



The Increasing Damage from Underground Coal Mining in Pennsylvania

A Review and Analysis of
the PADEP's Third
Act 54 Report

Summary Presentation

by **Stephen P. Kunz** to

Citizens Advisory Council

Harrisburg, PA

19 April 2011

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- Impact Assessment



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The **Citizens Coal Council** is national alliance of grassroots groups and individuals from the coalfields across the United States working together to protect communities affected by coal mining.

AIMEE ERICKSON, Executive Director



BACKGROUND

Bituminous Mine Subsidence and Land Conservation Act

27 April 1966

Act of 1966, Special Session 1, P.L. 31, No. 1

Special Session No. 1 of 1966

No. 1966-1

BMSLCA 1966:

*To protect the public health, welfare and safety by regulating the mining of bituminous coal; declaring the existence of a public interest in the support of surface structures; **forbidding damage to specified classes of existing structures from the mining of bituminous coal;***

Protected by the 1966 BMSLCA:

- **homes built before April 1966**
- **public buildings**
- **noncommercial structures** used by the public (such as **churches, schools, and hospitals**)
- **cemeteries**

By protecting structures

**1966 BMSLCA
effectively protected**

**streams, springs,
wetlands, aquifers, parks,
and farms**

1994

ACT 54

AMENDMENTS

Act 54 of 1994
Amendments to the Bituminous Mine Subsidence and Land Conservation Act

Official Advance Copy

SESSION OF 1994

Act 1994-54

357

No. 1994-54

AN ACT

SB 955

Amending the act of April 27, 1966 (1st Sp.Sess., P.L.31, No.1), entitled "An act to protect the public health, welfare and safety by regulating the mining of bituminous coal; declaring the existence of a public interest in the support of surface structures; forbidding damage to specified classes of existing structures from the mining of bituminous coal; requiring permits, and in certain circumstances bonds, for the mining of bituminous coal; providing for the filing of maps or plans with recorders of deeds; providing for the giving of notice of mining operations to political subdivisions and surface landowners of record; requiring mine inspectors to accompany municipal officers and their agents on inspection trips; granting powers to public officers and affected property owners to enforce the act; requiring grantors to certify as to whether any structures on the lands conveyed are entitled to support from the underlying coal and grantees to sign an admission of a warning of the possible lack of any such right of support; providing for acquisition with compensation of coal support for existing structures

**ACT
54**

**SIGNIFICANT CHANGES
IN LANGUAGE AND INTENT**

The prevention *or restoration* of damage from mine subsidence is recognized as being related to the economic future and well-being of Pennsylvania.

“... develop an adequate remedy for the restoration and replacement of water supplies affected by underground mining.

... develop a remedy for the restoration or replacement of, or compensation for, surface structures damaged ...”

**ACT
54**

**DAMAGE WOULD BE
ALLOWED**

(even severe damage)

PROVIDED there was provision for:

- *restoration*
- *replacement* or
- *compensation*

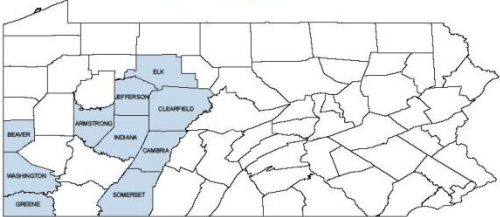
**for
structures
and water
supplies**

Section 18.1 of Act 54 mandates that the DEP shall
compile on an ongoing basis,
and
analyze at five-year intervals,

information contained in:

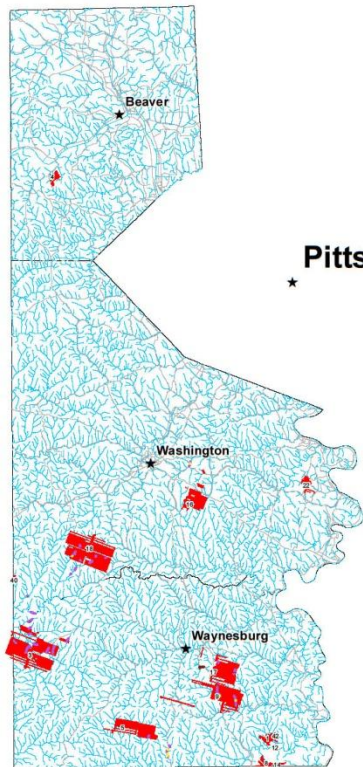
- **mining permit application files**
- **monitoring reports**
- **mining enforcement files**
- **any other appropriate source**

**to determine the effects of deep mining on
surface structures, features, and water resources**



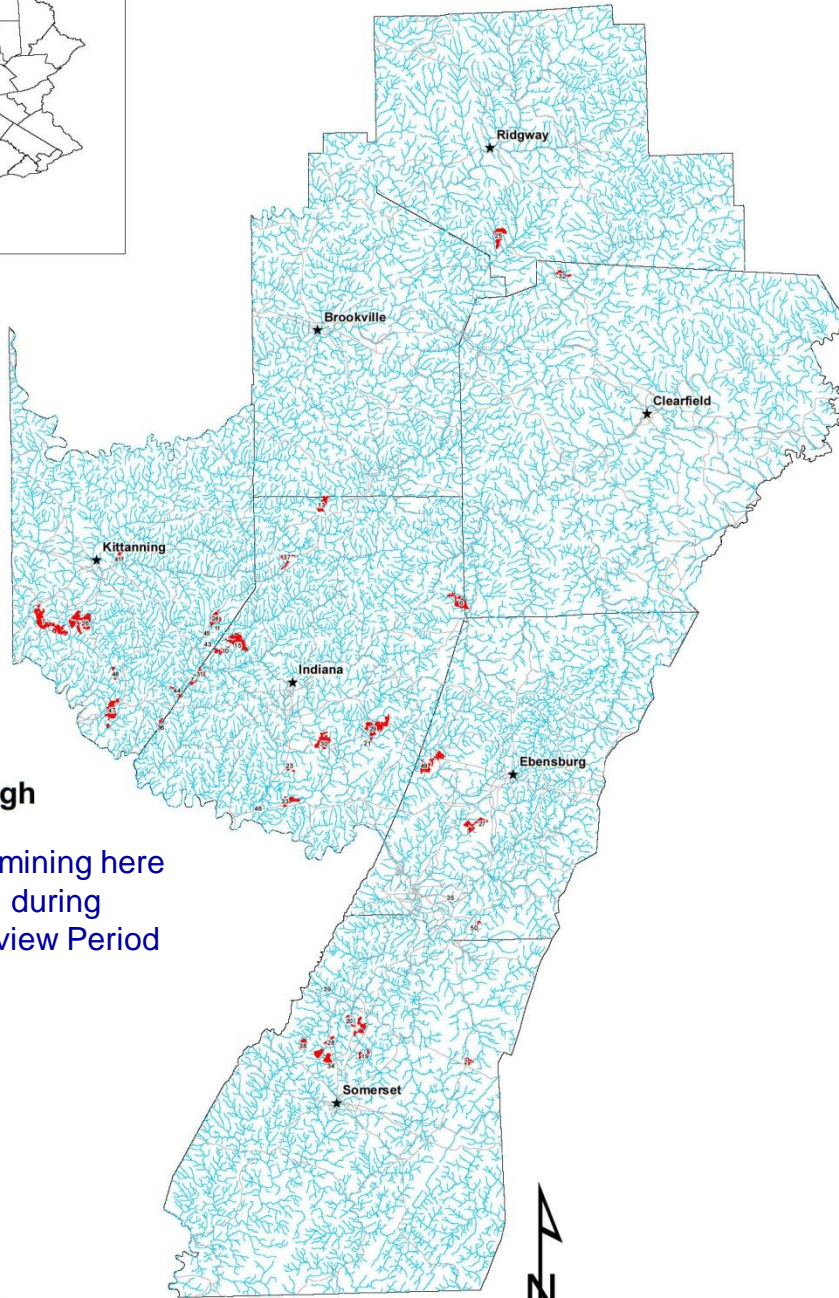
Map Key

- ★ City
- Mines
- Highways
- Streams
- Study Counties



★ Pittsburgh

No mining here
during
Review Period



ACT 54 Study Area

10 Counties in Western Pennsylvania



Prepared for:
Pennsylvania Department of
Environmental Protection (DEP)



Prepared by:
University of Pittsburgh



The Effects of Subsidence
Resulting from Underground Bituminous Coal Mining on
Surface Structures and Features and
Water Resources

Prepared Under the Authorization of
Section 18a of the Bituminous Mine Subsidence and
Land Conservation Act

Submitted to
Governor Tom Ridge, the General Assembly and
the Citizens Advisory Council
June 1999



Pennsylvania Department of Environmental Protection
James M. Seif
Secretary
www.dep.state.pa.us

**Review
Period
1993-1998**

**First
Act 54
Report
(1999)**

The Effects of Subsidence Resulting from Underground Bituminous Coal Mining on Surface Structures and Features and Water Resources

February 2001

Supplement to the June 1999 Report

Prepared Under the Authorization of Section 18a of the Bituminous Mine Subsidence and Land Conservation Act



**First
Act 54
Report
Supplement
(2001)**

Tom Ridge, Governor
Commonwealth of Pennsylvania

James M. Seif, Secretary
Department of Environmental Protection

**THE EFFECTS OF SUBSIDENCE RESULTING
FROM UNDERGROUND BITUMINOUS COAL
MINING ON SURFACE STRUCTURES AND
FEATURES AND ON WATER RESOURCES:
SECOND ACT 54 FIVE-YEAR REPORT**

**RESEARCH CONDUCTED BY
CALIFORNIA UNIVERSITY OF PENNSYLVANIA
DEPARTMENT OF EARTH SCIENCES
FOR
THE PENNSYLVANIA DEPARTMENT OF
ENVIRONMENTAL PROTECTION**

February 4, 2005

**Review
Period
1998-2003**

**Second
Act 54
Report
(2005)**

Cost: \$200,000



**The Effects of Subsidence
Resulting from
Underground Bituminous
Coal Mining on Surface
Structures and Features
and on Water Resources,
2003 to 2008**



Bituminous Mine Subsidence and
Land Conservation Act

ACT 54 Amendments
Five-Year Report
August 2003 to August 2008

Research Conducted by the University
of Pittsburgh for the Pennsylvania
Department of Environmental
Protection

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**Review
Period
2003-2008**

**Third
Act 54
Report
(2011)**

Cost: \$313,000

Underground Coal Mining Impacts

(1) WHAT WE KNOW

(2) WHAT WE *(still)* DON'T KNOW

(3) *ACT 54* CONSIDERATIONS

A dark, grainy historical photograph of soldiers in a trench. The text "WHAT WE KNOW" is overlaid in large, bold, yellow letters. The scene shows several soldiers in military uniforms and caps, some appearing to be in conversation or working together. The ground is uneven and appears to be a trench or a similar military position. The overall tone is somber and historical.

**WHAT WE
KNOW**

IMPACTS

FROM

UNDERGROUND COAL MINING

ARE

INCREASING

IMPACTS INCREASED

From 2nd Review Period to 3rd Review Period:

Total Reported Effects +14.4%

(structures, land, water supplies: 1,090 → 1,247)

Structures

(348 → 456)

+31%

Land

(58 → 108)

+86%

Water Supplies

(684 → 683)

N/C

MINING INCREASED

From 2nd Review Period to 3rd Review Period:

Total Effects Reported +14.4%

Acres undermined +12%
(34,051 → 38,256)

Properties undermined +18%
(3,033 → 3,587)

MINE METHOD CHANGES

From 2nd Review Period to 3rd Review Period:

Total Acres Undermined +12%

R&P* Mines, Acres +108.6%
(6,544 → 13,649)

Longwall Mines, Acres -10.5%
(27,507 → 24,607)

* Includes 2,097 acres of R&P Retreat Mines

Acreage of Mining, 2003-2008

MINE TYPE	(#)	MINING METHOD			TOTAL	
		<u>Longwall</u>	<u>R&P</u>	<u>Retreat</u>		
LWM	(8)	17,605	7,002	--	24,607	64%
R&P	(36)	--	11,552	--	11,552	30%
Retreat	(6)	--	1,821	276	2,097	5%
TOTAL	(50)	17,605	20,375	276	38,256	100%
		46%	53%	<1%		

Longwall MINES occupied 24,607 acres (64% of the total)

Longwall MINING was used under 17,605 acres (46% of the total)

UNDERMINED 2003-2008

	By R&P Mines	By Longwall Mines
# Structures	1,879	1,856
# Properties	1,738	1,572

(approximately equal)

LONGWALL MINING

is disproportionately responsible

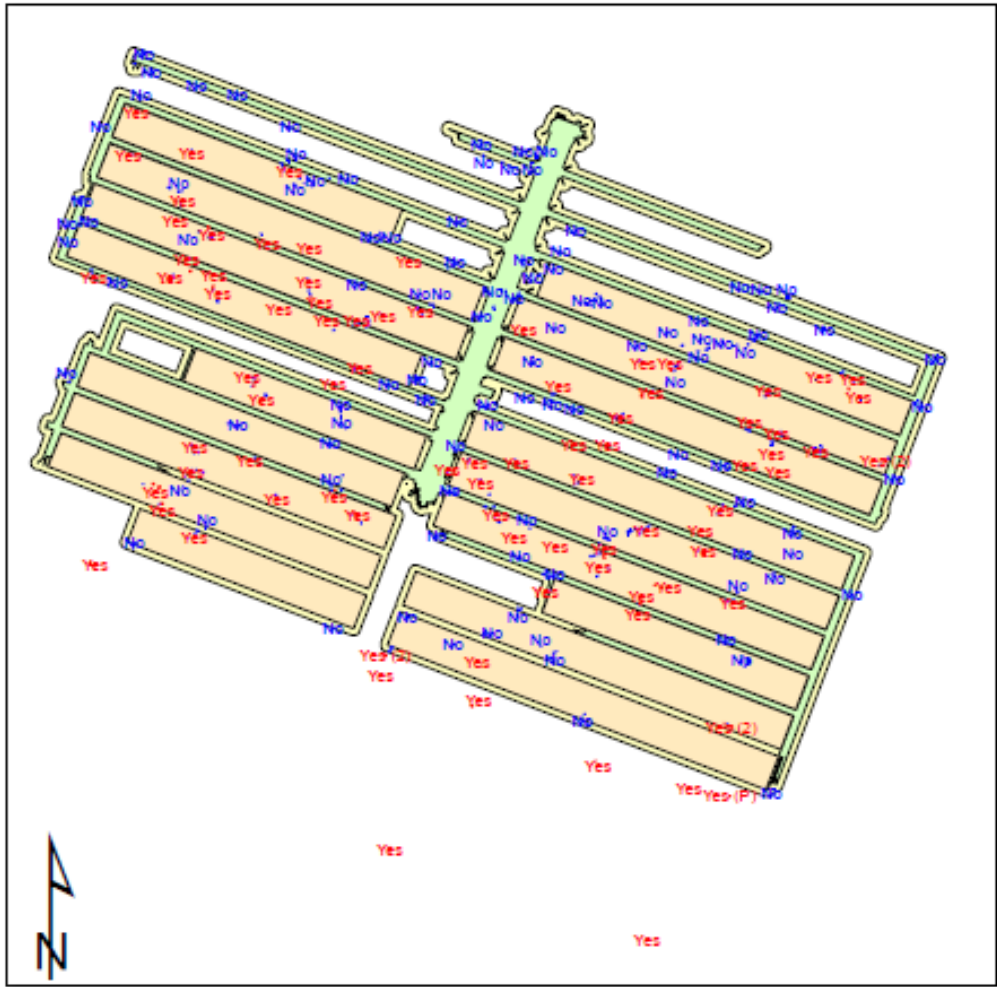
100% of impacts to **STREAMS**
(55 of 55)

95% of impacts to **LAND** (103 of 108)

94% of impacts to **STRUCTURES**
(427 of 456)

Enlow Fork Mine Mining Areas, 200-ft Buffer and Structures

**LONGWALL
MINE**



0 0.5 1 2 Miles



Prepared for:
Pennsylvania Department of
Environmental Protection (DEP)



Prepared by:
University of Pittsburgh



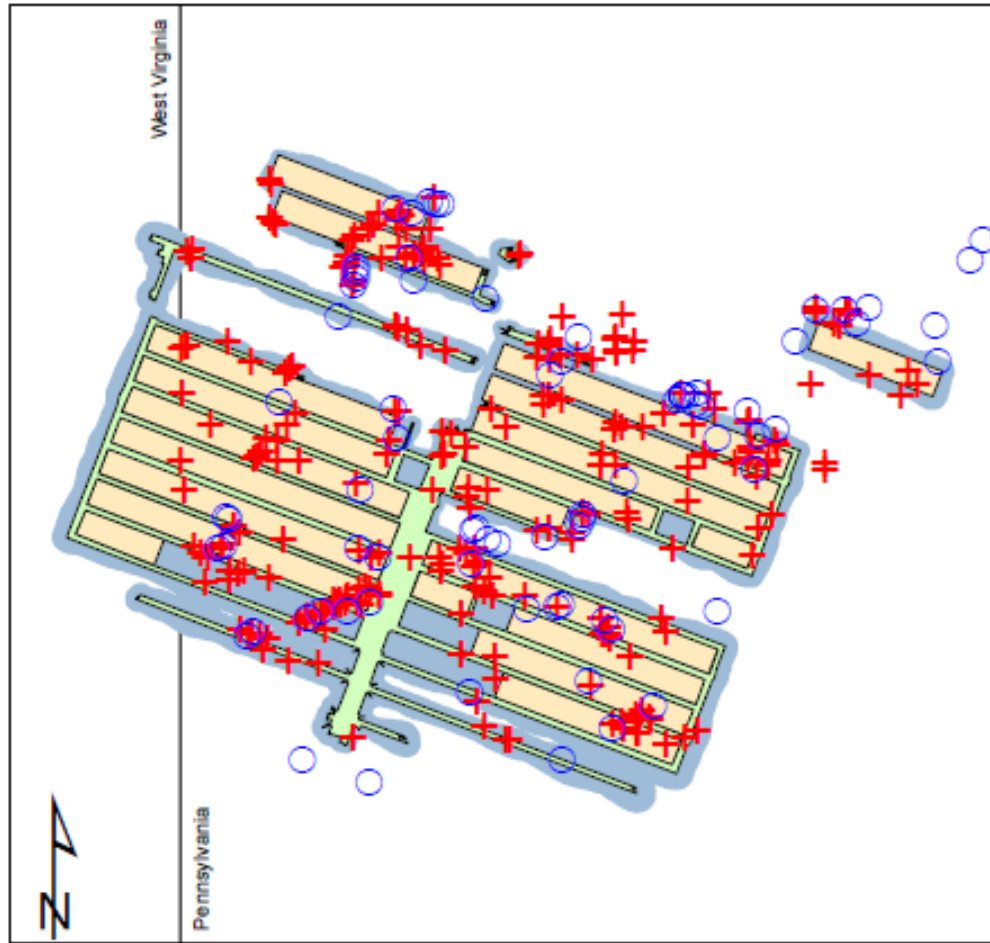
Washington County

Map Key

- Yes=Structures with reported effects
- No=Structures with no reported effects
- Longwall Panel
- Room-and-Pillar
- 200-ft Buffer

Bailey Mine

Mining Areas, Watersources and RPZ



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Prepared by:
University of Pittsburgh



Waynesburg

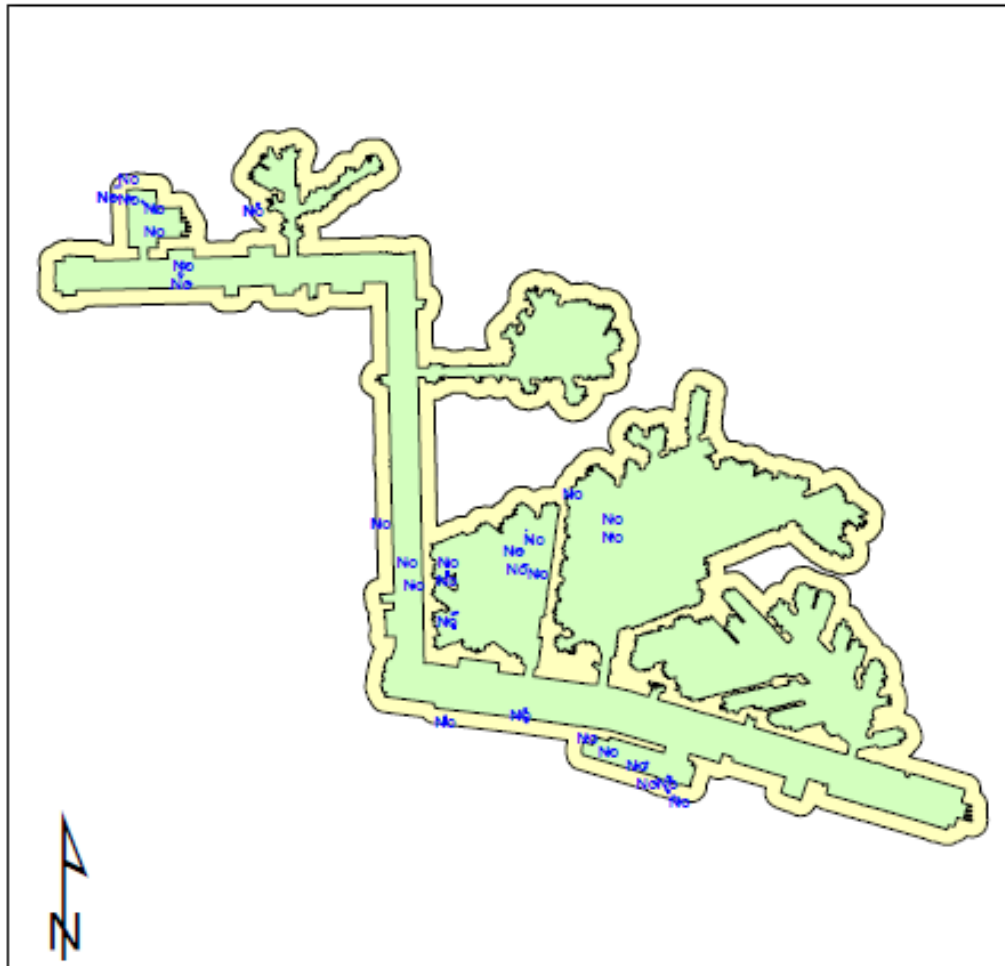
Greene County

Map Key

- Watersources with no reported effects
- + Watersources with reported effects
- Room-and-Pillar
- Longwall Panel
- RPZ

LONGWALL MINE

Cherry Tree Mine Mining Areas, 200-ft and Structures



0 0.2 0.4 0.8 Miles



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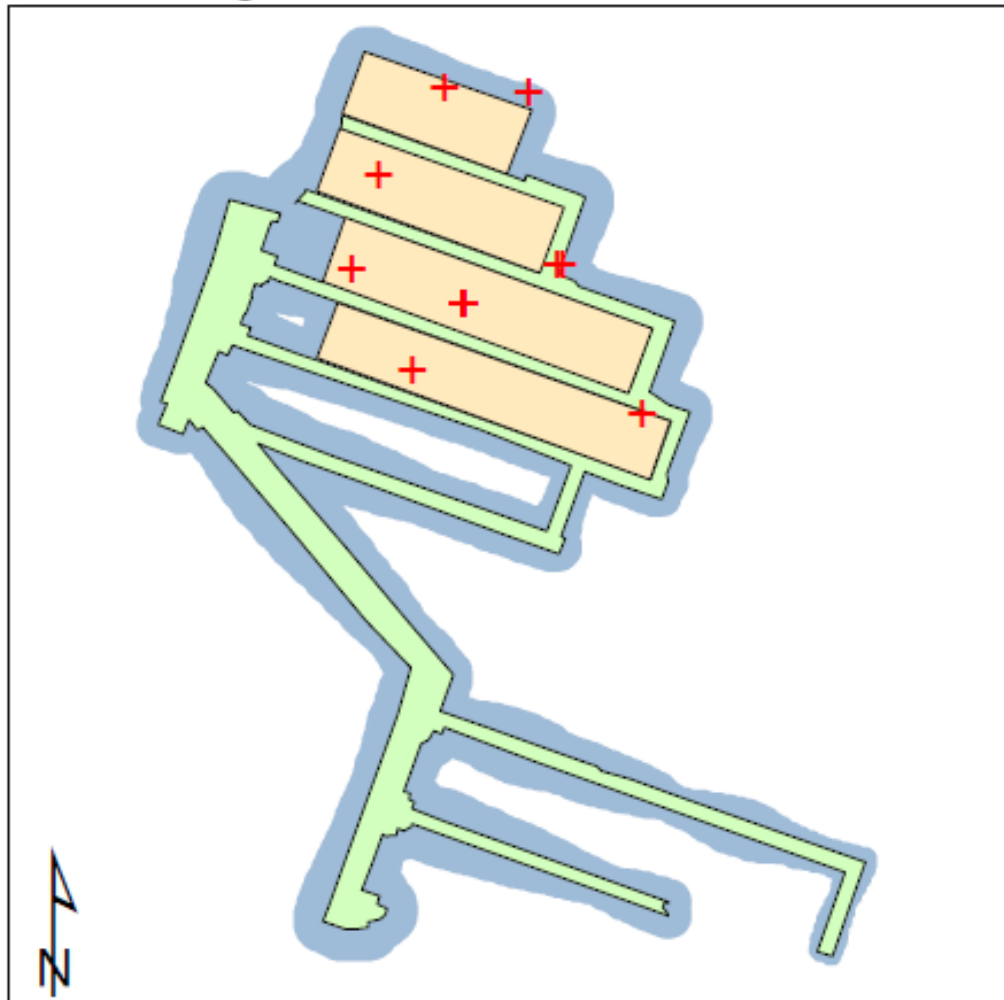
Clearfield County

Map Key

- No=Structures with no reported effects
- Room-and-Pillar
- 200-ft Buffer

ROOM & PILLAR MINE

High Quality Mine Mining Areas, Watersources and RPZ



**Mine
using both
Room &
Pillar
and
Longwall
Methods**

0 0.15 0.3 0.6 Miles



Prepared for:
Pennsylvania Department of
Environmental Protection (DEP)



Prepared by:
University of Pittsburgh



Washington County

Map Key

- + Watersources with reported effects
- Longwall Panel
- Room-and-Pillar
- RPZ

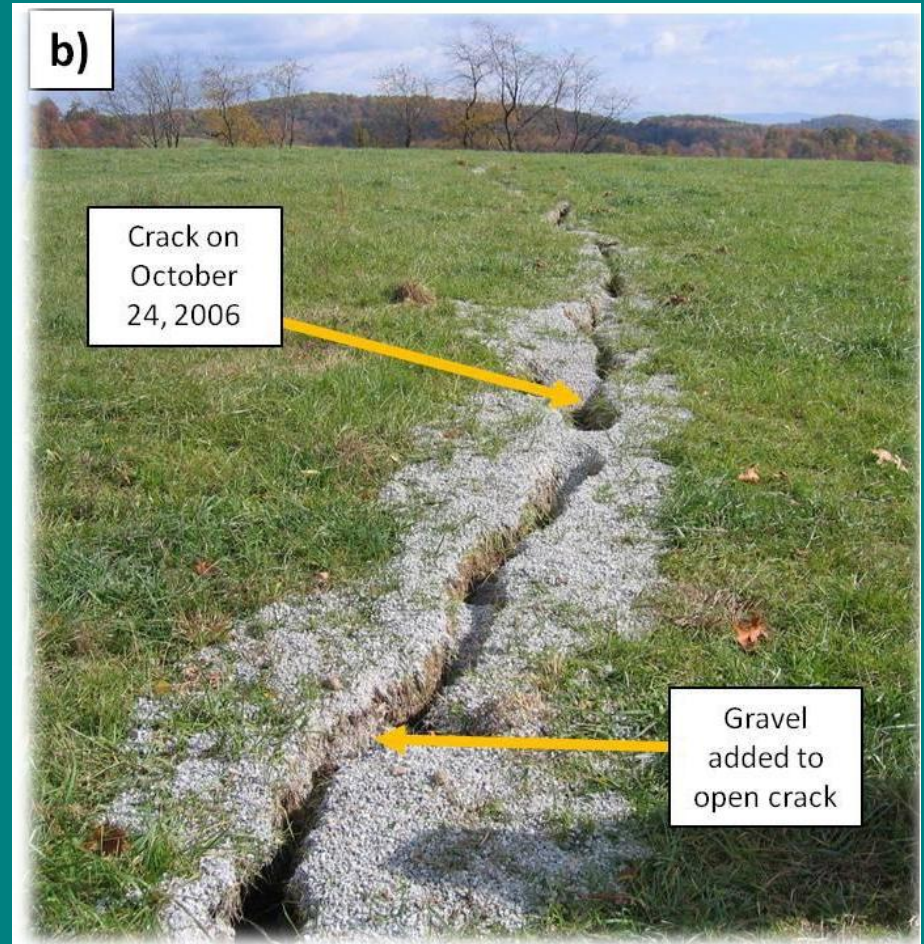
RESOLUTION of IMPACTS

is taking a very long time

The University has determined that for structures, water supplies, and land reported effects, 80-pct of all cases were solved in the first 600 days after the date of occurrence.

(3rd Act 54 Report, Page X-15)

In other words: 1 in 5 cases takes longer than 600 days to resolve



Average time to Resolution:
206 days for land

Source: Univ. of Pittsburgh, 2011



Figure V-14 - Photograph of bracing (photograph courtesy of N. Iannacchione).

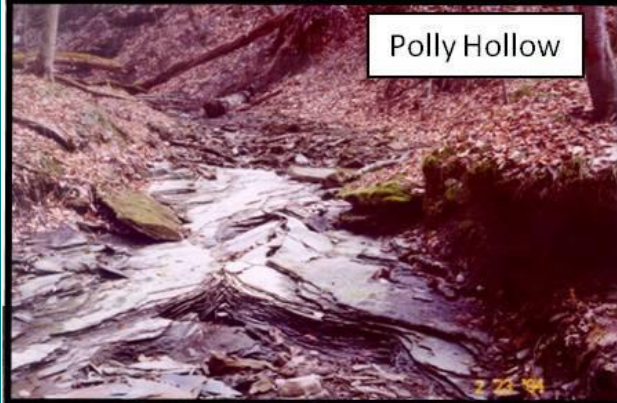
**Average time to Resolution:
207 days for structures**

Source: Univ. of Pittsburgh, 2011



Average time to Resolution:
321 days for water supplies

Source: Univ. of Pittsburgh, 2011



**Average time
to
Resolution:
688 days
for
streams**

“RESOLUTION”

DOES NOT = REPAIR

- *restoration*
- *replacement*
- *compensation*
- *agreement*

Resolution = “case closed”

STRUCTURE “RESOLUTIONS”

Of 300 reported incidents where structures were damaged by longwall mining, resolution was:

12% by a pre-mining agreement

27% by an unspecified private agreement

31% by Company purchase of the property

70%

only 6% were repaired

WATER SUPPLY “RESOLUTIONS”

Of 269 incidents where a mine company was deemed liable, the final resolution was:

36% by an agreement

13% Company purchase of property

3% by monetary compensation

7% by public water provided

only 9% recovered or were repaired

UNRESOLVED CASES

Reported Effects Unresolved
at end of Review Period:

Streams	35 (64%)
Water Supplies	234 (34%)
Structures	96 (21%)
Land	21 (19%)

32 water supply cases unresolved at end of 2nd Review Period were unresolved still at end of 3rd: averaging 6.8 years

LONGWALL MINING

IMPACT RESOLUTION

is disproportionately longer:

Avg. Time to Final Resolution

	<u>LWM</u>	<u>R&P</u>
STRUCTURES	238 days	107 days
WATER SUPPLIES	274 days	143 days



**WHAT WE
DON'T KNOW**

UNKNOWN: REGIONAL AND CUMULATIVE HYDROLOGIC IMPACTS

- **PADEP COMPILES NO SUCH DATA**
- **ACT 54 REVIEWS CANNOT EVALUATE**
- **ACT 54 FOCUS IS NARROW:**
 - **INDIVIDUAL IMPACTS**
 - **NOT REGIONAL IMPACTS**

1966 Mining Law:

Direct Protection: Structures

**Indirect Protection: Streams, Springs,
Wetlands, Aquifers, etc.**

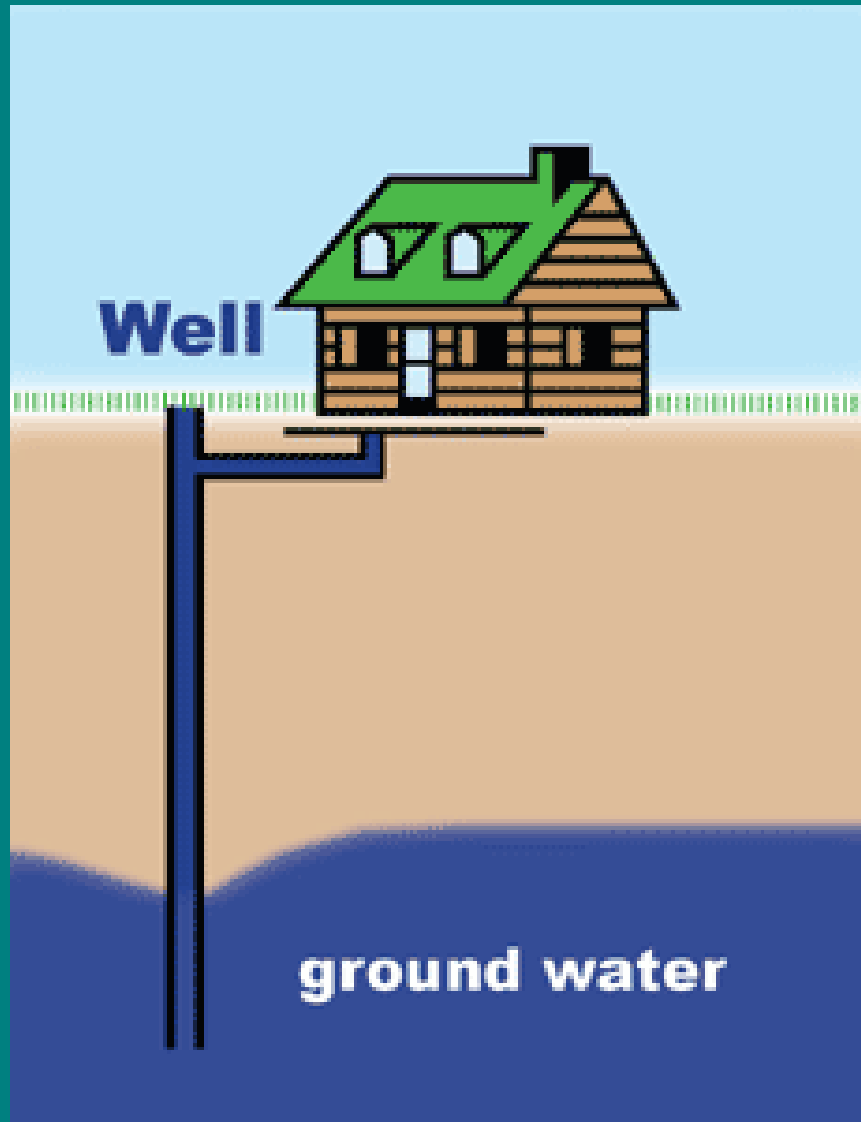
1994 ACT 54:

REMOVE Direct Protection: Structures

**REMOVE Indirect Protection: Streams,
Springs, Wetlands, Aquifers, etc.**

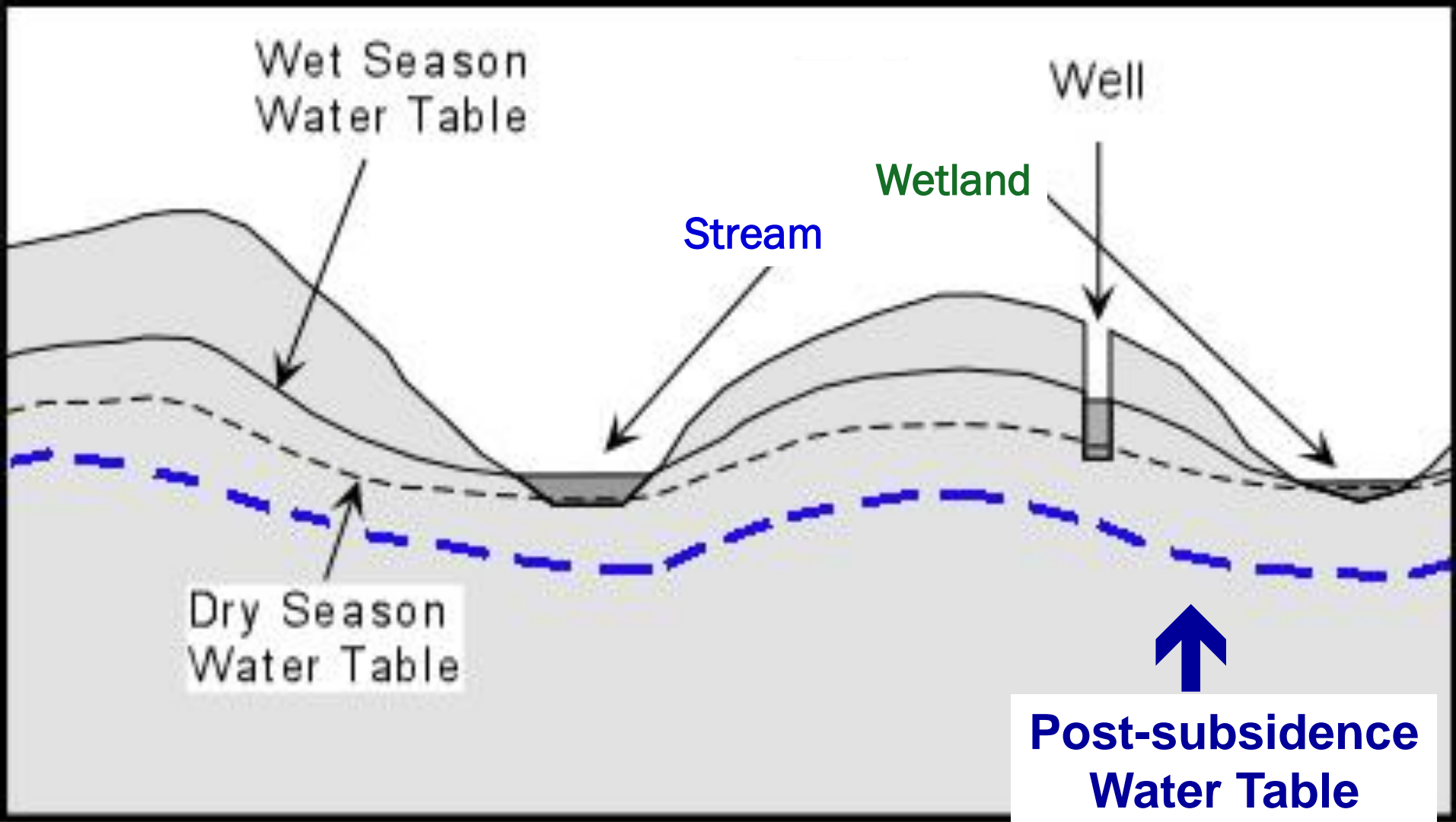
**RESTORE: Structures, water supplies
(wells)**

“Water Supply” = existing use
(well, irrigation system)



An aquifer - the
groundwater - is
the **water supply**.

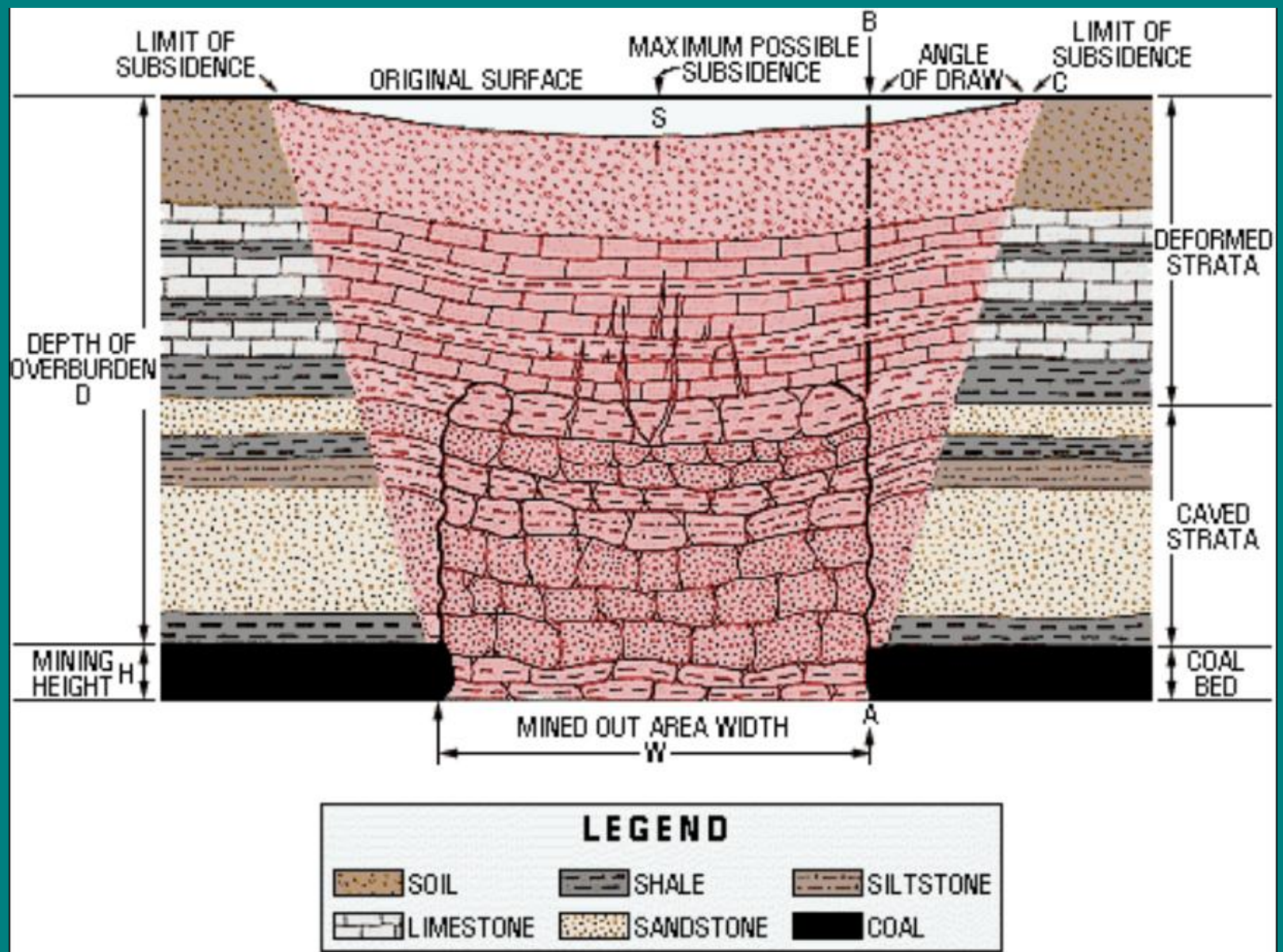
A **well** is a way for a home
to individually tap into the
groundwater, but the well
itself is not a water supply.



If subsidence lowers the water table, it can dewater wetlands, springs, and streams and cause wells to go dry.

UNKNOWN: WATER QUALITY IMPACTS

- **Changes to streamflow due to subsidence affect water quality (no review of HMRs)**
- **Direct discharges to streams (no review of DMRs)**
- **Release or migration of gas and pollutants from subsurface disruption**



Subsurface deformation can cause gas or pollutant migration.



**From Marcellus Shale drilling,
or underground coal mining?**



114 miles of
streams
undermined
2003 - 2008

UNKNOWN:

How many miles of
streams dewatered
or pooled?

How many “Special
Protection” waters
affected?



“...there isn’t enough pre-mining data to adequately determine which streams have been impacted and to what degree these impacts have occurred.”

Source: Univ. of Pittsburgh, 2011



UNKNOWN: WETLAND IMPACTS



“The impact to wetlands by undermining continues to elude measurement.”

“There was therefore, as in the 2nd assessment period, little to report.”

“How are Wetlands Impacted? While **this question can’t be adequately addressed in this report**, the necessary protocols to answer it in the future have been implemented...”

LONGWALL MINING

**Planned - Controlled -
Predictable**

“Subsidence caused by longwall mining is largely predictable which allows for better planning and accountability”.

- CONSOL Energy website

<http://www.consolenergy.com/Powering/MiningProcess.aspx>

How predictable is it?



PREDICTION OF IMPACTS

NO DATA EXISTS ON:

- NUMBER OF IMPACTS PREDICTED (vs unpredicted)
- PROPORTION OF IMPACTS PREDICTED (vs unpredicted)
- TYPES OF IMPACTS PREDICTED (pooling, flow loss, etc.)
- NATURE OF IMPACTS PREDICTED OR NOT: (streams, wetlands, springs, water wells, structures, land, etc.)
- DURATION OF IMPACTS (temporary vs permanent)
- SEVERITY OF IMPACTS PREDICTED



pennsylvania

DEPARTMENT OF ENVIRONMENTAL PROTECTION

RYERSON STATION STATE PARK

RYERSON STATION DAM

DAMAGE CLAIM NUMBER SA1736

INTERIM REPORT

Pennsylvania Department of Environmental Protection

California District Office

February 16, 2010



Photo 3. Sheared Concrete where Right Non-Overflow meets Spillway (Photo December 2006)



Photo II-14 : DEP photograph, taken July 30, 2005, shows the damage to this area has become more severe.



Photo 2. Open Joint between Right Non-Overflow and Spillway (Photo December 2006)

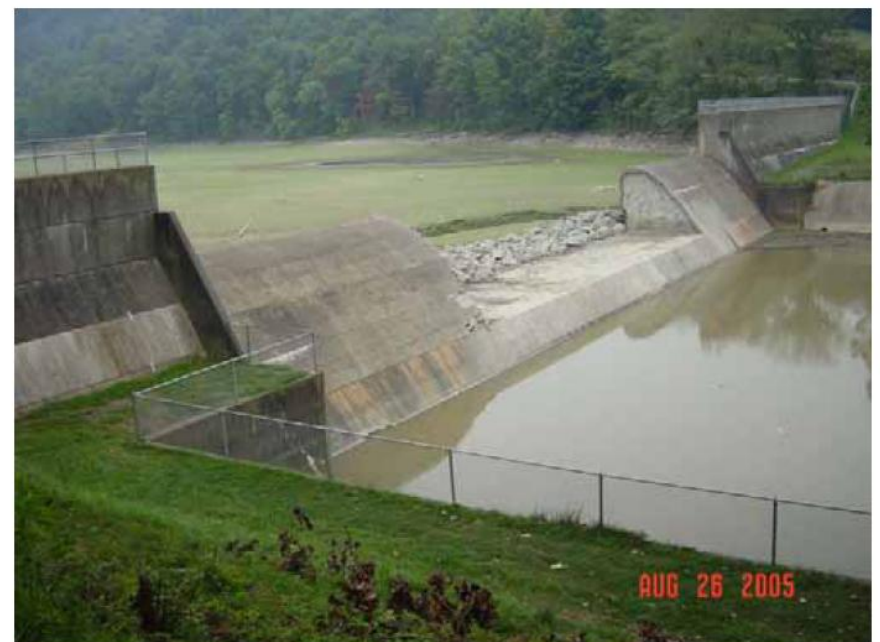


Photo II-9: DEP photograph, taken August 26, 2005, shows the dam breached.

General PADEP Conclusion:

*Previous documented incidents show that **longwall mining has the potential to cause mining induced movements and damage** at distances **beyond** the areas where customary subsidence theory would predict such impacts.*



ACT 54 CONCERNS

1966 BMSLCA

**Prevent
Damage**



1994 ACT 54

**Allow
Damage**

In 1994, it was not clear:

- How extensive any damage would be**
- How much restoration would be needed**
- How effective any restoration might be**
- That collateral damage would not be restored**

NOW, WE KNOW

- ☑ **Damage is significant and increasing**
- ☑ **Longwall method is disproportionate cause**
- ☑ **Damage “resolution” taking very long**
- ☑ **Resolutions are partial or incomplete at best**
- ☑ **Damage goes beyond individual issues**
- ☑ **Regional and public impacts not addressed**
- ☑ **No incentive to avoid damage**

WE ALSO KNOW

- ★ **Underground mining can be (and is being) done with minimal damage**
- ★ **Some mining methods are less damaging than others**
- ★ **Damage from some methods is resolved quicker than others**

Not all impacts are covered by Act 54

Covered impacts not resolved fully or timely

Damage is significant, increasing

Damage is unnecessary, avoidable

**Does this align with
Pennsylvania Constitution?**

**It is the mission of the Citizens Advisory Council
to strive to ensure that all people of the
Commonwealth enjoy the benefits included in
Article I, Section 27 of the
Pennsylvania Constitution.**

*Pennsylvania Constitution
Article I, Section 27*

The people have a right to clean air, pure water, and to the preservation of the natural, scenic, historic and ethic values of the environment. Pennsylvania's public natural resources are the common property of all of the people, including generations yet to come. As trustees of these resources, the Commonwealth shall conserve and maintain them for the benefit of all the people.

from CAC Website

Now what do we do?



**WE
ARE
HERE**

Performance-Based GOAL:

Allow Underground Mining

(by any method)

provided it will:

- ✓ **Protect All Surface Resources**
- ✓ **Avoid and Minimize Impacts**

SPECIFIC TOOLS

ADMINISTRATIVE

- ⊙ Fully apply/enforce existing laws
 - *Clean Streams Law*
 - *Dam Safety and Encroachments Act*

JUDICIAL

- ⊙ Fight each problem in the courts

LEGISLATIVE ** Preferred **

- ⊙ Revise *Act 54*
 - Realign it with PA Constitution
(balance **environmental protection** with **mining**)

Citizens Coal Council

would like to work

with CAC

in fixing Act 54



THE END