements for damages have rarely been documented or disclosed to the public. In the 5th five-year Act 54 reporting period, only 5% of underground mine damages were listed as repaired, and 3% of longwall-related damages were repaired. Repairs for longwall damages typically take significantly longer than for other mining methods.
- Challenges with Historic Structures: Damage to historic structures is a particular concern because restoration can be difficult or impossible, leading to prolonged and costly negotiations for affected communities.
- Department's Inaction: The Department of Environmental Protection (DEP) partially tracks impacts but lacks the budget or personnel to effectively monitor repairs. It also lacks access to confidential settlement agreements.

Recommendations

→ The DEP should require operators to submit regular data (quarterly or annually) on mining impacts and repair status, including a simple yes/no on repair status.

→ Data should be publicly posted online, and if confidentiality is an issue, the status can be aggregated.

→ The DEP should seek additional funding to improve tracking and mapping of impacts and resolutions.

Bituminous Underground Mining Information System (BUMIS)

The Department has used the Bituminous Underground Mining Information System (BUMIS) to record and track mining impacts, but the system is outdated, lacks modern functionality, and is incompatible with current GIS software used for mining permit applications.

Issues with BUMIS

- The interface uses obsolete computer language that modern browsers don't support.
- BUMIS cannot support basic GIS functions, so external contractors had to create separate ESRI-based GIS databases for the 2nd, 3rd, 4th, and 5th Act 54 Reports. This costly work started over every five years, rather than building on prior work.
- Limited data recorded: Initially, BUMIS tracked only impacts to structures and water supplies, but has recently begun partially tracking wetland and stream impacts, starting with the 5th Act 54 Report.
- The Department has not made GIS products publicly available despite their creation by contractors, thwarting efficient review by outside entities.
- Outdated format: BUMIS data is recorded in a layered PDF format and the Department is working towards making it compatible with GIS software, but this process has been given low priority.

Limited Usefulness of BUMIS

- BUMIS is primarily used for internal tracking and does not analyze data. It is not helpful for policymakers or surface landowners.
- The Yearly Data updates posted on the Department's website are not informative for the public or decision-makers.

Other Programs within the Department

- Other areas of the Department use ESRI GIS tools effectively for mapping and displaying data, but the Bureau of Mining Programs has not adopted these tools.

Recommendations

→ Phase out BUMIS: The Department should quickly transition to a modern GIS system for tracking mining impacts, as recommended by Act 54 contractors.

→ Make use of existing GIS data: The Department should make mine permit application data available to its enforcement staff and link all enforcement data to permit application data.

→ The Department should acquire and use the GIS databases created by contractors for the Act 54 Reports and make them publicly available to improve impact tracking and resolution monitoring.

35-Degree Angle of Draw

The Rebuttable Presumption Zone (RPZ) was established by Act 54 in 1994 to identify the area most likely to be affected by longwall mining subsidence. The RPZ is defined by projecting a 35-degree angle from the edge of a coal removal area to the land surface. Within the RPZ, mine operators are presumed liable for post-mining water supply damage, but outside the RPZ, the burden of proof shifts to the landowner.

Issues with the 35-Degree Angle

- The 35-degree angle was based on practices from 30 years ago, but modern longwall mines use larger panels, leading to greater and more widespread damage.
- Several Act 54 Reports have shown that the 35-degree angle is too narrow, and damages attributed by DEP to mining often occur outside this zone.
- In one notable case at Ryerson Station State Park, irreparable damage to Duke Lake dam occurred at a 66-degree angle, almost double the current 35-degree angle.
- The 4th Act 54 Report found that 50% of water supply damages occurred outside the 35-degree RPZ, with some damages at angles as large as 85 degrees.
- The 5th Report did not document exact figures but suggests that significant damage occurred beyond the RPZ.

Department's Response and Limitations

- The Department of Environmental Protection (DEP) investigates all impacts, but fails to request pre-mining data from mine operators for areas outside the RPZ.
- For impacts within the RPZ, DEP conducts investigations; for those outside, the mine operator investigates and submits findings to DEP for review upon request.
- DEP states that the 35-degree angle is written into the law and cannot be changed without legislative action.

Recommendations

→ Legislative Change: The General Assembly should revise the RPZ to better reflect the increased size and impact of modern longwall mines.

→ Protection for Landowners Outside RPZ: Allow landowners outside the revised RPZ to request pre-mining inventories of water supplies from mine operators.

→ DEP Policy Adjustment: If the General Assembly does not act, DEP should adopt a policy to protect water supplies outside the current RPZ based on available evidence and increase its permit information requirements.

Citizen Reporting of Impacts

Surface landowners must notify the mine operator if they believe mining has caused structural, water supply, or other damage. If the issue remains unresolved, the landowner can file a claim with the Department, which will investigate. Once reported, impacts are entered into the BUMIS database and tracked by the Department, though resolution may take years.

Issues with Reporting and Tracking

- Reported vs. Mine-Liable Impacts: Some reported impacts are not related to mining, but only "mine-liable" impacts are significant for the Act 54 Reports.
- Dilution of Mining Damages: The Act 54 Reports often fail to distinguish between reported and mine-liable impacts, which minimizes the visibility of unresolved mining damages.
- Underreporting: Damages outside the presumed limit (RPZ) may not be reported by residents due to the difficulty and cost of proving mining responsibility.

Pressure on Landowners

- Landowners may be pressured or deceived into signing agreements with mine operators before or after damages occur.
- These agreements often include non-disclosure clauses and prevent the Department from understanding the true extent of the damages and repairs or reporting it to the General Assembly and the public.

Act 54's Intent and Effectiveness

- Act 54 was designed to have mine operators repair or replace damages caused by mining, but in practice, only about 10% of reported damages have been repaired or resolved since longwall mining began.
- The law allows for negotiated settlements, but many landowners may not receive adequate restitution.

Recommendations

→ Simultaneous Notification: Landowners should notify both the mine operator and the Department immediately after damage occurs, enabling both parties to investigate and repair the damage promptly.

→ Department Response: The Department should respond quickly when damage is reported, rather than waiting until after the landowner and operator have negotiated.

→ The Department must be notified immediately of any impacts on structures and water supplies and must monitor progress until final resolution.

→ The Department should make and report a final determination as to whether damages were repaired, replaced, or restored, without infringing on privacy.

→ The Department should clearly distinguish between reported and mine-liable impacts in Act 54 Reports and report repairs only for mine-liable impacts.

Non-Disclosure Agreements (NDAs)

NDAs, also known as confidentiality agreements, prevent landowners from disclosing details about subsidence damages and settlement terms.

- NDAs may involve cash payments or agreements to perform repairs.
- Coal operators use NDAs to limit or avoid providing full and adequate repair or compensation for damages.
- Landowners often do not fully understand the scope and cost of repairs, leading them to accept settlements that may be insufficient.

Pressure to Sign NDAs

- Anecdotal evidence suggests that landowners are often pressured or intimidated into signing NDAs by mine operators.
- NDAs may be presented before a mine permit is issued, with operators encouraging landowners to sign early to avoid the lengthy and complex Act 54 process.
- The Act 54 process can be time-consuming and uncertain, offering no more assurance of fair compensation than an NDA.

Resolution of Mining Damages

- In the 5th Act 54 period, 52% of the 486 mine-liable damages were resolved by "agreement" (with unknown terms), and 31% were resolved by "purchase of property" by the mine operator (mainly longwall mines).
- Together, these two resolutions (agreement and property purchase) accounted for 83% of all reported resolutions. The percentage of demolitions or abandonments is unknown.
- There is no indication of whether repairs were made in these cases, which is particularly concerning for historic structures.

Impact on Communities

- Some structures purchased by operators may be resold to new landowners, while others may be abandoned, leading to community depopulation and a loss of local tax revenue.

- The BMSCLA (1966) highlighted concerns about the erosion of the local tax base due to subsidence damage from room-and-pillar mines.
- The 5th Act 54 Report noted that subsidence impacts can negatively affect local communities and the tax base, but this issue has not received detailed attention in the five-year reports.

Department's Role and NDA Limitations

- The Department acknowledged that Act 54 allows for negotiated settlements but is not privy to the terms of NDAs.
- Despite NDAs, the Department has an obligation to assess whether Act 54 is achieving its intended outcomes over time.
- The Department cannot fully determine the extent of repairs because NDAs prevent accurate tracking of damages and resolutions. But its field inspectors could easily report the performance of visible repairs.

Recommendations by CCC

→ The mining program must track the repair/non-repair status of all mine-liable damages.
→ NDAs should not prevent the Department from tracking the repair status of damages.
→ Department shadow inspectors should routinely make note of the presence or absence of repairs to evident post-mining damage.
→ The Department should assess and report damages to communities in future Act 54 5-year Reports to the public and the General Assembly.

Other basic assumptions regarding potential damages

The Department uses a 35° RPZ (Rebuttable Presumption Zone) to identify areas where longwall *mining may affect water supply*. For other subsidence-related assessments, a 30° "angle of draw" is used to define areas at risk of damage to *structures*, requiring mine operators to conduct pre-mining surveys. The Act 54 Reports offer no clear explanation for why different angles (30° and 35°) are used, or why they haven't been reevaluated despite evidence that real mine subsidence damage occurs well beyond these limits.

Inadequacy of Current Models and Assumptions

- The models used to predict subsidence damage are outdated, particularly as modern longwall panels are much wider than in previous decades.
- A model developed by Dr. Syd S. Peng in the 1980s to predict stream pooling is now over 30 years old, inaccurate at times, and has not been analyzed for accuracy or recalibrated by the Department.

- Subsidence damage predictions based on old models may not reflect current longwall mining practices, leading to underestimates of potential damage.
- No reliable models currently exist for stream dewatering.
- Reliable methodology for determining stream segment baseline hydrology prior to mining has been demonstrated by USGS (Hittle & Risser 2019) but has not been adopted by DEP technical guidance or regulations into permit applications.

Inaccurate Predictions and Impact of Longwall Mining

- The assumption that damage from "planned" and "predictable" longwall subsidence would be less problematic than unplanned damage from room-and-pillar mines is not valid---as demonstrated in every five-year Act 54 report for three decades.
- Longwall mining now causes the majority of damage (98% of structure impacts and 64% of water supply impacts documented in the 4th and 5th Act 54 Reports).
- Historical incidents, such as Duke Lake being damaged irreparably by mining at a 66° angle (much beyond the 30° prescribed limit), highlight the failures of current models.

Failure to Address Damage and Mitigation

- Despite detailed pre-mining data for longwall mines, the Department and operators continue to permit prolonged damage and merely attempt post-damage mitigation.
- DEP takes virtually no action to modify mining plans to prevent or minimize subsidence damage, even when required monitoring shows that subsidence is affecting local streams and water resources.

Need for Improved Predictive Models and Data

- Current models for predicting subsidence damage are deemed unreliable and should be re-evaluated to account for modern mining practices.
- The Department's focus on post-damage solutions rather than preventing damage is problematic, especially for water resources that are not allowed to be damaged under Act 54.

Recommendations

→ The Department should update its models and assumptions to reflect modern longwall mining practices and their impacts.

→ The Department should reassess the need for comprehensive documentation of resources over proposed room-and-pillar mines.

→ The Department should improve statistics on claims of underground mine damage, including tracking the rejection rates and reasons for dismissing claims.

→ Mine operators should bear a higher burden of proof when disputing responsibility for damage beyond 30 or 35 degrees from active undermining areas, rather than placing this burden on landowners.

SECTION 03

STREAM & WETLAND PROTECTION

Accurate identification of Resources at Risk

Effective environmental protection of water resources requires accurate knowledge of their location and pre-mining characteristics. Historically, the Department's mining program focused on preventing subsidence from room-and-pillar (R&P) mining, which had minimal impact on aquatic resources other than through acid mine drainage. With the adoption of Act 54 in 1994, subsidence damage became permissible, but the Department's review process did not adapt to focus on protecting aquatic resources that are necessarily damaged by longwall mining in southwestern Pennsylvania.

Issues with Early Efforts to Protect Aquatic Resources

The DEP's 1997 Technical Guidance Document (TGD #663-2000-655) was its first attempt to protect streams but had major limitations, including failure to address intermittent streams or wetlands. The 2005 revised TGD expanded protection efforts but still had deficiencies and has never been fully implemented during mining permit review. The Department has claimed to be revising it again but has accorded it low priority and provided no timetable. Stream impacts are often not predicted in permit applications, and the Department rarely reviews the accuracy of floodplain and wetland delineations, even when impacts are anticipated.

Challenges with Wetland and Stream Protection

- For decades, the Department has claimed that it lacks sufficient staff and resources to review all aquatic resources at risk in large underground mine areas.
- The Army Corps of Engineers is sometimes consulted for jurisdictional determinations, but their involvement is limited and typically occurs only when wetland impacts are predicted in advance (such as for road construction), which is rare.
- Unlike non-mining projects throughout the Commonwealth, which are required to delineate all aquatic resources, the mining program does not follow similar practices for stream and wetland identification in Washington and Greene Counties.

Legal and Regulatory Gaps

- Act 54 does not exempt mines from complying with the Clean Streams Law (CSL), Dam Safety and Encroachments Act (DSEA), or federal laws such as the Clean Water Act (CWA).
- Unidentified, unpredicted aquatic impacts are frequently reported in the Act 54 Reports as occurring above longwall mines, with the mining program failing to adequately identify or address all affected water resources and to achieve restoration.

Recommendations

For every underground mining permit application, the Department should ensure comprehensive identification of all regulated streams and wetlands, including:

→ Stream delineation: Identify whether streams are intermittent or perennial, determine pre-mining base flow (hydrology), assess biological conditions, and identify existing (attained) uses. Stream delineation has improved significantly in permit applications, but documentation of stream hydrology biology has not.
→ Wetland delineation: Accurately delineate wetland boundaries, confirm delineation with the Corps Jurisdictional Determination (JD), and document each wetland's size, hydrology, and ecological value.
→ Department staff should focus particularly on all modeled wetlands shown on PASDA maps within mine permit areas.
→ Provide digital GIS data (e.g., shapefiles) on the location, extent, and nature of all streams and wetlands, and make this information available for public review.

Prediction of Impacts

The coal industry claims that longwall mining subsidence is "planned," "controlled," and "predictable." This predictability was a key argument for adopting Act 54, which asserts that longwall operators can minimize damage and promptly repair any resulting surface subsidence.

Issues with Predictions and Monitoring

- Despite operators' claims of predictability, the Department does not monitor the accuracy of stream-damage predictions for longwall mining.
- No records are kept to track whether stream damage (such as flow loss or pooling) was predicted, whether actual damage differs from predictions, or whether damage was rectified.
- The Act 54 Five-Year Reports do not quantify or assess whether stream impacts were predicted, whether the impacts' locations and magnitudes matched predictions, whether attempted resource restoration was successful, or when "success" was attained.

Department's Position on Predictions

- The Department "requires" predictions as required by regulations but does not assess their accuracy or consider them critical to addressing actual stream impacts, which must be restored regardless of whether they were predicted.
- The Department has no clear definition of permanent vs. temporary stream impacts, and flow loss, which is more common, is rarely predicted, making it harder to manage.

- Incentives for operators not to predict permanent damage are great, because predicting adverse impacts could prevent permit issuance and incur penalties for inaccurate predictions or untimely restorations.

Importance of Predictions for Environmental Protection

- Accurate predictions are key to the environmental protection framework for avoiding, minimizing, and mitigating impacts, enabling operators to plan restoration efforts and post-restoration bonds ahead of time.
- Predictions could help operators quickly mobilize resources to restore damaged streams and return them to pre-mining conditions.

Recommendations

→ Permit applications should require operators to demonstrate legal access to all undermined streams and wetlands for potential restoration.

→ The Department should scrutinize the type and location of stream impact predictions and impose serious consequences (e.g., permit suspension) for inaccurate predictions.

→ Upon receiving notice of stream impacts, the Department should:

  – Determine whether the impact was predicted and whether the actual damage aligns with predictions in terms of location and extent.

→ All predicted stream impacts should be restored within 3 years. For unpredicted impacts or those not fully restored in a timely manner, the Department should:

  – Require enhanced restoration (e.g., 2:1 restoration) and suspend the mining permit until full restoration is achieved.

→ If a mine causes unpredicted stream damage, and its natural stream flow is not fully restored within 3 years, the mining permit should be revoked until restoration is complete.

→ The Department should ensure that accurate data are collected in Act 54 Reports to compare predicted vs. unpredicted stream impacts and trends in stream restoration.

Temporary vs. permanent damage/time limits for restoration

Act 54 permitted subsidence damage to structures and water supplies, provided mine operators repaired or replaced them. However, Act 54 did not permit damage to streams or wetlands and did not alter legal protections for these water resources. Data from Act 54 Reports show that aquatic resources above longwall mines are regularly damaged (e.g., flow loss, pooling), and most damage is unpredicted. Restoring stream damage often takes decades, if it is possible at all.

Unclear Policies on Stream Damage

- The mining program claims it does not allow permanent stream impacts, but lacks a clear policy or definition for permanent vs. temporary impacts.
- Under Chapter 105, aquatic resource impacts should be minimized, and unavoidable impacts must be compensated for based on severity, duration, and function loss.
- The mining program does not adhere to Chapter 105 guidelines for stream protection, and does not follow defined restoration timelines (3 years).

Restoration Delays and Failures

- Current TGD guidelines suggest stream restoration should be completed within 3 years of mining damage, with 5 years as the upper limit. After 5 years, alternative restoration in the watershed was to be considered.
- However, streams damaged for over 5 years have not received alternative restoration, and one stream in the 5th Act 54 Report was still not restored after nearly a decade.
- The Department does not require the operator to secure landowner access for all potentially needed stream restoration during the permit process, delaying restoration efforts when damage requires restoration.

Stream Damage from Subsidence

- In the 5th Act 54 period (2013-2018), there were 183 documented stream impacts from bituminous coal mining, affecting at least 27.4 miles of streams.
- 90% of these impacts were due to flow loss, which is unpredicted and harder to restore than pooling.
- Flow loss damage can extend up to 1 mile, and restoration can take 5-10 years. For pooling, restoration took on average 7 years 11 months to reach biological release.

Recommendations

→ Landowner authorization for restoring subsidence-damaged aquatic resources should be required prior to permit approval for longwall mining.

→ The mining program should establish a hard timeframe for stream restoration (no longer than 3 years) and enforce it consistently.

→ If a mine causes unpredicted stream damage, the stream flow must be fully restored within 1 year, or the mining permit should be revoked until restoration is complete.

→ For predicted stream damage that is not fully restored within 3 years, the Department should suspend mining operations until full restoration is achieved.

→ Stream evaluation reports (SREs) must be reviewed more quickly, and review delays should be factored into the total restoration timeframe. Results should be summarized in each five-year Act 54 report.

Violations and Enforcement Issues

Act 54 did not alter existing protections for streams and water resources under the CSL, DSEA, or BMSLCA. Unlike structures and water supplies, no damage to streams and water resources by underground bituminous coal mining is specifically allowed. Accurate predictions of water resource impacts are critical to avoid or minimize damage.

Stream Damage from Longwall Mining

- Longwall mining is the primary cause of flow loss and pooling in the streams of southwestern Pennsylvania, with these impacts occurring regularly and often unpredictably.
- Restoring streams affected by flow loss or pooling can take many years or even decades.
- The Department should require mine operators to acquire rights to access and restore all potentially damaged streams prior to issuing permits for mine expansion.

CSL and Pollution

- Under Section 611 of the CSL, it is unlawful to cause pollution to waters without prior approval from the Department.
- Flow loss or pooling caused by mine subsidence changes a stream's flow, water chemistry, temperature, and biology, all of which constitute pollution.
- The CSL and mining regulations prohibit permit issuance if there is presumptive evidence of potential pollution, but this evidence is not properly collected and is often ignored in practice.

Department's Handling of Stream Damage

- The Department claims it will not issue a permit if a mine predicts adverse damage to a stream, so in reality, operators rarely predict stream damage or collect relevant hydrologic information.
- When stream damage (e.g., flow loss or pooling) occurs, it often goes uncorrected for years, and the Department rarely enforces penalties.
- Enforcement actions are sometimes taken only for fish kills or significant incidents, but long-term pooling or flow loss rarely if ever results in consequences like permit suspension.

Examples of Unaddressed Stream Damage

- In cases like Crafts Creek and the Kim Jones stream, flow loss occurred but was never fully restored, and the Department took no significant enforcement actions.
- Numerous cases of irreparable flow loss have been identified, but these issues often remain unresolved.
- Twenty years after the last revision of the TGD for stream protection from mining, DEP has yet to require its information in permit applications but routinely approves new longwall mining.

Recommendations

→ DEP permit staff should immediately become familiar with the current TGD 563-200-655 requirements and require at least that level of information to be included in all underground bituminous coal permit applications.

→ The current TGD provisions should be adopted as minimum regulations and enforced during the permitting of longwall mines.

→ Revised TGD provisions should be adopted promptly as regulations and enforced during the permitting of longwall mines, including the current methodology for documenting stream hydrology at risk from mine subsidence.

→ The Department should assume that any stream potentially exposed to longwall subsidence will not recover within 1 year and ensure that the applicant has already secured authority to enter and restore flow if necessary.

→ Enforcement actions should be initiated whenever unpredicted stream damage occurs, in line with CSL and mining regulations.

→ Mine operators should be required to implement restoration actions immediately after damage occurs in the permit area.

→ Review Stream Evaluation Reports (SREs) and impose CSL-related penalties on operators if streams have not recovered after 3 years.

→ Require accurate predictions of longwall mine subsidence damage to streams and wetlands to help avoid undermining these resources, and routinely record the success of impact predictions.

→ Impose severe penalties, such as permit suspension, on operators who repeatedly violate the CSL and cause unpredicted damage to streams.

Streamflow modeling & monitoring, USGS Study

To assess the impact of underground mining on stream flow, baseline pre-mining flow rates must be established. Stream flow varies with seasonal and weather changes, and precipitation is a significant factor. Prior to October 2007, there was no formal procedure to monitor and assess the impacts of underground mining on streams. The 2005 TGD 563-2000-655 established a procedure for monthly monitoring during and after mining, but adequate pre-mining hydrology data is rarely, if ever, provided in permits or permittee reports. Thus, hydrology impacts are virtually unstudied in five-year Act 54 reports. In addition, the Department's Cumulative Hydrologic Impacts (CHIA) determinations for each permit application always consist of minimal checkoff boxes and bear no resemblance to model cumulative hydrologic impact documents prepared by OSMRE. Hence, there has been no improvement in hydrologic impact analysis of Pennsylvania longwall mines over the decades.

USGS Study and Monitoring Recommendations

- In 2019, the US Geological Survey (USGS) completed a study on how to determine natural streamflow in southwestern PA, partially funded by the Department.
- The study aimed to improve streamflow characterization in small watersheds scheduled for undermining.
- Following the release of the 4th Act 54 Report, stakeholders recommended revising the TGD and improving data collection to assess stream conditions and predict subsidence impacts.
- The USGS study was completed in June 2019, but its methodology is not reflected in the current TGD and would require more extensive data collection for longwall mine permit applications.
- To date, the USGS hydrologic analysis appears to have been ignored by DEP.

Problems with Current Streamflow Monitoring

- The 5th Act 54 Report noted that streamflow monitoring by mine operators is often incomplete and not aligned with current TGD procedures.
- The USGS study's improved methodology cannot be used until adequate data are collected. Current monitoring practices clearly are inadequate.
- Revisions to the TGD and improved monitoring methods are unlikely to protect streams if they only assess damage after it occurs and then try to restore streams to pre-mining conditions.
- True protection requires monitoring that predicts or detects impending impacts and allows actions to avoid damage before it happens.

- At present, longwall mine applications typically avoid various features requiring protection, such as deep wells for natural gas production. Streams subject to subsidence damage warrant at least equal protection as gas wells.

Recommendations

→ The mining program should adopt appropriate USGS streamflow monitoring methods and incorporate them into 25 Pa. Code Chapter 89 regulations.

→ Require complete pre-mining data (flow and biology) for all streams that will be undermined, and do not approve permits lacking this data.

→ Mine permit applicants should use pre-mining data to predict where flow loss is likely, and develop avoidance strategies to minimize predicted damage.

→ Under 25 Pa. Code Chapter 86, the Department should modify permits for mines that have caused three or more instances of unpredicted flow loss, allowing only room-and-pillar mining methods.

TGD 563-2000-655 and proposed revisions

Last revised on October 8, 2005, Technical Guidance Document #563-2000-655 provides guidance for protecting surface waterways and wetlands from underground coal mining. The 2005 TGD was a significant policy change for stream protection under Act 54 (1994) and became fully effective in 2007, but some provisions have not been effectively implemented decades later.

Implementation Issues

- While the current TGD contains positive provisions on paper, they have not been consistently followed, with major loopholes allowing weak enforcement year after year.
- The Department states that its technical guidance should be followed by permit applicants, unless they have demonstrated to the Department that they are using equivalently protective alternative measures. This is not done by the Mining Program, so TGD 563-2000-655's intended protection of aquatic resources remains unimplemented.
- Restoration time limits allowed for streams damaged by subsidence (3 years, 5 years in exceptional circumstances) are rarely met, and the advertised consequences for failure to restore streams (e.g., alternative mitigation) have not been applied.
- Adequate hydrologic data needed pre- and post-mining are not provided or verified by the Department, leading to inaccurate predictions of flow loss and inadequate monitoring of stream recovery.

Challenges with the 2021 Draft Revisions

- Draft 2021 TGD revisions aimed to address some of these issues, but it is unclear whether they could ever be effective, given the Department's decades-long history of not enforcing the current TGD. Work on TGD revision virtually ceased after 2021.
- Any TGD is only guidance and can be effective only if diligently applied, but the Department has historically allowed deviations from it that fail to provide equivalent information, while approving permit applications nevertheless.

Recommendations

→ Immediate implementation of the current TGD for every underground bituminous coal mining permit application

→ Immediate implementation of recommendations from the Citizen Advisory Council (CAC), including incorporating certain provisions into regulations and using external experts (e.g., Corps of Engineers for wetland verification).

→ The revised TGD should prioritize prevention of stream damage from longwall mining, with adequate hydrologic analysis and consideration of room-and-pillar mining as a viable alternative.

→ Mining permit applications must ensure that all streams and wetlands at risk of damage are accurately delineated and documented before approval. Operator delineations should specifically address all modeled wetlands shown on PASDA maps plus any additional extant wetlands not identified on PASDA maps.

→ The TGD should establish clear guidelines for predicting impacts, set a maximum 3-year restoration period, and enforce consequences for failure to restore streams or for inaccurate predictions.

SECTION 04

SPECIAL PROTECTION WATERS

Anti-degradation issues

Act 54 does not reduce protections for Pennsylvania streams under the Clean Streams Law (CSL), the Environmental Rights Amendment of the Pennsylvania Constitution, the federal Clean Water Act, or implementing mining regulations. Longwall mining cannot intentionally cause long-term damage to streams based on promises of eventual restoration, and the Department cannot issue permits that violate water protection laws, especially where there is evidence of potential pollution. Presumptive evidence from three decades of Act 54 Reports shows that longwall mines have caused pollution (loss of flow, pooling, sediment traps, increased water temperature) in Pennsylvania's waters, which the Supreme Court considers water pollution. Such pollution is ongoing. The burden of genuine stream restoration is being shifted onto the public, just as historic room-and-pillar mine damages, including acid mine drainage, long were shifted onto the public, requiring billions of dollars for cleanup.

Special Protection Waters

- Special Protection waters (designated Exceptional Value [EV] or High Quality [HQ]) are to receive heightened protection under state and federal laws.
- Antidegradation requirements (25 Pa. Code §93.4a-4d) are to protect these waters from degradation due to mining (as well as other) activities.
- The Division of Water Quality (DWQ) is responsible for ensuring streams meet their designated use, but mining applications often fail to identify Special Protection waters at risk.
- The 5th Act 54 Report fails to mention Special Protection waters, despite significant damage to these resources (e.g., Enlow Fork Mine and Harvey Mine).

Problems with Longwall Mining

- Most longwall mining historically occurred beneath streams without Special Protection designations, but now more sensitive watersheds (EV/HQ) listed in Chapter 93 are being targeted for mining expansion.
- Pre-mining data provided in applications rarely acknowledge the Special Protection status of streams, and no extra effort is made to predict, avoid, or recover damages to these waters.
- DEP never searches for additional stream segments that might qualify as Special Protection waters based on attained uses before making final decisions to approve longwall mining permits, although it could require applicants to provide relevant information before making final permit decisions under 25 Pa. Code §93.4.

- The Department's California District Mining Office claims it will not issue permits for new mining that harms Special Protection waters, but mining applicants rarely predict such impacts or apply the facts credibly.

Stream Protection and Restoration Issues

- Current TGD 563-2000-655 permits up to a 12% decrease in biological scores (TBS) before considering a stream impaired, but this threshold is not suitable for EV/HQ waters.
- Restoration efforts are not consistently successful or timely, and even if restoration occurs, there should be recognition of the higher attained uses of Special Protection waters to minimize damages.
- Alternative mining methods like room-and-pillar mining or techniques to minimize subsidence (e.g., backstowing) are virtually never considered, despite existing mining regulations and their being viable options to prevent or minimize stream damage.

Department's Accountability

- The Department has failed to apply appropriate protections for Special Protection waters and has allowed prolonged impairment without adequate mitigation.
- Lack of funding or resources is not an acceptable excuse for failing to enforce water quality protections.

Recommendations

→ Applicants must identify the existing and designated uses of streams proposed for mining and provide data using current methodology sufficient for DEP to identify attained uses.

→ Pre-mining data should be reviewed to assess potential redesignation of streams based on their attained uses.

→ Involve the Division of Water Quality and PA Fish and Boat Commission in reviewing mining applications.

→ Require applicants to propose specific avoidance and mitigation measures for Special Protection waters.

→ Stream Recovery Evaluations (SREs) should include detailed information on stream damage, mitigation measures, and restoration timelines.

→ The Act 54 Reports should specifically track the status of all mining-affected Special Protection waters, including predicted and actual impacts, restoration efforts, and recovery confirmation.

→ Where timely restoration is not achieved, update all future Clean Water Act Section 305(b) reports to reflect the impairment of these streams.

SECTION 05

WATER QUALITY IMPACTS

Direct (flow loss, pooling) and indirect

The Pennsylvania Clean Streams Law (CSL) and the federal Clean Water Act (CWA) aim to protect the integrity of waterways by preventing harmful changes to their chemical, physical, or biological properties. The CSL addresses more than traditional pollution, including acid mine drainage, and seeks to preserve the health and function of waterways.

Impacts of Longwall Mining on Waterways

- Subsidence from longwall mining causes:
  - Cracks in the floodplain and streambed that reduce or eliminate flow.
  - Pooling behind unsubsided gates or depressions in wetlands, causing water stagnation.
- These physical changes can result in:
  - Water quality degradation, including increased sediment and water temperature.
  - Changes in wetland functions and values.
  - Negative impacts on aquatic life (e.g., fish and macroinvertebrates), changing species composition to those more tolerant of pollution.
- The 3rd Act 54 Report documented these impacts, noting that longwall mining alters flow, sediment load, oxygen content, and habitat, leading to non-attainment of designated stream uses. Such impacts still occur routinely.

Water Quality Degradation from Subsidence

- Bentonite injection into streambed cracks to seal fractures may further degrade water quality.
- The Department has not studied the effects of substances like polyurethane grout on water quality or aquatic life.

Impact on Private Water Supplies

- Longwall mining can damage private water supplies (wells) by causing water loss or contamination.
- Septic system damage from subsidence can lead to wastewater leaking into streams and wetlands, contributing to surface water pollution.

Wastewater Discharges from Underground Mines

- Sanitary wastewater discharges from surface facilities for mine personnel are generally well-regulated, with few violations reported.
- Stormwater discharges from underground mines often exceed pollutant limits, with violations documented in Discharge Monitoring Reports (DMRs).
- There are inconsistencies between required monitoring and actual reporting, and many violations have gone unaddressed by the Department (Schmid & Company, Inc. 2014).
- The Department claimed that enforcement of DMR violations falls under NPDES permit regulations, not Act 54, and compliance actions are taken only when violations are identified.
- The 5th and 6th Act 54 Reports failed to analyze DMRs, ignoring the potential environmental impact of these violations, which increasingly have become recognized.

Recommendations

→ Improved monitoring and enforcement of DMRs, focusing on discharge limit exceedances and violations.

→ Investigation and reporting on water quality in streams near confirmed water-supply contamination incidents, compared with pre-mining baseline conditions.

→ Ensure future Act 54 Reports review DMRs for all active mines, document violations, and evaluate the impact of mining discharges on water quality.

→ Address the lack of thorough data collection and analysis on water quality issues related to underground mining, ensuring transparency for the public and decision-makers.

Impaired waters, CWA Section 303(d) list

Longwall mine subsidence causes physical changes in streams and wetlands, often leading to chemical and biological changes in water systems. These changes can alter water quality and habitat suitability, and efforts to reverse the damage often take years and rarely fully restore natural conditions. In non-mining situations, the Department's Division of Water Quality (DWQ) assesses annual changes in stream water quality to determine whether streams are attaining their designated uses. Streams that are impaired (not meeting their protected uses) are expected to be listed, and the cause(s) of impairment are noted in CWA 305(b) and 303(d) reports, which are submitted to the EPA every two years. This has not been done in longwall mining areas or discussed in five-year Act 54 reports.

Issues with Act 54 Reporting

- The 5th Act 54 Report found 153 cases of flow loss impacting 24.6 miles of stream, but none of these streams were listed in the CWA 303(d) reports to the EPA as impaired.
- This indicates a lack of recognition of longwall mine impacts on streams in the DWQ assessment process, likely due to poor communication between the Bureau of Mining Programs and the DWQ.

Department's Position on Post-Mining Water Quality

- The Department requires Stream Recovery Evaluations (SREs) to demonstrate recovery of biological conditions and flow after mining, but these evaluations only focus on streams directly damaged by subsidence.
- Water quality impacts from mining activities outside the subsidence zone are not acknowledged or addressed, leading to incomplete recognition of environmental damage.

Need for Improved Coordination and Assessment

- Impacts to water quality from subsidence-caused flow loss and pooling are not being effectively addressed due to the mining program's failure to utilize expertise from the Division of Water Quality and other agencies like the PA Fish & Boat Commission.
- As a result, water quality issues are not being included in statewide assessments, damaging Pennsylvania's high-quality streams and aquatic habitats or disclosed to the public and to decisionmakers.

Recommendations

→ Require comprehensive pre-mining and post-mining water quality analyses for all undermined streams to ensure that no mine-related water quality changes or impairments occur.

→ Improve coordination with the Division of Water Quality and the PA Fish & Boat Commission to more accurately assess stream conditions before and after mining and to identify and address possible water quality impairments.

→ Permit applications should immediately include specific information from the most recent permit areas in the atlas of Pennsylvania's surface waters, as presented in the latest Integrated Water Quality Report, rather than merely historic uses identified in 25 Pa. Code Chapter 93. DWQ continuously revises its stream classifications, which may warrant more stringent protection than the Chapter 93 lists suggest.

Outside agency/department assistance/protocols/guidance

The mining program has strong engineering and geological expertise to assess subsidence risks but lacks sufficient in-house resources for comprehensive environmental reviews and for evaluating wetland and stream hydrology and other impacts from mining. The program can benefit from the expertise of other agencies in identifying and assessing wetlands and streams.

Utilizing External Expertise

- The Army Corps of Engineers has a no-fee program for reviewing wetland and stream delineations, providing a jurisdictional determination (JD) for wetland boundaries that is valid for five years. Requiring mine applicants to use this process would reduce the burden on the mining program and improve the accuracy of environmental assessments.

Compliance with Environmental Laws

- Underground coal mines are subject to the Clean Streams Law (CSL), which includes protections under the Dam Safety and Encroachments Act (DSEA) for streams and wetlands.
- Although underground mines don't require a separate Chapter 105 permit under the DSEA, they must still comply with its protective provisions.

Several guidance documents are available to improve stream and wetland protection, such as;

- Assessment Methodology for Streams and Rivers 2021 (Bureau of Clean Water, 2021, 218 p.)
- Water Quality Monitoring Protocols for Streams and Rivers 2021 (Bureau of Clean Water, 2021, 568 p.)
- Pennsylvania Function-Based Aquatic Resource Compensation Protocol (TGD 310-2137-001, 2022, 43 p.)
- University of Vermont-Modeled Pennsylvania Wetlands, based on 2013 aerial photographs. https://www.pasda.psu.edu/uci/SearchResults.aspx?Keyword=modeled+wetlands
- Pennsylvania Wetland Condition Level 2 Rapid Assessment (TGD 310-2137-002, 2017, 32 p.)
- Pennsylvania Riverine Condition Level 2 Rapid Assessment (TGD 310-2137-003, 2017, 34 p.)

Challenges with Data and Reporting

- The Department has an ongoing program to assess surface water quality, but the data in Act 54 Reports do not meet the Bureau of Clean Water's standards for the Integrated Water Quality Report. Relatively simple adjustments to the analysis of biological data could provide more useful information on sampled streams.
- There is a gap in coordination between the mining program and the Bureau of Clean Water, especially regarding water quality monitoring and post-mining assessments.

Delay in TGD Revisions

- Following recommendations in 2014, the mining program delayed revising its 2005 stream protection guidance (TGD 563-2000-655). Despite the completion of important USGS research in 2018, draft 2021 revisions did not incorporate findings from that study, missing an opportunity to enhance water quality protections. No actual TGD revisions have been adopted as of mid-2026.

Funding and Resource Limitations

- The mining program suffers from chronic funding and resource shortages, but this should not prevent it from fulfilling its responsibilities under the Clean Streams Law and the Pennsylvania Constitution.
- Lack of resources highlights the importance of utilizing expertise from other state and federal agencies to improve water quality protections.

Recommendations

→ Incorporate existing guidance and protocols from other agencies to assess water quality and resource impacts in mine permit applications.

→ Develop collaborative relationships with other Department programs and external agencies focused on water quality.

→ Establish policies and procedures to incorporate outside expertise into water quality assessments and decision-making processes for mining permits.

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While this report was in preparation, Schmid & Company, Inc., completed a detailed technical review of DEP's 6th five-year Act 54 Report for CCC. That review includes full citations to the literature CCC has consulted over its many years of advocacy for genuine protection of the residents and environment in Pennsylvania coalfields subject to longwall mining. CCC also commissioned 2025 field sampling of water quality in streams within several watersheds slated for longwall mining, which identified previously unidentified Special Protection waters at risk of damage. That technical report is currently in final review. CCC and coalfield residents are grateful for the financial support of the Colcom Foundation and the Foundation for Pennsylvania Watersheds that made these efforts possible.